Measuring Cognitive Distraction in the Vehicle

University of Utah - Center for Prevention of Distracted Driving

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Driving is among the riskiest activities in which most of us engage on a regular basis-one that is often taken for granted.

Cognitive or mental distraction occurs when attention is withdrawn from processing information necessary for the safe operation of a motor vehicle. Cognitive sources of distraction are the most difficult to observe and measure because it is difficult to assess the mental status of a driver – simply what a driver's brain (as opposed to their hands or eyes) is doing.

This is of increasing concern as automakers tout a plethora of hands-free in-vehicle communications, information and entertainment systems that will almost certainly distract drivers' minds from driving.
There are various metrics researchers use to characterize visual and manual distractions; however, to date no studies have attempted to measure the amount of cognitive distraction caused by various non-driving tasks in which a driver may engage while behind the wheel.

The current project was designed to develop and validate the use of brain-based measures of cognitive distraction (i.e., EEG activity) and other driver performance-based measures while subjects drive in a driving simulator and also in an instrumented vehicles operated in real-world driving environments.
Specifically, researchers will be able to compare and contrast the cognitive distraction related to several different concurrent tasks:

- Baseline driving [i.e., no distractions);
- Listening to the radio;
- Listening to a book on tape;
- Talking to a passenger;
- Talking on a hands-free cell phone;
- Talking on a hand-held cell phone;
- Using a generic voice-activated text messaging/email systems; and
- Engaging in a demanding verbal working memory task (used for calibration purposes).

Research results will be used to develop a simple consumer-facing S-star rating system for low-to-high levels of cognitive workload-essentially a research validated benchmark for cognitive distraction associated with different in-vehicle activities. Results available internally this February with public release tentatively scheduled for late June/ early July 2013.

Next steps for the research team include using the recent findings to measure the mental distraction generated by current and next generation voice-activated and voice-to-text systems. The results should be available next year.