

Traffic Safety Facts

Traffic Tech – Technology Transfer Series

Training Novice Drivers to Shorten Distraction Time

Evidence in the field and on driving simulators suggests that when conducting secondary in-vehicle tasks, teen drivers are much more likely to glance inside the vehicle for long periods of time than are more experienced drivers. Such periods of distraction appear highly related to crashes and near crashes for drivers of all ages, but especially for teen drivers. Simply training drivers never to glance inside the vehicle, however, could be unsafe since glances at gauges and mirrors might actually serve to decrease crash risk. Also, given the large number of distractions in modern vehicles (e.g., radio/entertainment systems, cellular phones), it would be naive to think that drivers would voluntarily ignore the temptation to look away from the forward roadway while they are driving. This suggests the need for a training program that emphasizes the importance of minimizing distractions but also helps drivers learn to distribute the time that they do spend on in-vehicle tasks into more frequent and shorter glances instead of several long glances. Two studies are described here that document the development and evaluation of such a training program.

Study 1: PC-Based Assessment Program

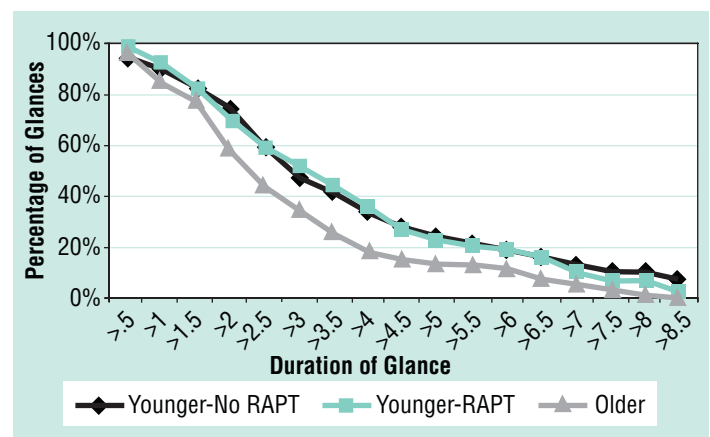
In Study 1, a personal-computer-based (PC-based) attention maintenance assessment program was developed, with attention maintenance defined as the ability to attend to the forward roadway while limiting long glances away from the roadway. An evaluation was conducted to determine if the program was capable of detecting differences in glance duration among younger and older drivers similar to those observed in previous field and simulator studies. This assessment program used an innovative approach (not an eye tracker) to determine if drivers were glancing away from the simulated roadway on the computer screen.

As part of the study, novice and experienced drivers performed two tasks displayed on a computer screen. The computer screen was split in half horizontally to display the tasks. Only one task, however, could be viewed at a time. To complete the tasks, participants had to toggle between the two views. The task displayed at the top of the screen involved identifying vehicles, pedestrians and bicyclists who posed a threat in a video recording of a drive down a local

roadway. The task displayed on the bottom half of the computer screen required drivers to look for a street on a map. Once the scenario began, the video played continuously, but when the participant toggled to the map view, the top half (driving video) of the screen went black. Similarly, the bottom half of the screen (map view) went black when the participant toggled to the video view. When the participant toggled to the map view, the video continued and the participant missed hazards that emerged. The program recorded the frequency and duration participants viewed each task.

In addition to simply looking at differences among younger and older drivers, a third group of young drivers received training before completing the PC-based assessment program. The trained drivers were taught to anticipate hazards using the Risk Awareness and Perception Training (RAPT) program. It was hypothesized that drivers who were more aware of risks would reduce the durations of their glances inside the vehicle. The results of Study 1 (see Figure 1) showed that the assessment program was able to differentiate between the attention maintenance skills of novice and experienced drivers with results similar to those found in field and simulator studies. The hazard anticipation training, however, did not improve the attention maintenance skills of

Figure 1. Percentage of Glances Greater Than Time Durations for Older, Younger RAPT and Younger No-RAPT Participants



young drivers, which led to the development of training that specifically addresses attention maintenance issues.

