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Extending parental mentoring using an event-triggered video intervention in rural teen drivers

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Abstract

Teen drivers are at high risk for car crashes, especially during their first years of licensure. Providing novice teen drivers and their parents with a means of identifying their risky driving maneuvers may help them learn from their mistakes, thereby reducing their crash propensity. During the initial phase of learning, adult or parental supervision often provides such guidance. However, once teens obtain their license, adult supervision is no longer mandated, and teens are left to themselves to continue the learning process. This study is the first of its type to enhance this continued learning process using an event-triggered video device. By pairing this new technology with parental feedback in the form of a weekly video review and graphical report card, we extend parents' ability to teach their teens even after they begin driving independently. Twenty-six 16- to 17-year-old drivers were recruited from a small U.S. Midwestern rural high school. We equipped their vehicles with an event-triggered video device, designed to capture 20-sec clips of the forward and cabin views whenever the vehicle exceeded lateral or forward threshold accelerations. Preliminary findings suggest that combining this emerging technology with parental weekly review of safety-relevant incidents resulted in a significant decrease in events for the more at-risk teen drivers. Implications for how such an intervention could be implemented within GDL are also discussed.

Keywords: Teen drivers; Novice drivers; Naturalistic driving; Intervention; Monitoring devices; Parental feedback

1. Introduction

Newly licensed teens are at high risk for car crashes. Teen drivers (16–19 years old) have crash rates that exceed those of drivers of any other age group, with 16–year olds having the highest crash rates of all (Mayhew, Simpson, & Pak, 2003; McCartt, Shabanova, & Leaf, 2003; Shope, 2006). As many as 3,467 teen drivers (aged 15–20 years old) were killed and 281,000 reportedly injured in motor vehicle crashes in 2005 (National Highway Traffic Safety Administration [NHTSA], 2006). This amounts to approximately one third of deaths from all causes for teenagers (Chen, Baker, Braver, & Li, 2000; Insurance Institute for Highway Safety [IIHS], 2004).

The tendency for teenage drivers to have high crash rates (fatal and nonfatal) compared with drivers of all ages remains true no matter how one looks at the data (i.e., whether crash rates are based on the total number of teenagers, the number of licensed teens, or the number of miles driven; IIHS, 2004). In fact, because licensure rates and miles driven per license holder tend to be lower among 16–19 year olds, their rate of fatal crashes per mile driven tends to be even more extreme compared to that of older drivers (IIHS, 2004; Insurance Information Institute [III], 2007). Crash risk varies greatly depending on whether a teen is at the learner stage (low crash risk), just licensed (highest crash risk in the first month of licensure), or has been driving for a year or more (Williams, 2003).

After the first years of licensure, crash risk tends to decline annually (IIHS, 2004; Mayhew et al., 2003; Williams, 2003). This decline in crash rates over time is linked to experience,

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maturation, or a combination of these two factors (Mayhew et al., 2003). Mayhew and colleagues (2003) investigated these issues in a study where they examined changes in collision rates during the first 24 months of driving. Consistent with other research, they observed a strong effect for age-related factors; 16- to 19-year-old novice drivers maintained a consistently higher crash rate (almost twice as high) as older (20+) novice drivers with the same amount of driving experience over the 24-month period after licensure. They also obtained a clear effect of experience-related factors on crash rates for both young and older novice drivers. Crash rates declined the most during the initial 7 months of driving, with 16- to 19-year-old novice drivers reducing their crash rate by as much as 42% during this short period of time. Finally, their data suggest that at any age, crash rates for novice drivers decrease as drivers accumulate driving experience. However, younger drivers show a more significant decline than their counterparts, especially during their first year after licensure.

2. Methods to reduce teen crash involvement

The findings of Mayhew and colleagues (2003) underscore the importance of protective programs and policies during the first two years of driving and, in particular, the first six months. What is needed is a method to control teen drivers' exposure to hazards so as to allow learning to take place in a more forgiving environment.

