

Psychology on the Road

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With gas prices rising dramatically, many people are turning to mass transit. But for the vast majority, cars are still the main mode of transportation. When you break it down, driving is pure behavior. It involves perception, cognition, emotion, and social acumen to operate a car — to process the information conveyed by lines, signs and symbols, to navigate while steering, and to share the space with all those other drivers. With more drivers on the road than ever, one has to wonder how so many people get from point A to point B in one piece. Psychological science is asking the same question.

Rage in the Machine

One of the most discouraging aspects of driving is the prevalence of angry drivers. Of course, no one likes it when they are cut off, or when someone weaves through traffic, or cruises in the passing lane, and while some people handle bad drivers obstacles with grace, others turn to more offensive methods of expression.

All the Rage

If you find yourself consistently outraged by the onslaught of angry drivers in your city, it may be time to move to a more laid back locale. The 2008 AutoVantage Road Rage Survey polled drivers throughout the country to discover America's most courteous – and rudest – cities for motorists. Pittsburgh, PA received top honors as the most courteous city for drivers, followed by Portland, OR; Seattle, WA; Minneapolis, MN; and Cleveland, OH. The Sunshine State seems to churn out some dreary drivers as Miami, FL clocked in at the number one rudest place for drivers, followed by nearly the rest of the East coast, including Boston, MA; New York, NY; Baltimore, MD; and Washington, DC. If you'd like to see

if your hometown made the cut visit www.autovantage.com.

The term “road rage” refers to violent behavior by a driver of an automobile, which causes accidents or incidents on roadways. Common manifestations of road rage include sudden acceleration, braking, close tailgating, sounding the vehicle’s horn or flashing lights excessively, and, of course, the classic one fingered salute. But, when obscenities start flying from the mouth of a parent, with child in tow, or a sweet looking older woman, that has to make you wonder what exactly makes level-headed people turn in to angry road warriors.

It turns out that all of these actions can be fostered by the feeling of security generated by the locked doors of your car. Psychologists assert that drivers may develop a sense of anonymity and detachment in the confines of their vehicles. And tinted car windows may be more than a safety hazard. They may even further detach drivers from the situation during an aggressive incident (Whitlock, 1971; Ellison-Potter, Bell & Deffenbacher, 2001).

Getting cut off is one thing, but when a huge gas guzzler whips in front of you, it seems to make the situation worse. Indiana University psychologist, Raymond Novaco, would argue that a person’s car is used as an instrument of dominance, symbolizing power, and that the road then becomes an arena for competition and control (Novaco, 1989; Whitlock, 1971). So remember: that driver in the Hummer who just cut you off is probably diminutive in other areas.

A common source of driver frustration on the roads comes from being stuck behind a slow or inexperienced driver and often it’s not only someone’s level of aggression, but their age, that contributes to bad driving.

Age: More than a Number

Two of the most common stereotypes in driving are that kids are maniacs behind the wheel, and that elderly people are a menace. According to the National Highway Traffic Safety Association (NHTSA), in 2006, 202,000 older individuals were injured in traffic crashes, accounting for 8 percent of all the people injured in traffic crashes during the year. Furthermore, in two-vehicle fatal crashes with an older and a younger driver, the older driver’s vehicle was nearly twice as likely to be the one that was struck and in 25 percent of those crashes, the older driver was turning left (NHTSA, 2006).

These facts point to a skill deficit in older drivers. Psychological science research presents us with interesting findings on the basic functioning skills of the aging population which have direct implications for many activities, including driving.

One of the most ubiquitous findings in research on cognition and aging is that a wide variety of cognitive abilities show an increasing decline across the life span. While knowledge-based skills, like driving at the speed limit, are maintained and might even improve with age, other fluid skills, such as pressing down appropriately on the gas pedal, are not preserved as we age (Kramer & Willis, 2002).

But older drivers have been driving for years, so experience should mediate their ability to drive, right? Wrong. Older drivers still cognitively know the mechanics of driving, but their psychomotor abilities are

not on par with their understanding of the skill.

That's not to say that practice doesn't make older drivers better. Researchers have examined whether long-term experience in areas such as driving, flying, and music serves to reduce age-related decline in basic abilities and helps develop compensating strategies. The general consensus is that yes, experience can reduce some age-related cognitive decline, however it requires deliberate practice of the relevant skills (Salthouse, 1984; Krampe & Ericsson, 1996).

