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Perceptions of driver distraction among teenage drivers

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ABSTRACT

Teenage drivers have been shown to have some of the highest crash risks. Crash data provide some insights on factors related to crash likelihood, but rarely capture all issues that can arise from driver distraction. The goal of this study was to assess teenage drivers' opinions and perceptions of driver distraction. A survey of 1893 Iowa teenagers was conducted to determine and compare the frequency of engagement in distracting activities while driving to their opinions of what they actually consider to be distractions. A cluster analysis was conducted based on their indicated engagement in distracting activities with three groups emerging and classified as INFREQUENT, MODERATE, and FREQUENT engagers. Across all cluster groups, the majority (over 80%) indicated that they considered text messaging to be a distracting task. However, those clustered as FREQUENT engagers still reported a high level of texting while driving even though they considered this task to be distracting. A binary logistic regression model (adjusted for miles driven and license type) showed that FREQUENT and MODERATE engagers were more likely to be involved in a crash when compared to INFREQUENT engagers. The study demonstrates that not all teenagers place themselves at risk. There are subgroups of teenage drivers that often engage in activities they know are distracting, potentially putting themselves in danger. However, this is not the case for all teenage drivers and it is important to target interventions appropriately as well as foster a culture of safety both in schools and at home.

1. Introduction

Studies show that teenage drivers are overrepresented in vehicular crashes (Beck, Shattuck, Raleigh, & Hartos, 2003; Ferguson, 2003; Hartos, Eitel, & Simmons-Morton, 2001; Lee, Simons-Morton, Klauer, Ouimet, & Dingus, 2011) and have a higher propensity to engage in many distracting tasks (Chisholm, Caird, & Lockhart, 2008). Examination of US crash data shows that distraction has been documented as a contributing factor in approximately 25% of all crashes (Stutts, Reinfurt, Staplin, & Rogeman, 2001) and is therefore, of great interest for policy makers, safety engineers, and researchers. Ranney, Mazzae, Garrott, and Goodman (2000) characterize driver distraction as any activity that takes a driver's attention away from the task of driving. The effects of performing dual tasks were observed early on by Brown, Tickner, and Simmonds (1969) who found that response time and task accuracy were negatively impacted when concurrently driving and speaking on the telephone. Teenagers are of primary interest because studies have shown that they have fewer visual scans toward the driving area and have more hard braking occurrences when cognitively distracted (Harbluk & Noy, 2002). Teenagers also indicate a greater willingness to engage in all types of multitasking activities (Lerner, 2005).

Teenage drivers tend to be overly confident in their driving ability, as well as underestimate the danger of specific driving situations when compared to older drivers (Finn & Bragg, 1986; Matthews & Moran, 1986). Teenagers tend to have a greater

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propensity to use technology in their vehicle with many indicating that they have texted while driving (Madden & Lenhart, 2009). However, some risky behavior appears modifiable with appropriate feedback and training. In a study by Ginsburg et al. (2008), teens with authoritative or involved parents were less likely to use their cell phones while driving. McGehee, Raby, Carney, Lee, and Reyes (2007) and Simons-Morton, Hartos, Leaf, and Beck (2002) also demonstrated the importance of parental involvement for young drivers.

One method of examining the impact of driver distraction is through crash data (Neyens & Boyle, 2007, 2008; Sheridan, 2004). This method captures police-reported crashes but provides limited information on driver-distraction related events because it is often difficult for the officer to pinpoint specific behaviors. Further, most drivers will not volunteer incriminating information related to distractions unless there is evidence that the distraction occurred (Neyens & Boyle, 2007; Wallace, 2003). Hence, the number of distraction-related crashes is typically underreported (Wallace, 2003). Another major limitation is the consistency in reporting across different states in the US. To address this issue, several states are working with police and other official reporting organizations to standardize the reporting of crucial data such as cell phone use (Violanti, 1997) but standardization across jurisdictions has not been formalized to date.

