Comparison of Anticipatory Glancing and Risk Mitigation of Novice Drivers and Exemplary Drivers When Approaching Curves

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1. Abstract

Novice drivers are overrepresented in run-off-the-road crashes. Indeed, the literature demonstrates that novice drivers are less likely to anticipate hazards or maintain attention to the forward roadway and as a result fail to mitigate hazards by slowing. This research was an effort to compare the linked hazard anticipation and hazard mitigation behaviors of novice drivers with exemplary experienced drivers at curves, locations that are known to have a greater crash risk. Each driver navigated three drivers in a driving simulator, one of which included a moderate curve left and one of which included a tightening curve right. Experienced drivers made more anticipatory glances and began slowing significantly earlier in the curves than did novice drivers. However, novice drivers who anticipated hazards were much more likely to also mitigate the hazard. The use of these results in a PC-based driver hazard mitigation training program will be discussed.

2. Problem & Causes

Drivers’ Lane Position

Drivers’ Glance Locations

Drivers’ Expected Speed Profile

Crash Type...Curves. FARS.gov
16 & 17 year olds 2-times more likely to die in a crash where the first harmful event involved striking an object off the road or a rollover.

2010 Fatal Crashes / Mile Driven

3. Methodology

Simulated Environment
Drivers negotiated through a 36 minute drive in a virtual world while driving in a Realtime Technologies simulated environment. The vehicle was a 1995 Saturn and each driver was fitted with eye tracking glasses developed by Applied Science Laboratories.

Sample Output
The eye tracker was comprised of two cameras, one for the forward view and one of the eye movements. The system overlays a crosshair on the forward view to depict where the driver is looking. Here, the driver is glancing toward the right edge of the road, near the apex of the curve.

Experienced & Novice Drivers’ were Compared at Two Curves

Gradual Curve Left

Scoring Glances

Sharp Curve Right

Description of Each Curve

Goals: Is the Problem Hazard Anticipation or Mitigation?

Curves Bisected

- Sharp Curve Right

- Sharp Curve Left

- Gradual Curve Left

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