So focusing on the specific skills involved in driving should improve older driver's abilities. This seems to work. According to a study conducted by the American Automobile Association Foundation for Traffic Safety and Yale University, senior drivers 70 years of age or older who took classroom driving improvement courses and behind the wheel training did, in fact, improve their driving performance.

Taking a look at the aging brain also reveals some of the challenges faced by elderly drivers. APS Fellow Timothy Salthouse heads the Salthouse Cognitive Aging Lab at the University of Virginia. He insists that we understand far less about the aging process in the brain, than we do in the body. "This is unfortunate because cognitive functioning can affect one's quality of life and even the ability to live independently," he wrote (Salthouse 2004).

And living independently requires access to transportation. With 27 million people currently aged 70 or older, a number predicted to rise to 37 million by the year 2030, precautions, such as age-related restrictions on licensing and mandated refresher courses, will need to be taken in order to reduce the safety risk of older drivers. This notion is often met with concern, specifically from the American Association of Retired Persons (AARP), the largest association of older Americans. AARP opposes licensing restrictions and testing of elderly drivers, citing age discrimination. This powerful lobby group argues that restrictions should be based solely on driving ability and not age (James & Nahl, 2000).

Law and Order: SUV

Lawmakers may be listening to researchers when creating driving-related legislation, but that doesn't mean that they always listen to common sense. The law books are littered with ridiculous driving related laws. The first ever speed limit was set in the United Kingdom in 1865— 4 mph in the country and 2 mph in town. To make matters worse for these slow moving drivers, each vehicle was required to have three drivers, two that sat in the car and one to walk in front carrying a red flag to warn the horses and carriages which shared the road. Imagine that on your morning commute. But, funny laws are not restricted to those first automotive pioneers:

- In modern day Florida, if you tie an elephant, goat or alligator to a parking meter, you must pay the fare as you would for a car.
- In Tennessee, it is illegal to shoot game from your car, but a special exception is made for shooting whales. Lawmakers were obviously trying to keep the ballooning Tennessee whale population under control.
- Stopping for ice cream on a hot day in Kentucky can turn sour if you are caught unlawfully transporting the cone in your back pocket while driving.
- If your car breaks down in Detroit and you are waiting for assistance, be aware that sitting in the middle of the street to read a newspaper is illegal.

- One of the most bizarre driving laws comes to us from Pennsylvania, where if you spy a team of approaching horses, you are required by law to pull to the side of the road and cover your car with a blanket or dust cover that has been painted or sewn to blend into the scenery. But, if the horses react skittishly to your efforts, you are then required to disassemble your car and hide the parts in the nearby underbrush.

The leading cause of death in the elderly is still heart disease, not car crashes; however the same cannot be said for their younger counterparts. Young drivers, ages 15- to 20-years old, are especially at risk for death and injury on our roadways. Traffic crashes are the leading cause of death for teenagers in America. Mile for mile, teenagers are involved in three times as many fatal crashes as all other drivers (NHTSA).

Young drivers are also involved in fatal crashes at over twice the rate as drivers aged 21 and older (NHTSA). Teen drivers are far more likely than other drivers to be involved in fatal crashes because they lack driving experience and tend to take greater risks due to their immaturity. Abigail Baird of Vassar College is interested in finding out what role immaturity plays in risky behavior. Baird's research shows that teenagers actually take longer to respond when presented with the option of participating in several dangerous situations and that their brain (as measured by fMRI) weighs options differently than adults. For example, when asked if jumping off a roof is a good idea, adults are more likely to create a mental image of possible outcomes, and to have an aversive response to the image, whereas teens seem to be trying to decide whether or not the scenario is actually dangerous and therefore have a delay in generating the correct response (Conkle, 2007).

On one hand, it may seem advantageous that teens take the time to make decisions in this manner; however hazards on the road often require a driver to make snap judgments, a skill the teen brain is not prepared to handle. Adult drivers are much more inclined to go with their gut, whereas a teenager may unknowingly waste precious seconds as their brain processes novel information.

Teenagers take more risks across the board and Temple University psychologist, Laurence Steinberg, also points to the teen brain as a reason for such risky behavior. A teenager's logical-reasoning abilities are more or less fully developed by age 15, but psychosocial capacities that improve decision making and moderate risk taking continue to mature well into young adulthood.

