

# *Creating a total safety traffic culture*

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## **Overview**

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For more than two decades, Geller and associates have used the concept of a *Total Safety Culture* to create significant and lasting safety improvements in a variety of industrial contexts. In a Total Safety Culture, the organization's members feel responsible for regularly identifying and acting on safety-related objectives, many going "beyond the call of duty" to address unsafe conditions and behaviors. This paper addresses the application of the Total Safety Culture notion to traffic safety issues and discusses the creation of a Total Safety Traffic Culture. Behavior-based safety, an actively caring model, and the benefits of using positive reinforcement are highlighted. Catalysts and barriers to a cultural shift are considered throughout, as is the need to teach basic behavioral-science methods throughout our culture.

The ideas offered herein can be used to identify specific problem targets, customize and validate intervention designs, derive relevant outcome measures, and demonstrate successive progress while traffic safety goals are continuously selected and achieved. Additionally, these behavior-change methods are easy to teach and use, inexpensive to execute, self-sustaining, and thus, are practical for large-scale application. Using locally informed, nationally endorsed, and socially valid interventions, an individualized approach to traffic safety can transform society's traffic safety orientation, bringing about an interdependent safety culture where everyone helps to prevent the tragic consequences of vehicle crashes.

## **Introduction**

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*Every year this country experiences a national tragedy that is as preventable as it is devastating.—Norman Y. Mineta (NHTSA 2006).*

Consider the social upheaval that arose, and rightly so, following the tragic attacks on the U.S. on September 11, 2001. The deaths of nearly 3,000 people in those attacks spurred: a) the creation of the new Cabinet-level Department, b) the passing of vast amounts of security-related legislation, c) military action involving the deployment of hundreds of thousands of troops with the death of over 3,000 U.S. soldiers and many more wounded at the time of this writing, and, d) the projected spending of nearly \$500 billion on related military operations by the end of 2007 (Department of Defense 2006a, 2006b; Belasco 2006). Perhaps more profoundly, Americans

have been willing to debate and change definitions of democracy and freedom to bring the threat of terrorism under control.

With great reverence, and simply by way of comparison to this historic shift in public consciousness, we ask the following question: Why have the crash-related deaths of approximately 200,000 people and injuries of roughly 15 million in the five years since 9/11 not generated the same sense of outrage and calls for sweeping action to protect citizens? Why are we not incensed over our tremendous losses from traffic crashes?

The answer is both simple and complex. The simple answer is complacency, but reasons for this complacency are complex. Probably few are truly at peace with these grim facts about driving dangers, but the main question for most is: “What can I do about it?” When you get right down to it, traffic safety is largely the responsibility of individual drivers. But, viewing collective risk from a national perspective, the dramatic numbers make the problem appear unsolvable.

For more than two decades, E. Scott Geller and colleagues have taught organizations how to achieve a Total Safety Culture and, more recently, documented how to apply psychological science to promote human welfare on a large scale (e.g., Geller 1989, 1991, 1994, 1995, 2000, 2001a, 2001b; 2002, 2003a, 2005a, 2005b, 2005c; Geller et al. 1998; Geller and Roberts 1993; Geller, Roberts, and Gilmore 1996; Porter 1998; Roberts and Geller 1995). The Total Safety Culture approach applies *behavior-based safety* (BBS) principles and an Actively Caring model, both theory-based and research-supported, to shift industrial cultures from risk-tolerant to risk-averse and from reactive to proactive in the pursuit of safety in all areas of operation.

The BBS approach includes a set of tools and methods that includes defining safe and at-risk behaviors, observing and recording related behaviors, giving feedback in a supportive manner, charting progress, and using data to motivate or celebrate accomplishments and to revise behavior-based goals. The Actively Caring model supports the use of BBS and consists of showing concern for others with behavior aimed at reducing risks. This model takes into account person states and barriers to helping, explains who is likely to demonstrate actively caring, and pinpoints the conditions that facilitate helping.

While generally not a replacement for punishment approaches, the use of positive reinforcement in safety interventions is stressed, as its efficacious use is supported by research. Related to BBS and actively caring, a People-Based Safety™ perspective stresses the need to keep people’s cognitions (thoughts, attitudes, and beliefs) and feelings at the forefront of any attempts to influence safety-related behavior. The benefits of these approaches, were they to be used universally, are virtually unlimited and have the added advantage of being straightforward and economical to teach, learn, and use. In addition, their application would be acceptable to most people.

The Total Safety Culture process takes a by-the-people-for-the-people approach, teaching employees what they need to know about behavioral science methods to produce positive safety outcomes in their own corner of the world. There is an explicit assumption: The “...more individuals participating in a safety-improvement process and the greater the rate of process-related behavior, the greater the momentum. And the greater the momentum, the greater the likelihood the process will be sustained and contribute to the ultimate benefit—a Total Safety Culture” (Geller 1999a, 16). With corporate executive vision, managerial support, and line-

worker participation, these interventions target individual behavior on a large scale and lead to the enrichment of a culture. This organizational process could be applied on a national scale.

Focusing on the Total Safety perspective, this paper specifies the components of, and actions needed to create, what might be called a “Total Safety Traffic Culture.” While considered Utopian thinking by some, we believe this to be a realistic proposal *if* traffic safety is elevated to the level of a true societal value.

The development of a Total Safety Traffic Culture would have positive implications for other societal safety issues as well, as the ultimate objective is to persuade citizens to exhibit a kindred sense of responsibility for the welfare of others, such that people monitor and change their own behavior and support others in doing the same. Indeed, the benefits of a Total Safety Traffic Culture should spill over into many areas of daily life, as everyone would know how to design behavioral-safety interventions for their own needs, and actively caring would be regularly demonstrated, cultivated, and promulgated. So, the crucial question is: how do we make traffic safety normative?

## **Issues in the achievement of a total safety traffic culture**

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Targeting culture change in any context requires an understanding of the present state of the culture in question. While a great deal of empirical work can and should be accomplished to pinpoint the exact nature of the traffic safety culture in the U.S. today, it can be safely described as top-down, which is to say it is primarily law enforcement based.

