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State-of-Knowledge on Distracted Driving Due to Portable Electronic Device Use: 2008 – 2022 Update

Background

The National Highway Traffic Safety Administration recognizes that safe driving requires the driver's attention to be fully on the driving task. The last comprehensive NHTSA-sponsored state-of-knowledge (SOK) report on distracted driving was conducted over 15 years ago (Ranney, 2008). The intervening years have seen a marked growth in the quantity and types of distraction sources and activities. The increase comes from advances in portable electronic device (PED) technology, the many ways drivers interact with them, and advances in measuring these interactions as well as the many ways PEDs affect driver behavior and safety. PED use involves any device easily carried into and out of a vehicle that a driver can use while driving, whether directly with the device independently or through the vehicle's interface. The latest data from NHTSA's National Center for Statistics and Analysis (NCSA) showed that 8% of all drivers involved in fatal crashes in 2021 were reported as distracted at the time of their crashes (Stewart, 2023). The latest cost estimate of societal harm caused by distraction-involved crashes, estimated for 2019, was \$395 billion (Blincoe et al., 2023). This same report estimates the percentage of all motor vehicle crashes in 2019 attributable to distraction to be 29%, and the percentage of crashes caused by cellphone distraction to be 6.1%. This SOK identifies what is known about driver distraction behavior due to PED use from 2008 through September 2022.

Methods

Researchers used comprehensive, systematic search, retrieval, screening, and review strategies, examining databases and other document sources for peer-reviewed documents such as journal articles and conference proceedings, State and Federal technical reports, and university theses and dissertations. The project team used key words and a search strategy of four searches related to the four specific chapter topics of this SOK in each of the databases. For studies whose abstracts passed initial relevance screening ($n = 1,817$), the researchers collected and assessed full-text documents for eligibility and study quality. The criteria were:

- articles focused on driver distraction due to PED use;
- involved an original empirical investigation or review/meta-analysis of original investigations;
- published after January 1, 2008, and before searching was stopped on September 7, 2022;
- published in English;
- methodologically appropriate; and
- from a sample of a relevant population (e.g., a U.S. or other population deemed to be sufficiently representative of a U.S. population). After the application of the eligibility criteria and the study quality assessment, 285 records remained for synthesis.

Highlights of the Findings

Driver Use of Portable Electronic Devices

- PED prevalence varied according to how it was measured: 0.4% to 2.8% of U.S. drivers during an average daylight moment (observations, depending upon the kind of PED use); 6.4% to 11% of total drive time (naturalistic driving studies); and 37% to 56% of drivers report engaging in distracted driving via PEDs (self-report surveys, depending upon the kind of PED use).
- Younger drivers tended to have a higher prevalence of PED use while driving, although there were conflicting results among studies regarding prevalence for gender/sex¹ and race. For gender/sex, some studies found higher prevalence of PED use while driving for one group over the other, but other studies found no statistically significant difference between the groups.
- Driver beliefs that PED use is less risky were associated with higher reported use while driving. In addition, people with whom young drivers share an important or meaningful relationship (e.g., significant other) were more likely to influence driver-reported PED use than other friends or casual acquaintances. Drivers with higher self-belief in their driving abilities were more likely to use PEDs while driving.
- Young drivers who report using a PED while driving were more likely to report speeding, riding with drivers who had been drinking alcohol, drinking alcohol and driving themselves, being in crashes, binge drinking, and not wearing seat belts generally.

Effects on Driver Behavior and Performance

- For visual distraction, typing and typing/reading texts had somewhat larger effect sizes than reading texts alone, indicating that these activities are associated with the eyes spending more prolonged or frequent glances away from the forward roadway.
- For dialing and handheld (HH)/hands-free (HF) conversation effects on driver hazard detection time, dialing on a cellphone and having a cellphone conversation (both HH and HF) had moderate to large effect sizes, with dialing on a cellphone having the largest effect sizes (larger effect sizes indicate that the activity is associated with taking more time to detect potentially hazardous targets or events). HH and HF effects on hazard detection time were similar; however, given that only three studies compared HH to HF for hazard detection time, caution should be taken in interpreting these results.
- For dialing and HH/HF conversation effects on driver detection accuracy, i.e., the accuracy with which a driver can detect a target, HH and HF conversations both had moderate, negative effect sizes on detection accuracy, and there was no meaningful difference between HH and HF modes. Given that the comparison between HH and HF for driver detection accuracy involved four studies, caution is advised in interpreting results.
- Visual-manual (VM) tasks such as texting or dialing had moderate to large effects, resulting in lateral position instability, greater driver headway from a lead vehicle, and lower driver speed.

Effects on Safety

- Distraction-affected crashes represented a higher proportion of crashes for non-fatal injury and property-damage-only (PDO) crashes than for fatal crashes.
- The limited studies examining crash type and distraction suggested that distracted drivers are vulnerable to rear-end crashes and single-vehicle collision and non-collision events such as hitting fixed objects or running off the road and overturning.
- The overrepresentation of young drivers in distracted driving crashes was shown when distraction was coded as a crash causation factor, in crashes involving PED use in general, and in crashes involving cellphone use specifically.

¹ For gender and sex, both terms were used by different authors in studies included in the SOK.

Reducing Driver Distraction

- In general, drivers reported cellphone blocking technologies, particularly the ones native to the cellphone, are beneficial and promote safer driving. Drivers consistently reported higher acceptance of approaches that do not restrict navigation and music playback.
- Legislative handheld bans were generally associated with reductions in fatal and injury crashes and driver and other road user fatalities.
- For high-visibility enforcement (HVE), reductions in driver HH use were observed at each of the NHTSA-sponsored HVE sites from before to after application of the HVE, but similar reductions were sometimes observed at the control sites as well.

Discussion

The literature search, screening, and review approach identified new literature on driver distraction due to PED use published since the last SOK report in 2008. This literature provides evidence of widespread driver PED use resulting in a significant safety problem. Many countermeasures to the problem have been identified, and some of these have already been fielded. However, much is still unknown about the precise extent of driver PED use, the number of crashes caused by that use, and the effectiveness of countermeasures that target the problem.

For more details, including results references, please see the full report:

Wright, T. J., Blomberg, R. D., Pradhan, A. K., Finstad, K., & Blenner, J. A. (2024, December). *State-of-knowledge on distracted driving due to portable electronic device use: 2008 – 2022 update* (Report No. DOT HS 813 645). National Highway Traffic Safety Administration.

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