



AOTA Critically Appraised Topics and Papers Series
**Driving and Community Mobility
for Older Adults**

**A product of the American Occupational Therapy Association's
Evidence-Based Literature Review Project*

CRITICALLY APPRAISED PAPER (CAP)

Focused Question

What is the evidence for the effect of interventions to address cognitive and visual function, motor function, driving skills intervention, self-regulation/self-awareness, and the role of passengers and family involvement in the driving ability, performance, and safety of the older adult? Intervention approaches include adaptation, remediation, prevention, and maintenance.

Ashman, R. D., Bishu, R. R., Foster, B. G., & McCoy, P. T. (1994). Countermeasures to improve the driving performance of older drivers. *Educational Gerontology, 20*, 567–577.

PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)

State the problem the authors are investigating in this study.

The paper does not explore background information that led to this study. It is an interesting study, as it uses professions that have the strongest backgrounds to provide interventions to clients: traffic engineers, gerontologists, physical therapists, occupational therapists, and driver educators.

RESEARCH OBJECTIVE(S)

List study objectives.

The objective of the research was to develop and evaluate ways to improve the safety of older drivers.

DESIGN TYPE:

Randomized Controlled Trial

Level of Evidence:

I

Limitations (Appropriateness of Study Design):

Was the study design type appropriate for the knowledge level about this topic? *If no, explain.*

Yes

No

SAMPLE SELECTION

How were subjects selected to participate? Please describe.

Convenience sample—volunteers

Inclusion Criteria

Individuals had to be ages 65 or older, be in good health, have a valid driver’s license, be driving on regularly, show evidence of financial responsibility, have a vehicle to use in the study, not have taken an older-driver training course, and have a medical release from their physician to participate in the study.

Exclusion Criteria

NR

NR = Not reported.

Sample Selection Biases: *If yes, explain.*

Volunteers/Referrals

Yes

No

Attention

Yes

No

Others (List and Explain):

SAMPLE CHARACTERISTICS

N = 105 (94 after dropouts)

% Dropouts

#/(%) Male

#/(%) Female

Ethnicity

Disease/disability diagnosis

Check appropriate group:

| | | | | |
|-------------------|-------------------|--------------------|---------------------|---------------------|
| <20/study group ✓ | 20–50/study group | 51–100/study group | 101–149/study group | 150–200/study group |
|-------------------|-------------------|--------------------|---------------------|---------------------|

Sample Characteristics Bias: *If no, explain.*

If there is more than one study group, was there a similarity between the groups?

Yes

No

Were the reasons for the dropouts reported?

Yes 11 of the subjects did not complete the study for various reasons; 2 became ill, and the others had personal business or scheduling conflicts that prevented them from continuing their participation in the study. Thus, only 94 subjects completed the study. Final sex distribution was not reported.

No

INTERVENTION(S)—Included are only those interventions relevant to answering the evidence-based question.

Add groups if necessary.

Group 1

| | |
|-------------------|---|
| Brief Description | Physical therapy |
| Setting | Home-based program of 7 exercises designed to improve posture, neck, and shoulder flexibility |
| Who Delivered? | Physical therapist |
| Frequency? | The exercises to be done 4 times per week |
| Duration? | 8 weeks |

Group 2

| | |
|-------------------|--|
| Brief Description | Perceptual therapy |
| Setting | Home-based program of 568 self-administered exercises to improve spatial relationships, visual discrimination, figure-ground discrimination, visual closure, and visual memory |
| Who Delivered? | Not specified |
| Frequency? | The exercises to be done for 20 minutes 4 times per week |
| Duration? | 8 weeks |

Group 3

| | |
|-------------------|---|
| Brief Description | Driver education that focused on right-of-way rules and procedures for crossing and turning left at intersections, safe following distances, correct lane positioning and selection, proper procedures for backing, and parking maneuvers |
| Setting | Classroom |
| Who Delivered? | Officer of the Nebraska State Highway Patrol |
| Frequency? | 8 hours of classroom instruction presented |
| Duration? | 1 day |

Group 4

| | |
|-------------------|--|
| Brief Description | Traffic engineering improvements incorporated into test route--signs, pavement markings, and traffic signal displays |
| Setting | Open road |
| Who Delivered? | Traffic engineering staff of City of Omaha |
| Frequency? | Not specified |
| Duration? | Not specified |

Intervention Biases: *Explain, if needed.*

Contamination

Yes

No

Co-intervention

Yes

No

Timing

Yes

No

Site

Yes

No

Use of different therapists to provide intervention

Yes

No

MEASURES AND OUTCOMES—Included are measures relevant to answering the focused question.