Traffic safety legislation is often promoted by caring individuals or legislators who have lost a loved one in a crash, organized groups such as Mothers Against Drunk Driving, or policy makers concerned with cost-benefit ratios and state liabilities. The main difficulty with all legislation is that it relies heavily on enforcement as a means of accomplishing goals, and law enforcement is usually a limited resource, able only to monitor a small sample of drivers at any given time. One of the chief advantages to legislation is that it sets standards for behavior.

Generally speaking, the standards for traffic safety behavior are proactively addressed in a systematic fashion only with our teenage youth and usually only in the context of driver education courses and/or in studying for license tests. Some parents contribute positively to this limited process, but many model unsafe behaviors. After getting a license, traffic safety issues rarely come to mind unless we are stopped for an offense, involved in a crash, or hear about a crash. Reference to car crashes by the public as “accidents” underscores the common perception that traffic safety is perceived to be largely beyond our personal control. Indeed, traffic safety as a collective issue is so immense that improvement efforts have traditionally been piecemeal and reactive, as opposed to holistic and proactive.

This state of affairs must change if we as a society are to make significant advancement in traffic safety. To do so, we need to teach traffic safety to children and adults, from preschool to the university level, at the workplace and in the home, and promote relevant discussions in all types of social contexts. This will only happen if our leaders (in all areas—e.g., school, religious,

community, legislative) tirelessly verbalize traffic safety as being a value to be proactively and ubiquitously addressed. In other words, we need to create a Total Safety Traffic Culture.

An industrial Total Safety Culture is an environment where all members of the organization feel responsible for safety, pursue safety objectives daily, and go “beyond the call to duty” to identify and intervene to correct hazardous conditions and at-risk actions (Geller 1994). When this vision is accomplished, an organization’s members routinely demonstrate actively caring for safety. This has been achieved and sustained in numerous large corporations (Geller 2001b). These organizations adopt safety as a key value, not a priority that shifts with situational demands. Large-scale and long-term actions with this focus can transform a culture from a state of dependence or independence with regard to safety to a dynamic state of *interdependence*.

## **Types of organizational safety cultures**

With regard to traffic safety, the organization in question is society, which functions as a relative whole only at special times and actually shares only a few major values. Our society generally functions as a loosely linked set of sub-organizations, sub-units, communities, families, and individuals. In reference to our top-down traffic safety culture, U.S. society generally promotes a dependent paradigm. Table 1 summarizes important differences between three cultural safety orientations.

A dependent culture is top-down in nature, and is safety conscious to the degree that disincentives are created by top management to ensure minimally acceptable levels of safety. Thus, police cite drivers for breaking established laws. Blame is readily sought and penalties are enforced to the extent possible. Safety is fairly important but is neither a priority nor a value. In this context, traffic safety is more about avoiding penalties than achieving personal safety, as was seen with the initial and continuing efforts to promote safety-belt use. Some did adopt the buckle-up habit for personal reasons, but were that the case for most, there would have been no need for laws, car buzzers/lights, or major media campaigns.

*Table 1: Characteristics of Differing Organizational Cultures. Adapted from Geller (2002).*

| <b>Dependent</b>            | <b>Independent</b>      | <b>Interdependent</b>       |
|-----------------------------|-------------------------|-----------------------------|
| Top-Down                    | Bottom-Up               | Empowerment                 |
| Conditions of Licensure     | Personal Commitment     | Team/Community Commitment   |
| Safety for Ticket Avoidance | Safety for Self         | Safety for Self and Others  |
| Disincentives for Outcomes  | Incentives for Outcomes | Recognition for Behavior    |
| Environment Focus           | Behavior Focus          | Environment/Behavior/Person |
| Fault Finding               | Fact Finding            | Systems Thinking            |
| Safety is Important         | Safety is a Priority    | Safety is a Value           |
| Quick Fix                   | Eventual Fix            | Continuous Improvement      |

In the dependent culture, laws are enacted as relatively convenient, quick fixes to specific problems. The difficulty, of course, is enforcing the laws on the scale needed to bring about comprehensive change. And, as an initial step to culture change, these types of legislative efforts are indeed important contributions, establishing societal norms.

An independent culture relies more on individuals attending to safety through personal commitment and a desire to achieve protection. Safety issues are explored in a fact-finding manner, with an emphasis on identifying important contributory variables, where blaming a person or circumstance is not the primary mission. Safety becomes a priority, and prevention is more a collaborative process where incentives or social campaigns (e.g., commercials exhorting people not to drink and drive) are used with the hope of having a beneficial, proactive impact.

In an independent culture, grass-roots organizations and concerned family members play a greater role in attempting to bring about traffic-safety reforms. Social marketing is central and ranges from engaging in impassioned personal conversations to organizing rallies and school programs, funding relevant public-service announcements, and lobbying for legislative reform.

While these are good things bringing about positive change, the paradigm we need to understand and achieve for a Total Safety Traffic Culture is that of *interdependence*. A number of the qualities of the other forms of culture are retained, including behavior-based incentives and disincentives. But, a major quality of an interdependent safety culture is actively caring for others, which is reinforced by the natural consequences of helping. Good citizenship becomes associated with safe driving. Safety becomes a value, and values always take precedence over goals, which are ever changing and dependent on the situation. With safety as a value, everyday traffic situations activate safe driving behaviors throughout an entire trip.

Environment and behavior are still critical foci for intervention, but interdependent cultures take person states into account. How people feel about an intervention is considered. Problem solving is systems oriented, seeking not only activators for specific behaviors, but also consequences likely to motivate and maintain safe behaviors, as well as person states that support safe versus at-risk behavior. This perspective ensures safety-related interventions are well received by the target audience, minimizing reactance (i.e., an assertion of independence by deliberately ignoring or doing the opposite of what is desired; Brehm 1966) and empowering people to be part of a problem-solving team at every level to make safety an ongoing process that facilitates continuous improvement.

## ***The behavioral approach to safety***

Ultimately, individual drivers are key to further improvements in collective traffic safety. Ostensibly, all driving-related laws, public-relations media, and safety education and training are intended to influence the behavior of individual drivers. While these are important efforts, more can be done. To influence behavior on a large scale, we can learn a great deal from the success of behavior-based safety (BBS) initiatives in industry. Research evidence shows this approach has been quite successful across a variety of industrial contexts (e.g., DePasquale and Geller 1999; Geller 1999b; Geller et al. 1998; Sulzer-Azaroff and Austin 2000).

