

Engineering-based Behavioral Interventions to Improve Teen Driving

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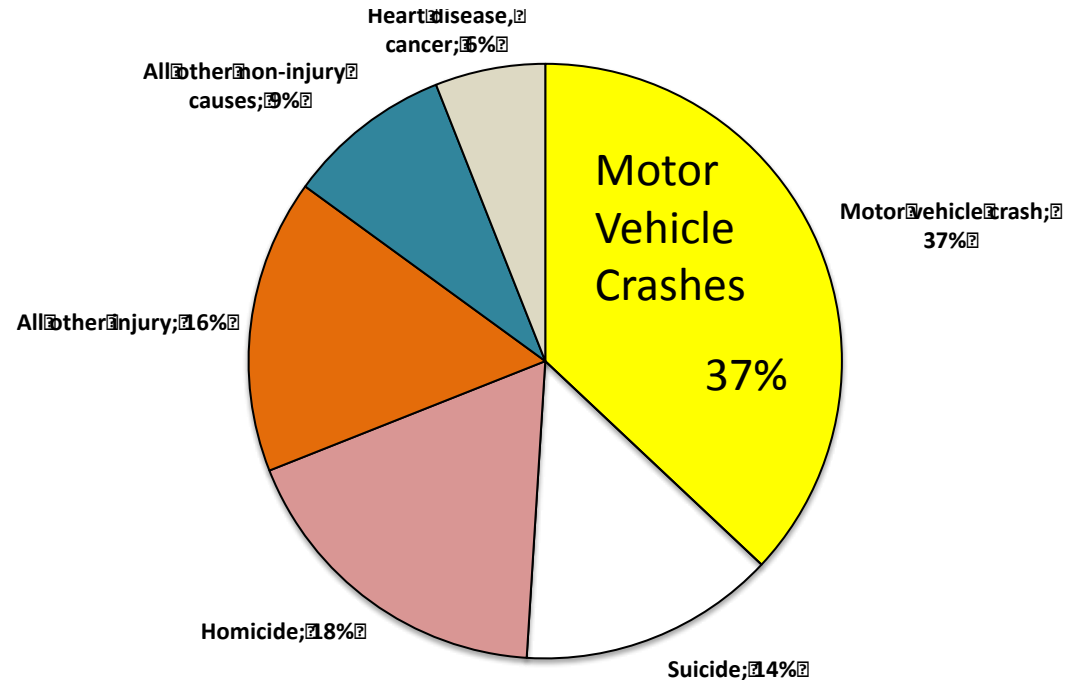
Jim Jenness, Westat

Two active projects

- Both using event triggered video recording
- Study 1: Age versus experience
- Study 2: The effect of video

Young driver crashes

- Driving is the single most dangerous thing we let our children do
- Leading cause of death ages 15-19
 - (CDC-WISQARS 2005-2009)
- These deaths are premature and preventable



Crash causes

1. Poor judgment & decision-making exacerbated by young age and inexperience
2. Sensitivity to peer influence & risk taking
 - The more teen passengers, the more risk and device interaction; encouraging and discouraging behavior
 - Risk taking causes vary; can be intentional or naïve; reduce safety margins
3. Disconnect between driving abilities and task demands
 - Difficulties in speed maintenance and hazard perception
 - Good at the technology part, but not on task sharing



Compelling teen driving research

- Crash risk increases about 10-fold when teens begin driving unsupervised and decreases at a moderate rate over first several *years*
- Enhanced Graduated Driver Licensing (GDL) showing positive results in other states
 - More supervised driving
 - Passenger restrictions
 - Nighttime driving limitations

Mayhew et al. (2003) – Decrease in crash rate during 1st 6 months of unsupervised driving

