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What is Behavior-Based Safety?

A Look at the History and its Connection to Science

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HISTORY: There seems to be much confusion in the practice of behavior-based safety (BBS) that indicates to us, as safety consultants, a need for a common definition. Mathis^[i] (2009)

says, “The truth is that BBS is a label applied to everything from safety incentive tokens to some very rigid and structured processes. Many of these processes have evolved over the years, and the consultants who designed them have changed their positions about some basic issues.”



In a paper by the United Steelworkers^[ii] in the early 2000's, behavior-based safety is described as “a variety of programs that focus on worker behavior as the cause for almost all workplace accidents.” This definition of behavior-based safety stems from the fact that in many articles, behavior-based safety is said to have begun with research conducted by Herbert William Heinrich, who worked for Traveler's Insurance Company in the early thirties. He reported that roughly 90% of all accidents, injuries, and illnesses were the result of what he called “worker errors.”

Given Heinrich's conclusion that worker error is the major cause of accidents, it is easy to see how companies began to blame employees for having an accident or causing one. Because of this focus, many of the early safety programs concentrated on stopping unsafe behavior through negative consequences^[iii]. Of course unions objected to such approaches, as they should. It is also interesting that although Heinrich's data focused the field of industrial safety on the behavior of employees as the cause of accidents, he was personally more interested in removing obstacles to safety than changing the behaviors that caused accidents, the very thing that unions want in safety.

Following the publication of Heinrich's book, *Industrial Accident Prevention: A Scientific Approach*^[iv], companies began to take a more systematic approach to analyzing accident data. However, as far as we can tell from the literature, there was nothing behavioral in his “scientific approach.” His interest was in analyzing accident data and not in changing it. This is not

to minimize Heinrich's contribution to the systematic study of safety, but he is not in the lineage of modern behavior-based safety.

The Beginning

It is difficult to pinpoint precisely the beginning of the field of behavior-based safety as it is known today. However, there was a flurry of work starting in the early 1970s. Fox, et. al.[v] worked on open pit mining in Utah starting in 1972 where they showed that with the use of a token economy, improvement in safety results were maintained for over 12 years. Komaki, et.al.,[vi] showed the positive effects of feedback and reinforcement on the safety of bakery workers. Dr. Beth Sulzer-Azaroff, a true pioneer in the field of behavior-based safety, published the first of many articles on behavior-based safety in the *Journal of Organizational Behavior Management* in 1978. The article was titled, "Behavioral ecology and accident prevention." [vii] Her chapter, "Behavioral Approaches to Occupational Health and Safety," [viii] in ***Handbook of Organizational Behavior Management*** by Fredericksen, remains to this day one of the best explanations of behavior-based safety.

This is by no means an exhaustive history of the early work in the field of behavior-based safety. Many others have contributed substantially to the evolution of the practice. McSween (1995) , a behavior analyst, who authored *The Values-Based Safety Process: Improving Your Safety Culture with a Behavioral Approach* [ix], and Geller, who wrote *Working Safe* [x] have had a significant impact on the field in the past two decades.

There is some argument as to the origination of the term "behavior-based safety." Some say Geller but many others say it was Dan Petersen. The evidence seems to favor Petersen who wrote 17 safety books before his death in 2007, and was probably the best known safety professional in the United States. In 1978 he wrote, *Safety Management: A Human Approach* [xi] and referred to the research and writings of B.F. Skinner, the father of behavior analysis.

It is clear that behavior analysis is the scientific foundation of the field. As Krause [xii] (1997) so aptly states, " ...the phrase *behavior-based safety* refers strictly to the use of applied behavior analysis methods to achieve continuous improvement in safety performance."

What is Applied Behavior Analysis?

Behavior Analysis is the scientific study of behavior. Its primary objective is the discovery of principles and laws that govern behavior. Applied behavior analysis is the application of the principles and laws discovered by the basic science to problems of living to increase the effectiveness of individuals, groups, companies and governments. The method used to discover these effective practices is the scientific method.

