

Supporting highway safety culture by addressing anonymity

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Overview

The purpose of this paper is to stimulate thinking and research about neglected approaches to traffic safety that are outside of typical engineering or law enforcement practices. These approaches include the study of social, cultural, and other motivational factors that play a role in traffic-safety culture. Not only do these factors affect drivers' behavior, they also affect public attitudes and political support for highway-safety research and implementation of countermeasures. A better understanding of social and cultural motivations underlying drivers' behavior ultimately may lead to improvements in traffic safety. To illustrate the type of approach advocated, the topic of anonymity is discussed in relation to drivers, highway workers, and crash victims. Research in social psychology has shown how anonymity may affect people's behavior in several ways, and a few studies have addressed the effect of anonymity on driver's behavior. Although further research is needed to evaluate the benefits of reducing anonymity, several possible strategies are discussed here.

Introduction

Safety engineering in the design of motor vehicles and roadway infrastructure often includes human factors analyses to understand, enable, facilitate, and control driver behaviors. Typically, human factors research has focused on topics related to drivers' motor skills and perceptual abilities (including risk perception, attention, and cognitive processing), and overall workload necessary for vehicle control and navigation, but generally it has ignored interactions between roadway users. The disciplines of social psychology and sociology which have proven useful for explaining and predicting human behavior in many non-driving contexts also could be applied to improving highway safety. However, these disciplines have only rarely addressed any social psychological aspects of driving behavior. In fact, a survey of sixteen English-language social psychology texts dating from 1938 to 1977 found only a single index entry under the headings "automobile", "cars", or "driving" (Knapper and Cropley 1980).

In the United States, automobiles have been marketed as a symbol for individual freedom, speed, fun, and the ability to travel to scenic locations. Car advertisements often feature a single vehicle on an open road (and only in the small print do the ads disclaim, "Professional driver on a closed course—do not attempt."). In reality, many areas of the country have high traffic densities, where safe driving is a cooperative social experience that requires respect for other road users and observance of traffic-control devices, traffic laws, and cultural norms. For example, at intersections controlled by four-way stop signs, drivers cooperate with others by noticing when they have stopped relative to when other drivers have stopped, and then they each proceed in an

orderly fashion when it is their turn to do so, but only if there are no pedestrians crossing the street in front of their vehicles. Cooperation is also required at roundabouts, merges, multi-lane turns, and many other situations. Various cooperative driving behaviors are culturally specific. As compared to drivers in the United States, drivers in Germany show greater respect for the (left) passing lane and willingly yield it to drivers who approach from behind and flash their lights. Drivers in Mexico City seem more comfortable with close following distances and are adept at using every inch of the travel lanes during periods of congestion. While taxis, automobiles, and trucks continuously negotiate their way into and out of crowded vehicle queues, motorcyclists ride skillfully through the middle of the crowd on the lane markings. In Japan, drivers nearly always use turn signals when changing lanes, and, when merging into a queue, it is customary for the driver to say, “Thank you,” by briefly activating his four-way flashers (emergency lights). All of these behaviors are forms of social interaction that occur on the roadways.

Effects of anonymity on behavior

In this paper, the terms “anonymity” and “anonymous” are applied broadly (and somewhat loosely) to describe the fact of being unidentified, the self perception that one is unknown, and the feeling of being socially isolated from others. Anonymity is not discussed here as an “all or none” state. Thus, reducing anonymity means simply to reveal some information about a person, but not necessarily to reveal that person’s identity. Drivers are rarely completely anonymous in the strictest sense of having an untraceable, unknown identity because their vehicles have unique license plates which are registered in a state database. In fact, some drivers have pseudonyms in the form of vanity plates, while other drivers publicly reveal information about themselves and their families through bumper stickers, various ornamentation hanging from the rear-view mirror, displays of stuffed animals or baseball caps in the rear window, etc. Despite these mild forms of self-expression, as traffic congestion in the United States continues to increase, many drivers find themselves spending an increasing amount of time as socially isolated, undifferentiated members of uniform crowds. The anonymity that drivers experience has been reflected in popular culture. For example, the recent animated film, “Cars” (Anderson, Lasseter, and Ranft 2006), is a story involving anthropomorphic vehicles that exist in a place where human drivers are never seen and play no role at all.

