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Do as I say, not as I do: Distracted driving behavior of teens and their parents

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ABSTRACT

Introduction: Driver distraction is an important contributor to crash risk. Teenage driver distraction can be influenced by the attitudes and behaviors of parents. This study examined teens' and their parents' engagement in distracting behavior while driving. *Method:* Survey data were collected from a national sample of 403 parent-teen dyads using random-digit dialing telephone interviews. *Results:* Results demonstrated few parent or teen sex differences in distracting behavior engagement while driving, or in their perceptions of each others' behavior. Parents and teens' frequencies of distracting behavior engagement were positively correlated. Parents' and teens' perceptions of each others' distracting behavior engagement while driving exceeded their own selfreports. Finally, the likelihood that teens reported engaging in distracting behavior while driving was more strongly associated with their perceptions of their parents' distracting behavior than by parents' self reports of their own behavior. *Conclusions:* These results suggest that parents' examples of driving behavior are an important influence on teen driving behavior, but potentially more important are teens' perceptions of their parents' behaviors.

1. Introduction

Driver distraction results when a secondary activity diverts attention away from the primary task of driving (Ranney, 2008). The recent rapid acceleration of interactive technologies built into vehicles, as well as the proliferation of nomadic devices that can be introduced into the driving context, have resulted in renewed concern over the effects of distraction on driver behavior and safety performance. While driver distraction is a perennial issue, having existed since the first motor vehicles were introduced, the surge in new sources of distraction in vehicles has caught the attention of the media, government administrators, policymakers, automobile manufacturers, and researchers. Estimates of the prevalence of driver distraction as a contributor to motor vehicle crashes range widely, from 5% to more than 25% (Gordon, 2009; Hurts, Angell, & Perez, 2011; Neale, Dingus, Klauer, Sudweeks, & Goodman, 2005). NHTSA reported that in 2013, nearly 3,151 individuals died and 424,000 were non-fatally injured in crashes in which at least one driver was distracted (National Highway Traffic Safety Administration, U.S. Department of Transportation, 2015). While these numbers represent a significant public health concern, they are likely underestimates of the true prevalence of driver distraction and the fatalities and nonfatal injuries that result from it (National Highway Traffic Safety Administration, 2015).

Although results are not perfectly uniform, research has provided consistent evidence of the negative effects of driver distraction on roadway safety (Curry, Kallan, Winston, & Durbin, 2011; Holland & Rathod, 2013; Park, Salsbury, Corbett, & Aiello, 2013; Ranney, 2008). Simulator-based experimental studies have helped to characterize some of the potential impacts of driver distraction on driver performance, such as increased steering wheel amplitude, slowed reaction times, reduced situation awareness, delayed speed adaptation, poorer speed and lateral control, and more hard braking (Bayly et al., 2009; Drews & Strayer, 2009; Horberry & Edquist, 2009). These studies are not representative of any particular driving population, and many are limited in their external validity due to the use of distraction tasks in a simulator that do not realistically represent the types of distractions drivers typically experience in real-world driving (Ranney, 2008). Nevertheless, the results are consistent with those from studies using other forms of investigation. Epidemiologic studies have shown consistent evidence of the effects of distractions related to multiple factors contributing to crash occurrence, including passengers riding with young drivers (Chen, Baker, Braver, & Li, 2000; Doherty, Andrey, & MacGregor, 1998; Lam, Norton, Woodward, Connor, & Ameratunga, 2003; Rice, 2003), the use of cell phones and other electronic nomadic devices, and secondary activities such as eating, smoking, and reaching for objects in the vehicle (Brace, Young, & Regan, 2007; McCartt, Hellinga, & Bratiman, 2006; Violanti, 1998; Violanti & Marshall, 1996; Wilson & Stimpson, 2010).

Naturalistic driving studies have provided some of the most objective data relating distraction to degradations in driver performance and increased frequencies of crashes and near crashes. The 100-car

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study, in which the normal day-to-day driving behavior of 241 drivers was measured unobtrusively, found that nearly 80% of crashes and 65% of near-crashes involved drivers looking away from the forward roadway. Other eye glances away from the forward roadway were evident in 93% of all lead-vehicle crashes (i.e., where the lead vehicle may be at fault) and minor collisions (National Highway Traffic Safety Administration & Department of Transportation, 2006a). Although it is not clear that all glances away from the forward view were due to distraction, versus driving-related scanning of side mirrors or off-road areas, these data are indicative of the diversity of visual information presented to drivers. Research using case–control methodology and data from the 100-car study estimated that secondary task distraction contributes to 22% of all crash/near-crash events at the population level (National Highway Traffic Safety Administration & Department of Transportation, 2006b). Glances away from the roadway for more than two seconds contributed to a significant increase in the odds of crash/near-crash events. Especially hazardous were distracting behaviors (DBs) (i.e., secondary task behaviors that have the potential to distract drivers from the primary task of driving) that involved relatively complex visual-manual tasks, required several steps to complete, and were not associated with built-in features of the vehicle. Behaviors such as reaching for a moving object, manipulating a hand-held or other electronic device, looking at a map, taking notes, and text messaging were associated with the greatest risk, increasing crash/near crash events by 600–2,300% (Dingus, Hanowski, & Klauer, 2011).

