

Car crashes rank among the leading causes of death in the United States.



Aggressive Driving: Research Update

April, 2009



Overview

Aggressive driving is a major concern of the American public, ranking at or near the top of traffic safety issues in national surveys of motorists. However, the concept of aggressive driving is not well defined, and its overall impact on traffic safety has not been well quantified due to inadequacies and limitation of available data.

This paper reviews published scientific literature on aggressive driving; discusses various definitions of aggressive driving; cites several specific behaviors that are typically associated with aggressive driving; and summarizes past research on the individuals or groups most likely to behave aggressively. Since adequate data to precisely quantify the percentage of fatal crashes that involve aggressive driving do not exist, in this review, we have quantified the number of fatal crashes in which one or more driver actions typically associated with aggressive driving were reported. We found these actions were reported in 56 percent of fatal crashes from 2003 through 2007, with excessive speed being the number one factor. Ideally, an estimate of the prevalence of aggressive driving would include only instances in which such actions were performed intentionally; however, available data on motor vehicle crashes do not contain such information, thus it is important to recognize that this 56 percent may to some degree overestimate the contribution of aggressive driving to fatal crashes. On the other hand, it is likely that aggressive driving contributes to at least some crashes in which it is not reported due to lack of evidence.

Despite the clear limitations associated with our attempt to estimate the contribution of potentially-aggressive driver actions to fatal crashes, it is clear that aggressive driving poses a serious traffic safety threat. In addition, our review further indicated that the “Do as I say, not as I do” culture, previously reported in the Foundation’s Traffic Safety Culture Index, very much applies to aggressive driving.

Background

Americans are very concerned about aggressive driving, at least when it’s done by “the other guy.” A 2005 telephone survey by ABC News and The Washington Post found that when asked which of several potential threats “most endangers your own safety on the road,” 32 percent of respondents identified aggressive drivers as the greatest threat, yielding as many responses as drunk drivers and nearly three times as many responses as any other item that was queried. The overwhelming majority of respondents to a 2002 survey by the National Highway Traffic Safety Administration reported having felt threatened by the behavior of other drivers at least occasionally in the past year, and about one in seven reported feeling threatened by other drivers weekly or more often (2003). In a 2002 telephone survey by the Pew Charitable Trusts, 58 percent of respondents reported that they often saw “drivers who are aggressive and reckless.”

Although studies of aggressive driving have defined the issue in a number of different ways, most suggest that young males are more likely than other demographic groups to drive in ways that may be considered aggressive or dangerous. Some studies suggest that individual differences in personality play a significant role in one's propensity toward aggressive or dangerous driving, and that people who drive aggressively are more likely than others to have other psychiatric or behavioral issues outside the specific context of driving. In contrast, others point out that very polite and well-mannered people, who wouldn't even think of cutting in line at the grocery store or doing other rude behaviors, act very rude and aggressive when behind the steering wheel, including late merges to cut in line. Studies have also found aggressive behavior increases under states of stress and that certain driving situations such as traffic congestion can evoke stress. Moreover, it is important to recognize that an aggressive driving act by one driver can trigger a disproportionate response, sometimes even escalating to the level of "road rage," which is a criminal act of assault which may stem from a confrontation that occurred on the road.

Given the Foundation's efforts to change the traffic safety culture in the United States, it is extremely important to remind motorists of the scope of aggressive driving, and to recognize that is unacceptable and represents a serious traffic safety problem.

Defining Aggressive Driving

Traditionally, the traffic safety community has defined and attempted to measure aggressive driving in a variety of ways. Some studies of aggressive driving have focused on specific driving behaviors, such as speeding, tailgating, or violating traffic control devices, which are commonly thought of as behaviors typically associated with aggressive driving. Other studies have distinguished between aggressive driving behaviors and driving behaviors that may be dangerous but not necessarily aggressive on the basis of the driver's intentions. Finally, studies have investigated acts of assault committed by drivers against other drivers with the intent of causing physical harm, which is a criminal act often referred to as "road rage," and is considered to be distinct from aggressive driving due to the intentionality of the harm that it may cause. In this paper, we focus on aggressive driving, and have not attempted to investigate criminal acts of "road rage."

In a review of published literature on aggressive driving, Tasca (2000) outlined some general criteria for a precise definition of aggressive driving, and proposed the formal definition: "A driving behavior is aggressive if it is deliberate, likely to increase the risk of collision and is motivated by impatience, annoyance, hostility, and/or an attempt to save time" (pg. 2). Tasca further provides a list of examples of specific behaviors that would meet his proposed definition, including: tailgating, weaving in and out of traffic, failure to yield the right of way to

other road users, preventing other drivers from passing, driving at speeds “far in excess of the norm,” running stop signs or red lights, and several others.

