

Title: THE PERCEPTION OF PEDESTRIANS FROM THE PERSPECTIVE OF ELDERLY AND EXPERIENCED DRIVERS

Presenting Author: Shani Bromberg

Authors: S. Bromberg 1; T. Oron-Gilad 1; A. Ronen 1;

Affiliation

1. Ben-Gurion University of the Negev, Department of Industrial Engineering and Management, Beer-Sheva, Israel,

Abstract:

The elderly population (typically defined as 65+ years old) is the relatively fastest growing age group in the population of the Western world. In addition, life expectancy increases and quality of life is constantly improving (Hakamies-Blomqvist et al., 2004). As a result, more drivers on the road are elderly. The variance in performance in most functions, of individuals over the age of 65, is very large (Midwinter, 2005). Situations that were found more demanding for elderly drivers were: heavy traffic load, loaded parking, bad road conditions and darkness. Researchers are trying to establish a way to distinguish between the "competent" and the "incompetent" drivers among the elderly drivers population. Hakamies-Blomqvist (2006) claimed that it is possible to classify a driver to 'safe' and 'unsafe' according to his/her probability to be involved in accidents, if permitted to drive. Our study examined hazard perception abilities among elderly and experienced drivers, particularly with regard to the presence of pedestrians in the urban road environment. Two evaluation methods were used; a) a commonly used hazard-perception evaluation method utilizing videos, where participants view videos of traffic scenes and press a button when they perceive a hazardous situation (see Borowsky, Oron-Gilad & Shinar, submitted), and b) simulated driving scenarios with or without dynamic elements (e.g., pedestrians) present, where the evaluation of hazard perception is embedded in the participants' driving behavior. By using two different means of assessment we were hoping to characterize "hazard perception performances" more accurately. We hypothesized that driving behavior in a driving simulator allows the drivers, particularly the elderly drivers, to respond more naturally to the environment. In the simulator drivers can also control their driving speed which is something elderly drivers often complain about in video observation tests. However, in the common method of video observation, the picture shown is of a real street, in a rather familiar environment, rich with details and cues. Possibly, combining both methods will create a more holistic dataset of parameters that measure hazard perception abilities. Our second objective was to characterize differences in hazard perception performances of elderly drivers in comparison to experienced drivers. Thus examining whether the elderly drivers differ from the experienced drivers in their hazard perception, and if they do, what are the characteristics of this difference and how it affects their driving. Previous studies suggested that Hazard perception abilities are not affected and that older drivers are as likely as younger experienced drivers to perceive hazards (e.g., Borowsky, Oron-Gilad & Shinar, submitted) however, they tend to rely more on other road-users intentions as well as to compensate for their deteriorating driving abilities (Ball et al., 1998; DeRaedt & Ponjaert-Kristofferson, 2000; Hakamies-Blomqvist, 1994).

Twenty four 'Experienced drivers' aged 28-55 (M=33) and twenty 'Elderly drivers' aged 65+ (M= 68) participated in the experiment as volunteers. The results of the video observation component had shown that elderly drives identified fewer hazards, and that their response time for hazard detection was longer. An analysis of the reasons for the presses, that were also recorded, had shown that experienced and elderly drivers relate

to different traffic elements as hazards. The elderly drivers frequently did not relate to pedestrians as a hazard, as opposed to their adversary, the experienced drivers. There was also evidence that they referred less to approaching a junction as a hazard. However, they referred more to the fact that the velocity driven in the video movies was 'too fast'. The results of the simulated drive had shown a different picture, the elderly and the experienced driver's performances were similar. There was only one pedestrians-related traffic event in which the differences in performances were significant. Based on our findings, we concluded that the elderly driver relate differently to pedestrians-related events. In addition, in the simulated drives, we found that elderly drivers press the brake pedal about 30% more than the experienced drivers and that they drive about 20% slower. This may lead us to the conclusion that in actual driving, elderly drivers compensate for their impairments in hazard perception by reducing the velocity and using the brake pedal more often.