

SUSTAINING PARTICIPATION IN A SAFETY IMPROVEMENT PROCESS:

10

Relevant Principles from Behavioral Science

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Behavior-based safety (BBS) has contributed significantly to the safety profession. When implemented correctly, applications of its basic principles and procedures have improved safety-related behavior (Geller 1998c, 2001a; Krause, et al; McSween; Sulzer-Azaroff; Petersen).

But the potential benefits of BBS extend beyond behavior change and injury reduction. For example, it has helped safety professionals realize that understanding and improving the human dynamics of safety require more than common sense (Geller 2001b). In addition, BBS has shown the value of psychological research and provided tools for obtaining objective data that can be used to identify and remove barriers to safe behavior.

BBS has also stimulated controversy within the profession. Some argue that a behavioral focus puts excessive responsibility on workers and allows managers to abdicate their safety responsibilities (Frederick and Howe; Howe; Hoyle; Manuele 32+). Others claim BBS is too limiting and should be abandoned for a more-holistic or culture-focused approach (Simon 135+; Topf 34+, 85+). Others recognize the utility in BBS, but seek breakthroughs in efficien-

cy, flexibility and effectiveness with regard to producing long-term change (Kamp 45+; Sarkus 18+).

This is all good news for the safety profession. BBS has provided a platform for constructive debate, and the conflicting opinions have challenged safety professionals to learn more about the psychology of injury prevention. It is commendable that many refuse to accept a principle or procedure on hearsay alone; this debate sets the stage for conducting objective research and disseminating practical findings. As a result, practitioners learn more about the human dynamics of safety, and supplement their subjective common sense with unbiased research-based knowledge.

This article strives to expand common behavior-based knowledge about the human dynamics of safety. Specifically, it presents 10 research-based principles that address the challenge of producing more "durability of positive change" in safety-related attitudes and behaviors (Sarkus 24). This requires a discussion of concepts not typically linked to BBS. This discussion is not inconsistent with BBS; rather it reviews psychological principles that should be considered whenever long-term change in behavior and attitude is

desired. When operationalized appropriately, the basic principles described can benefit any safety process that requires the lasting participation of people.

PRINCIPLE 1:

SELF-PERCEPTION IS DEFINED BY BEHAVIOR

A basic premise in BBS is the need to get people to change what they do. This is the principle behind the common BBS slogan that it is possible to "act a person into safe thinking" (Geller 2001a 18). The first step is to recognize the extent to which peoples' behaviors define who they think they are. This concept is founded in the teaching/research of Skinner and the follow-up scholarship of Bem. Bem developed a comprehensive theory of self-perception on the basic premise that "individuals come to 'know' their own attitudes, emotions and other internal states partially by inferring them from observations of their own overt behavior and/or the circumstances in which this behavior occurs" (2).

To learn what another person is thinking or feeling, one need only observe how that person acts in a particular environmental context. Similarly, according to Bem's self-perception theory, when an individual wants to know how s/he

feels, that person should examine his/her own behavior and the circumstances surrounding it.

This is exemplified by a person eating an excessive amount of food, then stating, "I must have been hungrier than I thought." Or, how about the individual who performs a certain task below par and concludes, "I'm not as good at this as I thought I was." Or the worker who goes out of her way to help another person and thinks, "I must care more than I thought I did." These are obvious cases of behavior influencing thought processes.

Supportive Research

Classic research by Schachter and Singer supports the claim that self-perception is determined in part by overt behavior. In this study, subjects received injections of epinephrine or adrenaline, which made them feel physically aroused. Subjects then waited with another person who presumably had received the same injection. Moments later the experimenter returned and asked the two individuals to complete a questionnaire about their feelings (379+).

What emotion did these subjects experience? The physiological arousal was the same for each subject, yet some reported extreme anger while others said they were very happy. Why this difference? The subject's own behavior and that of the other person in the waiting room—who was actually a research assistant—determined which emotion the participant felt.

