

100-Car Naturalistic Study Fact Sheet



Setting up the Study

Study Sponsors:

- National Highway Traffic Safety Administration (NHTSA)
- Virginia Department of Transportation (VDOT)
- Virginia Transportation Research Council (VTRC)
- Virginia Tech (VT)

Study Parameters:

- 109 primary drivers, 241 total drivers (primary plus secondary)
- Northern Virginia/Metropolitan Washington, DC area
- 12 – 13 months of data collection
- Drivers' ages ranging from 18 to 73 years old; 60 percent male; 40 percent female

100-Car Study Features:

- First large-scale instrumented-vehicle study undertaken with the primary purpose of collecting pre-crash and near-crash naturalistic driving data.
- Captured a range of severity of crashes from airbag deployments to minor, low-force, no-property-damage crashes.
- First study to collect detailed information on a large number of near-crash events.
- Drivers were given no special instructions and no experimenter was present.
- Vehicles were used for general purpose driving.
- Data collection instrumentation was unobtrusive.

Data Collection Instrumentation Included:

- Five channels of digital, compressed video
- Front and rear radar sensors
- Accelerometers
- Machine vision-based lane tracker

- GPS
- Vehicle speed sensor

The Database:

- Contains many extreme driving cases, including severe drowsiness, impairment, judgment error, risk taking, secondary task engagement, aggressive driving and traffic violations
- Each safety-related conflict was classified as one of the following:
 - ▶ Crash – any physical contact between the subject vehicle and another vehicle, fixed object, pedestrian, pedalcyclist or animal
 - ▶ Near-Crash – situations requiring a rapid, severe evasive maneuver to avoid a crash
 - ▶ Incident – situations requiring an evasive maneuver occurring at less magnitude than a near-crash

Top Level Database Statistics

- Approximately 2,000,000 vehicle miles of driving
- 42,300 hours of driving data
- 15 police-reported and 67 non-police-reported crashes
- 761 near-crashes
- 8,295 incidents

Types of Driving Behavior Recorded:

- Drowsiness
- Driver Inattention
- Traffic violations
- Aggressive driving and “road rage”
- Seat belt usage

Discoveries

Driver Inattention:

- Nearly 80 percent of all crashes and 65 percent of all near-crashes involved driver inattention (due to distraction, fatigue, or just looking away) just prior to (i.e., within 3 seconds) the onset of the conflict.

Rear-End-Striking Crashes:

- Visual inattention was a contributing factor for 93 percent of rear-end-striking crashes.
- In 86 percent of rear-end-striking crashes, the headway at the onset of the event was greater than 2.0 s.
- Most near crashes involving conflict with a lead vehicle occurred while the lead vehicle was moving, while 100 percent of the crashes (14 total) occurred when the lead vehicle was stopped. This indicates that drivers are sufficiently aware and able to perform evasive maneuvers when closing rates are lower and/or expectancies about traffic are not violated.

Age-Related:

- Judgment error, including secondary task performance in higher risk situations, driving while impaired, and other instances of aggressive driving, was much more prevalent in the youngest age group (i.e., 18 to 20 years) relative to the older age groups.
- The rate of inattention-related crash and near-crash events decreased dramatically with age, with the rate being as much as four times higher for the 18- to 20-year-old age group relative to the older groups (i.e., 35+ years).

Hand-Held Wireless Devices:

- Primarily cellular telephones, but included a small amount of PDA use.
- Associated with the highest frequency of distraction-related events for both incidents and near-crashes.

Driver Drowsiness:

- Contributing factor in 20 percent of all crashes and 16 percent of all near-crashes, while most current database estimates place fatigue-related crashes at a much lower percent (i.e., under 10 percent) of total crashes.

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