

The Science of Safety Leadership: Building a Sustainable Safety Culture

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Introduction

Organizations have always relied on science to guide many aspects of their business. Understanding and applying scientific knowledge from chemistry, physics, biology, and engineering are essential to achieving consistent business results. Interestingly, when it comes to managing human resources (around safety or otherwise) organizations rarely use the relevant science of human behavior—behavior analysis—to improve safety performance.

An in-depth knowledge of behavior analysis can enable leaders and safety professionals to build systems and management practices that create a sustainable corporate-wide safety culture. Such a culture builds safe behavior into every process, ensuring that safety is not something separate from delivering cost-effective, quality products and services to customers. Everyone, from the boardroom to supervisors to front-line employees, has a specific role to play in creating a safety culture. Such a culture is possible only when managers and all other employees understand the science of behavior to be more than a collection of tools and techniques but rather the only way to create a sustainable, high-performance organization.

The Science of Behavior

Behavior analysis is the study of behavior: why people do what they do and how to positively influence behavior. On the surface, behavior analysis looks simple. Its foundation is called the ABC Model. Behavior (B) is influenced by what comes before it (A—antecedents) and what follows it (C—consequences). However, as simple as it appears, there are a great many factors determining the effectiveness of each element, just a few of which are highlighted below.

The Limited Impact of Antecedents

An antecedent is anything that precedes and prompts behavior. Signage, speeches, training, meetings, rules, regulations, instructions and reminders are all antecedents. The science tells us that antecedents are necessary, but not sufficient, to sustain behavior change. Safety training provides the perfect example. Sending employees through a training class rarely results in those employees going back to work and using what they learned in training from that point on. Similarly, writing safety procedures or creating policies (both antecedents) are important but, by themselves, they do not result in lasting behavior change. Unfortunately, many organizations still use antecedents as if they do lead to lasting change, and then are frustrated when they don't. The data are clear, but many organizations are not yet adjusting their strategies accordingly. Antecedents must be paired with consequences to produce lasting improvement.

Effects and Side Effects of Consequences

A consequence is anything that follows behavior and influences whether that behavior happens again or not. There are two consequences that strengthen behavior (positive and negative reinforcement) and two that weaken behavior (punishment and extinction). The science tells us much about the predictable effects of consequences on behavior and, just as importantly, the side effects we can expect from using them. Some things the science tells us include:

- Behavior that is reinforced increases.
- Positive reinforcement generates the highest rates of behavior.
- Behavior that occurs without reinforcement is weakened and will eventually stop (this is called extinction).
- Behavior that is punished decreases.
- Behavior that is stopped by punishment will reappear when the threat of punishment is removed or is remote.
- Punishment has negative side effects.

The Importance of Timing and Probability

Everyday logic suggests that the larger the consequence, the more powerful it will be. However, in safety we know that is not necessarily the case. People often engage in behavior (e.g., texting while driving) that risks their lives and the lives of others despite the largest of all possible consequences (death).

Science shows us the flaw in our everyday logic by demonstrating that the power of a consequence is heavily influenced by timing and probability, not perceived size or impact. Immediate (occurring very soon after behavior) and certain (highly probable) consequences are more powerful than delayed, uncertain ones. This means that the possibility of injury is a less powerful consequence than most people think, because injuries are almost always low probability events (e.g., working without gloves does not always lead to hand injuries, standing on the top rung of a ladder does not always lead to a fall) and sometimes future and uncertain (e.g., chronic back injury, carpal tunnel). It also means that more attention needs to be paid to the seemingly small but immediate and certain consequences that encourage unsafe behaviors. For example, many unsafe behaviors are faster, easier, and more comfortable than the safe behaviors. This is why it is a struggle getting people to do many safe behaviors. We are naturally wired to respond to those immediate, certain consequences even if they are not in our long-term best interest.

There is much, much more to learn from the science of behavior. What we have presented here is just the tip of the iceberg, and we encourage the reader to learn more. Let's turn now to three examples of how understanding this science can improve safety.

1. **Creating a culture of discovery and improvement where missteps are regarded as invaluable learning opportunities that ultimately lead to better prevention.** The goal of incident investigations and root cause analyses is to learn what happened and why in order to prevent future incidents. Typical incident investigations focus on training, process, procedures, equipment, and communication about hazards, but often fail to identify the more subtle organizational contingencies that contribute to an incident. When at-risk behavior is identified as a contributor to an incident, that behavior can be analyzed scientifically. A scientific analysis examines the conditions, systems and behaviors of others that may have set the context for the at-risk behavior. The right questions uncover all kinds of contributors, including overly complex processes, production pressures, peer pressure, level of fatigue and lack of reinforcement for critical safe behavior. The key is to understand the power of immediate and certain consequences. It is too often the case that many influential root causes are ignored because they seem small and insignificant. Understanding the power of timing and probability leads to a different conclusion.

