Title: AGE-RELATED DIFFERENCES IN STREET-CROSSING SAFETY BEFORE AND AFTER OLDER PEDESTRIANS' TRAINING

Presenting Author: Viola Cavallo

Authors: V. Cavallo 1;A. Dommes 1; F. Vienne 2;I. Aillerie 2;

Affiliation
1. French National Institute for Transport and Safety Research (INRETS), Laboratory of Driver Psychology, Versailles, France, 2. French National Institute for Transport and Safety Research (INRETS), Laboratory for Road Operation, Perception, Simulators and Simulations INRETS-LCPC, Paris, France,

Abstract:
International accident statistics indicate that elderly pedestrians make up an extremely vulnerable road-user group. In France, more than half of all pedestrians killed on the road are over 65 years old, whereas this age group represents less than 15% of the population.
Past research has shown age-related difficulties in selecting safe gaps. More specifically, recent studies demonstrated an effect of the approaching car's speed on elderly adults' decisions: contrary to younger adults, who accepted constant time gaps, older pedestrians were found to accept shorter and shorter time gaps as the car's speed increased, putting them at a higher risk at high speeds. They also tended to miss many safe opportunities to cross in front of cars approaching at low speeds. These behaviors are thought to reflect age-related difficulties in processing information about the approaching car's speed and integrating that information into the decision-making process. With aging, distance gap seems to become the overriding parameter for deciding whether or not to cross.
Although for many seniors, walking is the major way of getting around, there are surprisingly no studies on improving the safety of elderly pedestrians through training. The present study was aimed at contributing to this issue. The objective was to develop and assess a behavior-training program aimed at enhancing the safety of elderly pedestrians via simulator-based training in street crossing.
To this end, twenty seniors (aged 65-83) were enrolled in a street-crossing training program. The training program promoted individual sensory-motor practice (via repeated practice on a simulator) and addressed elderly adults' ways of thinking about the task and the strategies they bring into play (via discussions, explicit feedback and instructions). Before the training, immediately after it, and 6 months later, the street-crossing decisions and behaviors of the older participants were assessed using a simulated street-crossing task. Twenty younger participants (aged 20-30) performed also the simulated task to serve as a baseline against which the street-crossing performance of the older trained group was compared.
The present study used an interactive street-crossing simulation device which included a portion of an experimental road (4.2 m wide, materialized on the ground), and a computer-generated visual scene with traffic approaching from one side. Participants were instructed to cross the experimental road when they judged it was safe to do so by walking at any pace but not running. Thanks to the interactive simulation, the participants could calibrate their perceptions of the approaching traffic with their actions. Traffic scenes were updated interactively by a movement-tracking system that recorded the participant's positions via a cable attached to the participant's waist.
The results showed that the training produced significant short- and long-term benefits and enhanced the overall safety of the older participants' street-crossing behavior. These findings suggest that combining repeated simulator-based street-crossing practice with enhanced awareness of street-crossing dangers can have a positive effect. When compared with younger participants, older pedestrians considerably improved their behavior so that no differences in safety-related indicators were observed any longer. However, the older participants' ability to take the oncoming vehicle's speed into account in their decisions did not improve with training. Contrary

to younger participants, older participants made more unsafe decisions when vehicles were approaching at high speeds than at low speeds. These age-related differences appeared before as well as 6 months after older street-crossing training. This finding may reflect age-related sensory or cognitive impairments that cannot be remedied by a simulator-based behavioral method.

The results of this study stressed the importance of street-crossing training for seniors and provided a basis for developing future programs adapted to their difficulties. Further studies are required to identify the sensory, perceptual, and cognitive abilities involved in street-crossing decision-making. A better understanding of these skills would be useful in designing other training programs likely to improve the behavior of senior pedestrians.