Anonymity and automobile design

Before Henry Ford applied assembly-line manufacturing processes, automobiles were ordered from custom coachbuilders. They were expensive status symbols that expressed the individual taste of the owner. Marsh and Collett (1986) explain that Ford’s assembly line for the Model T produced a car that was more accessible to the masses, but more standardized in its design. For instance, due to difficulties in producing durable automotive paints, color was not an option. In those days, Mr. Ford’s strategy was, “Give the customer any color he wants so long as it is black.” Today, customers have limited choices over factory options, such as color, but very few cars are unique.

In recent decades, concerns about fuel efficiency have led automobiles to become more aerodynamic, and body designs have converged to a small number of vehicle shapes. As a result,

the automobile fleet is rather homogeneous. It is difficult to spot one's car in a large parking lot because so many cars look similar. Except for the small number of people who opt for custom paint jobs, vehicle modifications, or older (perhaps "classic") models, most drivers occupy vehicles that blend in completely with other traffic. Few people can be uniquely identified by the cars they drive. This is slightly awkward for modern law enforcement systems. Automated red-light cameras target vehicle owners rather than violators per se. When a vehicle's license plate number is captured clearly by a red-light camera, the identity of the violator is unknown. The registered vehicle owner is responsible for paying the fine. As is the case for parking violations, it seems that the automobile rather than the driver has been cited for the offense. In situations where it may be difficult to track down the driver of the vehicle, the offending driver may feel that he or she is anonymous and may be reluctant to accept responsibility for the offense. Surely many people, feeling unidentifiable, have been tempted to ignore a parking ticket received when they were driving a rental car or failed to leave a note when they hit someone else's parked car.

Automobile designs encourage isolation from other drivers and from the roadway environment. Automobiles often have been designed and marketed so that drivers and passengers would feel at home in their vehicles. Marsh and Collett (1986) point out that similar marketing messages have been used to sell automobiles at least since the 1940s, when slogans were used, such as "The '49 Ford is a living room on wheels." More recently, Johnson Controls used the living room theme in their Kion concept interior, which was unveiled at the 2000 Paris Auto Show. It was described as a "home away from home" where time spent in the car could be used to work, surf the Internet, make phone calls, or simply relax (PRNewswire 2000). One author, commenting on trends in recent model automobiles noted that, "[...] as the driving experience becomes more insular—almost cocoon-like with tinted windows for extra privacy and security—people begin to feel empowered and anonymous" (George 2006).

Feelings of being "at home" in one's automobile may lead to territorial feelings and beliefs that extend outward beyond the vehicle to the immediate highway "neighborhood" (Richman 1972). The driver's sense of personal space is expanded to the outer shell of the vehicle and beyond. Most drivers are highly annoyed if another driver encroaches on this personal space by following too closely, or drifting slightly over the lane lines. In these situations, feelings of territorial violation may be accompanied by legitimate safety concerns about the vehicles colliding, etc. However, to illustrate that driver's personal space is a valid construct, consider the following situation which involves very low risk of injury from a crash—*Suppose that you were stopped at a traffic signal and an unknown driver behind you slowly crept forward until his front bumper just barely touched your rear bumper? Would you feel uncomfortable? Would you feel threatened?* Now imagine yourself carrying out this maneuver on another unknown driver stopped ahead of you. Most people would feel extremely uncomfortable about doing this.

Between drivers who know each other, the size of personal-space buffer zones may be smaller than between drivers who are anonymous. For example, based on their behavior it is fairly easy to identify pairs or trios of vehicles on the highway that are apparently traveling together. The drivers' behavior is similar (speed, lane changes, etc.) and usually, the drivers traveling together maintain closer following distances between themselves than they do with other traffic. The point of these examples is that drivers' behavior is influenced by many of the same types of social forces that mediate cooperative and competitive interactions among people everywhere.

Social psychology of anonymity

The research literature in social psychology shows that people behave differently when they are anonymous or when those with whom they interact are anonymous as compared to situations where they are identified. The effects of anonymity may be particularly strong when people are in groups. The studies summarized in the sections below relate to anonymity and aggression, and may be applicable to safety discussions about drivers' behavior. There are many other studies (not reviewed here) that have been conducted by social scientists to understand how anonymity can affect altruistic behaviors and people's responses to victims. Although not discussed here, research on these topics is relevant to understanding public perceptions of crash victims and public support for safety programs.