Before delving into the particulars of BBS, a brief overview of a few applied behavior analysis principles is warranted. Eminent researchers, such as Thorndike, Watson, Hull, Wolpe, Skinner, and their countless colleagues, have scientifically studied behavioral phenomena and showed us that most, if not all, behavior is learned, maintained, or discontinued as a function of related consequences, be they anticipated, imagined, or actual.

The *ABC model* provides a framework for understanding why people do what they do and what it takes to change what they do. ‘A’ stands for *Activator*, ‘B’ for *Behavior*, and ‘C’ for *Consequence*. Applied behavior analysis involves identifying and understanding the role of each of these elements in order to orchestrate contingencies that promote beneficial change in prescribed directions. Activators signal the availability of consequences, thereby directing or suppressing behaviors relevant to acquiring pleasant or avoiding unpleasant consequences. Actions that enable desirable consequences tend to be repeated, while actions followed by undesirable consequences are less likely to occur again. People often encounter, but are not necessarily mindful of, multiple sets of concurrent activators, behaviors, and consequences.

As a basic illustration, a stop sign signals for stopping a vehicle, where doing so brings a consequence of crash avoidance and safe traffic flow. However, if a stop sign is viewed on a road with minimal traffic, this activator may result in slowing down, but not complete vehicle stopping. To shave a few seconds off a drive in this manner may not seem on the surface to be a powerfully rewarding consequence, but rapid acquisition and long-term maintenance of such behavior suggests otherwise. Suppose one day, a police car is present at the intersection and the driver who habitually runs the stop sign, makes a complete stop upon seeing the patrol car. This new activator influenced behavior change. The driver stopped completely in order to avoid the consequence of inconvenience and a financial penalty. Should the driver not see the patrol car, the consequence of running the stop sign would likely be the receipt of a citation. The next encounter with the stop sign would likely activate a complete stop, until the memory or threat of confrontation with the law wanes. Should the consequence of running the stop sign have been a crash, subsequent complete-stopping behavior would likely occur for a prolonged period.

It is important to note that road signs and other environmental conditions are not the only antecedents affecting traffic and driving behavior. There are many antecedent conditions that set the occasion for at-risk behavior, including such multitasking as: talking on phones or with passengers; watching non-relevant signs, billboards, pedestrians, or other vehicles; selecting or attending to in-vehicle entertainment; reading,; checking appearance; eating and/or drinking; etc.

With this primer in mind, let’s take a closer look at BBS. In 2001, Geller proposed seven major principles of BBS and later updated them with his *People-Based Safety™* (PBS) approach (Geller 2005a). Basic principles of BBS are covered in brief, and aspects of PBS are noted.

**1. Begin with observable behavior.** Behavior-based interventions target behaviors that can be observed by others. The focus is on what people do and the application of an evidence-based strategy for improvement. The mission is to *act people into thinking differently* rather than to *think people into acting differently*, as is the case with many traffic safety interventions. Following the management maxim “what gets measured, gets done,” this is accomplished through the use of observers who give feedback with a protocol that requires minimal training. If we want turn-signal use to increase, we might have a co-worker make observations of the driver’s signal use in a defined time period (e.g., a specific trip, a ten-minute interval).

PBS recognizes the notion that people, if properly motivated, can think themselves into safer actions. Behavioral self-management is certainly possible as we can note and act on our own thoughts, attitudes, and beliefs. Yet, both BBS and PBS interventions focus on improving specific behaviors with an observation and feedback process.

**2. Look for external factors to understand and improve behavior.** BBS deals primarily with activators and consequences. A variety of environmental determinants of behavior are defined (i.e., activators and consequences), which often suggest intervention strategies. Some factors encourage at-risk behaviors, such as the lack of opportune and socially valid substitutes, such as is somewhat the case with alternatives to driving while impaired (DWI). Other factors hinder the adoption of safe behaviors, such as the inconvenience, discomfort, and perceived unattractiveness of wearing motorcycle and bicycle helmets. By calling attention to, altering, eliminating, or adding external factors to the environment, at-risk behaviors can be decreased and/or safe behaviors increased.

The phase “swift and certain” applies here. If pleasant consequences are swift and certain and unpleasant consequences delayed and uncertain, the relevant behavior will likely persist. Drivers take risks because they expect to gain something, like time or convenience, or avoid something, such as discomfort or inconvenience.

When drivers don’t use safety equipment or don’t follow safe-operating procedures, they are usually rewarded by perceived increases in consequences like comfort (e.g., “unhindered” by a safety-belt or helmet), convenience (e.g., talking on a cell phone), and speed of travel (e.g., speeding or running through stop signals). Thus, the perceived rewards for risky driving appear swift and certain, whereas aversive consequences are distant and uncertain.

Most drivers, when sober, say DWI is not acceptable and that the odds of being caught are relatively high. But once drunk, one may drive anyway to avoid: a) taxi fare, b) adherence to the whims and/or schedule of a sober designated driver, c) leaving a vehicle overnight, and/or d) the loss of perceived freedom or personal control. Besides avoiding these perceived inconveniences, the possibility of a crash or arrest is actually relatively unlikely (see Dula, Dwyer, and LeVerne, in press). As one drinks, reasons to drive may outweigh the prohibition against doing so. Thus, the DWI offender sees gains as swift and certain and negative consequences as unlikely. This can be a tough set of circumstances to overcome, but problem solving must begin with a frank assessment of the maintenance factors for the at-risk behavior.

The PBS perspective addresses related thoughts, perceptions, and attitudes. However, as most of our current interventions already target such variables, we should focus on increasing our use of practical principles of behavioral science.

**3. Direct with activators and motivate with consequences.** Activators influence behavior only to the degree that related consequences are soon, certain, and sizable. Activators tell us what to do in order to receive or avoid consequences. The ABC model suggests use of activators that specify behaviors and consequences, and which are supported by the implementation of swift and significant consequences. A half century of behavioral science demonstrates the value of this approach in designing successful behavior-improvement interventions at individual, group, and organizational levels (Geller 2001a, 2001c, 2001d).