Name of measure:

Driver Performance Measurement Test

Outcome(s) measured (what was measured?):

The subjects' driving performance was measured on the road using the driver performance measurement (DPM) technique developed at Michigan State University. The DPM route was designed to measure the subjects' driving performance relative to the maneuvers often involved in older-driver accidents at intersections in Omaha, Nebraska. Driving performance was evaluated at 7 locations on the 19-km route.

A certified driver education expert trained in the DPM technique conducted the evaluation. At each of the 7 locations on the DPM route, the evaluation of a subject's driving performance was based on search, speed control, and direction control criteria, each of which was scored as either satisfactory or unsatisfactory.

Is the measure reliable (as reported in article)?

Yes To improve the reliability of the test scores, each subject drove the DPM route twice.

No

NR

Is the measure valid (as reported in article)?

Yes Statistics were not reported on establishing validity. Yet, the outcome measure is an activity that subjects participated in regularly. They used their own vehicle, which may support the ecological validity.

No

NR

How frequently was the measure used for each group in the study?

Subjects were given the measure as a pre- and posttest. The driving performance of the control group and the traffic engineering improvements intervention group were tested differently from the other subject groups. First, their driving performance was tested at the beginning of the study, at the same time the other subjects were first tested. They were tested again 2 months later, after the traffic engineering improvements had been installed. The difference between their first and second DPM scores served as the control for the study, and the difference between their second and third DPM scores served to measure the effects of the traffic engineering improvements.

Measurement Biases

Were the evaluators blinded to treatment status? *If no, explain.*

Yes

No

Recall or memory bias: *If yes, explain.*

Yes The traffic engineering improvements intervention group took the outcome measure 3 times, 1 time more than all other groups. The extra familiarity of being with the driving instructor, etc., may have biased the DPM data, resulting in higher scores than the other groups.

No

Others (list and explain):

Limitations (appropriateness of outcomes and measures) *If no, explain.*

Did the measures adequately measure the outcome(s)?

Yes

No

RESULTS

List results of outcomes relevant to answering the focused question.

Include statistical significance where appropriate ($p < 0.05$).

Include effect size if reported.

Combining driver education with physical or perceptual therapy tended to increase the improvement in driving performance, but statistical significance was not obtained.

Was this study adequately powered (large enough to show a difference)? *If no, explain.*

Yes

No The size of each study group was small.

Were appropriate analytic methods used? *If no, explain.*

Yes

No

Were statistics appropriately reported (in written or table format)? *If no, explain.*

Yes

No

CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

All interventions were equally effective, each providing a 7.9% improvement in the driving performance of older drivers. Physical therapy was most cost-effective intervention. Traffic engineering improvements could be cost-effective depending upon the volume of participants.

Were the conclusions appropriate for the Study Design (Level of Evidence)? *If no, explain.*

Yes

No

Were the conclusions appropriate for the statistical results? *If no, explain.*

Yes

No

Were the conclusions appropriate given the study limitation and biases? *If no, explain.*

Yes

No

IMPLICATIONS FOR OCCUPATIONAL THERAPY

This section provides guidance about clinical practice, program development and other implications of the study findings as they relate to the focused question.

A variety of interventions may improve the driving ability of older drivers. Combining driver education with physical or perceptual therapy tended to increase the improvement in driving performance. The implication for occupational therapy is that the best training may include driver's training on the road with reviews of the rules of the road in combination with physical exercise and exercises in perceptual activities. This is a valuable study for occupational therapists, as it emphasizes integrating several approaches that tap into various skill components: muscle strength and flexibility, vision and perception, which could impact attention and reaction time; practicing maneuvers on the road to build up self-confidence; and learning the rules of the road, as many older drivers never had to learn these details to become licensed drivers.

This work is based on the evidence-based literature review completed by Linda Hunt, PhD OTR.

CAP Worksheet adapted from: Critical Review Form – Quantitative Studies ©Law, M., Stewart, D., Pollack, N., Letts, L., Bosch, J., & Westmorland, M., 1998, McMaster University. Used with permission.

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.



Copyright 2007 American Occupational Therapy Association, Inc. All rights reserved.
For personal or educational use only. All other uses require permission from AOTA.
Contact: copyright@aota.org