New England University Transportation Center
77 Massachusetts Avenue, E40-279
Cambridge, MA 02139
617.253.0753
utc.mit.edu

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Year 24 Final Report

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Project Title:

Reducing Older Driver Crashes: Technology, Training and Livable Communities

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Principal Investigator:	Matthew Romoser	**Co-Principal Investigator:**	Donald Fisher; Michael A. Knodler
Title:	Assistant Professor	**Title:**	Professor; Associate Professor
University:	Western New England University	**University:**	University of Massachusetts/Amherst; University of Massachusetts/Amherst
Email:	Matthew.romoser@wne.edu	**Email:**	fisher@ecs.umass.edu; mknodler@umass.edu
Phone:	413.782.1492	**Phone:**	413.545.1657; 413.545.0228

Brief description of project:

In this study, simulator micro-scenarios were designed to train older drivers to take secondary looks. These micro-scenarios take no more than 30 to 45 seconds to complete and are much shorter than the 20 minute training programs now available. In addition, level of immersion was varied, from relatively low (the virtual world was projected onto three 22" diagonal LCD monitors) to medium (the virtual world was projected onto one to three 60" screens). A total of five groups of older drivers (91 total between the ages of 67 and 86) were trained. Three of the groups were given active, secondary glance training on a driving simulator – one on a low-immersion simulator and two on a medium-immersion simulator (one group utilized all three screens and one group utilized only one screen) – one of the groups was given passive, secondary glance training using a PowerPoint presentation and one of the groups received no training at all, control group. After the training was delivered participants in all five groups were evaluated in the field while driving alone in their own vehicle as they wore a head mounted camera. Secondary glances were recorded from the videos of the drives captured by the camera. The percentage of secondary glances in the field increased significantly for the group given active, 3-screen medium-immersion simulator training (82%) above those given passive, PowerPoint training (69%) and those who received no training, control group (42%). There was no statistically significant difference between the group given active, low-immersion simulator training (74%) and the group given passive, PowerPoint training; however, statically significance exists between the three active training groups and the 1-screen medium immersion simulator training (58%). It is clear that the design and use of micro-scenarios in medium and low immersion simulators increased the frequency of secondary glances.

Methodology:

A total of 91 older, licensed drivers between the ages of 67 and 86 participated in this study. All scenario graphics were generated using STISIM Drive® software. MODATS and STISIM simulators used STISIM v2.08 08 to retain training continuity with prior work (Romoser & Fisher, The Effect of Active Versus Passive Training Strategies on Improving Older Drivers' Scanning in Intersections, 2009). The micro-scenarios took anywhere between 30 and 45 seconds to complete.

Training included: 1) an instructional narrated video of the scenario using different perspectives (top down, driver) highlighting the potential hazard and correct secondary glance behavior (lasting 3 to 4 minutes), 2) a head camera video replay of the pre-test scenario, 3) repeat of the pre-test scenario on the simulator to correct/confirm correct glance behavior, 4) practice with the second scenario in the family not initially presented at pre-test, and 5) repeat of the last scenario as needed. The passive training group listened to a PC narrated series of PowerPoint slides (26 total) covering the same material as seen in the instructional videos with various statistics and examples.

The experiment consisted of two sessions with each participant: 1) a training session in the Arbella Insurance Human Performance Laboratory (HPL) at University of Massachusetts, Amherst and 2) a field assessment/drive in which participants drove their own vehicle to a familiar destination (e.g., grocery store, church, etc.) located approximately 15 minutes away then returned home (total travel time 30 minutes). However, the control group consisted of one condensed session with each participant, which combined the pre-screening assessments with the field assessment.

Conclusions:

This older driver study examined the effect of low and medium immersion simulator training on secondary glances. The results show that 3-screen medium-immersion simulator training when combined with micro-scenarios is an effective tool for training the older driver population which can significantly reduce the prevalence of simulator sickness (compared to Romoser & Fisher). Note that the time between the training and field evaluation in this study (roughly three weeks) was significantly less than the time between the training and the field evaluation in the Romoser & Fisher (2009) study (roughly three months). The effect of training in this study was similar to the effect of training in the Romoser & Fisher (2009) study. The frequency of secondary glances increased from 40% to 80%, while in this study, the frequency of secondary glances increase from 40% to 82% (in the medium-immersion group).