**4. Focus on positive consequences to motivate behavior.** In managing individual behavior on a large-scale, it may seem to many that punishment is the only viable approach. While it can be effective under certain conditions (cf., Azrin and Holz 1966), punitive consequences are rarely sufficient in size, swiftness, or certainty to influence the behavior of many who choose to drive at-risk. Using negative consequences to control behavior reduces perceptions of personal control, responsibility, and freedom, and may generate reactance and other undesirable side effects such as the experience of negative emotions (e.g., Newsome, Favell, and Rincover 1983; Sidman 1989). Punishment does not generally lead to the teaching and supporting of desired actions either, and people generally feel less empowered when working to avoid negative consequences than when working to achieve pleasant consequences (e.g., Geller 2002).

There is growing evidence showing positive reinforcement to be a productive means to increase safe driving (e.g., Austin, Sigurdsson, and Rubin 2006; Everett, Haywood, and Meyers 1974; Geller, Kalsher, Rudd, and Lehman 1989; Hagenzieker 1991; Hickman and Geller 2003; Kalsher, Geller, Clarke, and Lehman 1989; Ludwig, Biggs, Wagner, and Geller 2001; Olson and Austin 2001; Rudd and Geller 1985; Slater 1999), though Geller (2001a) noted a need for more long-term research.

Some may think it odd to “reward” behavior that “should” happen anyway. Some think “rewards” must be tangible or costly. Tangibles are not necessary, though tokens, prizes, and the like can be used to good effect. Simple conversation can be rewarding, and this power is seen anytime a respected other gives us a smile or pat on the back for doing a good job. Praise is quick, easy, and free. It is interesting to note how quick many are to notice and criticize “bad” behavior. Why are we not as quick to notice and praise “good” behavior? And if a behavior that “should” happen anyway isn’t happening, why not try positive reinforcement?

See Flora (2004) for a review of studies rebuffing arguments that reinforcement should not be used to motivate desired behavior. If we focus on, and give genuine support to one another for safe driving, the reinforcement principle dictates the rewarded safe behaviors are more likely to occur again. Of course, whether or not they actually do recur is an empirical question, which leads us to the next BBS principle.

**5. Apply the scientific method to assess and improve interventions.** The only way to be sure an intervention has a desired effect is to measure the target behavior before, during, and after an intervention. Scientific methodology provides information necessary to determine if there are changes in a target behavior, and when there is no improvement, to point out the need to modify our techniques. The acronym “*DO IT*” teaches the scientific method to safety leaders and lay persons alike.

‘D’ is for *Defining* the target behavior to be increased if “safe” or to be decreased if “at-risk.” ‘O’ is for *Observing* (and recording) the target behavior over a baseline period to identify social and environmental factors influencing the behavior, to set goals, and to obtain data for intervention evaluation. ‘I’ is for *Intervening* with a BBS plan and ‘T’ is for *Testing* intervention efficacy through continued observation and recording of the behaviors. This process can be facilitated with a *critical behavior checklist* (CBC).

Basic to BBS is a process whereby workers create CBCs, or checklists of safe and at-risk behaviors, which are then used to guide the observation and recording of target behaviors. The

CBC lists target behaviors and has a column to note whether a performed behavior was “safe” or “at-risk.” Definitions of “safe” versus “at-risk” are developed in group discussions designed to build consensus. The CBC is then used to give feedback in face-to-face or group conversations (e.g., DePasquale 1999; Geller 2001c, 2001d, 2005c; Krause, Hidley, and Hodson 1996; McSween 2003; Williams and Geller 2000). Observation and feedback are tied directly to the CBC, so careful definition of safety-related behaviors and safe performance standards is vital.

This BBS process can’t succeed without interpersonal trust—a dimension of PBS. BBS observation and feedback processes require openness, discretion, and sincerity between workers, supervisors and administrators, all of whom contribute to the development and maintenance of a Total Safety Culture (DePasquale and Geller 1999). The CBC provides a framework for a BBS intervention and can enhance trust by reducing the potential for personal bias by virtue of its objective nature and positive focus. This process should be essentially the same for teachers, families, or companies working to improve traffic safety behaviors.

Indeed, the CBC has potential for broad applications in driving safety. Geller (2003c) discussed use of a CBC in the contexts of increasing safety-belt use, reducing vehicle speed, using turn signals, checking tire inflation, and correcting child safety-seat installation. He also provided a driving CBC sample he used to teach safe driving to one of his daughters. More details about the construction and use of a CBC can be found elsewhere (e.g., Geller 1996, 2001c, 2003b, 2003c; Geller and Williams 2001), as can important issues regarding behavioral inconvenience, risk exposure, behavior severity, and behavior probability (Geller 2003b, 2003c).

After filling out a CBC, a “percent-safe” score can easily be calculated for any driving behavior. The reliable increase of a percent-safe score over time indicates intervention efficacy. The lack thereof suggests a need to revisit intervention design, activators, behavioral definitions, participation quality, and/or consequences. Similarly, success of intervention adjustments can be shown objectively in short order. Moreover, analyses of successive DO IT processes can produce a knowledge base that can be incorporated into a theory, as is emphasized in the next principle.

**6. Use theory to integrate information.** Patterns tend to emerge following systematic use of the “DO IT” process. Some techniques work better than others, depending on situations, behaviors, and people involved. Connecting intervention impact to social or contextual variables yields guiding principles for similar situations. For example, a successful approach to increasing turn-signal use might also work well for increasing following distance. The resulting theories suggest the most cost-effective intervention methods under a designated set of circumstances. Beyond this scientific methodology, one final PBS principle alluded to throughout this presentation merits contemplation.

**7. Consider the feelings and attitudes of others.** Though people’s feelings and attitudes may be more difficult to ascertain and influence than their behaviors, attending to feelings and attitudes is critical. They impact, and are influenced by any intervention. Those who develop an intervention strategy should consider the cognitive and affective implications of their approach, taking into account the attitudes, opinions, and beliefs of the target audience. Genuine empathy for participants is a powerful means for leaders to understand and defuse reactance, as well as to motivate and reward participation. We suggest that positive consequences be used whenever possible because when people feel better about a process, they are more likely to fully participate

and benefit from it (e.g., Geller 2002). With that said, we turn to other important factors, such as trust, organizational support, mandatory participation, and recruiting lay safety leaders.

