Age-related differences in street-crossing safety before and after training of older pedestrians

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ABSTRACT

International accident statistics indicate that elderly pedestrians make up an extremely vulnerable road-user group. Past research has shown that older adults make many unsafe street-crossing decisions and adopt insufficient safety margins, especially when vehicles are approaching at high speed. Apart from studies on road design and speed-limit countermeasures, there is surprisingly no road-safety research on behavior-based measures to improve older pedestrians’ safety. In this line, the present study was aimed at (i) assessing the effectiveness of a training program for older pedestrians that combined behavioral and educational interventions, and (ii) examining whether and to what extent age-related differences in street-crossing safety could be reduced after training older adults. Twenty seniors were enrolled in a training program. Before, immediately after, and six months after training, street-crossing behavior was assessed using a simulated street-crossing task. Twenty younger participants performed the same simulated task to obtain a baseline measure. The results showed that the training produced significant short- and long-term benefits, due to a shifting of the decision criteria among the older participants towards more conservative judgments. When compared with the younger group, the older participants improved their behavior considerably so that significant differences in the mean safety-related indicators were no longer observed. However, the older participants’ ability to take the oncoming car’s speed into account did not improve. Even after training, and contrary to younger adults, older participants were found to make more and more unsafe decisions as the car’s speed increased, putting them at a higher risk at high speeds. This finding may reflect age-related perceptual and cognitive difficulties that cannot be remedied by a behavioral or educational training method. The present findings underline that high speed is an important risk factor for elderly pedestrians that should be handled by effective speed reduction measures (i.e. speed ramps, road narrowing).

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1. Introduction

International accident statistics indicate that elderly pedestrians make up an extremely vulnerable road-user group (NHTSA, 2001). In France, more than half of all pedestrians killed on the road (51%) are over 65 years old, whereas this age group represents less than 15% of the population (ONISR, 2006). In French urban areas, the percentage of elderly pedestrians killed on the road even reaches 63% of all pedestrian fatalities. Implementing countermeasures for improving street-crossing safety among older adults is therefore becoming an urgent problem.

Previous research (Holland and Hill, 2010; Lobjois and Cavallo, 2007, 2009; Oxley et al., 1997, 2005) has pointed out several age-related changes in street-crossing behavior, such as slowing of decision-making, decreased walking speed, and difficulty selecting safe gaps and adopting sufficient safety margins. These problems appear to be particularly marked on two-way roads (Holland and Hill, 2010; Oxley et al., 1997) and/or when the approaching vehicle’s speed is high (Lobjois and Cavallo, 2007, 2009; Oxley et al., 2005). Whereas younger pedestrians’ behavior is largely independent of vehicle speed, elderly people accept shorter and shorter time gaps as speed increases. Elderly pedestrians seem to mainly use simplifying heuristics based on the distance of the approaching vehicle (Lobjois and Cavallo, 2007). For a given available time gap, the distance of the approaching car is greater at high speeds than at low speeds. Considering only the greater distance, the elderly more often think it is safe to cross at higher vehicle speeds. On the other hand, the shorter car distances associated with lower speeds lead older pedestrians to miss more crossing opportunities when vehicles are approaching slowly.

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