In a series of studies on obedience and disobedience to authority, Milgram (1965) showed that participants were more willing to carry out orders from an experimenter to administer high levels of shock to a fellow participant when they could not see or be seen by the victim. Similarly, the degree of anonymity between the experimenter and the participant strongly affected the participant's behavior. In conditions where the experimenter was never seen, the participant was much less likely to carry out his orders. A similar effect of anonymity was seen under some, but not all conditions in a study of interracial aggression (Donnerstein, et al. 1972). White male participants administered less intense shocks to a Black target individual when they were known to their target than when they were led to believe that they were aggressing anonymously. However, when paired with a White target individual, the White participants delivered equally high levels of shock in face-to-face and anonymous conditions. This study was conducted on a university campus at a time when racial tensions between Blacks and Whites were high. The authors concluded that the observed effect of anonymity reflected the White participant's fear of retaliation from the Black target individual.

Social psychologists seeking to explain the conditions under which normally law-abiding individuals may engage in antisocial behaviors when in groups have described a process called deindividuation. Deindividuation refers to the loss of a person's sense of individuality and an accompanying loss of the normal constraints against antisocial behavior (Zimbardo 1969). Various environmental factors that create anonymity (such as being in a large crowd or wearing a mask or hood) contribute to deindividuation. In studies of aggressive behavior, men are usually more aggressive than women, however; Zimbardo (1969) found that women who were dressed in baggy white coats and hoods and who remained anonymous (deindividuated condition) consistently administered much longer durations of shock to other individuals than women who wore large name tags and were encouraged to interact with each other (individuated condition). Similar results were found by Lightdale and Prentice (1994). In this study, men were more aggressive than women in an individuated condition; however, in a deindividuated (anonymous) condition, the women were just as aggressive as the men.

For many people, being unidentifiable may release their normal inhibitions against engaging in impolite, antisocial, or unlawful behavior. When college students were simply asked what they would do if they could be totally anonymous (and invisible) for twenty-four hours, their most frequent response was to "rob a bank" (Dodd 1985; cited in Brehm and Kassin 1996).

Children also have been shown to be affected by variables associated with deindividuation (Diener, et al. 1976). A naturalistic study of was conducted with over 1300 children who were trick-or-treating on Halloween. The children were told that they could take a single piece of

candy from a bowl but were given the opportunity to steal other candy and money. Significantly more stealing occurred when the children remained anonymous than when the children were asked to identify themselves, and more stealing occurred in the presence of a group than when children were alone. Also, the increase in stealing associated with being anonymous rather than identified was much greater in the group condition than in the individual condition.

Anonymity is often mentioned in discussions of aggressive driving and road rage where aggression is said to be encouraged by the sense of anonymity that drivers feel while in their vehicles (e.g., Shinar 1998). People may be more willing to engage in antisocial behaviors when they are in their vehicles than when they are not. For example, people almost never cut in on one another while standing in lines at the grocery store, but they may do so when driving in traffic on the way home, even though the time saving in traffic may be just a few seconds. One focus-group participant described the situation this way, “Talking about people jumping queues, in a supermarket you don’t really get it but in a traffic jam you do. People don’t care; they just want to get there a little bit faster.” (U.K. Department for Transport 2006, p 24). Drivers who are in anonymous groups may show a tendency to violate traffic laws more often than drivers who are alone. Yinon and Levian (1995) found that drivers who were observed waiting at a traffic light were more likely to violate the law by entering the intersection before the light turned green when there were other drivers present.

