BEHAVIORAL SAFETY ANALYSIS: A NECESSARY PRECURSOR TO CORRECTIVE ACTION

By E. SCOTT GELLER

Substantial confusion seems to exist regarding the benefits of behavior-based safety (BBS). (See Geller, "What is Behavior-Based Safety"; "Principles of BBS"; "BBS: Confusion.") This is due, in part, to the lack of agreement regarding an operational definition of this approach to injury prevention. Even leading consulting firms disagree about the key components of a BBS process (Manuele 32+; La Bar 49+).

Some of the harshest criticism of BBS has been offered by representatives of the United Auto Workers' (UAW) Health and Safety Dept. (e.g., Howe; Mirer 24+). For example, one department representative claims that BBS programs are "completely reactive, blame the workers for almost all health and safety problems, and drive problems underground, inject fear into the workplace, and discourage workers from reporting injuries and illness" (Howe). Similar statements were expressed by the department's director during a panel discussion held at ASSE's 1999 Best Practices in Safety Management Symposium.

Some of the prevalent confusion is based on the misperception that BBS is for corrective action only. In fact, many believe BBS is essentially observation and feedback. This usually translates into an interpersonal coaching process whereby observers complete a behavioral checklist while observing others at work, then use their observations to deliver behavior-focused feedback in one-on-one and/or group settings (Geller "Safety Coaching"; Geller, et al "Researching BBS").

A prescription without diagnosis is malpractice.
— Socrates

Although interpersonal observation and feedback is critical for behavior improvement in many work situations, it is not the only injury prevention approach reflective of BBS. Behavioral principles may be applied when designing safety incentive programs (Geller "The Truth About Safety Incentives"); delivering individual recognition and group celebrations (Geller "Key Processes"); and implementing safety self-management procedures for the lone worker (Geller and Clarke "Safety Self-Management").

These articles address ways to improve worker behavior—which is at the root of most criticism directed toward BBS. Many critics believe that BBS intervention or corrective action focuses solely on the worker rather than on management or the system (Howe; Hoyle; Lessin; Mirer 24+).

Certainly, observation and feedback, recognition, incentive/reward and self-management programs focus on worker behavior. This does not mean engineering, management systems or environmental fixes are any less important. Factors in all of these domains contribute significantly to occurrences of the at-risk behaviors that eventually lead to injury.

This article discusses how BBS principles can help identify what factors contribute to at-risk behavior. Thus, the theme is not corrective action but behavior analysis. Basic guidelines for analyzing the behavioral aspects of a near-miss or injury are provided to help determine the most cost-effective corrective action.

Furthermore, it is shown that these principles *do not* involve fault-finding or victim blaming, and *do* focus on factors beyond the individual worker. Discussion also examines how these methods can be used for more than corrective action; they are invaluable for conducting the diagnosis needed to select the most appropriate approach for safety improvement.

WHAT IS A BEHAVIORAL DISCREPANCY?

"Retraining" or "discipline" (meaning punishment) are often selected impulsive-

FIGURE 1

	Individual Consequence		Group Consequence	
	Reward	***Penalty***	***Reward***	***Penalty***
Safe Behavior	"Thank you card" for cleaning up a spill.	"Sissy" or other non-macho comment for using PPE.	Group celebration after 100 coaching sessions.	Team ranked at bottom for attendance at safety meetings.
At-Risk Behavior	Praise for adjusting equipment without locking out power.	Verbal reprimand for walking outside yellow line.	High-fives for team lifting without a hoist.	Group reprimand for unreported property damage.
Production Behavior	Praise for working 12 hours overtime.	Written warning for omitting a quality check.	Group efficiency plaque for fastest work process.	Work team ranked last on "Resource Management" chart.

ly as a corrective action to achieve behavior change when a less-costly, more-effective approach is called for. Proper behavioral safety analysis can reveal this. However, such analysis is only relevant if the problem involves behavior—or more specifically a "behavioral discrepancy."

The key is to consider human performance problems as a discrepancy rather than a deficiency (Mager and Pipe). This places the focus on behavior, not the individual. In other words, a difference exists between the behavior demonstrated and that desired—in safety, the difference between at-risk and safe behavior.

