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COGNITIVE AND PERCEPTUAL FACTORS IN AGING AND DRIVING PERFORMANCE

PROBLEM STATEMENT

There is overwhelming evidence that suggests that older drivers may have more difficulty than the general driving public in attending to the driving task and that they may be slower at processing information, especially when required to make complex decisions. For example, the older driver may be at a disadvantage both perceptually and cognitively in dealing with complex traffic situations (Transportation Research Board; National Research Council, 1988). Traffic accidents caused by elderly drivers have been attributed by investigators to neglect or an inattention to relevant information from road signs, as well as to other cars on the road and to pedestrians crossing or at the side of the road (Ponds, Brouwer, and Wolfelaar, 1988). These accidents have resulted in a significant number of fatalities and financial losses. However, it may be that the rise in accident rates among the elderly is not due only to age-related declines but also to the additional functional losses resulting from age-related brain diseases. Therefore, the neurological status of the driver needs to be examined.

OBJECTIVES

The objective of this study is to systematically examine the perceptual, cognitive, and neurological factors that affect older drivers. The hypothesis is that older drivers are more susceptible to driving impairment in a low-fidelity driving environment than are younger adults.

FINDINGS AND CONCLUSIONS

Researchers examined cognitive and perceptual factors as a function of age differences in drivers. Three major groups of participants were employed in the study: young adults aged 19 to 34 years, middle-aged adults aged 35 to 59 years, and older adults aged 60 or more years.

Researchers first studied and determined various perceptual and cognitive measures at the Visual Performance Laboratory at the University of Central Florida, while other tests assessing neurological status were being conducted at the FASST Laboratory. Researchers then conducted simulation studies using a low fidelity simulation of the driving task. In general, tests such as the Useful Field of View (UFOV), Digit Symbol, Block Design, Trails B, and Contrast Sensitivity tests seemed to be better able to predict driving performance on the low fidelity simulation task when compared to other tests.

Researchers found that younger drivers had more collisions/crashes than older drivers. Older drivers were less likely to exceed speed limits than younger drivers. Researchers also found that the various measures of UFOV increased with the age of the participant. Thus, younger drivers

were found to be responsible for more collisions/crashes and to disobey speed limits more than older drivers. Changes in older drivers appear to be best measured with various neurological measures and UFOV.

BENEFITS

The findings of this research suggest several possible remedies for driving impairments as a function of age. The following are some practical remedies for drivers at risk. They involve training interventions and design guidelines for automobiles.

1. Poor or shorter attention spans in older or even younger drivers can be improved. The distributors of the UFOV test offer a version that aids improvement in attention performance. This type of training may well alleviate some of the driving problems of at-risk drivers of any age.

2. A design change in automobiles that could produce a safer driving environment for all drivers, particularly at-risk drivers, might well employ in-vehicle warning systems. Such systems could acquire a driver's attention when another car moves into the blind-spot area or is passing the subject driver's car, or when the driver is following another car too closely. These displays might be primarily visual, but they could be accompanied by auditory signals, as well (e.g., auditory alarms, synthesized speech).

3. Training older or at-risk drivers in simulators using scenarios that often cause problems could be a useful method for facilitating improvement.

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