Somewhat similarly, in a report published by the Transportation Research Board, Neuman et al. (2003) define aggressive driving as, “operating a motor vehicle in a selfish, pushy, or impatient manner, often unsafely, that directly affects other drivers.” (pg. I-1) They further define aggressive driving as a “contextual violation,” dependent upon the driver’s psychological state and environmental factors such as traffic conditions that are present when a behavior is performed. They also note that there is wide variation in estimates of the extent of aggressive driving.

A report published by the National Highway Traffic Safety Administration (NHTSA) states that aggressive driving “is generally understood to mean driving actions that markedly exceed the norms of safe driving behavior and that directly affect other road users by placing them in unnecessary danger.” (2009, pg. 3-1). This report states that “immature” and “selfish” driving behavior may be typical of a small proportion of drivers, but that the vast majority may respond to specific provocation, for example due to frustration with traffic conditions, by driving in an aggressive manner.

In an online report by NHTSA for the law enforcement community, NHTSA (n.d.) defines aggressive driving as “when individuals commit a combination of moving traffic offenses so as to endanger other persons or property.” Having been written for the law enforcement community, this definition refers to “offenses” rather than simply “behaviors,” however, an important element of this definition is the concept of combinations of offenses (or behaviors). Arguably, combinations of behaviors—each of which may or may not necessarily be indicative of aggressive driving on its own—may be more likely to be indicative of aggressive driving than individual behaviors in isolation. For example, as shown subsequently, 30.7 percent of all fatal crashes from 2003 to 2007 involved a speeding driver, and 11.4 percent involved a driver who reportedly failed to yield the right of way. Either of these behaviors could have been committed purposely—in an aggressive manner—or unintentionally as the result of an error, but when a driver performs both of these behaviors at the same time, it is arguably more likely that the driver did so on purpose rather than accidentally.

We contend that any unsafe driving behavior, performed deliberately and with ill intention or disregard for safety, can constitute aggressive driving. However, as noted earlier, existing sources of data on motor vehicle crashes do not include information about the motivations or intentions of drivers, therefore, attempts to estimate the prevalence of aggressive driving using motor vehicle crash data must rely on information about the driver’s actions.

“Do as I Say, Not as I Do”

Foundation research is consistently pointing to a duality in drivers in which they condemn behaviors of other drivers, yet they admit engaging in those same behaviors themselves. For instance, according to results from the 2008 AAA Foundation’s Traffic Safety Culture Index (AAA Foundation for Traffic Safety, 2008), 78 percent of respondents rated aggressive drivers as a serious or extremely serious traffic safety problem. However, many of the same people reported driving in ways that could be classified as aggressive, which is the essence of the “Do as I say, not as I do” attitude we have seen previously. For example, despite rating aggressive driving as a serious or extremely serious traffic safety problem, nearly half of those surveyed reported exceeding the speed limit by 15 mph on major highways in the past 30 days, and 15 percent even admitted exceeding the speed limit by 15 mph on neighborhood streets. Drivers also admitted to performing numerous other potentially-aggressive acts, including speeding up to beat a yellow light (58%), honking at other drivers (41%), pressuring other drivers to speed up (26%), tailgating (22%), and deliberately running red lights (6%).

To that end, it is interesting to note two additional findings from our Traffic Safety Culture Index survey. First, 3 out of every 4 drivers said they are more careful than most other drivers. Second, almost 60 percent of drivers indicated that they were substantially in control of whether or not they would be involved in a crash.

What is the role of aggressive driving in fatal crashes?

Methods

To investigate the prevalence of aggressive driving in fatal motor vehicle crashes, NHTSA’s Fatality Analysis Reporting System (FARS) database was analyzed. FARS is an annual census of all crashes involving motor vehicles in transport, which occur on public roadways, and result in the death of one or more persons within 30 days of the crash. FARS provides detailed information derived from police reports on all fatal crashes, specifically on all the vehicles and people that are involved.

The role of aggressive driving in crashes was assessed using the driver-related contributing factors coded in FARS. These are factors listed on police crash report forms as having contributed to the crash, and include a number of different factors related to the driver’s behavior and performance (e.g., failure to yield right of way), condition (e.g., drowsy), and circumstances (e.g., vision obscured by an object). Each driver record in FARS may include up to four driver-related contributing factors. Only factors related to behavior and performance, discussed subsequently, are relevant to the present study. Note that a contributing factor should not be interpreted as the cause of the crash. Because of the retrospective nature of the police investigations which produce the information that is coded into FARS, no claims are made about the causes of the crashes.

