

The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data



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Abstract

The purpose of this report was to conduct in-depth analyses of driver inattention using the driving data collected in the 100-Car Naturalistic Driving Study. An additional database of baseline epochs was reduced from the raw data and used in conjunction with the crash and near-crash data identified as part of the original 100-Car Study to account for exposure and establish near-crash/crash risk. The analyses presented in this report are able to establish direct relationships between driving behavior and crash and near-crash involvement. Risk was calculated (odds ratios) using both crash and near-crash data as well as normal baseline driving data for various sources of inattention. The corresponding population attributable risk percentages were also calculated to estimate the percentage of crashes and near-crashes occurring in the population resulting from inattention. Additional analyses involved: driver willingness to engage in distracting tasks or driving while drowsy; analyses with survey and test battery responses; and the impact of driver's eyes being off of the forward roadway. The results indicated that driving while drowsy results in a four- to six-times higher near-crash/crash risk relative to alert drivers. Drivers engaging in visually and/or manually complex tasks have a three-times higher near-crash/crash risk than drivers who are attentive. There are specific environmental conditions in which engaging in secondary tasks or driving while drowsy is more dangerous, including intersections, wet roadways, and areas of high traffic density. Short, brief glances away from the forward roadway for the purpose of scanning the driving environment are safe and actually decrease near-crash/crash risk. Even in the cases of secondary task engagement, if the task is simple and requires a single short glance the risk is elevated only slightly, if at all. However, glances totaling more than 2 seconds for any purpose increase near-crash/crash risk by at least two times that of normal, baseline driving.

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The purpose of this report was to conduct in-depth analyses of driver inattention using the driving data collected in the 100-Car Naturalistic Driving Study. An additional database of baseline epochs was reduced from the raw data and used in conjunction with the crash and near-crash data identified as part of the original 100-Car Study to account for exposure and establish near-crash/crash risk. The analyses presented in this report are able to establish direct relationships between driving behavior and crash and near-crash involvement. Risk was calculated (odds ratios) using both crash and ne... Twenty drivers were involved in a driving experiment where they were asked to perform several car followings, with and without interacting with a visual research task. Expectations of traffic behaviour were reproduced by varying (i) the lead vehicle speed: proceeding at a variable speed and sudden brake and (ii) size: a car for predictable conditions, a bus (obstructing follower sight) for unpredictable. Average Time Headway and Brake Reaction Time were selected as on-road performance indicators. The impact of driver inattention on near-crash/crash risk: an analysis using the 100-Car naturalistic driving study data. National highway traffic safety administration technical report, DOT HS 810 594Google Scholar. 7. Naturalistic driving studies (NDSs) offer a unique opportunity to study driver performance and behavior experienced in the real world with actual consequences and risks (2 ↓-4). Near-crashes are operationally defined as having the observable factors that could lead to a crash, with one difference present: the performance of a successful evasive maneuver. Using the SHRP 2 NDS crash database, this paper