So, teens are correct in believing that they can make mature decisions, however this may only hold true when the influence of psychosocial factors are minimized. In the presence of peers or under conditions of emotional arousal, say driving a friend around in a brand new car, impulse beats out proper judgment almost every time (Steinberg, 2005).

Considering results like these is part of the reasoning behind the recent enactment of graduated licensing programs (GDL). A typical three-stage GDL program involves a "Learner stage" in which all driving must be supervised by adult (usually a parent), followed by an "Intermediate (or 'Provisional') stage," which allows unsupervised driving but only under certain conditions (e.g., during the day, no passengers), and after completion of the first 2 stages, the teen is awarded full license privileges. According to the American Automobile Association, the rate of fatal crashes of 16-year-olds reduced by 11% (per capita) in states with 3-stage GDL programs. Currently, 43 states and the District of Columbia

have enacted three-stage GDL systems, and all states have some form of GDL.

Driven to Distraction

Another common driving problem drawing lawmakers' attention is distraction. Driver distraction has been a problem since the dawn of the car. Ever since the first motorists' attention was diverted by the funny noise the engine was making, that robin in the tree along the road or the fetching person in the passenger seat, we've had trouble keeping our eyes and minds on the road. But, with today's in-car entertainment and navigation systems, plus cell phones, PDAs and all our other gadgets, driver distraction is at an all time high.

Estimates of the role that distraction plays in accidents or injury vary, but data based on a national sample of police-reported crashes in which at least one car was towed, showed that 11.6 percent of the crashes involved a distracted driver (Stutts, et al, 2005). Since most people aren't likely to admit to an officer that they just happened to be reaching for that CD when they veered and many times the officers don't even ask, these numbers are likely much lower than the actual percentage of accidents caused by distraction. The numbers get even scarier as the accidents get worse. Drivers who were distracted when they crashed are 50 percent more likely to be killed or seriously injured than non-distracted drivers (NHTSA, 2008).

Researchers have divided distraction into four broad categories (Stutts et al., 2005): Visual distractions, like when a frustrated mom uses the rear-view mirror to spy on misbehaving kids, rather than focusing on the road; audible distractions, like the screams of a child while his brother pulls his hair; physical distractions, when the mother reaches back with her right hand to wrangle the offending brother back to his side of the car; and cognitive distraction, like the ensuing conversation about being nice to your brother. As the above example shows, what many people might think of as one distracting situation can actually have many components that increase the potential for driving disaster.

Studies have shown that different types of distraction affect driving differently. Under the umbrella of the HASTE (Human-machine interface and the Safety of Traffic in Europe) project, eight research teams in Europe and Canada assessed the distraction potential posed by in-vehicle information systems, like Global Positioning System units (more on these later). Visual tasks led to problems with steering and lateral movements, like staying in one's own lane (Carsten, 2005). On the other hand, cognitive tasks led to less longitudinal vehicle control, i.e., maintaining a proper distance from the car in front of you. Unexpectedly, drivers' lateral control improved when completing cognitive tasks. Researchers further investigated this strange result with an eye-tracking study. It seems that when performing a cognitive task, drivers keep their eyes on the center of the road rather than scanning the entire road surface more frequently as they usually do. This phenomenon is not completely understood, but it may be that drivers are simplifying their driving to account for the cognitive load being taken up by the other task. So, they focus on the most key aspect of driving, what's directly in front of them, but may take longer to see that other car darting out from the left than they would without the cognitive distraction.

Newer technologies are providing more opportunity for distraction than ever before. One of the main offenders is in-vehicle information and navigation systems, the most popular being GPS devices. These systems involve every type of distraction: the physical distraction of pressing keys, visual distraction of reading the display, aural distraction of listening to directions from the device and cognitive distraction

of interpreting and processing the devices directions (NHTSA, 2008). There is also evidence that just having the device in the car increases distraction because drivers simply can't resist playing with it, even when they don't need directions: scrolling through the various menus, testing different displays and what not. Even when we should be focused on driving, our curious human nature gets the better of us. But, regardless of their distraction potential, in-vehicle information systems may have a leg up over the more traditional option of paper maps. In a study comparing various types of navigations systems with paper maps, using a paper map lead to worse driving than every combination of visual and aural information. So, you may want to consider permanently stashing the road atlas in that pocket behind the passenger seat.