Distraction is particularly serious for young novice drivers and is likely to have a greater impact on their crash risk than is the case for more experienced adult drivers (Neyens & Boyle, 2007). The number of crashes involving teenage drivers is disproportionate to their representation in the entire driver population (National Highway Traffic Safety Administration, U.S. Department of Transportation, 2012c), and teenage drivers have the highest crash risk per mile driven of any age group apart from the most elderly drivers (National Highway Traffic Safety Administration & U.S. Department of Transportation, 2013b). Morbidity resulting from non-fatal crash-related injuries of teenage drivers is especially high relative to older age groups of drivers, and more teenagers die as a result of a motor vehicle crash than from any other cause (Centers for Disease Control & Prevention, 2014). Teenage drivers' high crash risk is partly attributable to immaturity, but largely results from a lack of critical driving skills that only develop with many hours of driving experience (Mayhew, Simpson, & Pak, 2003; Olsen, Lee, & Simons-Morton, 2007). Driving is a complex multitask activity. While many of the tasks involved become partially, if not nearly completely, automated with large amounts of driving experience, they are cognitively highly demanding for inexperienced drivers, for whom the multitask activity of everyday driving is largely under conscious control (Graham & Gootman, 2008). In addition to lacking experience, teenage drivers possess characteristics related to their developmental state and stage that further interfere with safe driving, such as heightened impulsivity and an elevated drive to seek sensations, which can have developmental benefits as well as lead to risk-taking behavior (Dunlop & Romer, 2010; Romer, 2010; Romer & Hennessy, 2007). Teenagers also more quickly adopt and more intensely utilize new technologies compared to adults, technologies that are key sources of driver distraction (Weilenman & Larsson, 2002). Hence, distraction is a particular concern that threatens the well-being of teenage drivers due to the higher demand of the driving task, their developmental susceptibility to sensation seeking and risk taking, and their willing acceptance and use of new technologies.

In response to rising concern over driver distraction, multiple organizations and agencies have called for the passage of laws and regulations banning the use of electronic devices, most typically cell phones for voice and text communication, by the operators of motor vehicles on public roadways (Governors Highway Safety Association, 2014; National Highway Traffic Safety Administration, U.S. Department of Transportation, 2012a, 2012b). In addition, in response to concerns relating to teenage drivers particularly, a variety of interventions to reduce the occurrence and impact of driver distraction have been implemented or are being developed and evaluated. These interventions cover the range from technology-based solutions to attempts to alter individual behavior through broad policy and enforcement (Donmez, Boyle, & Lee, 2006; Goodwin, O'Brien, & Foss, 2012; Regan, Lee, & Young, 2009a; Watkins, Amaya, Keller, Hughes, & Beck, 2011). Real-time distraction prevention technologies, such as workload managers, attempt to avoid distraction before it happens, while mitigation approaches attempt to interrupt distraction after it occurs by returning attention to the driving task, or invoking automatic crash avoidance measures to prevent an imminent crash from occurring (Engstrom & Victor, 2009). However, these approaches do not address the root problem, which is human behavior, and are unlikely to be effective in eradicating driver distraction or its effect on roadway safety in the near future. Behavioral modification strategies, such as broadly applied driver training that is effective in reducing susceptibility to distraction, policy-based interventions prohibiting behaviors that lead to distraction such as texting while driving, or regulating fleet management requirements or licensure requirements also hold potential (Regan, Lee, & Young, 2009b). Enforcement has also proven effective in altering driver behavior and increasing roadway safety; however, to date, these approaches have not been successful in reducing driver distraction. Overall, research evidence indicates that driver education and licensure requirements do not increase roadway safety (Fisher, 2006; Groeger & Banks, 2007), and in the case of advanced driver training programs, may even increase crash risk (Katila, Keskinen, Hatakka, & Laapotti, 2004).

Evaluations of cell phone and texting bans have shown mixed results. Most evaluations of laws banning texting and talking on cell phones while driving indicate that these bans have been largely ineffective in reducing crash risk (Burger, Kaffine, & Yu, 2014; Cheng, 2012; Ehsani, Bingham, Ionides, & Childers, 2014; Foss, Goodwin, McCartt, & Hellinga, 2009; Goodwin et al., 2012; Highway Loss Data Institute, 2010; McCartt et al., 2006), especially among the youngest drivers. In addition, two evaluations indicate bans might also result in increases in crashes, especially those that are most serious (Ehsani et al., 2014; Highway Loss Data Institute, 2010). The threat of citations and fines to enhance compliance with policies to reduce driver distraction also seems to have limited impact, especially for distraction that is difficult to observe or identify through observation from outside the vehicle (Goodwin et al., 2012). Several studies, however, indicate that cell phone and texting bans are effective. There is some evidence that they lead to reductions in cell phone use while driving, but not crashes and fatalities (Cheng, 2012), while other studies suggest these laws reduce crashes (Abouk & Adams, 2013; Bhargava & Pathania, 2013; Carpenter & Nguyen, 2014; Ferdinand et al., 2014; Kwon, Yoon, & Jang, 2014); however, some research suggests that any positive effects are short lived (Abouk & Adams, 2013) or limited only to specific conditions (Kolko, 2009). While individual behavior change programs and policy implementation have been effective in changing other health-risk behaviors throughout an entire population, this approach has largely failed in the case of driver distraction, and may be due to too little public education and/or weak or inconsistent enforcement (Carpenter & Nguyen, 2014).

The ability to design and implement successful behavioral, policy, and enforcement approaches is dependent on having an adequate and accurate understanding of drivers' engagement in DBs in terms of timing and frequency. However, from a behavior change perspective, it is even more important to understand individual motivations. Understanding the motivations and decision-making process leading to intentional participation in DBs while driving is essential to the development and design of effective behavioral, policy, and enforcement approaches to prevent or mitigate the negative effects of distracted driving.

Teenage driver behavior and subsequent safety, like other health risk behaviors, is strongly influenced by the attitudes, behaviors, and