Although our proposed definition of aggressive driving is conditional upon not only a driver's observable actions but also his or her intentions, no information about drivers' intentions is available in the data analyzed. As discussed previously, any of these behaviors could be performed willfully, in which they would be indicative of aggressive driving as defined herein; however, many of them could also be performed accidentally, in which case they arguably should not be taken as indications of aggressive driving. For example, if a driver purposefully violates a traffic signal or fails to yield right-of-way due to an aggressive motivation, this would constitute aggressive driving; however, the same action should not be classified as aggressive if the driver simply failed to notice a traffic signal or failed to recognize the right-of-way of another road user, but without any aggressive intent or willful disregard for safety. This would be a serious error, but would not be appropriate to categorize as aggressive driving. Therefore, the driver-related contributing factors listed here are referred to hereafter as *potentially-aggressive actions*.

The following driver-related contributing factors in FARS were taken as indications that crashes may have involved aggressive driving.*

- Following improperly
- Improper or erratic lane changing
- Illegal driving on road shoulder, in ditch, or on sidewalk or median
- Passing where prohibited by posted signs, pavement markings, hill or curve, or school bus displaying warning not to pass, passing on wrong side, passing with insufficient distance or inadequate visibility or failing to yield to overtaking vehicle
- Operating the vehicle in an erratic, reckless, careless, or negligent manner or suddenly changing speeds
- Failure to yield right of way
- Failure to obey traffic signs, traffic control devices, or traffic officers, failure to observe safety zone traffic laws
- Failure to observe warnings or instructions on vehicle displaying them
- Failure to signal
- Driving too fast for conditions or in excess of posted speed limit
- Racing
- Making an improper turn

The frequency with which each of these factors was coded in fatal crashes was analyzed using FARS data from 2003 through 2007.

Results

* The factors summarized in this list represent FARS driver-related contributing factors 26, 27, 29, 33, 34, 35, 36, 38, 39, 41, 42, 44, 46, 47, and 48.

From 2003 through 2007, a total of 192,069 fatal crashes occurred in the United States, resulting in the deaths of 212,997 people. In 456 of these crashes, no information was available about any driver involved. These crashes were excluded from the analyses reported here. Thus, analyses reported here are based on the remaining 191,611 fatal crashes, which involved 289,659 drivers, and resulted in the deaths of 212,427 people.

Figure 1 shows the percentage of fatal crashes in which each potentially-aggressive action (from the previous list) was coded for at least one involved driver. Overall, in 84,884 of these fatal crashes (44.3%), none of the potentially-aggressive actions was reported; in 90,638 crashes (47.3%) one such action was reported; in 15,044 crashes (7.9%) two of these actions were reported; and in 1,045 crashes (0.5%) three or four of these actions were reported. In total, 106,727 fatal crashes from 2003 through 2007 (55.7%) involved at least one driver who was coded as having committed at least one potentially-aggressive action.

