Human Factors Simulation Approach to Analyze Older Drivers' Performance in Intersections Left-Turn Scenarios

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Abstract : While there exists a greater understanding of the differences between the driving behaviors of older and younger drivers, there is still a need to further understand how the two groups perform when attempting to perform complex intersection maneuvers. This paper looks to determine if, and to what extent, these differences exist when drivers encounter permissive left-hand turns, pedestrian traffic, two and four-lane intersections, heavy fog, and night conditions. The study will utilize a driving simulator to develop custom drivable scenarios containing one or more of the previously mentioned conditions. 32 younger and 32 older (+65 years) participants perform driving simulation scenarios and have their velocity, time to the nearest oncoming vehicle, accepted and rejected gaps, etc., recorded. The data collected from the simulator is analyzed via Raff's method and logistic regression in order to determine and compare the critical gaps values of the two cohorts. Out of the parameters considered for this study, only the age of the driver, their experience (if they are a younger driver), the size of a gap, and the presence of pedestrians on the crosswalk proved significant. The results did not support the hypothesis that older drivers would be significantly more conservative in their critical gaps judgment and acceptance.

Keywords : older drivers, simulation, left-turn, human factors

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