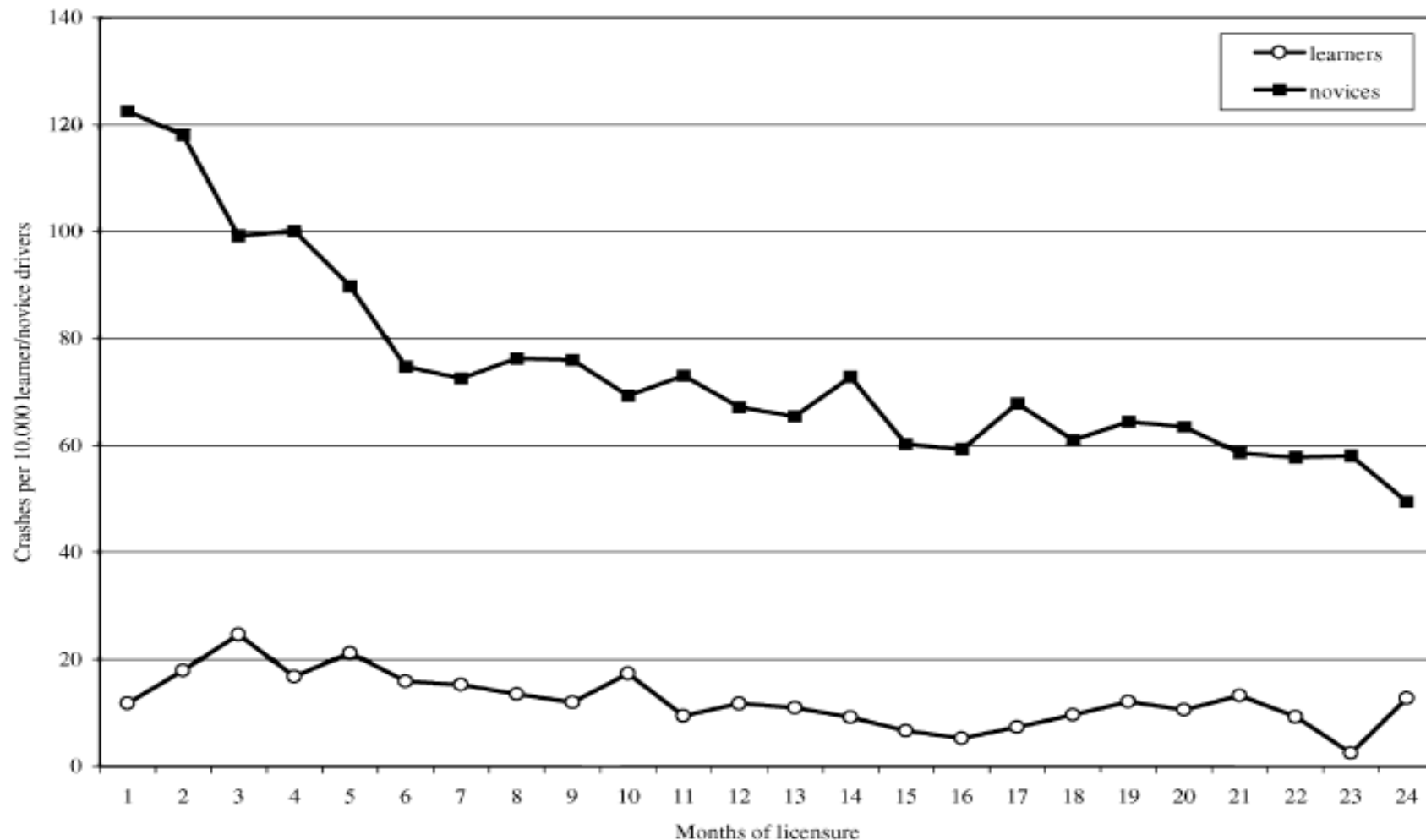


Fig. 1. Crash rates by license status and months of licensure.