The research assistant acted in one of two ways during the waiting period. In the euphoric condition, he threw paper airplanes, shot crumpled balls of paper into a wastebasket and twirled in a hula hoop. He encouraged the subject to join in the fun, and most did.

In the anger condition, both individuals were asked to complete a questionnaire while waiting for the experimenter to return. Questions were intimate and often inappropriate (e.g., "With how many men has your mother had extramarital affairs: four and under, five to nine, or 10 and over?"). When the research assistant read this question, he ripped up his survey form in an apparent fit of rage.

Perhaps this study's finding that behavior influences emotional state seems obvious (or just common sense). But consider what the results mean. Each participant's emotional reaction was determined by the behavior s/he observed from

him/herself and another person. After being physically aroused, each subject felt joy or anger depending on external circumstances and accompanying behavior.

Many other experiments have demonstrated the crucial role of external events and behaviors on perception of personal emotions, attitudes and moods. For example, in one series of studies, participants' emotions were manipulated by giving them false auditory feedback about their heartbeat (Valins). When they presumably heard their heart beating faster they felt more aroused or fearful, depending on external events. Thus, it is possible to change self-perception by altering external conditions. In other words, a person can act him/herself (and others) into thinking or feeling a certain way.

Acting People Into Certain Thinking

How does one motivate another person to do something? Even if one believes that people can only truly motivate themselves (from within), it is possible to establish an external condition or environmental context that facilitates intrapersonal motivation. In other words, a person can do things to increase the probability that others will do as desired. These "interventions" can vary from developing an external accountability system or incentive program to initiating opportunities for personal choice, ownership or constructive interpersonal conversation.

The most-efficient way to motivate certain action in others is to create an environmental context or behavior-consequence contingency that facilitates the occurrence of desired performance. In other words, establish the conditions for people to act themselves into new ways of thinking. This new behavior can then influence a new way of perceiving themselves. This can lead to a new personal label, then to more behavior consistent with that label. "I'm wearing my safety glasses, so I'm a safe worker and should also use all other PPE."

Thus, personal change can be viewed as a continuous spiral of behavior causing thinking, thinking inducing more behavior, and this additional behavior influencing more thinking consistent with the behavior. It does not matter which came first—behavior or thinking. What matters is that a person can effect beneficial change in others by focusing on their behavior. Then, when people see themselves performing this new behav-

ior, they might change how they view themselves; they might act themselves into thinking differently and thus be motivated to sustain the new behavior.

Notice the use of "might" in the previous thoughts. This is because some behavior-change interventions do not facilitate an attendant change in thinking. Not all behavior change leads to relevant and supportive change in thinking and self-perception. Next, let's review some research-based principles for increasing the likelihood that an intervention to alter behavior will also influence thinking consistent with that behavior change.

PRINCIPLE 2:

DIRECT PERSUASION HAS LIMITED IMPACT

Advertisers use direct persuasion. They show people enjoying positive consequences or avoiding negative consequences by using their products. As such, they apply the ABC contingency of BBS to sell their product. The activator (the "A" of the contingency) announces the availability of a reinforcing consequence ("C") if the purchasing behavior ("B") is performed.

Advertisers also apply research-based principles from social psychology to deliver more-persuasive messages. Specifically, social scientists have reported advantages in using highly credible communicators and in arousing the audience's emotions (Aronson 875+; Hovland and Weiss 635+). Therefore, sales pitches are often given by authority figures and attempt to get viewers emotionally involved with product-related issues.

However, these attempts at direct persuasion do not seek behavior that is inconvenient or difficult. Normally, an advertisement attempts to persuade consumers to select a certain brand of merchandise—to merely choose one commodity over another at the local store. While shopping, consumers need only move their hands a few inches to select a different product—hardly a difficult lifestyle change.

Safety-related behavior is often less convenient and requires significant adjustment to an established routine (at work, home or on the road). Therefore, adopting a safe practice may first require a person to eliminate an efficient and convenient at-risk habit. Furthermore, participation in a safety-promotion effort usually requires that a person regularly perform several inconvenient safety-related behaviors.