Depasquale and Geller (1999) emphasized that the success of BBS rests on maximizing participation, interpersonal trust, and organizational support. Suppose, for example, a high school and its PTA generate a BBS driving program and implement a CBC-based observation and feedback process during their driver-education courses. To increase chances for success, the principal, teachers, parents, and students should all be involved in designing the CBC and the implementation process. Moreover, school boards, school systems, local law enforcement, and local media outlets should overtly demonstrate support. Businesses might be enlisted to provide incentives for those who participate, to put up flyers endorsing the program, or to offset the relatively small costs associated with photocopying CBCs, all of which would make for good public relations with potential or actual customers. Everyone should be aware of the mission (safer drivers and safer roads), the details of the observation and feedback process, research supporting its use, and the need for full participation. The more people and organizations there are involved at the outset, the more enticing it will be to join in.

Depasquale and Geller (1999) found that mandatory participation in the observation and feedback method was not particularly aversive to participants as long as there was freedom in when, where, how, and with whom one engages in the process. Thus, in this example, a CBC procedure might be required of all student drivers (e.g., asking parents to complete CBCs on their child's driving, and turn them in for part of the course grade). Alternatively, students in driver education programs could serve as BBS agents for one another under the supervision of the instructor. For willing parents and siblings, the CBC process can be reversed and the student can rate the more seasoned driver's behavior, making everyone more conscious of traffic safety in the process. In an alternate scenario elementary school children could fill out CBCs on their parents (which would encourage parents to be more model drivers) and local businesses or other organizations might contribute prizes to be raffled off for turning in CBCs filled out by children and their families.

The data generated by collected CBCs could be used to create posters or public service announcements to openly display charted driving improvements. The trust issue can be handled easily in this type of scenario as observations and feedback can be done by family members, and individual results can be kept confidential, while only posting group results. Whatever the case, it is important for BBS interventions to have maximal organizational support, conditions that build interpersonal trust, and high levels of participation.

With a Total Safety Traffic Culture, much like in an industrial Total Safety Culture, when people consistently perform the desired behaviors, they can be enlisted as agents to influence the safety of others (Geller 1998a; Geller et al. 1990). Safety professionals often find themselves "preaching to the choir," but focus should be on empowering the choir to win over others to the cause. The more people who are on board for safety, the more safety becomes a demonstrated value, and the more often holdouts will convert to safe practices.

Roberts and Geller (1994) found a positive correlation between the number intervention agents involved in safety-belt promotions and the impact of the intervention. Becoming an agent for safety change moves one toward developing self-accountability and self-directed behavior for injury prevention (Geller 1998a). The idea that people who learn BBS can take on the role of a

safety change-agent, promoting continual concern for the safety of others, leads us to a discussion of the *Actively Caring* model, which incorporates a holistic PBS perspective.

## ***Actively caring for safety***

The Actively Caring model can help us understand what it takes to achieve the vision of a Total Safety Traffic Culture. Use of this model has helped numerous industrial sites shift to a Total Safety Culture. While the concept of a Total Safety Culture has not been pursued beyond the work environment, we strongly suggest it should be attempted at a societal level for traffic safety. Actively caring behavior in a work context is operationalized as persistence in looking for environmental hazards and risky work practice and intervening to bring about corrective actions or conditions. Thus, actively caring is behavior activated by an intrapersonal state in which one's attitudes and beliefs increase a willingness to contribute to the health and well-being of others.

Actively caring person mindsets have been researched as a predisposition to act (Allen and Ferrand 1999; Geller, Roberts, and Gilmore 1996; Roberts and Geller 1995; Porter 1998), but actively caring is also conceptualized as a teachable construct. Geller (1991) examined social and personality psychology for relevant person states to predict who would most likely engage in actively caring behaviors. The presumed components of an actively caring stance are: a) high self-esteem (feeling valued), b) high self-efficacy (believing you can make a difference), c) an internal locus of control, d) an optimistic outlook, and e) a sense that one belongs to a cohesive group (e.g., family, friends, co-workers, community). Figure 1 displays the person states, each contributing to feelings of empowerment with overlaps that reflect critical belief statements. The model was tested using surveys to measure the five actively-caring states, and findings generally supported the theoretical mechanisms proposed (Allen and Ferrand 1999).

Most people do not want bad things to happen to their family, friends, co-workers, or even strangers, but our culture does not pull for a demonstration of actively caring on a regular basis. Before intervening in an emergency, people are faced with barriers to helping, as exemplified by the following questions: Is something really wrong? Is help needed? Should I intervene? Do I know what to do? Only if each is answered in the affirmative, are people apt to actively care and intercede (Latané and Darley 1970). However, actively-caring strategies can be taught to offset helping hurdles. In fact, the Red Cross teaches some such skills to those learning CPR and First Aid, including: a) be on the lookout for emergency situations, b) assume responsibility as a trained helper, c) actually check to see if help is needed, d) direct others to specific tasks (e.g., "You, call 911!"), and, e) attempt to provide help. Thus, it stands to reason that actively-caring concepts can be taught to our youth throughout their education, so they will arrive at adulthood with an actively caring perspective and relevant skill sets, and that adults can pick up and make use of the concepts as well.

A company's culture can inhibit predispositions to actively care by encouraging at-risk production methods and safety shortcuts. On the other hand, a company that aspires to become a Total Safety Culture must redefine itself to hold safety as a value, seeking employee input into the safety improvement process. This enhances predispositions to actively care, but also activates actively caring among those less inclined to do so, by increasing optimism (e.g., "they consider my input") and belongingness (e.g., "our work team actively cares for one another"). And these factors combined may actually raise self-esteem. Likewise, an interdependent actively caring

culture of citizens armed with BBS knowledge and the will to use it will progress toward a Total Safety Traffic Culture.