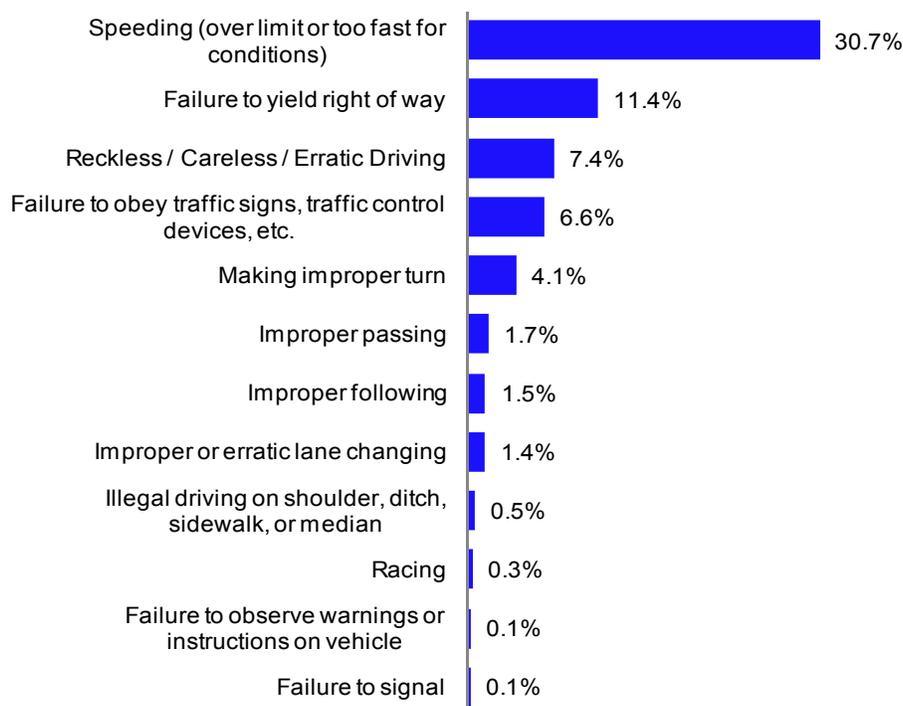


Figure 1. Percentage of fatal crashes involving potentially-aggressive driver actions, FARS 2003 – 2007.

Speeding was the most common potentially-aggressive action by far; nearly one of every three fatal crashes over the period studied involved a driver who was reported to have been exceeding the speed limit and/or driving too fast for conditions.

Half of the fatal crashes (53,358, 50.0%) coded as involving potentially-aggressive actions were single-vehicle crashes; 45,021 (42.2%) involved two vehicles, and 8,348 (7.8%) involved three or more vehicles. Of the 45,021 two-vehicle crashes, potentially-aggressive actions were coded for only one of the drivers in 94.5 percent of these crashes and for both drivers in 5.5

percent. Of the 8,348 crashes involving more than two vehicles, potentially-aggressive actions were coded for only one driver in 91.6 percent of these crashes, two drivers in 6.9 percent, and more than two drivers in 1.5 percent.

A total of 119,475 people were killed in crashes involving potentially-aggressive actions. Of these, 67,223 (56.3%) were those drivers themselves (i.e., drivers coded as having committed potentially-aggressive actions), 25,799 (21.6%) were their passengers, and 26,453 (22.1%) were occupants of other vehicles and non-motorists.

Some previous research has suggested that young male drivers are more likely than others to engage in aggressive driving behaviors. To investigate this, potentially-aggressive actions were tabulated by driver age and gender. When analyzed with respect to age, the proportion of fatal-crash-involved drivers for whom any potentially-aggressive actions were coded decreased steadily with increasing age from the teenage years through about age 60, before increasing again. For example, 58.8 percent of 16-year-old drivers, 35.3 percent of 35-year-old drivers, and 26.5 percent of 60-year-old drivers had any potentially-aggressive actions coded. Among drivers in their teens, twenties, and thirties, male drivers were substantially more likely than female drivers to have potentially-aggressive factors coded; however, this trend narrows considerably for drivers over about age forty.

The proportion of drivers with potentially-aggressive factors coded increased steadily from ages in the mid-sixties through the very oldest ages; however, other studies suggest that this is due to older drivers' increased propensity toward committing errors, rather than a tendency to drive aggressively. More in-depth examination of the data tends to support this hypothesis. Arguably, behaviors such as speeding and driving carelessly or recklessly are likely to be committed willfully, whereas failure to yield right of way may be more likely to be committed accidentally, for example, due to inattention, confusion, or an error in judging the speed or distance of another vehicle. The proportion of drivers coded as speeding or driving carelessly or recklessly decreased steadily with increasing age across the entire age spectrum, whereas the proportion coded as failing to yield the right of way increased dramatically at the older ages.

Discussion

According to the definition of aggressive driving that we propose here, whether or not an action constitutes aggressive driving is conditional upon a driver's intent, but because information about the driver's intent is not available in the data analyzed here, we cannot determine whether or not these crashes truly involved a driver who was deliberately driving aggressively. Thus, while the data indicate that up to 56 percent of the fatal crashes analyzed here involved potentially-aggressive driving actions, this may to some degree overestimate the true prevalence of aggressive driving in fatal crashes.

It is worth noting that the potentially-aggressive driver actions shown in Figure 1 are not mutually exclusive; in 8.4 percent of the crashes, a driver was coded as having committed two or more of these actions. Arguably it is more likely that a driver's actions were committed deliberately, as opposed to accidentally, when a driver was coded as having committed multiple potentially-aggressive driving actions.