Indirect persuasion facilitates the kind of internal dialogue needed to maintain behavior in the absence of an external motivator or accountability system.

Clearly, long-term participation in a safety-related work process is far more cumbersome and lifestyle-changing than consumer behavior targeted by advertisers. As a result, direct persuasion is often not the best way to increase safety-related behavior or promote long-term participation in a safety process. Such attempts usually yield disappointing outcomes.

For example, communication strategies have generally been unsuccessful when designed to persuade smokers to quit smoking (Elder, et al); drivers to stop speeding (Geller 1998a); homeowners to conserve water or insulate their water heaters (Geller, et al 96+; Geller 1981 331+); bigoted individuals to cease prejudicial behavior; or sexually active people to use condoms (Aronson 875+).

The problem with direct persuasion is that it often comes across as someone else's idea. It may even suggest that the behavior is actually for someone other than the performer; this leads to a disconnect between the behavior and self-perception as it creates no self-persuasion—a state or mindset needed for lasting change.

PRINCIPLE 3: AN INDIRECT APPROACH IS MORE LIKELY TO INFLUENCE SELF-PERSUASION

Self-persuasion is more likely when the motivational strategy is less obvious. Most people have been complimented by someone only to think, "Is this person trying to get something from me?" In this case, self-perception will not change because the person is suspicious of the other's intentions.

Compliments regarding a person's performance are more powerful when they are more indirect than direct (Allen; Geller 1997 40+). Suppose you overhear a person tell someone else about your superb achievement on a particular assignment. Or, suppose a friend gives you secondhand recognition by sharing what another person said about your special talents. Both situations reflect indirect commendation and will likely have greater influence on self-perception than a direct interpersonal statement of praise. Why? Because, the direct approach is tainted by the possibility of an ulterior motive.

Indirect persuasion deviates significantly from the standard direct and top-down method of attempting to obtain compliance with safety regulations. Although both approaches may motivate behavior change, the indirect approach will facilitate the kind of internal dia-

logue needed to maintain behavior in the absence of an external motivator or accountability system.

It is not easy to define intervention conditions that can make this occur. To start, ask whether the situation promotes individual choice, ownership and personal accountability. "Does the context in which safety participation is desired connect or disconnect the link between what people do and what they think of themselves?" "Are safety-related activities only behaviors or do they stimulate supportive cognitive activity or self-persuasion?"

PRINCIPLE 4: SELF-PERSUASION IS KEY TO LONG-TERM BEHAVIOR CHANGE

Self-persuasion is an internal dialogue that supports ongoing behavior and motivates continued participation in the absence of external contingencies. Such behavior is self-directed (as opposed to other-directed) and self-motivated. Self-directed behavior is more likely than other-directed behavior to influence self-perception and, in turn, helps to sustain behavior change.

Most safety-related behavior starts as other-directed behavior—it is shown through instructional manuals or training (Geller 1998b; Geller 1999 40+). In many cases, people practice the more-inconvenient—but safe—practice because someone is either holding them accountable (other-directed behavior), or because they hold themselves accountable (behavior transitioned to self-directed).

With respect to injury prevention, self-directed behavior is more desirable because in this state individuals choose the safe way even when working alone. Consequently, it is important to define situations and contingencies that promote self-persuasion and support the transition from other-directed to self-directed behavior.

Let's now consider how certain interventions facilitate or inhibit self-persuasion and self-directed behavior. Behavioral research suggests that some standard ways of promoting safe work practices are ineffective because they hinder self-persuasion, self-directed behavior and, therefore, enduring change.

PRINCIPLE 5: LARGE INCENTIVES CAN HINDER SELF-PERSUASION AND LASTING CHANGE

Suppose a person is offered a large sum of money to perform a task safely. While this incentive increases the likelihood that

s/he will perform the desired activity, the incentive will likely stifle self-persuasion and hinder a self-directed state. In this situation, the person will be less likely to persuade him/herself that the behavior is a reflection of personal values than if s/he performed the safety-related behavior for little or no external incentive.