Horn honking as a measure of aggression and the effect of anonymity

Ellison, et al. (1995) studied drivers’ responses to other drivers who were blocking their way at an intersection. In this field study, the visibility of the blocking driver was manipulated to alter his or her degree of anonymity. The blocking driver was an experimenter who drove either a Jeep or a convertible. On each trial, the blocking driver positioned his or her vehicle first in line at a red traffic light. On some trials, the blocking vehicle’s top was up and in other trials the blocking vehicle’s top was down. On each trial, the blocking driver frustrated the following driver by remaining stationary after the traffic light had changed to green. Drivers’ reactions depended upon the degree of anonymity of the blocking driver. When the blocking vehicle’s top was up, increasing the degree of anonymity, the following drivers honked their horns sooner and more frequently than when the blocking vehicle’s top was down. Besides anonymity of the blocking driver, several other variables have been studied using the blocking-vehicle paradigm. Horn-honking responses have been shown to depend on the sex of the blocked driver (Doob and Gross 1968) and the sex of the blocking driver (Deaux 1971), the social status of the blocking driver (Doob and Gross 1968), and cell phone use by the blocking driver (McGarva, Ramsey, and Shear 2006).

Turner, Layton, and Simons (1975) used the blocking-vehicle paradigm to study how anonymity of the blocking driver may interact with other cues that may influence aggression. In this study the blocking driver drove a pickup truck. A curtain hanging in the rear window of the pickup truck was open on some trials and closed on other trials. The pickup truck also had a gun rack in the rear window that was always visible, even when the curtain was closed. On some trials, the gun rack held a rifle and on other trials it did not. Also, when the rifle was present, it was paired with a bumper sticker that said either “Friend” or “Vengeance.” These words were chosen to alter the perceived aggressiveness of the rifle. The closed curtain significantly increased the rate

of honking across all conditions as compared to the open curtain treatment. The highest rate of honking was observed when the blocking driver was not visible but the rifle and the “Vengeance” bumper sticker were visible.

The horn-honking studies discussed above addressed how drivers’ behavior toward other drivers depended on the degree of anonymity of the other drivers. Anonymity of the driver also has been shown to affect driving behavior. One such study was conducted by Ellison-Potter, Bell, and Deffenbacher (2001). Prior to beginning a driving-simulation task, participants were either instructed to imagine that they were anonymous—“You are to imagine that you are driving a convertible with the top up and other motorists can identify your car but no one can personally identify you.”—or they were instructed to imagine that they were identifiable—“You are to imagine that that you are driving a convertible with the top down and other motorists can personally identify you.” As expected from the social psychology literature, those who were in the anonymous condition drove more aggressively than did participants who were identifiable.

Anonymous but similar people

Among people who are anonymous, even a small amount of revealed personal information can alter social behaviors. People who share similar attributes tend to be grouped together, and knowledge of shared attributes can produce weak social bonds between people who are otherwise strangers. In fact, a shared attribute that is sufficient to form a social bond can be minimal. Miller, Downs, and Prentice (1998) showed that young women cooperated more with a (fictitious) opponent in a Prisoner’s Dilemma game when they were led to believe that they shared the same birthday with the unseen individual. It is likely that weak social bonds form between drivers with similar vehicles (e.g., motorcycle riders, Corvette drivers, truckers, people with the same state license plates who are in another state far from home). It is not known how strongly and in what ways such affiliations may affect driving behavior. Perhaps drivers are simply more polite to those who share some of their attributes, or perhaps drivers are more willing to help similar drivers who are in need (e.g., stopping to assist a driver with a disabled vehicle or stopping after witnessing a crash).

People may behave more responsibly in the presence of others who can identify them. For example, drivers may be more courteous when driving on a street in their neighborhoods or in parking lots at their place of work where they may know people than in other locations where they probably don’t know people and are anonymous (e.g., shopping center parking lot).

Possible down side of making drivers more identifiable

Before making recommendations on ways to reduce anonymity in order to improve traffic safety, it should be noted that reducing the anonymity of drivers may have unintended consequences. The following example illustrates a rare circumstance where certain drivers were less safe because they were partially identifiable.

In Florida during the early 1990s there was a series of violent crimes against tourists, including a German tourist, Barbara Meller Jensen, who was robbed and beaten to death (Kidwell and Garcia 1993). Criminals had specifically targeted tourists whose vehicles could be easily identified as

rental cars. Drivers from out-of-town were identifiable because in the late 1980s and early 1990s, rental cars in Florida displayed license plates ending in the letters “Y” or “Z.” Until 1991, when they were banned in Dade county, rental cars in Miami often carried stickers or a front tag advertising the name of the rental car company. Ms. Jensen had both a “Z” rear license plate and a rental car company tag mounted on the front of her rental car. Thus, although reductions in the degree of anonymity of drivers may improve the traffic-safety culture overall, certain identifying information may be exploited to commit unlawful acts. Drivers who choose to personalize their vehicles may be subjected to prejudice or may become victims of aggression.

