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MOTORING

The In-Car Camera Never Blinks (but Viewers Flinch)

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NOVI, Mich.

THE screams and gasps were just what one might expect from an audience watching a horror movie, but the scenes on the screen were slices of everyday life: real-world traffic accidents in progress, seen in footage recorded inside the ill-fated cars as part of a study of driver attention patterns.

Playing on a digital screen, and eliciting alarm from a crowd of experts here for a conference on auto telematics, were some of the 82 crashes — and almost 10 times as many near misses — recorded during a yearlong research project by the [Virginia Tech](#) Transportation Institute in Blacksburg, Va. The goal of the study was to collect the kind of information that does not usually turn up in accident reports, insurance claims or other types of after-the-fact data gathering. It found that driver inattention was the overwhelming cause of the crashes in the study.

Among the gleanings was a nighttime video of a 20-something male driver whose eyes close and head nods as he speeds down a highway. The car drifts toward approaching headlights; the audience screams warnings while the split-screen view shows him drowsing. An oncoming car swerves onto the shoulder and narrowly squeaks by; the sleepy young man is startled awake only after a collision would have occurred.

Known as the 100-car study, the project tracked 241 drivers — 60 percent male, 40 percent female — in the Washington metropolitan area for 13 months. The study was co-sponsored by the [National Highway Traffic Safety Administration](#) and the Virginia Transportation Research Council.

Each of the 100 cars was equipped with video cameras, radar antennas, traffic lane trackers, satellite navigation and a sensor system to monitor the drivers, what they saw, their driving environment and the actions they took. The participants volunteered to have the equipment installed in their vehicles.

Cameras were positioned to record images of the driver's face, an over-the-shoulder view looking toward the steering wheel, a view of the road ahead and a view to the rear. The radar units, mounted at the license plates, captured distance data while other instruments measured forces on brakes and other car components. The data were stored on a computer in the trunk.

The drivers, from 18 to 73, represented a wide range of skills, including 7 percent that "you probably wouldn't want to have on the road," said Jonathan M. Hankey, a Virginia Tech researcher.

Though drivers knew they were being monitored, study results showed that most became accustomed to the in-car overhead-mounted camera within an hour and rarely gave it a glance, indicating that they were either comfortable with the equipment or had forgotten it was there.

"We never coached people on what to do," Dr. Hankey said. "We just equipped their vehicles and turned them loose."

The results provide scientific insight to show what happens when drivers are distracted or drowsy. The project manager of the study and a senior research associate at the institute, Sheila G. Klauer, who is known as Charlie, said far more near accidents and accidents were recorded than the researchers had anticipated.

Dr. Klauer's doctoral thesis on distracted driving was based on the results of the study. She said that discovering the true risk factors of inattentive driving was one of the study's main accomplishments.

"Some of those videos still scare me, even though I've seen them a hundred times by now," she said.

Dr. Hankey has seen the videos so often that he no longer reacts like first-time viewers, who have been known to tense their muscles or shout advice at onscreen drivers making mistakes. Among the incidents recorded was a middle-aged man who kept gazing down and to the right, apparently sorting through papers in stop-and-go driving — until he slammed into an S.U.V. stopped in front of him.

In another video segment, a woman eating a hamburger dipped her head forward and below the instrument panel, unaware of traffic in the lane ahead until she hit the car in front of her.

The incidents in the study include 761 near crashes recorded in nearly two million miles of driving. "A near crash is just like a crash except that somebody did something to avoid it," Dr. Hankey said.

Near crashes are not captured in driving statistics now because they are rarely observed or reported to police. They show an important pattern for driver safety and awareness, though.

In all, in the data collected over 42,300 hours of driving, there were 15 crashes reported to police and 67 crashes that went unreported.

The study also found that leased cars were driven more carelessly than personally owned vehicles — a situation that Dr. Klauer calls "rental car phenomenon." She said that drivers using leased cars took more risks than drivers in cars they owned outright.

In some cases, drivers who had ample warning to take evasive and preventive action failed to do so because they were distracted or drowsy. Analysis of the data found that in nearly 80 percent of actual crashes and 65 percent of near crashes, the driver was inattentive in some way within three seconds beforehand. In rear-end collisions, the drivers were distracted 93 percent of the time.

The study found that drivers were overconfident or very poor at predicting when it was safe to look away from the road to

perform another task. Driving situations can change abruptly, but many drivers seem to be lured into thinking the world outside the moving car can be put on hold while they pay attention to other things.

Because the equipment inside the cars recorded constantly, many incidents demonstrated how perilously close drivers had come to tragedy. In one instance, a young woman, lost in a suburb, pulls into a driveway and begins dialing a cellphone resting in her lap. Still dialing, she backs out of the driveway, accelerates forward, and at the last moment looks up — just as a young child darts from between two parked cars.

One of the distracting activities noted most often was what Dr. Hankey called a "complex multistep, multiglance secondary task," like pushing buttons on a cellphone or similar device. More than 22 percent of the crashes and near crashes involved that kind of distraction. Young drivers in the study were far more likely to be distracted by such tasks.

Fatigued drivers were even more dangerous to themselves and others, the study found. Roughly 46 percent of accidents and incidents recorded during the study involved some form of fatigue, with a surprisingly high number occurring during morning commutes.

Dr. Klauer said that analysis of the Virginia Tech data would continue and that a smaller study of teenage drivers, sponsored by the [National Institutes of Health](#), would be conducted to track 16-year-olds in their first 18 months of driving. Another small-scale study has been proposed to study the behavior of drivers older than 75.

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