This scenario has been evaluated in numerous studies, and results have demonstrated the superior influence of small over large incentives. The classic study in this domain was conducted by Festinger and Carlsmith in 1959 (203+). They paid college students either \$20 or \$1 to tell another student a boring task they just performed was actually fun. Afterwards, the students were asked to offer their personal opinion of the task.

Which group was more likely to develop a self-perception consistent with their verbal behavior? In other words, which incentive condition influenced greater self-persuasion that the task was not as boring as it seemed? The lower incentive contingency, presumably because these subjects had less external motive to call a dull task fun. As a result, they developed internal motivation or justification for their verbal behavior. With only minimal incentive to tell a lie, they convinced themselves the task was really not that boring. In contrast, the \$20 recipients had an excuse for lying and had no need to change their perception of the task.

The same kind of self-persuasion occurs when one exerts extra effort to complete a special assignment with no additional compensation. Without an external reinforcer for behavior, a person moves inside his/her head for justification. "This effort is worthwhile and deserves my 'blood, sweat and tears.'" Analogously, the more a person must do to join a group (as in the notorious fraternity "Hell Week"), the more self-persuasion will occur to convince him/herself it is worth it. Aronson and Mills found that students who completed a severe initiation to join a "special" discussion group rated the group's silly and boring discussion as significantly more interesting than those who gained admission with only a mild initiation (177+).

What's the message for using incentives to motivate safe work practices? Incentives must not be presented nor perceived as a "payoff" for safe behavior. When the only justification people give for their behavior is external conse-

Some contingencies will motivate people to follow rules, but will not encourage the kind of self-persuasion needed when people work alone with no one to hold them accountable except themselves.

quences, they will not likely develop an internal rationale for their actions. Thus, behavior-based rewards should be given only as “tokens of appreciation” for the actions workers take to keep themselves and others injury-free. Preventing injury is the big payoff and it warrants plenty of internal justification or self-persuasion.

PRINCIPLE 6: MILD THREATS INFLUENCE SELF-PERSUASION MORE THAN SEVERE THREATS

How about the use of disincentives or threats to motivate behavior? Should a threat be severe or mild? If self-persuasion is the goal, management must use the smallest disincentive possible to initiate the desired behavior. Then, through self-persuasion, the behavior has a chance of continuing when the intervention is no longer available.

The superiority of a small disincentive to prevent undesirable behavior was demonstrated in a series of experiments known as the “forbidden toy studies” (Aronson and Carlsmith 584+; Freedman 145+). Children were asked not to play with an attractive toy, then received either a mild or severe threat of punishment for disobeying.

In the mild-threat condition, the experimenter said, “It is wrong to play with that toy.” In the severe-threat condition, the researcher added, “If you play with that toy, I will be very angry and will have to do something about it.” The experimenter then left the room and watched from behind a one-way mirror to record whether the subject played with the forbidden toy or with other less-attractive toys that were available.

Regardless of the disincentive condition, few children played with the forbidden toy. This is a critical point. The mild threat was sufficient to prevent undesirable behavior. Then, the experimenter tested which condition produced the most self-persuasion by assessing the children’s preference for toys or providing them an opportunity to play with the forbidden toy later without the disincentive.

In the study by Freedman, another experimenter returned to the school where 44 boys had participated in a mild- or severe-threat condition study six weeks earlier. The experimenter removed the boys from class individually and, with no reference to the prior study, instructed each to take a drawing test. While scoring the test, the experimenter told the boy he could play with any toy in the room. The same

five toys from the previous study were available, including the forbidden toy.

Of the boys from the severe-threat condition, 17 (77 percent) played with the forbidden toy, compared to only 7 (32 percent) from the mild-threat condition. Presumably, more children given the mild disincentive adopted a self-perception consistent with their avoidance behavior during the earlier session. Through self-persuasion, these subjects developed a rationale for avoiding the previously forbidden toy in the absence of an external punishment contingency.