General privacy concerns may limit efforts aimed at reducing anonymity. With the development of advanced Intelligent Transportation Systems (ITS) technology, including the potential for vehicle-to-vehicle communication, vehicle to infrastructure communication, and crash avoidance, the protection of drivers’ privacy and access to personally identifiable information will become an issue. Although drivers may not mind exchanging some data with other drivers, it may be important for individual drivers to retain control over how much information they share.

Recommendations (How to move forward)

Reducing the degree of anonymity among roadway users may be an effective catalyst to improving safety culture on the highways. Specifically, a programmatic approach could be developed (as outlined below) to reduce anonymity of drivers, highway workers, convicted traffic offenders, and crash victims. Such a program is expected to change people’s perceptions, attitudes, and behaviors, ultimately producing cultural change in the direction of improved safety.

Workshop

As a first step, a multidisciplinary workshop could be held to focus on the concept of anonymity as it relates to traffic safety. This focused topic may be more productive than a more general topic, such as principles of social psychology on the roads. Participants would include a panel of experts, including social psychologists, sociologists, cultural anthropologists, and political scientists who would be able to bring a fresh perspective to highway safety. The purpose of the workshop would be to identify the most promising strategies for improving traffic safety culture. Some candidate strategies are discussed below.

Potential strategies for reducing anonymity among drivers

Although it may be difficult to reduce the anonymity of drivers, some approaches are possible. Promoting increased personalization of vehicles may be beneficial in at least three ways:

1. Drivers whose vehicles reveal some personal information about themselves (i.e., preferences for sports teams, musical groups, support for charitable or political causes, etc.) may feel less anonymous and may be less susceptible to deindividuation.

2. Increased personalization of vehicles may cause drivers of those vehicles to be perceived as individuals rather than as anonymous obstacles.
3. Personalization of vehicles may increase the formation of weak social links between drivers who notice that they share some attribute.

Certainly, many drivers may prefer to remain anonymous and would not like to reveal any information about themselves through their vehicles; however, the popularity of Internet-enabled social networks such as MySpace.com, media sharing sites such as Flickr.com, and self-publishing on the Internet (e.g., through “blogs”) indicates that there are millions of people in the United States who are willing to share certain personal information with strangers. The socio-cultural changes that are occurring because of the Internet (including the increased comfort level that many people feel about communicating with the public) have the potential to influence automobile culture as well. Some consumers may want vehicles that allow for greater self-expression. Perhaps, a vehicle that outwardly expressed the emotional state (mood) of the driver would have traffic-safety benefits.

Current efforts to develop automatic vehicle-to-vehicle communications technologies are focused primarily on immediate crash avoidance. However, including driver-to-driver communications capabilities in these systems may be helpful for reducing anonymity and allowing drivers to better understand each other’s intentions. For example, drivers may use vehicle-based systems to communicate personalized preprogrammed messages to request lane changes or, perhaps, to apologize for minor driving mistakes. To provide a net safety benefit, any such driver-driver communication systems must be simple to use and must not distract drivers from their primary driving tasks.

Strategies that rely on monitoring drivers’ behavior may be effective for improving the safety of certain groups. For example, teen drivers (who, compared to older, more experienced drivers are especially high-risk) could be monitored by their parents. Operators of fleet vehicles may be monitored by the company that employs them. There are already several consumer products available to monitor and record certain driving parameters which are indicative of unsafe driving. Some of these include cameras that record the driver’s face. Insurance companies may be interested in monitoring the driving behavior of people whom they insure. For example, Progressive Auto Insurance has conducted trial programs in Ohio and Texas. Less invasive monitoring strategies rely on reporting by other drivers. Many companies put signs on their vehicles, such as, “How’s my driving?” and provide a phone number for other motorists to report poor driving.