Cell phone use while driving has become the hallmark of distracted driving. What driver hasn't cursed a fellow roadster for bad driving while on the phone only to pick up his or her own phone a few minutes later? Like navigation systems, cell phones involve every type of distraction. And their use while driving is commonplace and rising. Daylight surveys of passing drivers showed a steady one percent increase in hand-held phone use every year between 2002 and 2005 (NHTSA, 2008). According to 2005 National Highway Traffic Safety Administration estimates, about 10 percent of daytime drivers are having a phone conversation at any moment. And hands-free doesn't necessarily make talking while driving better. Researchers at the University of California, San Diego found that performing just easy auditory and visual tasks, with no physical element, slowed reaction time by 174 milliseconds. That might sound tiny, but at 65 mph that translates to 16 feet, more than enough to cause or avoid catastrophe (Levy et al., 2006).

As described before, determining the actual effect of cell phone use is difficult because of lack of reporting. But, while phone records are not available to researchers in the United States, they are in many other nations. This has allowed researchers to compare crash times directly with phone records. Studies in both Canada and Australia have shown that cell phone use is associated with four times the risk for a crash. And, once again, hands-free calling didn't help (NHTSA, 2008).

Text messaging is another cell-phone related threat. An Australian report found that when texting, drivers take their eyes of the road four times more than they do normally. Also, younger drivers are more likely to use texting and phone capabilities other than making calls while driving. These distractions in the hand of less-developed drivers, as discussed earlier, makes for an even more dangerous situation (Parliament of Victoria, 2006).

In the near future, you may be checking email and weather from a built-in computer during your daily commute in addition to talking on the phone, texting or getting your route from a GPS device. With technology developing as quickly as it is, the possibilities for driver distraction are endless. So what's to be done? Many jurisdictions are turning to laws to lessen cell phone use. Currently, six states and the District of Columbia have laws banning hand-held cell phone conversations while driving and over 30 more states have some form of this legislation in process (National Conference of State Legislatures, 2008). Lawmakers appear to be listening to the scientists' advice, but only partially. For example, a recent anti-texting while driving bill in Maryland failed to pass the state legislature. Many legislators felt that the existing anti-distraction laws covered texting, they were not unaware of the obvious dangers of texting while driving. Also, most legislation only limits hand-held phone calls, while the research has clearly shown that hands-free phone calls can be just as distracting. Because enforcing hands-free laws would be very challenging unless you are also going to pull over drivers for talking or singing to

themselves, this may be an opportunity for bringing science directly to the public through awareness campaigns and other educational tools rather than through laws.

While legislation is an important step in discouraging some types of driving behavior, you can't legislate behavior change. As we all know from experience with speed limits, enforcement is effective but the effects are often fleeting, lasting about as long as it takes to get through a speed trap or photo enforcement zone. New York's law prohibiting cell phone use while driving went into effect in December 2001. Before the ban, 2.3 percent of drivers used phones while driving. Immediately after the ban, the number dropped to 1.1 percent, showing that the ban did have an effect. But, by 2003 the number was back up to 2.1 percent (Sundeen, 2005). In order for legislation to be effective in the long run, it must be combined with education and other programs to change drivers' behavior. In a review of cell phone and driving research, a group of researchers from the Insurance Institute for Highway Safety concluded that "publicized enforcement is needed to achieve widespread long-term compliance" with these laws (McCartt, et al., 2006)

Even with these measures, human behavior is notoriously difficult to change, and when driving, it often seems like it's the other guy, not me, who needs to change. In the coming years technology may be able to provide some assistance. Some Volvos are now available with a feature that monitors "steering wheel movement, the position of the accelerator, turn indicator activation and braking" to determine when the driving climate is especially busy. During these times, calls and text messages to the vehicles integrated mobile phone system are blocked until driving returns to calmer conditions (Volvo, 2008). The 2008 Lexus LS600hl will feature a camera which tracks the drivers eye-movements. If the driver is looking away when the car's radar detects a threat, the system will warn the driver (NHTSA, 2008). McCartt, et al., also suggest that future phones could be designed so that they can't be used while a car is in motion. Although we humans may not want to change our distracted ways, technology could eventually force us all to be the safe drivers that we should be. Or that we at least want others to be. ?

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