In an instructive follow-up experiment in 1971, Lepper invited (with an attractive prize) young subjects to falsify their scores on a test. Three weeks earlier in another setting, these same subjects had resisted playing with the forbidden toy following a mild or severe threat. Lepper reported that those children who had received the mild threat were significantly less likely to cheat than those who had received the severe threat. Apparently, the former group was more likely to develop a self-perception such as, “I’m a good boy who resists temptation.” Such internal dialogue caused the children to resist the temptation to cheat three weeks later (Bem 1+).

What is the message for workplace programs designed to motivate compliance with safety regulations? Words such as “compliance” and “regulation” clearly put the control on the outside of people. Now add in the threat of a fine or losing one’s job. Such contingencies will certainly motivate people to follow rules that are enforced, but likely will not encourage the kind of self-persuasion needed when people work alone with no one to hold them accountable except themselves.

PRINCIPLE 7: THE MORE OBVIOUS THE EXTERNAL CONTROL THE LESS THE SELF-PERSUASION

To decide how a particular situation might influence a person’s self-persuasion, try this exercise. Imagine you are watching an individual perform a given behavior under a particular accountability system or set of circumstances. Then ask, “Do sufficient external consequences exist to justify the amount of effort demonstrated?” If yes, the performer is not likely to develop an internal justification for the behavior; if no, then some self-persuasion has occurred or is occurring.

To sustain desired behavior over the long term, management must promote

self-persuasion and self-directed behavior whenever resources are insufficient to keep incentives or disincentives in place. This means the ABC contingency of BBS must be strong enough to initiate the behavior, but not sufficient to provide complete justification for the effort. This enables self-persuasion to develop and helps maintain participation when an external accountability system is no longer available.

PRINCIPLE 8: SELF-EFFICACY IS KEY TO EMPOWERMENT & LONG-TERM PARTICIPATION

Empirical and theoretical evidence support the assertion that believing you can do something is the first step toward doing it. Known as “self-efficacy,” this concept has been the topic of many research articles and theoretical proposals. Most notable is Bandura’s 1997 book, *Self-Efficacy*, which makes a strong case for self-efficacy being the most-central and critical concept in applied psychology. Let’s consider the key elements of this concept.

Can I Do It?

Self-efficacy reflects a “can do” attitude. It refers to a person’s perception that s/he can organize relevant resources and execute procedures necessary to reach a certain goal. Many studies have shown that people who score relatively high on a measure of self-efficacy gain more from psychotherapy and perform better at a wide range of tasks (Bandura). In addition, they show greater ability and motivation to solve complex problems at work and have better safety habits (Bandura; Betz and Hackett 262+; Hackett, et al 527+).

Self-Efficacy vs. Self-Esteem

Self-efficacy is not the same as self-esteem, but each contributes to the other. Self-esteem reflects a general sense of self-worth as in “I am valuable,” whereas self-efficacy refers to feeling successful or competent at a particular task. While self-esteem remains rather constant across situations, self-efficacy is task-focused and, therefore, can vary from one circumstance to another.

Self-Efficacy & Training

Good training teaches participants certain skills or competencies. For example, effective training in BBS safety coaching teaches participants how to 1) observe and analyze another person’s behaviors;

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2) deliver supportive and corrective feedback; 3) develop an improvement plan; and 4) obtain commitment for change and follow-up (Geller 1995 16+). But effective safety coaches need more than these skills; they also need self-efficacy.

Trainees show what they know on written exams and demonstrate their behavioral expertise through role-play. Effective trainers improve skills through behavior-based feedback; in other words, through practice and feedback, participants develop competence.

Mastery in some area usually builds self-efficacy and vice versa. But having one does not mean a person has the other. People may excel at a certain task, yet lack the personal confidence to execute required behaviors. It is also possible for people to have more self-efficacy than warranted by their ability to perform (which often earns the label “over-confident”). But, even when people have both self-efficacy and adequate skills to implement an intervention, they will not do so unless they also have response-efficacy.