One such method is a Graduated Driver Licensing (GDL) program that extends the period of supervised driving for several months and imposes a set of restrictions on novice drivers. GDL programs focus on the critical period when teens are at the highest risk of being involved in a crash. By providing adult supervision and driving restrictions at different stages of licensing, GDL programs attempt to keep teens out of high-risk situations. Several states have adopted GDL programs and recent evidence suggests that the more stringent programs have been effective at reducing crash involvement (Dee, Grabowski, & Morrisey, 2005). While GDL programs vary widely, they usually consist of three phases: (a) an extended supervised learning phase (six months or more), (b) an intermediate license that restricts unsupervised driving at night or with passengers and may require parent certification, followed by (c) a fully issued unrestricted license upon successful completion of the first two phases. By the time they are granted their unrestricted license, depending on the state, most teen drivers are 17 or 18 years of age.

The parents of teenage drivers play a significant role in their teen's driving safety. They are responsible for enforcing the graduated driver licensing policies and driving restrictions by controlling access to their teen's vehicle (Simons-Morton, Hartos, & Beck, 2003). It is interesting that even a brief intervention at the time of teen provisional licensure has proven successful in increasing parental restrictions on teen driving privileges (Simons-Morton et al., 2003). By simply showing a short video on the risks of teen driving and providing both parents and teens with a driving agreement listing teen driving risks and suggestions for families on setting driving rules for teens, Simons-Morton and colleagues (2003) reported significant treatment group differences that were still present nine months later. A recent literature review supports this notion, indicating that parental involvement in management of novice teen driving positively impacts teen driver safety (Simons-Morton & Ouimet, 2006).

Another method to reduce teen crashes involves the use of a driver-monitoring device. The Record Online (Milgrim, 2005) reported that Senator Bill Larkin introduced legislation in the New York Senate and Assembly in April 2005 to allow for the in-car "installation of special devices to monitor the driving patterns of newly licensed teens." The bill would not mandate the installation of the devices, but it would require a reduction in insurance rates for owners of vehicles equipped to monitor the driving of those under 21 years of age. The claim is that insurance rates could be reduced by up to 25%. According to Senator Larkin (Milgrim, 2005), "The devices will need to monitor speed, steering, acceleration and braking patterns, among other things, and be able to immediately notify a parent or guardian if they detect unsafe driving practices."

Several safety-monitoring devices have become available in the marketplace — each offering a different method for parents to monitor their teens' driving. Some of these systems use the functionality of event data recorders (EDR) that capture vehicle data, such as speed, engine information, number of trips by time and day, miles driven, etc. Marketed to parents, these devices enable them to set thresholds for different vehicle parameters and to monitor whether and when their teens exceed these thresholds. One major disadvantage of such systems, however, is that while they provide speed, mileage, and/or geographical data, they do not supply any *contextual* information for the parents and teens to understand what caused the threshold exceedances. Without such context, there is no way to truly 'learn' from the flagged behavior and the opportunity to use this incident as a 'teachable moment' is lost.

Using event-triggered video devices is advantageous in that the context of the event can be better understood. For instance, a lateral acceleration exceedance may be flagged with any data recording system. Without video feedback, however, it is not possible to know where the exceedance occurred or what happened in the car leading up to it. This information may be critical. In addition, if a driver exceeds a speed threshold in a residential area, as opposed to a freeway, there are clearly differences in context that may have dramatic safety implications. Also, if the exceedance occurs due to cell phone usage, this information might teach the driver something about their own ability to safely operate the cell phone while driving.

Missing from any technology-centric approach, however, is parent/teen interaction. Simply installing the device in a teen's vehicle may not be sufficient to improve driving safety. However, providing video clips of safety-relevant driving behaviors to the teens and parents/guardian for review could create an opportunity for teens to learn from their mistakes. While it is well known that people rationalize their behavior, and can generate a myriad of reasons to