The *scientific method* is a process that involves the following steps:

1. Identifying a problem
2. Collecting objective data
3. Developing hypotheses
4. Testing those hypotheses by controlled experimentation
5. Drawing conclusions from the data
6. Applying the findings to test the hypotheses in similar situations

These steps must be repeatable in order to dependably predict any future results. It requires that all data and procedures are fully documented in such a way that other scientists are able to reproduce the results by using the same processes. Such an objective process reduces biased interpretation of the results.

We at ADI have put the scientific process into our own five-step problem solving model[1]. The steps are:

Pinpoint

Measure

Feedback

Reinforce

Evaluate

This model is easy to apply in businesses and with this model, we can apply it to all problems/opportunities that arise in safety and all other parts of the organization as it meets all the criteria of the scientific method listed above.

As Geller[xiii] (1996) says, "A psychology of safety must be based on rigorous research, not common sense or intuition." We believe that many ineffective practices initiated in the name of behavior-based safety are due to a lack of understanding of the science of behavior analysis.

In summary, behavior-based safety is the application of the science of applied behavior analysis to issues of safety in the workplace. The issues include all employees from the front-line to the board room and involve architecture, equipment, management systems, work processes and management and employee behaviors.

For more details on behavior-based safety and behavior analysis, consult the following books:

Agnew, J. & Snyder, G.
Removing Obstacles to Safety
Daniels, A.
Bringing Out the Best in People

[1] We are indebted to Dr. Ogden Lindsey, long time psychologist at the University of Kansas, who created the original 4-step model, *Pinpoint, Record, Consequence, Evaluate*. We adapted his model to the workplace and have used it as the 5-step problem-solving process successfully in a wide variety of businesses for the last 41 years.

[i] Mathis, T.L. (2009) *Managing Safety: Unions and Behavior-Based Safety: The 7 Deadly Sins*.

[ii] Frederick, J. (1999) *Comprehensive Health and Safety vs. Behavior-Based Safety: The Steelworker Perspective on Behavioral Safety (Part 2)*. Remarks to the 1999 Behavioral- Safety Now Conference. Las Vegas, Nevada, October 6.

[iii] Stop. DuPont, etc.

[iv] Heinrich, H. W. (1931). *Industrial accident prevention: a scientific approach*. McGraw-Hill.

[v] Fox, D.K, Hopkins, B.L. and Anger, W. K. *The Long-Term Effects of a Token Economy on Safety Performance in Open-Pit Mining*. Journal of Applied Behavior Analysis. 1987, **20**, 215-224.

[vi] Komaki, J. , Barwick, K. D. & Scott, L. R. (1978) A behavioral approach to occupational safety: Pinpointing and reinforcing safe performance in a food manufacturing plant. *Journal of Applied Psychology*, 63, 424-445.

[vii] Sulzer-Azaroff, B. (1982) Behavioral ecology and accident prevention. *Journal of Organizational Behavior Management*, 2, 11-44.

[viii] Sulzer-Azaroff, B. Behavioral Approaches to Occupational Health and Safety. 505-538.

Frederiksen, L. W. (1982) *Handbook of Organizational Behavior Management*. Wiley. N.Y.

[ix] McSween, T.E. (1995) *The Values-Based Safety Process: Improving Your Safety Culture with a Behavioral Approach*. Van Nostrand Reinhold. New York.

[x] Geller, E.S. (1996) *Working Safe: How to Help People Actively Care for Health and Safety*

[xi] Peterson, D. (1996) *Analyzing Safety System effectiveness* NY: Van Nostrand Reinhold

[xii] Krause, T.R. (1997) *The Behavior-Based Safety Process: Managing Involvement for an Injury-Free Culture*. Van Nostrand Reinhold. N.Y.

[xiii] Geller, E. S. (1996) *The Psychology of Safety*.

ADI

Founded in 1978, and headquartered in Atlanta, GA, **Aubrey Daniels International (ADI)** works globally with a diverse spectrum of clients. We help accelerate the business and safety performance of companies worldwide by using positive, practical approaches grounded in the science of behavior and engineered to ensure long-term sustainability. ADI supports its clients in accelerating strategy execution while fostering employee engagement and positive accountability at all levels of their organization.