Event-triggered video as an intervention tool

- The intervention is more important than the technology itself
- Purpose is to extend parent mentoring, not monitoring
 - Goal is to enhance learning for long term
- Video provides the driver and parent the context of safety-relevant events
- Looking for teachable moments
 - The good, the bad, and the “you almost died”
- User acceptance is critical for success

Event-triggered video recorders



- Two cameras
- 3-axis accelerometer
- Video/audio buffer
- GPS location and speed
- Triggers and saves video clips when g-force exceeds threshold ($\sim .5$ g)
- Records 8 sec before/4 sec after trigger
- Cellular download

Current evaluation: age and experience

- Three different groups of participants
 - School license holders (14.5 – 15.5 years old)
 - Inexperienced intermediate license (16 years old)
 - never held a school license
 - Experienced intermediate license (16 years old) – had a school license for at least 4 months
- 90 participants: Half the participants in each group assigned to control condition

Research Design

Age/Experience Groups	Intervention Group	Control Group
School License (Age 14.5-15.5)	n=15	n=15
Inexperienced Intermediate (Age 16, never had school license)	n=15	n=15
Experienced Intermediate (Age 16, had school license)	n=15	n=15
Total	45	45

Research Design - Timeline

- Each Participant drove for 6 months
 - ETVR installed prior to independent driving
- First 4 weeks were no-feedback baseline for all (pre-intervention)
- Middle 16 weeks of feedback/ intervention
 - Flashing light on ETVR (immediate feedback)
 - Weekly report and CD of video (delayed feedback)
- Last 4 weeks: return-to-baseline (post-intervention)

March 2012 analysis

- Data completed for 79/90 participants
- 240,257 miles
- Primary dependent measure is number of safety-relevant events per 1000 miles
 - Event frequency
- Negative binomial regression
 - Log of mileage as offset variable
 - Repeated measures

Summary

- Data collection completed – August 2012
- Report writing in progress
- A published report should be forthcoming early 2013

Study 2

- “Evaluating ^emonitoring and alerting technologies for teen drivers”
- A growing number of ‘off the shelf’ systems monitor various driving metrics and use them for behavioral interventions (NHTSA, 2010)
 - Video footage of incidents
 - Summary ‘report cards’
 - Real-time warnings
 - Text messaging to parents
 - Most systems include a combination

Existing Research

- Most report that use of system reduces risky driving, typically when there is consequence (Farmer et al. 2009; McGehee et al., 2007 Musicant & Lampel, 2010)
- Issues:
 - Kitchen sink: Use of a multifaceted intervention; what is (are) the agent(s) of behavior change?
 - Video:
 - Privacy & effect on parent-teen trust (NHTSA, 2010)
 - Cost implications
 - Anecdotal evidence: video may be a medium for building trust

Current Project

- 3 objectives
 - How do video-based and non-video-based interventions affect teen driving compared to control group and baseline period?
 - Are there different behavioral effects associated with the 2 interventions
 - What are teens' and parents' attitudes and impressions with respect to acceptability, usefulness, and safety benefits

Research design

- 3 (intervention group) x 4 (month) mixed design
 - 3 Intervention Groups (n = 20): Video based, Non-video based, control group
 - 4 months of driving: M
 - Month 1 = baseline; months 2-4 = interventions for the 2 experimental groups
- 2 sites: DC metro area and Iowa

Behavioral Interventions

	Video intervention	No video intervention	Control group
Video events recorded	X	X	X
Flashing LED when event is triggered	X	X	
Weekly report sent to parents	X	X	
Number of events triggered	X	X	
Type of events (e.g., hard braking, fast turn/curve)	X	X	
Events where driver was speeding	X	X	
Events where driver was not belted	X	X	
Graph comparing teen's events to those of a peer group	X	X	
Events where passengers were not belted*	X		
Events where a traffic violation occurred (e.g., running a stop sign)*	X		
CD of event videos sent to parents	X		

*Under this design, the video intervention report contains information about the event obtained from video analysis.

Timeline

- Data collection began in spring 2012
- 12 participants in data collection phase
- Data collection should continue to mid-2013.
- Report due September 2013

Contact Info

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