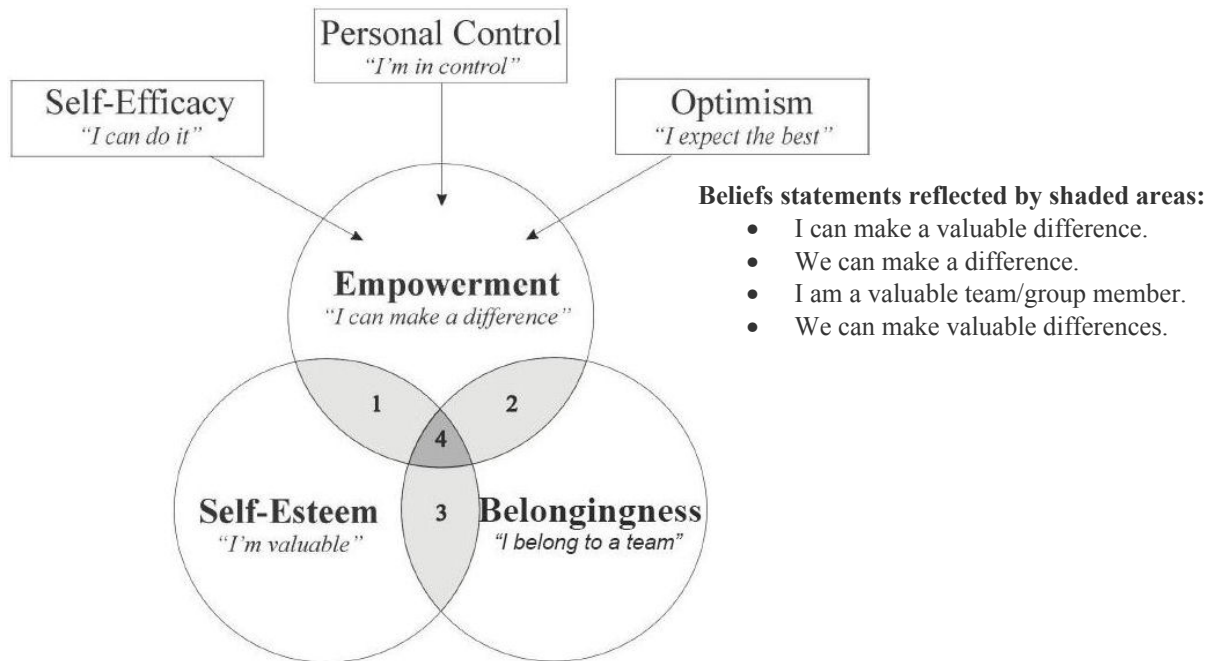


Figure 1: Actively Caring Model. Adapted from Geller (2002).

## Venues and approaches to improving traffic safety behavior

Two of the greatest advantages to the BBS and actively caring approaches are the facts that they are easy to teach and inexpensive to implement. However, culture change takes time and the efforts to achieve such a change must be large-scale and pervasive. One of the main venues we have for disseminating cultural and technical information is our educational system. A focused nationwide campaign to teach behavioral science and actively caring skills throughout elementary, middle, and high school would do much to achieve and sustain a Total Safety Traffic Culture, where BBS strategies would target vehicle safety, from private to public transportation.

Teaching traffic safety through BBS and the Actively Caring model in school systems is quite feasible, and would likely impact other safety domains. It would also behoove us to have a traffic safety course at every college and university using BBS principles. We could insert traffic safety issues into general education courses such as history (e.g., noteworthy figures lost to traffic crashes, the rise of vehicles, roadways, injuries, and death tolls), psychology, sociology, health, physics and engineering (e.g., the progression of vehicle and roadway safety engineering), mathematics (e.g., traffic safety statistics could be used for examples), and students could even be encouraged to write on related topics in English classes. Courses that speak to personal identity, interpersonal ethics, and social responsibility are common in university settings and are certainly appropriate venues for traffic safety issues. A similar list of courses could apply to primary and secondary educational settings as well.

To provide a context for BBS and actively caring, it is useful to consider that most people probably care about safety, but in some cases may lack knowledge regarding what is safe or how to obtain support for choosing safe over at-risk behaviors. Where people knowingly take risks, it is likely that probabilities for disaster seem so remote as to be insignificant. A lifetime of traffic safety learning would probably help to show how remote risks are real, dispel the myth that driving safety is the “other person’s” problem, instill a more profound sense of responsibility for driving a vehicle, and promote attitudes that inhibit thrill seeking or careless driving.

Thus, in teaching traffic safety methods and responsibilities, perspective should also be expanded from the single driver’s perspective to a collective societal viewpoint, to emphasize the role of the individual in society. Systems-thinking is needed here. Drivers need to see beyond the seemingly isolated environment of their own vehicles and consider the complex, interdependent system of a synchronized traffic structure. From early childhood, we must teach our citizens to appreciate who is affected by traffic crashes, including children, teens, and young/middle/older adults, in the form of lost lives, painful and debilitating injuries, lost freedom for offenders, property damage, snarled justice systems, lost personal and business productivity, higher insurance rates, higher taxes, higher healthcare costs, and on and on.

School is an obvious choice and an important venue for conveying the principles, policies, and procedures of a Total Safety Traffic Culture. However, this is by no means the only venue. We only need to realize that virtually every citizen has been touched in some way by a traffic crash, to understand that many, if only prompted or prodded, would see their way to learning about and teaching BBS to facilitate and support the taking of greater personal responsibility for vehicle safety. There are a multitude of outlets at local, regional, and national levels for this kind of interpersonal support, teaching, and learning of traffic safety, including: a) athletic events from pee-wee to professional levels, b) every government agency, c) faith-based organizations and communities, d) the healthcare industry, e) businesses of all sizes and types, f) every type of media and entertainment, g) libraries, h) museums, i) community and neighborhood associations, j) fraternities and sororities, k) civic organizations, l) hobby and interest groups, and so on. The specific traffic safety topics to be addressed are plentiful and can be customized to the audience.

To illustrate the whole array of traffic safety domains, a categorical traffic safety issue grid is useful to identify change-advocacy areas. Figure 2 shows how the wide variety of general traffic safety can be arranged to promote a greater appreciation of their complexity and used to help identify interventions and teaching opportunities. A brief glance at Figure 2 shows dangerous driving issues grouped into five broad categories, which could be addressed within three widely definable geographical areas, with four major age categories of target participants. This overview has a total of 60 potential intervention cells. On one hand, this model explicates the vastness of the subject at hand; while on the other hand, it helps intervention designers focus on particular issues, locations, or target groups, without losing sight of the big picture.

