

## HEALTH RESEARCH ABSTRACT SUBMISSIONS

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<b>Department *</b>	Mechanical and Industrial Engineering/ Neurology
<b>Title of Research *</b>	Effects of augmented reality cues on driver performance
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<b>Introduction &amp; Purpose *</b>	Intersections are among the most hazardous roadway locations, particularly for left turns. This study evaluated effects of augmented reality (AR) cues on decisions to turn left across gaps in oncoming traffic.
<b>Experimental Design *</b>	Ten middle-aged drivers (Mean=40.6 years, SD=7.5; males=4) were tested on six simulated rural intersection scenarios. Drivers activated the high beam lever the moment they judged it safe to turn and released the lever the moment it was unsafe. A transparent 'no turn left' AR cue assisted the driver. It was positioned where oncoming traffic crossed the intersection, subtended 10°, signaled 4s time-to-contact (TTC) (cf., Nowakowski et al., 2008), and persisted until oncoming traffic passed. Uncued blocks (N=3) always preceded cued blocks (N=3). The three different cued blocks contained either: 1) 0% false alarms (FAs) and 0% misses, 2) 15% FAs, 0% misses, and 3) 15% misses (no cue despite <4s TTC), 0% FAs. A safety cushion was calculated as: (TTC when a driver judged it unsafe to go) – (actual turning time).
<b>Results *</b>	There was a main effect of condition (3 cued, 3 uncued) on safety cushion ( $F(5,401)=3.14$ ). The first of the three uncued conditions showed the smallest safety cushion (Mean=1.39 s, SE=0.20). The mean safety cushion for the later uncued conditions was 1.73 s (0.20) and similar to the mean for the cued conditions (Mean=1.74 s, SE=0.20). There were no differences between the cued conditions ( $p>.05$ , all cases).
<b>Conclusions *</b>	AR cues may have influenced driver behavior. The safety cushion in uncued conditions increased after AR cue exposure. This more conservative behavior may reflect cue related learning or general learning; however, if this finding were due to general learning we would expect smaller cushions. The small proportion of FAs and misses did not appear to affect response to the AR cues, based on the finding of no differences between the cued conditions.
This work was submitted and accepted to the Journal of Vision (Rusch et al., 2010) and a poster will be presented at the Vision Sciences Society Annual Conference.	
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