Study 2: Attention Maintenance Skills Training

In Study 2, a new training program that focused solely on attention maintenance skills was developed and evaluated. The Focused Concentration and Attention Learning (FOCAL) program was created to teach novice drivers how to reduce their glance durations to less than 2 seconds while still performing an in-vehicle task accurately. The training was tied, in part, to the results of the attention maintenance assessment program. Fifteen randomly assigned participants completed FOCAL training, and 15 completed control training. The control training program took about the same amount of time to complete as FOCAL. Participants in the control training group were instructed on the meaning of road signs, signals, and pavement markings.

As a pretest, participants completed the assessment program used in Study 1 to get a measure of willingness to look away from the roadway and to give feedback during training. After completing the assessment program, participants taking FOCAL training saw the following sequence of events:

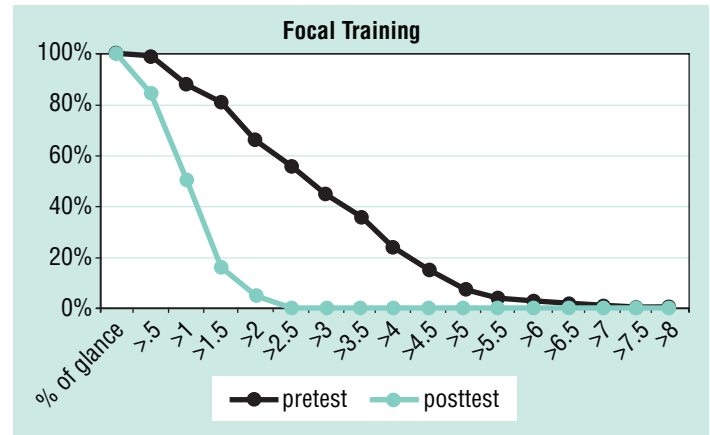
1. A video from the pre-test that went blank when the participant toggled to the map task;
2. A video from the pre-test that went blank when the participant toggled to the map task accompanied by an on-screen timer showing how long the participant looked away from the video;
3. Videos that displayed the map for 3 seconds whenever the participant wanted to see the map, after which the display automatically returned to the video view;
4. Videos that displayed the map for 3 seconds, followed by a loud tone if the map remained on for more than 3 seconds; and
5. Videos that displayed for 2 seconds.

After training, the assessment program was re-administered to see if FOCAL training effectively reduced long glances away from the roadway video.

Results

A comparison of the control group and training group indicated that the two groups had similar glance patterns prior to training. In contrast, participants trained with FOCAL (Figure 2) showed significant reductions in the percentage of longer glances (e.g., greater than 2 seconds) compared to the control group.

Figure 2. Distribution of Glance Durations Before and After Focal Training



Moreover, the distribution of glances did not change for the control group before and after training. In a separate analysis, the total time that the FOCAL group spent on the map task after training did not differ from the total time that the control group spent on the map task after training. This result indicates that the FOCAL training group was taking more frequent, but shorter glances and suggests that those who received FOCAL training were not ignoring the map task to complete the roadway task.

Discussion

Study 1 suggests that the assessment program may be a valid means to measure attention maintenance because differences among older and younger drivers were found, and the differences were similar to previous studies. The results of Study 2 indicate that the PC-based training program led to a reduction in long glance durations to the surrogate in-vehicle task used for the assessment program. These studies provide support for testing the effects of the training using a driving simulator and a test course as the test environments rather than a PC.

How to Order

To order the interim technical report titled *PC-Based Attention Maintenance Training: Development and Evaluation of a PC-Based Training Program* (56 pages), prepared by Dunlap and Associates, Inc., write to the Office of Behavioral Safety Research, NHTSA, NTI-132, 1200 New Jersey Avenue SE., Washington, DC 20590, fax 202-366-7394, or download from www.nhtsa.gov. Ian Reagan was the Contracting Officer's Technical Representative for this project.



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