The framework depicted in Figure 2 can be modified along any dimension to expand or contract coverage, as needed. For example, if driving attention issues were the target for potential interventions, different subtypes could occupy the left-hand column and include drowsiness, cellular-phone use, in-vehicle entertainment devices, passenger distractions, and driver emotions. Geographical area could be narrowed across the top row to include specific places in a town or county. Age categories could be broken down to signify different intervention needs, as in the

case of child-safety restraints (e.g., infant, toddler, preschooler, school age). Target group categories might be changed to variables such as race, sex, socioeconomic status, rural versus urban residential status, level of experience, etc. Another dimension might be created for common interventions for particular issues. Given many outlets and approaches to traffic safety education and intervention design and delivery, we now turn to inducing the “choir,” those who already practice or who come to practice safe driving, to become “preachers.”

|  | Older Adult   | Older Adult   | Older Adult  |
|--|---|---|--|
|  | Middle Adult  | Middle Adult  | Middle Adult   |
|  | Teen/Young Adult  | Teen/Young Adult  | Teen/Young Adult   |
|  | Child   | Child   | Child  |
|  | Local<br>City, County,<br>Neighborhood,<br>University, Business | Regional<br>Multi-city,<br>Multi-state,<br>Border Regions | National/International<br>Federal,<br>Multi-country,<br>Global |
| Safety Restraints  |   |   |  |
| Driving While Impaired   |   |   |  |
| Attention:<br>Distracted &<br>Drowsy Driving                                 |   |   |  |
| General Risk-Taking<br>(e.g., speeding, red<br>light running,<br>tailgating) |   |   |  |
| Roadway &<br>Vehicle<br>Engineering  |   |   |  |

Figure 2: Traffic safety issues, target audiences, and target geography.  
(Thanks to Dr. Bruce Behringer for sharing this conceptual representation method.)

## **Recruiting and training traffic safety behavior change agents**

The process of identifying and training leaders at all levels of society for the Total Safety Traffic Culture movement is at once easy and difficult. It is easy in that most citizens drive or ride at some point in their lives and have been, or are at-risk for being, directly or indirectly affected by traffic crashes. Thus, almost everyone is a potential traffic safety agent.

As noted earlier, training in BBS processes is relatively easy, with only a little instruction enabling people to perform observation and feedback with skill. If this approach were applied across the educational spectrum, children would be repeatedly exposed to this simple and straightforward process and should be “experts” within a few years. Peer teaching of the BBS

and actively caring concepts is not only possible but desirable, as the transmission of knowledge by familiar others will increase acceptance and use of the ideas at hand to “learners” and reinforce the “teacher’s” self image as a proactive and safety conscious citizen.

On the other hand, involving great numbers of citizens in pursuing a Total Safety Traffic Culture is a formidable challenge. It will take famous leaders, such as our presidents, governors, congressional and state representatives, activists, professional athletes, stars of television, movies and music, and other nationally known personalities, to speak out with a consistent and meaningful message. A national move to incorporate of traffic safety education into elementary and secondary school curricula would be most helpful. If we blend traffic safety with other educational topics which are universally taught, many opportunities to educate in the service of preventing traffic tragedies will be gained. Traffic safety activators should be everywhere, in all of the venues listed above, and not just on the occasional television spot or billboard. As more people are prompted to consider traffic safety issues, more will be inclined to examine how they can contribute to solving our ongoing national traffic tragedy. As a dramatic perspective tends to motivate people to action, one could use the consistent terminology of the “ongoing traffic tragedy,” or in the sense that safety and security are somewhat synonymous, the problem could be couched in terms of a national security issue, albeit of an unusual type. The point is again, that traffic safety must be elevated to a value at the societal level for progressive cultural change to come about.

## ***Guidance in positive approaches to traffic safety behavior change***

Many types of creative traffic safety advocacy efforts have been implemented previously, and exemplify the BBS and actively caring principles. The successes and failures of these efforts can be used to inform future efforts. While space does not permit listing all the community-based interventions to increase traffic safety, a literature search in almost any specific traffic safety area reveals a host of both traditional and unorthodox approaches. Creativity is called for when trying to change a culture.

We emphasize use of positive consequences to promote safe behaviors, as this approach is likely to be well received, promote good feelings, and contribute to the interdependent paradigm needed for a Total Safety Traffic Culture. Still, punitive methods have their place. But when used, we should be careful to implement only those with sound evidence of efficacy and to increase their scope to levels which maximize effectiveness while incorporating additional tactics, such as persistent public display of outcomes, to further increase their impact by contributing to general deterrence (e.g., Dula, Dwyer, and LeVerne, in press).

The use of positive consequences to promote the use of safety belts (e.g., Boyce and Geller 1999; Campbell, Hunter, and Stutts 1984; Geller 1989; Geller, Davis, and Spicer 1983; Geller, Kalsher, Rudd, and Lehman 1989; Geller, Rudd, Kalsher, Streff, and Lehman 1987; Grant 1990; Kello, Geller, Rice, and Bryant 1988; Pastò and Baker 2001; Roberts and Geller 1994) and child safety seats (e.g., England, Olson, and Geller 2000; Greenberg-Seth, Hemenway, Gallagher, Ross, and Lissy 2004; Roberts and Layfield 1987; Roberts, Fanurik, and Wilson 1988; Task Force on Community Preventive Services 2001; Will and Geller 2004; Zaza et al. 2001) is well

documented and these studies are helpful in showing how BBS and actively caring principles can be applied on a large scale. Similarly, field researchers have demonstrated practical ways to prompt safety-belt use and activate culture change with buckle-up promise cards (Geller and Lehman 1991), buckle-up flash cards (Geller, Bruff, and Nimmer 1985), and safety-belt reminders on airliners (Geller, Hickman, and Pettinger 2004). More comprehensive guides on the application of behavioral science to traffic safety issues are available and would be of great help to culture-change agents for traffic safety (e.g., Geller 1998b; Sleet and Lonero 2002).