A behavioral discrepancy may be a "sin of omission" or a "sin of substitution." A worker might fail to perform a particular safe behavior (e.g., taking a shortcut). Or, s/he may perform a behavior that puts others at risk. After defining what is safe and what is at-risk for a particular individual and work situation, an action plan can be designed to reduce the discrepancy between what is and what should be.

SHOULD THE WORK CONTEXT BE CHANGED?

Based on more than 60 combined years of analyzing human performance problems, Mager and Pipe conclude that many discrepancies between ideal and real behavior can be easily eliminated. Specifically, behavior may be more at-risk than desired because expectations are unclear, resources are inadequate or feedback is unavailable.

In such cases, one solution may be to change the context in which the behavior is performed—typically referred to as environmental system factors or interpersonal dynamics. Behavior-based instruction or demonstration can overcome invisible expectations, and behavior-based feedback can enable continuous improvement. In addition, a work team could decide what resources are needed to make a safe behavior more convenient, comfortable or efficient. Consider these questions:

- Does the worker know what safety precautions are expected?
- Do obvious barriers to safe work practices exist?
- Is equipment safe?
- Is required protective equipment readily available and comfortable?
- Do workers receive behavior-based feedback related to their safety?

IS SAFE BEHAVIOR PUNISHED?

A key BBS principle is that behavior is motivated by its consequences. In other words, a person's behavior results in favorable or unfavorable consequences, which, in turn, determine future behavior.

In some situations, natural consequences work against safety—the safe behavior is typically less comfortable, convenient or efficient than some at-risk alternative. Therefore, safety leaders must view the situation through the performer's eyes. Some consequences may seem positive to an observer, yet are viewed as negative by the performer.

For example, a plant manager considers a public safety award to be reinforcing, yet to the recipient, it means harassment from co-workers. Often, such negative consequences from peers lead to subsequent reductions in individual performance.

In some cultures, interpersonal consequences of reporting a hazard are more negative than positive. After all, these situations imply that someone was irresponsible or careless. It is not unusual for a worker to be ridiculed for wearing protective gear or using an equipment guard. Some employees even consider it "macho" to work unprotected and take risks.

These situations are "upside-down consequences"; whenever a behavioral discrepancy exists, part of the problem is that the desired behavior is being punished (Mager and Pipe).

Consider these questions:

- What are the consequences for safe behavior?
- Do more negative than positive consequences exist for safe behavior?
- Can negative consequences for safe behavior can be reduced or removed?

IS AT-RISK BEHAVIOR REWARDED?

As mentioned, at-risk behavior is often followed by natural positive consequences. Shortcuts usually save time, which means a faster rate of output. As a result, such risk-taking may be labeled "efficient" behavior. For example, in some environments, avoiding or over-riding power lockout switches is acceptable because it benefits production. In such cultures, a worker who fixes equipment without locking out is seen as a "macho" hero.

Keep in mind that behavior does not occur in a vacuum. Most people perform as they do because they expect to achieve soon, certain, positive consequences—or to avoid soon, certain, negative consequences. They take calculated risks because they expect to gain something pleasant or avoid something unpleasant.

Ask these questions:

- What are the soon, certain, positive consequences for at-risk behavior?
- Does a worker receive more attention, prestige or status from co-workers for at-risk rather than safe behavior?
- What rewarding consequences for at-risk behavior can be reduced or removed?

ARE EXTRA CONSEQUENCES USED EFFECTIVELY?

Because the natural consequences of comfort or efficiency are often present to support at-risk behavior, it may be necessary to add consequences to motivate safe behavior. Often, these take the form of incentive/reward or disincentive/penalty programs.

Unfortunately, many such programs do more harm than good because they are implemented ineffectively. Disincentives are often used inconsistently and motivate avoidance behavior rather than achievement, while incentive programs based on outcomes often discourage injury reporting (Geller "The Truth"; Krause 24+). More-effective alternatives include behavior-based incentive/reward programs and interpersonal recognition (Geller "The Truth"; "Key Processes"; Loafmann 20+).

Task context questions must be asked first. In addition, before the individual worker is targeted (via training), engineering strategies for task simplification must be considered.

Consider these questions:

•Can safe behavior lead to soon, certain, positive consequences?

•Does a safety incentive program discourage injury reporting?

•Are workers recognized individually and as teams for completing process activities related to safety improvement?

