

Drivers' visual attention during the onset of the circular yellow indication at high speed signalized intersections

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Abstract:

Objective: Drivers have difficulty deciding whether to stop at the stop line or proceed through the intersection at the onset of the circular yellow (CY) indication. The purpose of this study was to understand how drivers distribute their visual attention when the traffic signal turns to the CY indication at high-speed signalized intersections, and whether factors such as time to stop line, headway or following vehicle type, influence overt visual attention.

Method: Data included eye-tracking metrics from 45 participants during a 24-scenario driving simulator experiment. Three areas of interest (AOIs) were defined (traffic signal, rear view mirror, and side view mirrors).

Results: Results showed that while the CY indication was displayed, total fixation durations (TFDs) were highest on the traffic signal (626 s), lower for the rear view mirror (50 s), and lowest for the side view mirrors (3 s). Repeated-measures ANOVAs indicated that the type of following vehicle influenced TFDs. Being followed by a heavy vehicle resulted in drivers shifting their fixations away from the traffic signal. Drivers fixated on the traffic signal more when followed by a passenger car than they did when followed by a heavy vehicle. Additionally, higher time to stop lines resulted in greater TFDs on the traffic signal.

Conclusions: This study highlights the importance of understanding the fixation behavior of drivers and the factors that influence drivers' visual attention. These findings could guide future efforts by the transportation community to involve drivers in training programs to emphasize the risks associated with ignoring rear view mirrors during their response to CY indications.