PRINCIPLE 9: RESPONSE-EFFICACY IS KEY TO EMPOWERMENT & LONG-TERM PARTICIPATION

Response-efficacy refers to one’s belief that a certain technique or strategy will produce a desired outcome. Thus, it is not enough to know what to do and have the confidence to do it; one must also believe it is worth doing. For example, people can have the skills and self-efficacy to perform safety coaching, yet they will not actually coach on a regular basis unless they believe it will improve safety.

Response-Efficacy & Training

The concept of response-efficacy has critical implications for safety training. Specifically, it is not enough to teach participants procedural steps for conducting a certain safety process. Trainees must also believe that the technique can prevent personal injury.

How is this accomplished? Response-efficacy is typically taught with group numbers or outcome statistics. Research data that show significant improvement as a result of a particular intervention strategy are presented. Although effective for research presentations, this approach may not convince the average employee.

Case Studies Over Statistics

While many employees understand statistics, they may not relate to hard

numbers. Therefore, it is better to deliver a more-personal message when “selling” the value of an intervention process. For example, research on risk perception has shown that people show more concern about an issue when individual case studies are used in lieu of group statistics (Sandman; Slovic). That’s the rationale behind politicians pointing to specific individuals in the audience when attempting to gain support for a particular issue or plan of action.

Personal testimonies provide a powerful image as well. Listeners can relate to an individual’s story and put themselves in the same situation. Two types of testimonies increase response-efficacy: 1) a personal account of an injury that could have been prevented by the safety technique; and 2) an anecdote about someone who avoided injury by using the particular strategy or safety process.

PRINCIPLE 10: MOTIVATION TO ACT COMES FROM OUTCOME EXPECTANCY

“Outcome expectancy” is the third type of belief entertained in Bandura’s self-efficacy text. It involves the consequence one expects to receive when practicing the intervention process. One of Skinner’s greatest legacies is “selection by consequences,” which means behavior is motivated by events or conditions that follow it. In other words, people motivate themselves to do or not do something by anticipating what positive consequences will be gained and/or what negative consequences will be avoided.

So, a person might believe s/he can do something and believe it will have a certain effect, yet will not take action unless s/he also believes the outcome is worth the effort. In safety, a group might believe its safety record is good enough, given that few co-workers have been seriously injured. To this group, the potential gain from following an inconvenient process might seem too small to justify the amount of extra effort required for implementation.

Here, again, it is more useful to “sell” with a case study than a statistic (such as total recordable injury rate). For example, the safety manager might detail a single injury that occurred in the plant, and explain how an intervention like that being taught could have prevented the incident. In this way, the training inspires both response-efficacy and outcome expectancy—the belief that the intervention process works.

It is also important to note the difference between an individualistic mindset and a systems perspective. From an individual outlook, the probability of injury is minuscule; as a result, the outcome from participation in a safety effort can seem insignificant. Systems thinkers take a wider view; they recognize that someone will benefit from large-scale participation in a safety process.

CONCLUSION

Today’s pop psychologists and motivational speakers are right. Beliefs *are* important in determining success. However, these advocates usually focus solely on one kind of belief—self-affirmation or self-confidence in one’s ability to meet a challenge. Clinical psychologists call this “self-efficacy.”

Self-efficacy is key to success, but it is not *the* key. A belief that a particular action plan will be effective is also critical, as is a belief that the ultimate outcome from the intervention is worth the effort. Psychologists call the former belief “response-efficacy,” the latter “outcome-expectancy.”

Safety professionals must understand and appreciate these three types of personal beliefs and attempt to influence them when teaching the steps of an intervention process. It is not enough to convince employees that they can perform a certain technique. They must also believe the technique will produce a desirable outcome and that the ultimate effect of the intervention will be worthwhile.