Figure 1 depicts extrinsic consequences that can influence occurrences of safe or at-risk behavior. Three categories of behavior are shown (safe, at-risk and production-related) as potentially influenced by four types of behavior-based consequences.

None of these examples are natural or intrinsic to the task; rather, they are added in an attempt to sustain desired behavior or change undesired behavior. Therefore, each consequence manipulation can be considered a corrective action. These are not presented as recommended interventions, however; they merely illustrate the variety of consequences that can change the context of a work situation and, thus, occurrences of desired behaviors.

Behavior analysis helps determine what type of motivating consequences should be removed from or added to the work context. Sometimes, such analysis reveals the need for a more-fundamental intervention—such as an environmental or engineering modification.

CAN THE TASK BE SIMPLIFIED?

Before developing a training program designed to increase on-the-job safety, site management must make sure all possible engineering "fixes" have been implemented. Can the environment be changed to reduce physical effort, reach and repetition? In other words, management must examine ways to make the job more user-friendly before it decides what behaviors are needed to prevent injury.

In some cases, behavior facilitators can be added (e.g, designing different-shaped controls that can be discriminated by touch as well as sight; displaying instructions at the point of application; using color coding to aid memory and tasks, and differentiation) (Norman).

Furthermore, complex tasks should be reviewed to assess whether they can be redesigned to require fewer steps or involve more people. For simple tasks, job rotation may reduce repetition.

To determine whether a task can be simplified, ask these questions:

•Can an engineering intervention make the task more user-friendly?

•Can the task be redesigned to reduce its physical demands?

•Can a behavior facilitator be added to improve response differentiation, reduce memory load or increase reliability?

•Can the challenges of a complex task be shared?

•Can repetitive tasks be swapped?

DOES A SKILL DISCREPANCY EXIST?

What about situations in which the individual simply does not know how to perform the prescribed safe behavior? Such a person is "unconsciously incompetent." The typical response is training, which can be quite expensive. Most behavioral discrepancies are not caused by genuine lack of skill, however (Mager and Pipe). Most people can perform the safe behavior provided the conditions and consequences are right. Therefore, in the author's opinion, training should be the least-used corrective action.

To determine whether the behavioral discrepancy is caused by a lack of skill, ask these questions:

•Could the person perform the task safely if his/her life depended on it?

•Are the person's current skills adequate for the task at hand?

•Did the person ever know how to perform the task safely or has s/he forgotten the safe way to perform the task?

WHAT KIND OF TRAINING IS NEEDED?

Answers to the last question help pinpoint what kind of intervention is needed. A "yes" response implies the need for a skill-maintenance program, such as police officers practicing regularly on a pistol range to keep sharp for those rare times when they must fire a weapon. This also serves as the rationale behind periodic emergency training (e.g., mock drills). Emergencies are rare, but people must know how to respond when they arise.

Another, very different situation also calls for skill-maintenance training. This arises when certain behaviors occur regularly, yet discrepancies still exist. The problem here is not lack of practice—the worker gets plenty of practice performing the behavior ineffectively. Practice merely serves to entrench a bad (or at-risk) habit.

Driving is a good example of this situation. Most drivers know how to drive a vehicle safely. Over time, however, safe driving behavior may deteriorate, with some safe practices simply ceasing to be performed.

Appropriate behavior-based feedback is critical to solving both types of skill discrepancies. However, if the skill is used frequently, yet has deteriorated (e.g., driving), an extra feedback intervention may be needed to overpower the natural consequences that have caused the behavior to drift. This is the basic rationale for the observation and feedback process in BBS.

While a police officer gets task-inherent feedback to improve performance on the pistol range, at-risk drivers may need behavior-based coaching to improve. The coach must complete a critical behavior checklist (CBC) while observing for safe versus at-risk driving, then use this CBC to offer supportive and corrective feedback (Geller "Safety Coaching").

To determine whether the skill discrepancy is due to lack of practice or lack of appropriate feedback, consider these questions:

•How frequently is the desired skill performed?

•Does the performer receive regular feedback relevant to skill maintenance?

•How do performers learn how well they are doing?

IS THE PERSON RIGHT FOR THE JOB?

Skill discrepancy can be addressed in one of two ways: Change the job or change the person. The first approach involves simplifying the task; the latter encompasses practice and behavior-based feedback. This is behavior-based training.