Increasing awareness of the effects of anonymity on behavior

In addition to strategies aimed at reducing driver anonymity, drivers could be informed about the potentially dangerous behavioral changes that often accompany feelings of anonymity. Public service announcements (PSAs) might compare the anonymous driving context to more proximate and personal interactions between people. For example, one such PSA might show someone butting into a line of people, shoving them, getting on a cell phone and bumping into people, telling the person in front of them to hurry up, etc. While those behaviors look unacceptably rude and absurd, a driver would be shown (maybe the same person who was deeply

offended while waiting in line) doing analogous things while driving. If effective, such messages could broadly affect safety behavior and reduce public tolerance for aggressive driving.

Potential strategies for reducing the anonymity of violators

This approach would attempt to provide a stigma for dangerous driving behavior and a public intolerance for other drivers violating one's right to safety. Names of drivers convicted of DUI, reckless driving, or other serious driving offenses may be published in local newspapers or on the Internet. Alternatively, a "scarlet letter" approach (Hawthorne 1850) may be used where violators are required to display something on their vehicles to identify them as offenders (e.g., tag on license plate). Public identification by a mark on the vehicle would reduce the anonymity of violators and would provide a warning to those who share the road with dangerous drivers. For many convicted violators, this public identification would provide an embarrassing stigma. It may cause some drivers to drive more safely out of fear that the identifier could make them a more likely target for enforcement.

In Washington and Oregon, one form of the "scarlet letter" approach was implemented to discourage offenders from continuing to drive despite being unlicensed or having a suspended or revoked license (U/S/R drivers). Neuman, et al. (2003) has described how the program worked: In this program, the vehicle registration of the vehicle driven by the U/S/R driver was cancelled, and the annual renewal sticker on the license plate was covered by a striped "zebra" sticker. If the vehicle owner was not the offender, then the owner had a 60-day period in which to pay a fee and purchase a new renewal sticker to cover the zebra striped sticker. If the vehicle owner was the offender, then the vehicle registration could not be cleared until the offender's driver's license was reinstated. In this case, the zebra striping remained on the renewal sticker. For law enforcement officers, seeing a zebra sticker on a vehicle's license plate was considered probable cause to stop the vehicle and check the status of the driver's license. In Oregon, the strategy was shown to be effective, but the laws were eventually rescinded in both Washington and Oregon. The effectiveness of the program depends on placing stickers on any vehicle operated by the offender, even if he or she is not the owner. Thus, in Oregon almost half of the stickered vehicles were not owned by the offender. This situation evidently caused much embarrassment for other family members who must operate the stickered vehicle.

Public identification of offenders may provide an inroad for making the general public less tolerant of risky drivers because it helps promote a sense that there is a specific inconsiderate individual behind the act, rather than just a general sense that "traffic" is aggressive. Efforts could be made to address this as a personal-rights issue, in much the way the risk of "second-hand smoke" is now perceived: Unlawful driving endangers the welfare of all road users. "Scarlet letter" strategies may work by reducing public complacency for the risky actions of other drivers, by providing a social stigma for being such a violator and by alerting other drivers to the presence of nearby offenders who may pose a safety risk.

Potential strategies for reducing the anonymity of highway workers

Highway workers often work in close proximity to moving traffic and protecting them from careless drivers is a major workplace safety concern. Pennsylvania DOT and several other states and municipalities have posted signs in association with highway work zone signs that say, “My Daddy works here” or “My Mommy works here.” The font on these signs resembles a child’s hand writing. If drivers recognize that highway workers are real people (like themselves) who have families, jobs, etc., they may show them more respect by moderating their speeds and driving more carefully in highway work zones. However, the present author was not able to identify any evaluations of the effectiveness of these signs.

Public service announcements and other messages in the media also may be helpful for personalizing highway workers. The American Road and Transportation Builders Association Transportation Development Foundation (ARTBA-TDF) has sponsored a “Highway Worker Memorial Scholarship Program” to help children of highway workers who have been killed or permanently disabled in the line of duty. Publicity about such programs may have a positive indirect effect on work zone safety, both by personalizing highway workers and by making the driving public more aware of the dangers that highway workers face while they are on the job.