It is also likely that some crashes in which none of these potentially-aggressive actions were coded in FARS did in fact involve a driver who was driving aggressively. A salient example would be a case in which a driver commits an aggressive driving action that causes another driver to lose control of his or her vehicle and crash. If the vehicle being driven aggressively did not contact another crash-involved vehicle, and subsequently left the scene of the crash, it is unlikely that the aggressive action on the part of the driver of the non-contact vehicle would be captured in FARS. In 2006, a data element was added to FARS to record instances in which the police reported aggressive actions on the part of a non-contact vehicle; however, this data element was only used in a total of three fatal crashes in 2006 and two in 2007, which we suspect is a substantial underestimate of the true prevalence of this scenario.

One might argue that a driver who commits a potentially-aggressive action while impaired by alcohol is not performing the action completely voluntarily, in which case potentially-aggressive actions committed by intoxicated drivers might reasonably be excluded from the analysis reported here. To investigate the impact of this, the analysis was repeated, using multiply-imputed driver BAC data in FARS (see Subramanian [2002] for explanation of this method), and only including crashes that involved at least one driver who was coded as having committed a potentially-aggressive action and as having a blood alcohol concentration (BAC) below the legal limit of .08 mg/dL. All drivers reported to have committed potentially-aggressive actions were legally intoxicated (BAC \geq .08) in an estimated 33,524 of the 106,727 fatal crashes involving any potentially-aggressive actions. In the remaining 73,203 fatal crashes (68.6% of the original estimate; 38.2% of all fatal crashes over the period), potentially-aggressive actions were reported for a driver with a BAC below .08, the majority of which had a BAC of zero.

Along with the contributing factors analyzed here, FARS also includes a code for *Road Rage / Aggressive Driving*, which was added in 2004. This code does not distinguish between aggressive driving and road rage, however, as noted previously, these are widely considered to be fundamentally different. An act of road rage, as it is typically defined, is committed with the intent of causing physical harm to another road user, whereas an act of aggressive driving is committed with disregard for safety but not necessarily with intent to cause physical harm. Thus, the interpretation of this variable in FARS is unclear. Also, the FARS driver-related contributing factors include a code for *Emotional (e.g., Depression, Angry, or Disturbed)*. Thus, it appears that the use of this code may in some cases suggest that the driver acted with aggressive intent, for example, if the code was used to indicate that the driver was angry; however, it may also be used to indicate that the driver was experiencing some other

emotional state unrelated to aggressive driving, such as depression. Both of these codes are used extremely rarely in FARS—Road Rage / Aggressive Driving was coded in 0.2 percent of all fatal crashes from 2004 to 2007, and Emotional was coded in 0.3 percent of all fatal crashes. Given the disparate types of scenarios that either of these codes may be used to indicate, neither was analyzed any further nor included in the statistics cited in this study.

We attempted to analyze trends over time in the contribution of these potentially-aggressive driver-related factors to fatal crashes; however, exploratory data analysis revealed implausibly large yearly fluctuations in the percentage of fatal crashes in which these factors were coded in some states suggested that changes in police reporting procedures or data coding procedures would likely render trend analysis invalid. Most saliently, it was evident that the reporting of some of the driver-related factors analyzed herein decreased markedly in recent years, much more sharply than could be attributable to improvements in driver behavior, and most likely attributable to changes in the forms used by police to record information about crashes.

Similarly, a comparative analysis of the contribution of factors suggestive of aggressive driving in different states was not performed, as it was suspected that state-to-state variation in reporting or coding procedures would bias comparisons across states. These issues also suggest that although the estimates of the role of these potentially-aggressive actions are the best estimates that can be produced from available data, the true frequencies with which these actions are involved in fatal crashes may be somewhat lower or higher than those reported here.

Irrespective of whether or not the potentially-aggressive actions cited in this study were committed intentionally or accidentally, the fact that 56 percent of fatal crashes are associated with speeding, failure to yield the right of way, recklessness, carelessness, and other such behaviors is very disturbing. Each and every one of these behaviors is unacceptable, dangerous, and is inconsistent with the positive traffic safety culture the Foundation is seeking to promote.

Conclusion

The traffic safety community has not adopted a standard definition of aggressive driving. We contend that any unsafe driving behavior that is performed deliberately and with ill intention or disregard for safety constitutes aggressive driving. However, due to the limitations of the available data on motor vehicle crashes, it is not possible to ascertain a driver's intentions or motivations, thus this research focused on observable driver behaviors that were reported in police investigations to estimate the contribution to fatal crashes of behaviors typically associated with aggressive driving.