Suppose, however, that a person's interests, skills or prior experiences are incompatible with the task at hand. For example, a person might not be "mechanically inclined." Before investing in skill training for such an individual, site management must assess whether s/he is right for the job. If s/he lacks the motivation, or necessary physical and mental capabilities, the most cost-effective solution is to replace the performer. Otherwise, not only is work output hindered, but the risk of personal injury is increased as well.

To determine whether the individual can handle the job safely and effectively, ask these questions:

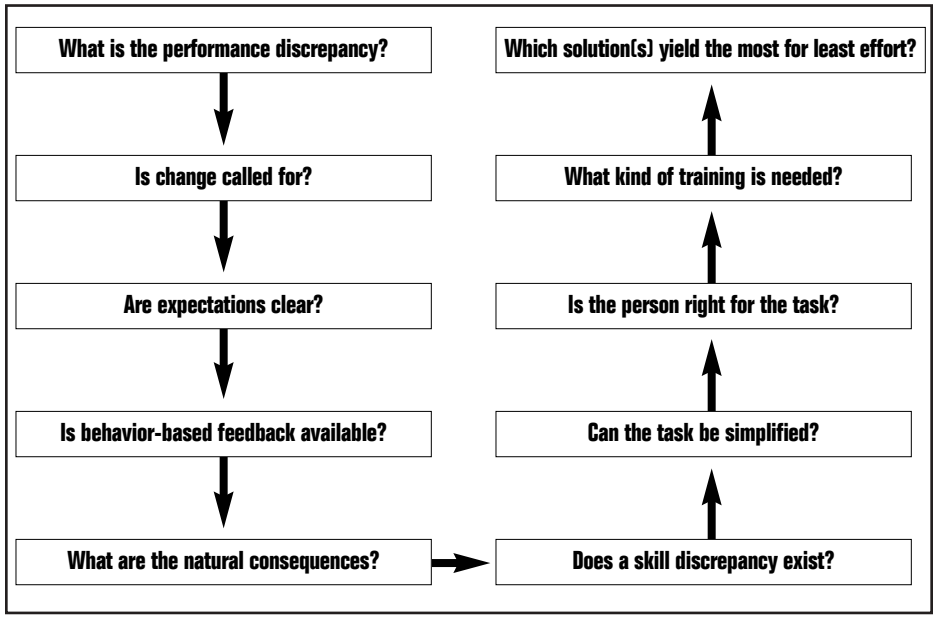
•Does the person have the physical capability to perform as desired?

•Does s/he have the mental capability to handle task complexities?

•Is the person over-qualified and, thus, prone to boredom or dissatisfaction?

•Can the person learn how to perform the job as desired?

FIGURE 2



Before selecting an intervention strategy, site management must analyze the situation, behavior and individuals involved. A behavioral safety analysis will give priority to several alternatives. Performing such an analysis *before intervening* will help ensure that the corrective action plan does not result in malpractice.

CONCLUSION

Some basic guidelines for diagnosing the human behavior aspects of a safety-related problem have been reviewed. Many factors contribute to a behavioral discrepancy. Most involve the context in which the task is performed or elements of the task itself.

Common contextual variables include: a) unclear or misunderstood expectancies; b) upside-down contingencies that reward at-risk behavior or punish safe behavior; and c) the lack of behavior-based feedback to help people improve. Often, a job can be simplified or re-engineered to reduce physical or mental effort, which decreases the probability of personal injury.

Training should be considered only after critical contextual and task variables have been analyzed and corrected. Some training is required to help people practice actions needed to handle a rare event, while other training is needed to help people change frequently occurring at-risk behavior to safe behavior. In addition, training is needed when a new procedure or process is introduced. Each situation requires behavior-based feedback—and the situation and individuals involved determine the protocol for delivering this feedback.

Figure 2 depicts a flow chart of the 10 basic questions to ask when conducting a behavioral safety analysis. Take note: *Task context* questions are asked first. In addition, before the individual worker is targeted (via training), engineering strategies for task simplification are considered.

Before selecting an intervention strategy, site management must analyze the situation, behavior and individuals involved. Training or discipline may not be called for. A behavioral safety analysis will give priority to several alternatives. Performing such an analysis *before intervening* will help ensure that the corrective action plan does not result in malpractice. ■

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