



# Analysis of SHRP2 Speeding Data

Speeding-related crashes continue to be a serious issue in the United States. Attempts to address this problem through a variety of approaches have not led to a substantial reduction in speeding-related safety problems. A better understanding of speeding behavior is needed to inform development of new speeding countermeasures.

New insights on speeding behavior are being gathered through naturalistic driving studies (NDS), which collect data on driving behavior from drivers as they engage in their normal day-to-day driving. The Strategic Highway Research Program 2 (SHRP2), a large naturalistic study, collected driving data from 3,539 passenger vehicle drivers over 12 to 24 months in six regional sites in the United States, generating approximately 4,200 driver years of data and up to 5.4 million trip files. The SHRP2 NDS data includes real-time vehicle records, such as GPS, speed, acceleration, braking, steering, and forward radar, as well as multiple video views around and inside the vehicle. This study, which included data from 2,357 drivers, is the first to use the SHRP2 data to examine speeding behavior.

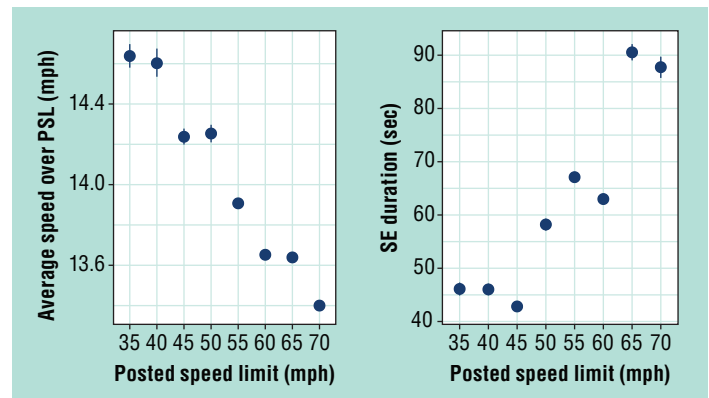
## Definition of Speeding

Driving 10 mph above the posted speed limit (PSL) was relatively common in the SHRP2 data. For this study, speeding was defined as a discrete speeding episode (SE) in which the vehicle speed exceeded the PSL by at least 10 mph for longer than 6 seconds and also exceeding the PSL by at least 15 mph at some point during the SE. Average maximum speeds for most SEs ranged from 12 mph to 20 mph above the PSL.

## Predictors of Speeding

Speeding typically does not occur if a driver is boxed in by slow traffic or stopping for traffic control devices. In this study, opportunity to speed was estimated by identifying periods, called Free Flow Episodes (FFE), in which the vehicle was traveling at speeds near the PSL or faster. Roadways with high speed limits tended to have more FFEs, more opportunity to speed. When drivers were on these types of roadways with higher PSLs they sped significantly more often than when on roads with lower PSLs. While drivers tended to speed for longer durations on roads with higher PSLs, drivers tended to exceed the PSL by greater amounts on the roads with lower PSLs (see Figure 1).

**Figure 1: Average speed over the posted speed limit and average duration of speeding episode by posted speed limit in miles per hour**



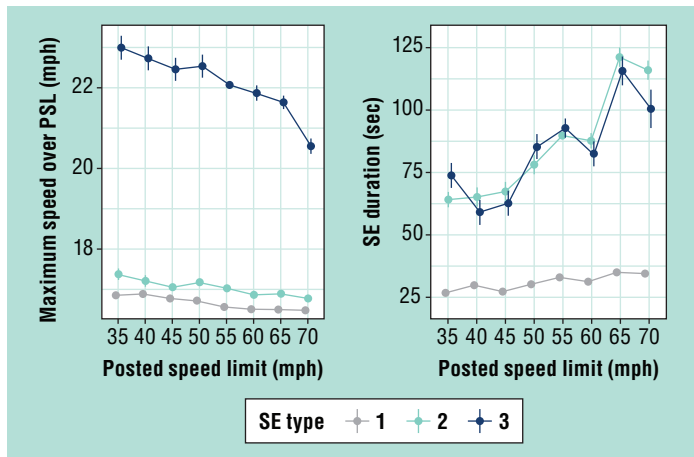
Years of driving experience was the only significant demographic predictor of speeding. The less experienced drivers, typically younger drivers, tended to speed more. Drivers who reported having had two or more traffic violations in the past 3 years, as compared to drivers with no violations, were associated with more speeding, as were drivers reporting having had a crash compared to drivers with no crashes. Drivers who scored higher on sensation-seeking measures, as well as drivers that self-reported engaging in aggressive, risk-taking, anti-social, and poor driving behaviors were also associated with more speeding. Finally, drivers with higher attention deficit hyperactivity disorder (ADHD) confidence indexes (which represents chances that a significant attention problem exists) were more likely associated with higher amounts of speeding.

