Some distractions while driving are more risky than others, researchers say

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The Virginia Tech Transportation Institute naturalistic driving study method involves equipping vehicles with unobtrusive instrumentation, including an advanced suite of radars, sensors, and cameras -- depicted here with an institute researcher volunteer behind the wheel. The method continuously collects real-world driver performance and behavior. Credit: Virginia Tech

Drivers more than double their crash risk for more than half of their trips when they choose to engage in distracting activities, according to Virginia Tech Transportation Institute researchers writing in this week's *Proceedings of the National Academy of Sciences*.

Using or reaching for a handheld cell phone, reading or writing, reaching for a non-cell phone object, or using touchscreen menus on a vehicle instrument panel—activities that require drivers to take their eyes off the road—increase crash risk. Being in an obvious emotional state also adds to the risk factor. Now, researchers are discovering more about how risky some factors really are, and how other activities are not as risky as people may have thought.

"These findings are important because we see a younger population of drivers, particularly teens, who are more prone to engaging in distracting activities while driving," said Tom Dingus, lead author of the study and director of the Virginia Tech Transportation Institute. "Our analysis shows that, if we take no steps in the near future to limit the number of distracting activities in a vehicle, those who represent the next generation of drivers will only continue to be at greater risk of a crash."

Virginia Tech Transportation Institute researchers used results from the Second Strategic Highway Research Program Naturalistic Driving Study, the largest light-vehicle naturalistic driving study ever conducted with more than 3,500 participants across six data collection sites in the United States.

The study represents the largest naturalistic crash database available to date, with more than 1,600 verified crash events ranging in severity from low, such as tire and curb strikes, to severe, including police-reportable crashes.

While previous naturalistic driving data analyses required combining

crash data with "surrogate" crashes—or near-crashes and minor collisions—to determine driver risk, the magnitude of the Second Strategic Highway Research Program Naturalistic Driving Study facilitates the first crash-only analysis, resulting in the most conclusive findings to date of the biggest risks faced by drivers today, the researchers said.

For the current research, transportation institute researchers considered 905 higher severity crashes involving injury or property damage in the data set and found that, overall, driver-related factors that include fatigue, error, impairment, and distraction were present in nearly 90 percent of the crashes.

"We have known for years that driver-related factors exist in a high percentage of crashes, but this is the first time we have been able to definitively determine—using high-severity, crash-only events that total more than 900—the extent to which such factors do contribute to crashes," Dingus said.

Furthermore, the study highlights how driving while observably angry, sad, crying, or emotionally agitated can increase driver risk nearly 10 times. Traveling well above the speed limit creates about 13 times the risk, and driver performance errors such as sudden or improper braking or being unfamiliar with a vehicle or roadway have an impact on individual risk.

Researchers found several factors previously thought to increase driver risk, including applying makeup or following a vehicle too closely, actually had a lower prevalence in the naturalistic driving study, meaning they were minimally present or were not present at all in the crashes analyzed.

Factors such as interacting with a child in the rear seat of a vehicle were

found to have a protective effect, or had a risk lower than the base risk value.

"All of these findings are especially important as we work with policymakers, educators, drivers themselves, law enforcement officials, and vehicle designers to define and help mitigate driver risks," Dingus said. "Our ultimate goal is to identify those risks and to help others create the necessary countermeasures to ensure the safety of ground transportation users."

All factors analyzed in the article were compared to episodes of model driving, or episodes in which the drivers were verified to be alert, attentive, and sober.

The naturalistic driving study method pioneered at the Virginia Tech Transportation Institute involves equipping volunteer participants' vehicles with unobtrusive instrumentation—including a suite of cameras, sensors, and radar—that continuously collects real-world driver performance and behavior, from the time the drivers turn on the ignition to the time they turn off their vehicles.

Drivers in the Second Strategic Highway Research Program Naturalistic Driving Study participated between one and two years each, resulting in more than 35 million miles of continuous naturalistic driving data that are securely housed in a data warehouse located on-site at the transportation institute.

The Second Strategic Highway Research Program Naturalistic Driving Study is one of the largest projects funded by the National Academy of Sciences, with more than $50 million awarded to the Virginia Tech Transportation Institute alone, which led the study with several partners. The institute was recently awarded a contract with the National Academies to support users who wish to access data from the naturalistic

driving study, including researchers, government agencies, and auto manufacturers and suppliers.

More information: Driver crash risk factors and prevalence evaluation using naturalistic driving data, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1513271113

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