

Safer Glances, Driver Inattention, and Crash Risk: An Investigation Using the SHRP 2 Naturalistic Driving Study

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This paper presents progress in the SHRP2 Safer Glances analysis project which aims to establish the relationship between crash risk and driver inattention using rear-end crashes and near crashes. Results will pinpoint the most dangerous glances away from the road and show how to change glance behavior to be safer.

The Second Strategic Highway Research Program (SHRP2) is conducting the largest and most comprehensive naturalistic driving study (NDS) ever conducted (see Campbell, 2013; and www.shrp2nds.us). The study has recruited 2,800 volunteer drivers. All of their trips are recorded for one to two years. When complete in early 2014, the NDS data set will contain over 33,000,000 travel miles from over 3,800 vehicle-years of driving – over 4 petabytes of data.

The analysis plan is formulated in five analytic steps. Each analytic step is expected to provide better precision and explore different components of the inattention-risk relationship by providing more detail on inattention-risk relationships under different circumstances – relationships to timing with optical parameters, glance characteristics, and relationships with respect to different levels of crash severity.

This research will identify a more precise relationship between glance patterns and their associated risk around a sweet spot, a time when perceptual information is particularly valuable in crash avoidance. Further, it will relate glance behavior to injury severity as defined by new severity scales. This set of functions will indicate crash likelihood and/or injury severity for certain contextual characteristics of the lead-vehicle crash scenario, such as traffic density, road type, and speed. These relationships can be used to show more precisely which glance behaviors are safer than others.

Safer glance strategies for interacting with electronics and the traffic environment can be encouraged in a number of ways including design guidelines, education, and in-vehicle feedback. Likewise, the most dangerous glances can be pinpointed and associated with improvements to appropriate countermeasures like distraction guideline performance criteria and active safety system technology.