Based on our analysis of fatal crash data from 2003 through 2007, we found that potentially-aggressive actions, including speeding, failure to yield the right of way, reckless driving, and the others discussed previously, were reported in 56 percent of fatal crashes. The fact that 56 percent of fatal crashes involved such actions—even if not all of them were committed intentionally and with aggressive motivations—speaks volumes about the great need for traffic safety cultural change.

To more fully understand aggressive driving, future research is needed using other methods, such as naturalistic driving studies, where the psychological state can be assessed at least to some extent by measures such as galvanic skin response, as well as studies that are more qualitative in nature, which can explore behavior and delve into associated psychological states.

It is very important for drivers to honestly assess their own driving practices. To be truly safe and responsible drivers, people must discard notions that they can safely perform unsafe behaviors because of their above average skills, and they must stop simply “blaming the other guy.” Helping motorists understand the scope and magnitude of aggressive driving and other inappropriate behaviors, and instilling an appreciation for the magnitude of the threat posed by these acts, is a vital first step in achieving the positive traffic safety culture we envision.

Key Points

- ✓ Surveys consistently show that people believe aggressive driving is one of the most serious traffic safety problems.
- ✓ In the AAA Foundation’s 2008 Traffic Safety Culture Index, 78 percent of respondents rated aggressive drivers as a serious or extremely serious traffic safety problem, yet nearly half of these same people reported exceeding the speed limit by 15 mph on major highways in the past 30 days. Substantial numbers also admitted accelerating to try to beat traffic lights, honking at other drivers, tailgating and pressuring other drivers to speed up, illustrating the AAA Foundation’s “Do as I say, not as I do” critique of the prevailing driving culture.
- ✓ Driving in excess of the speed limit or too fast for conditions is a major contributor to aggressive driving and is a contributing factor in nearly one of every three fatal crashes.
- ✓ As many as 56 percent of deadly crashes involve one or more unsafe driving behaviors typically associated with aggressive driving.
- ✓ It is very important for drivers to honestly assess their own driving practices.
- ✓ Helping motorists understand the threat posed by aggressive driving and other inappropriate behaviors is a vital first step in achieving a positive traffic safety culture.

References

- AAA Foundation for Traffic Safety. (2008). *2008 Traffic Safety Culture Index*. Washington, DC: AAA Foundation for Traffic Safety: <http://www.aaafoundation.org/pdf/2008TSCIndexFinalReport.pdf>.
- Fatality Analysis Reporting System*. (2004–2007) [Data files]. Washington, DC: National Highway Traffic Safety Administration.
- National Highway Traffic Safety Administration. (2009). *Countermeasures that work: A highway safety countermeasure guide for state highway safety offices. Fourth edition*. Report No. DOT HS 811 081. Washington, DC: National Highway Traffic Safety Administration.
- National Highway Traffic Safety Administration. (2003). *National survey of speeding and unsafe driving attitudes and behaviors: 2002. Volume II – Findings report*. Washington, DC: National Highway Traffic Safety Administration.
- National Highway Traffic Safety Administration. (n.d.) *Aggressive driving enforcement. Strategies for implementing best practices*. Retrieved March 29, 2009 from <http://www.nhtsa.dot.gov/people/injury/enforce/aggressdrivers/aggenforce/index.html>.
- Neuman, T. R., Pfefer, R., Slack, K. L., Hardy, K. K., Raub, R., Lucke, R., & Wark, R. (2003). *Guidance for implementation of the AASHTO Strategic Highway Safety Plan. Volume 1: A guide for addressing aggressive-driving collisions. NCHRP Report 500*. Washington, DC: Transportation Research Board.
- Subramanian, R. (2002). Transitioning to multiple imputation – A new method to impute missing blood alcohol concentration (BAC) values in FARS. Report No. DOT HS 809 403. Washington, DC: National Highway Traffic Safety Administration.
- Survey by Pew Charitable Trusts and Public Agenda Foundation, January 2-January 23, 2002*. Retrieved October 14, 2008 from the iPOLL Databank, The Roper Center for Public Opinion Research, University of Connecticut: <http://www.ropercenter.uconn.edu/ipoll.html>.
- Survey by Time and ABC News/Washington Post, January 26-January 31, 2005*. Retrieved October 14, 2008 from the iPOLL Databank, The Roper Center for Public Opinion Research, University of Connecticut: <http://www.ropercenter.uconn.edu/ipoll.html>.
- Tasca, L. (2000). *A review of the literature on aggressive driving research. Aggressive Driving Issues Conference*. Retrieved October 17, 2008 from <http://www.aggressive.drivers.com/papers/tasca/tasca.pdf>.