Cellular phone-related driver distractions are extensively examined given their potential impacts toward driver safety. As of 2000, 90% of drivers who own cell phones reported using it while driving (Goodman, Tijerina, Bents, & Wierwille, 2000) and the US Census Bureau estimated a 300% increase in cellular subscribers from 34 Million in 1995 to 159 Million in 2003 (Bergman, 2004). Data from the World Bank showed that in 2004, 63% of the US population had mobile cellular subscriptions, and by 2009, the percentage rose to 89% (World Bank, 2010).

Distraction studies on in-vehicle devices have largely been examined in controlled environments to minimize the potential on-road risks to drivers as they traverse through safety–critical situations (Donmez, Boyle, & Lee, 2007; Greenberg et al., 2003). For example, driving simulator studies showed that engagement in phone conversations resulted in slower reaction times, a twofold increase in rear-end collisions (Strayer & Drews, 2004), and a higher workload and response time to traffic signals (Drews & Strayer, 2009). Hancock, Lesch, and Simmons (2003) showed greater failures in identifying traffic signals when engaged in a cell phone task. The growth in naturalistic studies, where drivers are observed (using instrumented vehicle with video data) in their natural driving environment, has also provided other insights on driver distractions. For example, Stutts et al. (2005) was able to observe that distractions was a common component of everyday driving and that distractions were frequently associated with decreased driving performance.

The advancement in technology has enabled mobile devices to be used for more than phone conversations. These smart devices now include the capability to send and receive emails and text messages, access the Internet, and play music. There are also distractions unrelated to technology that can be detrimental for teenage drivers such as talking to passengers, eating, and drinking (Regan, Lee, & Young, 2009). Simons-Morton et al. (2011) further examined the effects of passengers and showed that risk propensity was lower with adult passengers, but higher with risky friends.

Studies in controlled settings (e.g., simulators, on-road closed courses) allow researchers to observe changes in driver performance based on specific distracting tasks. As noted earlier, cell phones and text messages are key areas of examination. However, there are other secondary tasks that cannot be examined in a controlled setting but are important to capture because of safety implications. Surveys can provide a means of capturing self-identified behavior (Mann, Vingilis, Leigh, Anglin, & Blefgen, 1986) that may not be observed otherwise in crash data, controlled settings, or even in naturalistic studies. Surveys also provide insights into stated preferences that may not necessarily match actual performance and can therefore, reveal subpopulations of drivers that differ based on their attitudes toward different distracting activities.

The goal of the study was to examine driver distraction among teenagers including what tasks they consider to be distracting as compared to their level of engagement in these same distracting tasks. To address this goal, a survey targeted toward teenage drivers was designed, distributed and analyzed as part of the current study.

2. Method

2.1. Survey participants

The study participants were US drivers in their teens from the state of Iowa. Teenagers in this region are eligible for some form of driver licensing beginning at age 14. Hence, this study can also provide insights on differences across several teenage years. The high school principals from 19 schools in Eastern Iowa were contacted for possible participation though e-mails, postal mail, and follow-up telephone calls. Of these, seven high schools responded that they would be able to distribute the surveys during a regularly scheduled seminar or homeroom period within the 3 week requested timeframe. After a day and time was coordinated with each school, the surveys were delivered to the principal for distribution to the student body. Each survey had a cover letter explaining the purpose of the study and that participation was optional. Consent to participate was obtained when students chose to fill out a survey. Students were free to leave some or all of the responses blank if they did not want to answer. The paper and pencil survey was administered to students by a staff or faculty member at the high school. When completed, students placed their survey in a manila envelope at the front of the classroom. The faculty or staff member then returned the envelope to the principal who then mailed it back (in an overnight envelope) to the research team. No names or identifiers were associated with the participants. There was no compensation provided for participation. The study was approved through The University of Iowa Institutional Review Board (IRB ID#: 200803734).