Systems thinking and an interdependent mindset can augment the perceived value of the potential consequences of an intervention. In other words, when people see the bigger picture and adopt a “collective community” perspective, they realize their participation in a safety process will eventually benefit someone in the workplace. Believing that it is meaningful to work for the potential benefit of others (actively caring) promotes self- and response-efficacy.

Safety professionals must also understand the concept of self-persuasion and its role in sustaining long-term behavior change. Situations that best facilitate self-persuasion limit the salience of direct outside control. In other words, the more obvious the external control/accountability, the greater the disconnection between behavior and self-perception, and the less self-persuasion and sustained participation when the intervention is removed. ■

When people see the bigger picture and adopt a “collective community” perspective, they realize their participation in a safety process will eventually benefit someone in the workplace.

REFERENCES

Allen, J. I *Saw What You Did and I Know Who You Are: Bloopers, Blunders and Success Stories on Giving and Receiving Recognition*. Tucker, GA: Performance Management Publications, 1990.

Aronson, E. “The Power of Self-Persuasion.” *American Psychologist*. 54(1999): 875-884.

Aronson, E. and J.M. Carlsmith. “Effect of Severity of Threat on the Valuation of Forbidden Behavior.” *Journal of Abnormal and Social Psychology*. 66(1963): 584-588.

Aronson, E. and J. Mills. “The Effect of Severity of Initiation on Liking for a Group.” *Journal of Abnormal and Social Psychology*. 59(1959): 177-181.

Bandura, A. “Self-Efficacy Mechanism in Human Agency.” *American Psychologist*. 37(1982): 122-147.

Bandura, A. *Self-Efficacy: The Exercise of Control*. New York: W.H. Freeman and Co., 1997.

Bem, D.J. “Self-Perception Theory.” In *Advances in Experimental Social Psychology*, L. Berkowitz ed. Vol. 6. New York: Academic Press, 1972. 1-60.

Betz, N.E. and G. Hackett. “Applications of Self-Efficacy Theory to Understanding Career Choice Behavior.” *Journal of Social and Clinical Psychology*. 4(1986): 263-279.

Elder, J.P., et al. *Motivating Health Behavior*. New York: Delmar Publishers, 1994.

Festinger, L. and J.M. Carlsmith. “Cognitive Consequences of Forced Compliance.” *Journal of Abnormal and Social Psychology*. 58(1959): 203-210.

Frederick, J. and J. Howe. “The Employee’s Perspective on Behavioral Safety.” Presentation at the ASSE Behavioral Safety Symposium, Orlando, FL, 2001.

Freedman, J.L. “Long-Term Behavioral Effects of Cognitive Dissonance.” *Journal of Experimental and Social Psychology*. 1(1965): 145-155.

Geller, E.S. “Evaluating Energy Conservation Programs: Is Verbal Report Enough?” *Journal of Consumer Behavior*. 8(1981): 331-334.

Geller, E.S. “Safety Coaching: Key to Achieving a Total Safety Culture.” *Professional Safety*. July 1995: 16-22.

Geller, E.S. “Key Processes for Continuous Safety Improvement: Behavior-Based Recognition and Celebration.” *Professional Safety*. Oct. 1997: 40-44.

Geller, E.S. (1998a). *Applications of Behavioral Analysis to Prevent Injuries from Vehicle Crashes*. 2nd ed. Cambridge, MA: Cambridge Center for Behavioral Studies, 1998.

Geller, E.S. (1998b). *Beyond Safety Accountability: How to Increase Personal Responsibility*. Neenah, WI: J.J. Keller & Assoc. Inc., 1998.

Geller, E.S. (1998c). *Understanding Behavior-Based Safety: Step-By-Step Methods to Improve Your Workplace*. 2nd ed. Neenah, WI: J.J. Keller & Assoc. Inc., 1998.

Geller, E.S. “Behavior-Based Safety: Confusion, Controversy and Clarification.” *Occupational Health & Safety*. Jan. 1999: 40, 42, 44, 46, 48-49.

Geller, E.S. (2001a). *The Psychology of Safety Handbook*. Boca Raton, FL: CRC Press, 2001.

