U.S. Department of Transportation
National Highway Traffic Safety Administration

TRAFFIC TECH
Technology Transfer Series

NHTSA
www.nhtsa.gov

DOT HS 811 771

May 2013

Training for Healthy Older Drivers

This research examined the effectiveness of four types of training techniques designed to improve the driving performance of normally aging adults. Each technique is suitable for a broad cross-section of the healthy older driver population. The study *did not* include training programs designed specifically for an individualized rehabilitation regime. For example, the study did not include a customized rehabilitation regime tailored to meet the needs of a driver following a stroke.

The research team measured training effectiveness by comparing the on-road performance of drivers 65 and older in each treatment group with that of a control group (that received a neutral intervention) before and immediately after training, and again after a 3-month delay. Thus, study results reflected planned comparisons between each treatment group and the control group, but did not compare treatment groups to one another.

Training

The training activities examined in this study included:

1. Classroom driver education delivered in a group setting, supplemented by an hour of one-on-one, behind-the-wheel instruction;
2. Computer-based exercises designed to improve speed of visual information processing and divided attention;
3. Occupational therapy (OT)-based exercises to improve visual skills and attention; and
4. Physical conditioning to improve strength, flexibility, and movement.

Hospital staff or project consultants provided training to each group, which included 8 hours of direct contact with study participants. The providers identified driver improvement as an explicit goal of participation in the training activities. The control group participants received 8 hours of relaxation training or health and wellness counseling that were not associated with driver improvement.

Researchers randomly assigned 20 volunteer older drivers recruited at the Roger C. Peace Rehabilitation Hospital in Greenville, South Carolina, to each training group, as well as to the control group, for a total of 100 participants. Attrition over the course of the study reduced the number who finished the post-treatment assessments and were included in analyses of training effectiveness to between 15 and 17 participants per group. The mean age across groups ranged from 71.5 to 74.1 years.

Evaluation

A certified driver rehabilitation specialist (CDRS), who was blind to the type of training each participant received, conducted the on-road performance evaluations. The CDRS developed different routes of equal driving difficulty to avoid having participants become familiar with the route across successive assessments – before, immediately following, and 3 months following training.

The CDRS scored participants' competence on 33 subscales comprising tactical and strategic domains of driving performance. Strategic skills include attending to central and peripheral visual cues, planning, following directions and knowing the rules of the road. Tactical skills include managing speed and lane position, anticipating hazards and navigating in a manner appropriate to traffic laws as well as prevailing traffic and environmental conditions.

Scores were based on an ordinal scale from 0 to 4. Ratings indicated how often a driver demonstrated a particular skill or behavior, in relation to the number of opportunities to demonstrate it during each on-road assessment. Because the CDRS evaluated participants on the road, normal variability in traffic conditions produced different numbers of opportunities from person to person, and from drive to drive for the same participant.

The CDRS provided feedback to study participants about their driving only after the delayed post-treatment assessment (Drive 3), not after the baseline evaluation (Drive 1) or immediate post-treatment evaluation (Drive 2). The CDRS also talked to participants about their views of the validity and utility of the driving evaluation and training activities they took part in during the study.

Findings

Because the stated goal of each training activity was to preserve or enhance safe driving behavior, our research hypotheses were:

1. Each training group will have a higher percentage than the control group of drivers *without* deficits at baseline who *maintain* their performance at the immediate and/or delayed post-treatment assessments; and
2. Each training group will have a higher percentage than the control group of drivers *with* deficits at baseline who *improve* their performance on Drive 2 and/or Drive 3.

Only the group that received the occupational therapy-based exercises to improve visual skills and attention demonstrated a significant gain relative to the control group in the percentage of drivers without performance deficits at baseline who maintained their skills on subsequent evaluations. This effect was significant at $p < .05$ on the immediate post-treatment assessment and at $p < .01$ on the delayed assessment.

For the few drivers who demonstrated some deficiency on the baseline assessment, two training groups achieved significant ($p < .05$) gains relative to the control group in the percentage of participants who improved their performance on the immediate post-treatment evaluation. These were the OT-based exercises group and the classroom plus behind-the-wheel training group. None of the training activities was effective in producing such gains on Drive 3.

The OT-based visual skills training, which showed the strongest gains relative to the control group, points to an opportunity for professionals *without* the relatively scarce CDRS credential to enhance seniors' safety behind the wheel. The curriculum and support materials described in this report and appendix merit further research, potentially culminating in the broad implementation of this training in clinical settings across the country.

Results for the classroom plus behind-the-wheel training produced more limited but still significant performance gains, and more study participants perceived practical value in this intervention than in any other. With regard to the remaining treatments, physical conditioning holds the promise of health and wellness benefits well beyond improved driving performance; and computer-based training can be completed at home at the driver's own pace, providing a convenient and relatively inexpensive training option.

There were clear limitations in this research due to sample size, and to the restriction in range of driving skill levels for all of the healthy older driver groups on the baseline assessment. In addition, the training protocols only assured that participants were engaged in the respective training activities for an equal amount of time across groups. The study did not document performance on the training tasks themselves nor analyze performance differences on these tasks in relation to the on-road measures of effectiveness.

Another caveat to consider in interpreting these findings is the relatively short retention period. It is fair to question whether data from a 3-month follow-up evaluation provides a sufficient basis upon which to draw conclusions about the persistence of training effects. Consumers who invest eight hours in a training program, perhaps at substantial cost, could reasonably expect a benefit that lasts not months but years.

The CDRS rating system, based on ordinal measures, not only limited the application of inferential statistical techniques for data analysis but its focus on isolated behaviors does not necessarily provide a gauge of how well a driver integrates these various component skills for successful whole task performance. As a future research goal, a more standardized and refined methodology including interval-level measures of performance would improve analyses of on-road driving, often cited as the 'gold standard' for determining fitness to drive.

How to Order

Download *Validation of Rehabilitation Training Programs for Older Drivers* (95 pages plus appendices), prepared by TransAnalytics, LLC, from www.nhtsa.gov.

U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE., NTI-132
Washington, DC 20590

TRAFFIC TECH is a publication to disseminate information about traffic safety programs, including evaluations, innovative programs, and new publications. Feel free to copy it as you wish. If you would like to to be added to an e-mail list, contact Kathy Sifrit, e-mail: kathy.sifrit@dot.gov.