## **Summary and recommendations**

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Initially, a desired norm may need legal and punitive push to gain a critical mass for change. However, moving beyond safety plateaus and achieving world-class traffic safety requires thinking outside the traditional engineering and regulation boxes. Only with appropriate focus on the human dynamics of safety, including environmental, personal, and social variables, can we significantly improve relevant human behavior beyond current levels. Systems and cultural factors must figure heavily into the design of cost-effective interventions. Making progress beyond status quo requires changing the status quo with regard to goal setting and intervention evaluation. What was acceptable before cannot continue to be standard if our future efforts are to make a marked difference. For a Total Safety Traffic Culture to be created and maintained, it is critical that our citizens understand, teach, and consistently apply behavioral science principles.

This paper described the tried and true methods of the behavior-based safety (BBS) process, which can be applied by anyone young or old, in an effort to improve traffic safety. Anyone doing so would demonstrate actively caring and likely inspire others to do the same, thus pushing us successively toward greater societal interdependency. Greater detail on the use of BBS, critical behavior checklists, actively caring, social dynamics of safety, safety communication skills, behavioral self-management, safety leadership, and other related issues can be found in a variety of sources (e.g., Geller 2000, 2001a, 2001b, 2001c, 2001d, 2002, 2003a; Geller and Williams 2001).

Some key barriers identified were: a) the general lack of a supportive cultural orientation for any large-scale shift toward greater traffic safety, b) the sheer number of relevant traffic safety intervention targets, c) the need to teach BBS and actively caring principles to large numbers of people of all ages at all levels of society, d) the hesitancy of people to act on behalf of others without being trained to overcome helping hurdles, and e) the potential for reactance to top-down traffic safety interventions.

The facilitators identified were: a) the potential for society to rally around powerfully emotional causes, b) that traffic safety could be easily framed in terms of a national tragedy or a national security issue, to motivate citizens to create change, c) the BBS and actively caring concepts are easy to learn and to use, d) the BBS-related materials (e.g., CBCs, posters) are inexpensive to produce and costs may be offset by community businesses or organizations who can benefit from the positive exposure, e) the BBS processes may be easily repeated as needed, f) those who learn the concepts can become behavior-change agents and facilitate diffusion of the concepts to others, and g) participation as a change-agent for traffic safety will cultivate self-directed responsibility for safety. We conclude these facilitators should overcome the barriers, enabling a

national movement to advance the cause of BBS and actively caring in the service of traffic safety. And, such a large-scale and comprehensive BBS safety process would undoubtedly generalize to other domains of public health and safety.

We have a specific recommendation as well. Service programs should be established in elementary, middle, and high schools to teach BBS and actively caring and to carry out CBC-based traffic safety improvement programs for car-riding students, and scholarly research should be conducted on these programs to produce detailed efficacy data. This would involve the monitoring of percent-safe scores and the use of surveys and focus groups to gauge participants' levels of concept comprehension, program adherence, traffic safety attitudes and beliefs, and perceptions of the interventions. Importantly, the process would also produce independently observable behavioral data as outcome variables, including safety-belt use, child safety-seat installation proficiency, turn-signal use, average speeds in school zones, and the like, during baseline, intervention, and follow up periods. The objective demonstration of increases in safe behavior and decreases in at-risk behavior should be the gold standard for any proposed approach to improving our culture as it pertains to traffic safety. Objective efficacy data will be needed to push for supportive programming on a national level.

Taking on large-scale projects in urban, suburban, and rural school settings has the advantages of: a) built-in infrastructure for interventions (e.g., system-wide methods for approval and endorsement of research, b) convenient access to participants, c) ease of data collection of all types at centralized school locations, d) the potential for quick community buy-in and support, and e) the ability to assess a variety of traffic safety issues across a variety of demographic samples (race, geography, ages/grades). Again, such an effort will provide the initial empirical evidence needed to convince others of the utility and cost-effectiveness of the approach, while providing additional guidance to others wanting to replicate and extend the process.

As this is a long-term proposition, the sooner we get started, the sooner we will reap the benefits and move toward the realization that safety can become the number one concern for all drivers at all times. A national tragedy can be turned into a national triumph. Momentum is important, and the initiation of this compendium is evidence that the forces are in place to get us started moving in the right direction. Perhaps a Total Safety Society should be the ultimate vision.

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## Biographical statements

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**Chris S. Dula** received his doctorate in Clinical Psychology from Virginia Polytechnic Institute and State University (Virginia Tech) in 2003. While there, he worked closely with Dr. E. Scott Geller at the Center for Applied Behavior Systems. Dr. Dula's preliminary examination and dissertation at Virginia Tech and his master's thesis at Appalachian State University were each focused on dangerous driving. He completed a one-year postdoctoral research fellowship focused on traffic safety issues at the University of Memphis, under the direction of Dr. William Dwyer. In the fall of 2004, Dr. Dula began work as a tenure-track assistant professor at East Tennessee State University. He founded the Applied Psychology Laboratory (APL) in the spring of 2005. A number of graduate and undergraduate research associates are currently working on a variety of APL projects and have collectively presented over 40 professional presentations in its first full year of operation. He has been co-Principal Investigator on three grant-funded research projects, totaling over \$230,000 and Principal Investigator on several smaller projects totaling almost \$30,000 in funding. His research interests include dangerous driving and traffic safety issues, aggression and risk-taking, self-report measure development, and the teaching of research.

**E. Scott Geller, Ph.D.** For almost four decades, Dr. Geller has taught and conducted research as a faculty member in the Department of Psychology at Virginia Tech. In this capacity, he has authored 27 books, 42 book chapters, 38 training manuals, 198 magazine articles, and over 300 research articles addressing the development and evaluation of behavior-change interventions to improve quality of life. Dr. Geller has been the Principal Investigator for more than 75 research grants, totaling nearly \$6.5 million in funding, which involved the application of behavioral science for the benefit of corporations, institutions, government agencies, or communities in general. His Center for Applied Behavior Systems has helped numerous undergraduate and graduate students obtain valuable research experience. He and his students have delivered more than 1,200 research presentations, and he has served as chair of over 40 master's theses and more than 25 doctoral dissertations. His current research interests include industrial health and safety, vehicle and pedestrian safety, environmental protection, and the reduction of medical errors.