Geller, E.S. (2001b). “What’s So Special About Behavioral Safety?” *Proceedings of the ASSE Behavioral Safety Symposium*. Des Plaines, IL: ASSE, 2001. 11-25.

Geller, E.S., et al. “Attempts to Promote Residential Water Conservation with Educational, Behavioral and Engineering Strategies.” *Population and Environment*. 6(1983): 96-112.

Hackett, G., et al. “Gender, Ethnicity and Social Cognitive Factors Predicting the Academic Achievement of Students in Engineering.” *Journal of Counseling Psychology*. 39(1992): 527-538.

Hovland, C. and W. Weiss. “The Influence of Source Credibility on Communication Effectiveness.” *Public Opinion Quarterly*. 15(1951): 635-650.

Howe, J. “A Union Critique of Behavioral Safety.” Presentation at the ASSE Behavioral Safety Symposium, Orlando, FL, 1998.

Hoyle, B. *Fixing the Workplace, Not the Worker: A Workers’ Guide to Accident Prevention*. Lakewood, CO: Oil, Chemical and Atomic Workers International Union, 1998.

Kamp, J. “It’s Time to Drag Behavioral Safety Into the Cognitive Era.” *Proceedings of the ASSE Behavioral Safety Symposium*. Des Plaines, IL: ASSE, 2001. 45-52.

Krause, T.R., et al. *The Behavior-Based Safety Process: Managing Improvement for an Injury-Free Culture*. 2nd ed. New York: Van Nostrand Reinhold, 1996.

Manuele, F. “Perspectives on Behavioral Safety: Observations of ASSE’s Behavior Safety Symposium.” *Professional Safety*. Aug. 1998: 32-37.

McSween, T.E. *The Value-Based Safety Process: Improving Your Safety Culture with a Behavioral Approach*. New York: Van Nostrand Reinhold, 1995.

Petersen, D. *Safe Behavior Reinforcement*. New York: Aloray Inc., 1989.

Sandman, P.M. “Risk=Hazard+Outrage: A Formula for Effective Risk Communication.” Videotaped presentation for the American Industrial Hygiene Assn. Environmental Communication Research Program, Rutgers University, New Brunswick, NJ, 1991.

Sarkus, D.J. “Safety and Psychology: Where Do We Go from Here?” *Professional Safety*. Jan. 2001: 18-25.

Schachter, S. and J.E. Singer. “Cognitive, Social and Physiological Determinants of Emotional State.” *Psychological Review*. 69(1962): 379-399.

Simon, S. “Implementing Culture Change: Three Strategies.” *Proceedings of the ASSE Behavioral Safety Symposium*. Des Plaines, IL: ASSE, 2001. 135-140.

Skinner, B.F. *Science and Human Behavior*. New York: Macmillan, 1953.

Skinner, B.F. *Beyond Freedom and Dignity*. New York: Alfred A. Knopf, 1971.

Skinner, B.F. *About Behaviorism*. New York: Alfred A. Knopf, 1974.

Slovic, P. “Beyond Numbers: A Broader Perspective on Risk Perception and Risk Communication.” In *Deceptable Evidence: Science and Values in Risk Management*, D.G. Mayo and R.D. Hollander eds. New York: Oxford University Press, 1991.

Sulzer-Azaroff, B. *Who Killed My Daddy? A Behavioral Safety Fable*. Cambridge, MA: Cambridge Center for Behavioral Studies, 1998.

Topf, M.D. “Behavioral Safety: A Multifactorial Approach.” *Professional Safety*. Aug. 1998: 34-35.

Topf, M.D. “Behavioral? Holistic? Forget What You Call It. Here’s What Works!” *Proceedings of the ASSE Behavioral Safety Symposium*. Des Plaines, IL: ASSE, 2001. 85-94.

Valins, S. “Cognitive Effects of False Heart-Rate Feedback.” *Journal of Personality and Social Psychology*. 4(1966): 400-408.

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