Adding the behavior science perspective to investigations leads to at least two good outcomes. First, such analyses minimize the blame and bad feelings that so often accompany investigations. As people begin to see all the contributors to incidents, the finger pointing fades away. Second, these analyses help focus everyone on effective corrective actions that can truly prevent a reoccurrence. Rather than looking backward to assign blame, the conversations focus forward to who needs to do what to improve.

2. **Improving the impact of rewards, recognition and discipline.** Organizations use a variety of consequences (positive and negative) in attempts to influence safe behavior, but many popular approaches (including incentive systems and disciplinary practices) are flawed. Science helps us understand the limitations of such common practices and informs the development of high-impact consequence systems that avoid the side effects and baggage of the more traditional approaches.

Incentive Systems

Having zero incidents is the ultimate goal of safety, but most safety incentive systems (e.g., safety bingo, group rewards for going periods of time without an accident, bonuses based on incident rates) are fundamentally flawed. The problem is that the employees can get the incentives in three possible ways:

1. Employees work safely and thus earn the reward through desired safe behavior. In this case the incentives are operating in the intended fashion; they are motivating safe behavior and that safe behavior is preventing accidents.
2. Employees engage in some or many at-risk behaviors but are lucky in that none of the at-risk behaviors result in an accident. In this case the incentives are rewarding luck and possibly teaching employees that at-risk behaviors are okay: "It won't happen to me!"
3. Employees engage in at-risk behaviors and some of those at-risk behaviors result in accidents, but the accidents are not reported in order to avoid losing the incentive. In this case, incentives are motivating non-reporting of accidents.

To avoid these problems and ensure improved safety, motivational systems should be based on preventive measures. Identify what employees at all levels need to do day-to-day and week-to-week to prevent incidents and establish meaningful consequences for those behaviors. By setting up a system that reinforces safe behaviors directly linked to desired

results, you will get more people engaging in preventive behaviors, which will naturally reduce your incident rate.

Discipline

While there is a place for all consequences in safety, including negative consequences like discipline, too many organizations use discipline (sometimes inadvertently) as a primary tool for driving safety. Much research has been done on the use of negative consequences, and the findings would surprise many. While discipline can be effective, it is remarkably hard to execute well and, most importantly, it has side effects that are of grave concern in safety. Most organizations don't think they overuse discipline; however this must be assessed relative to the use of positive consequences. Too often front-line employees report that they only hear about safety when they have done something wrong. In the context of little positive reinforcement for safe behavior, even small amounts of discipline can lead to the same side effects as heavy-handed use of discipline.

Some of the side effects include lower morale, decreased teamwork, lower trust and suppressed reporting of incidents and near misses. The last one is critical. If employees have any reason to believe that what they report around safety may come back to haunt them, they are likely to stay quiet. They will not discuss safety concerns, they will not report near misses, they will not report incidents (if they can get away with it) out of fear of reprisal. Incidents, near misses and at-risk behaviors all provide valuable opportunities to learn how to make the workplace safer. Discipline, reprimands and other forms of punishment stifle reporting and make achieving a culture of safety impossible. To be clear, we are not saying there is no place for discipline (or other negative consequences), however the science demonstrates that in the vast majority of cases, unsafe behavior can be turned into safe behavior without the use of discipline and all its undesirable side effects. Furthermore, when discipline is used in the context of much positive reinforcement for desired behaviors, the side effects are minimized.

- 3. Developing better measures of behavior that enable proactive safety management.** The common practice of focusing heavily on lagging measures (incident rate, DART, etc.) in safety is problematic. Measuring safety via incident rate is akin to measuring quality by customer complaints. How many unhappy customers are there for every one that actually complains? How many near misses, unreported accidents and at-risk behaviors are there for every incident that gets reported? These measures can be misleading. They tell us how many people got hurt and how badly, but they do not tell us how well a company is doing at preventing accidents and incidents. One of the reasons they are a poor gauge of prevention is that these numbers have what statisticians call natural variation. In other words, it is a statistical fact that if the yearly number of unsafe conditions and unsafe behaviors were held constant, an organization could experience a different number of incidents during the first half of a year and the last half (or from one year to the next). Thus, incident rate can get better or get worse with absolutely no change in safety conditions or behaviors. The result is that organizations, and departments within organizations, can go for long periods of time without accidents, despite having an unsafe work environment. By the very nature of it, this statistical fact works against keeping safety a priority. Furthermore, such lagging metrics result in reactive safety management where incidents lead to a flurry of activity, but during periods with no incidents, safety activities are given a low priority. A better approach is to manage safety with leading indicators that focus on proactive activities on the part of all employees—

measures that track what people are doing daily to prevent accidents. With such measures in place, immediate and certain consequences can be engineered in to ensure those activities occur. A scientific approach to behavior provides leading indicators that enable proactive safety management and ultimately create a path to safety excellence.

There is clearly much more to developing a sustainable safety culture. The above is intended to provide a sample of the benefits to taking a scientific approach to behavior. Everything we do around safety is done through the behavior of people. Understanding how to create the conditions to ensure consistent, high-impact behavior is essential for safety excellence.