

The Federation of Behavioral, Psychological, and Cognitive Sciences

along with

**the Human Factors and Ergonomics Society
& the American Psychological Association**

Congressional Briefing on

Preventing Crashes: Driver Safety through Human Factors Science

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Abstracts

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Human performance and behavior are fully or partially responsible for over 90% of vehicular crashes. Recent research utilizing large numbers of vehicles equipped with highly sophisticated instrumentation, including multiple cameras, has provided much needed detail regarding the combination of driver, roadway, traffic, and environmental factors that lead to a large number of these crashes. For example, studies of both private and commercial drivers have shown that roughly 10% of drivers account for almost 50% of the crash risk. The major factors that contribute to this risk include: Impairment (due primarily to alcohol), inattention and distraction, drowsiness, and judgment-related error. Two specific issues, driver drowsiness and inattention, will be presented in some detail. Our research has shown that driving, while at least “moderately” drowsy, increases crash risk almost eight times when compared to driving while alert. This research also shows that drowsiness occurs for all types of drivers and during all times of day. This research also shows that while all drivers are inattentive at times, teen drivers are at the greatest risk. This risk is rapidly becoming an “epidemic” due to increases in the frequency with which teens perform complex secondary tasks while driving, including: cell phone dialing and text messaging, iPod/MP3 manipulation, and internet interaction.

Donald L. Fisher, PhD

Newly-licensed drivers during their first six months of solo driving are up to 11 times more likely to die in a crash than drivers 40 – 50 years old. This increased risk is not due to drugs, alcohol or speed; rather, it appears largely to be a function of failures of: (1) hazard anticipation, (2) attention maintenance, and (3) hazard avoidance. Various programs of research will be described which have both identified the particular behaviors which differentiate newly-licensed from experienced drivers and evaluated alternative training programs designed to modify the behaviors of newly-licensed drivers. (1) The results of the series of hazard anticipation training studies are encouraging: newly-licensed drivers can be trained to anticipate hazards every bit as well as more experienced drivers, they can perform more safely in both a driving simulator and on the open road, and they can maintain these improvements for some period of time. Various different levels of training programs have been evaluated, including ones that can easily be downloaded from the web and more advanced ones on low fidelity driving simulators. Not too surprisingly, the more realistic is the hazard anticipation training program, the larger are the gains, including actual reductions in crashes. (2) Studies of attention maintenance training programs are considerably fewer, but the preliminary results are equally encouraging. (3) By contrast, hazard avoidance training programs (e.g., skid control training) either increase crash risk or do not change that risk.

John D. Lee, PhD

Driver distraction and inattention represent a serious and growing safety problem, already accounting for a majority of crashes. The rapid development of technology, ranging from MP3 players and cellphones to navigation systems and DVD players, promises to confront drivers with many additional distractions in the coming years. Drivers’ surprisingly limited attentional capacity makes them vulnerable to distraction, particularly novice drivers. Recent research addressing visual attention and the mechanisms governing driver distraction has begun to reveal the underlying causes of distraction and promises to identify effective ways to reduce driver distraction. Increasingly, cars will be able to assess whether a driver is distracted and then guide a distracted driver’s attention to critical roadway events, such as a car ahead that begins braking. Developing the research base to address the issues of driver distraction will also help designers create cars that will help other at-risk drivers, such as older and novice drivers, drive more safely.