## Speeding Types

Individual speeding episodes were categorized based on the characteristics of the speeding. This revealed three qualitatively different types of driving behaviors. *Momentary Speeding* was typically comprised of a brief increase then decrease in speed. This could be unintentional, a brief moment of inattention, be a function of topography (a downhill grade), or serve a short-term driving maneuver, such as passing another vehicle. *Cruising Speeding* was comprised of longer duration speeding with low maximum speed and lower speed variability for much of the SE, which was consistent with speed maintenance behavior. Cruising SEs typically lasted for minutes. Drivers had ample time to observe the speedometer, so it is likely that this type of speeding reflects a conscious decision by drivers to

speed. *Riskier Speeding* was characterized by multiple riskier attributes: long duration, high maximum speed, and higher speed variability. It included greater fluctuations in acceleration and gas pedal position, consistent with drivers actively controlling high speeds. These SEs had the highest speeds, especially on low PSL roadways, they had relatively long durations, and speed was consistently varying throughout the SE. On 35 mph roadways, the average maximum speed in riskier SEs exceeded the PSL by 65 percent (see Figure 2).

**Figure 2: Maximum speed over PSL by PSL for types of SEs (1-Momentary, 2-Cruising, 3-Riskier Speeding)**



## Speeder Types

A typology of speeders was developed based on the proportion of each speeding type within individual drivers. Five speeder groups were identified. These groups were clearly distinct based on the amount of speeding and the underlying characteristics of the SEs associated with each group. *Non-Speeders* had no speeding in the trip sample. This group appeared to be distinct from other groups, with substantially fewer trips and lower exposure to FFEs. *Infrequent Speeders* almost never sped, but when they did, it mostly involved Momentary SEs. This group had the smallest proportion of Riskier SEs, but was similar to other speeder groups in average number of trips and FFE exposure. Infrequent speeders were the most common speeders, just over half of the driver sample. *Occasional Speeders'* proportion of speeding was five times higher than the Infrequent Speeder group. Their average SE duration was over 80 seconds long and their average maximum SE speed was greater than 15 mph above the PSL. For these drivers, speeding was not a rare occurrence and they were clearly not speeders by chance. *Long-Duration Speeders* had the highest proportion of Cruising Speeding, reflecting more deliberate speed maintenance well above the PSL. This group stood out by having substantially longer average SE durations and greater total

exposure to opportunities to speed. These speeders had the second highest amount of speeding and may have experienced elevated safety risk due to having the highest levels of speeding exposure. *High Speeders* had the highest proportion of speeding, the highest maximum speeds above the PSL, and the highest proportions of the Riskier SEs.

Long-Duration and High Speeders appeared to engage in speeding that represented some degree of elevated risk, especially the High Speeders. Clear differences across groups for driver-specific factors were found. The most prominent factor was age. Attitudes and behaviors toward risk also systematically varied across groups, but it was possible that some of these effects reflected age differences, since age and attitudes were likely related.

## Conclusions

Most drivers had plenty of opportunities to speed; however, only drivers with certain characteristics took advantage of these chances. Suitable situational conditions may have been necessary for speeding to occur, but they were not sufficient in most instances. Age was a strong predictor of the amount of speeding during FFEs and average amount of speeding across drivers, and varied systematically across speeder groups. Older drivers were associated with less speeding overall. Young adults 20 to 24 years old made up the highest proportion of drivers in the Long-duration and High Speeder groups. Teen drivers 16 to 19 were much more evenly distributed across all speeder groups. Drivers who sped more or engaged in riskier speeding behavior were more likely to be accepting of safety risk, were inclined towards sensation seeking, and had a higher proclivity for ADHD.

The Long-Duration and High Speeders represent a small subset of drivers that differ in their riskier speeding behaviors, and attitudes and beliefs toward speeding and risk in general. They represent the high-payoff speeders to target with safety countermeasures. This study points to some of the relevant driver attitudes and beliefs of these high speeders, in addition to providing some characteristics to help identify these individuals.

## How to Order

To order the *Analysis of SHRP2 Speeding Data*, prepared by Battelle Memorial Institute, write to the Office of Behavioral Safety Research, NHTSA, NPD-300, 1200 New Jersey Avenue SE, Washington, DC 20590, fax 202-366-7394, or download from [www.nhtsa.gov](http://www.nhtsa.gov).

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