Other creative solutions to personalize highway workers and make them seem less anonymous could be developed. One such solution might include name tags perhaps in the form of changeable magnetic signs posted on the approaches to work zones that list the first names of the workers on duty each day. Workers’ reflective safety vests might also include their first names or their initials printed in large letters. All of these ideas have the potential to change drivers’ perception of highway workers from that of anonymous agents who cause traffic congestion to real people who are working to improve driving conditions on the highway.

Potential strategies for reducing the anonymity of crash victims

Waitresses often write their name on the customer’s check, and people who clean hotel rooms often sign their name on a small card left in the room to increase the amount of tips that they receive. Customers are often more generous when those serving them simply identify themselves in this way. In general, people are also more sympathetic and more generous toward identified victims than toward statistical victims who have yet to be identified. This suggests that strategies which reduce the anonymity of victims may be effective for garnering public support for highway-safety improvements. For promoting traffic-safety culture, local statistics, and community-based programs where the victims have less social distance from members of the community, may be more effective than national statistics and national programs.

Approximately 40,000 traffic fatalities occur each year in the U.S. and families of loved ones killed in crashes sometimes place roadside memorials (crosses, flowers, pictures, and personal items). These informal signs may help to personalize the victim, and provide a warning to drivers, although they also might distract drivers. The net safety benefit of informal roadside memorials is not known. However, some jurisdictions (e.g., Sacramento, CA) have formalized roadside memorials by allowing the families of victims to sponsor official roadside signs

containing a safety message and victim's name (e.g., "Please don't drink and drive."—"In memory of <name>"). Other creative, possibly more effective, methods could be developed for families to publicize information about victims. Over time, providing much greater levels of organized support for the families and friends of those killed or injured in crashes to testify publicly about their experiences may influence public perceptions about highway safety and may increase political pressure for safety-related legislation and funding priorities.

In some jurisdictions, victim panels have been used to educate DUI offenders about the possible consequences of their actions. Family members who have lost a loved one or people who have been severely injured as a result of a crash involving a drunk driver are given the opportunity to tell their stories, sometimes in face-to-face meetings with DUI offenders. The risks of driving under the influence of alcohol are made salient to offenders by reducing the anonymity of the victims.

Conclusions

Improving the safety culture of the United States highway system may be aided by research and programs aimed at social factors of driving. Recruiting social psychologists, sociologists, and other social scientists to collaborate on the problem is a first step. One possible approach discussed in this paper is to reduce the anonymity of road users. Several suggestions are offered here to personalize or identify individual drivers, highway workers, or crash victims. Research is needed to explore the effectiveness of these approaches. Although many of the strategies discussed may require sustained efforts over a long period of time to be effective, other public health efforts such as reducing the number of people who smoke have been successful at producing lasting cultural changes.

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Biographical statement

Dr. James W. Jenness is a Senior Research Scientist in Westat's Transportation and Safety Research Group. He holds a Ph.D. in Biopsychology (University of Michigan, 1992) and has over fourteen years of experience in behavioral research, particularly in the areas of visual perception, in-vehicle technologies, computer-based training, and auditory communications. Dr. Jenness was a Research Associate in the Visual Sciences Center at University of Chicago (1992–1995) where he conducted studies on color perception and visual adaptation. For five years (1995–1999) he was assistant professor of Psychology at The College of Wooster (OH) where he taught courses in psychology, statistics, and experimental design. Dr. Jenness worked on product research and development at Beacon Publishing Group, The Dot Com Group, and SS8 Networks where he was Principal Investigator, and then Manager of Human Factors. While at SS8 Networks, Dr. Jenness lead usability tests and user interface design activities for telephone messaging products. He has designed and tested auditory user interfaces for telephone messaging systems, including a TDD/TTY user interface for hearing impaired users. Dr. Jenness also lead behavioral studies of driver distraction caused by cell phone use. Since joining Westat in 2003, Dr. Jenness has managed human factors research projects for Federal Railroad Administration, National Highway Transportation Administration, Washington Metropolitan Transit Authority, and others. Recently, Dr. Jenness was the principal investigator for a behavioral study funded by the Federal Highway Administration to determine adequate color and visual contrast of detectable warning surfaces (walking surfaces) for pedestrians who have visual impairments. Dr. Jenness participates in several professional organizations, including the Society of Automotive Engineers, the Transportation Research Board, the Human Factors and Ergonomics Society, and the Usability Professionals Association.