



Drivers' perception of vulnerable road users: A hazard perception approach

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ABSTRACT

The present study examined how experienced and young-inexperienced drivers (either trained in hazard perception or not) respond to and identify pedestrians when they appear in residential roads within populated neighborhoods and in urban roads located outside neighborhoods and usually less populated. As part of a hazard perception test, participants were connected to an eye tracking system and were asked to observe 58 traffic scene movies and press a response button each time they detected a hazardous situation. Analyzing all pedestrian-related events revealed that, regardless of driving experience or training, drivers detect pedestrians less often when they appear in urban areas and more often when they appear in residential areas. Moreover, experienced drivers processed information more efficiently than young-inexperienced drivers (both trained and untrained) when pedestrians were identified. Visual search patterns in urban and residential traffic environments are discussed.

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1. Introduction

According to the Israeli Road Safety Authority, the total number of fatal and serious injuries from traffic crashes in urban areas in 2008 was 20,807 compared to 11,004 in intercity areas. The corresponding numbers of injured pedestrians were 3131 and 186, respectively. Thus, conflicting situations involving pedestrians are more typical in urban areas and less common in intercity areas. Nevertheless, the urban environment itself is not unified. There are variations in its characteristics; some of its roads are located inside residential neighborhoods and are more populated with pedestrians while other urban roads are located beyond residential neighborhoods and are less populated with pedestrians. Specifically, it is not clear whether differences in pedestrian expectancies can be exemplified in within-neighborhood residential roads and between-neighborhood urban roads. For making terms more robust we defined *residential* areas as roadways that are located within neighborhoods and *urban* areas as roadways that are located outside neighborhoods.

Obviously, drivers in intercity and urban areas adopt higher speeds, therefore, given a crash occurs, the outcome is more likely to be harmful. Nevertheless, beside travel speed, additional driving-related skills such as hazard perception ability may affect the likelihood that pedestrian-driver conflicts will result in a crash.

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Hazard perception is usually considered as the ability to 'read the road' or in other words, the awareness of hazardous situations (Horswill and McKenna, 2004). Accumulated evidence suggests that experienced drivers possess better hazard perception skills than young-inexperienced drivers (e.g., Borowsky et al., 2010; Pollatsek et al., 2006; Wallis and Horswill, 2007; Underwood et al., 2005).

One common way to measure hazard perception is to ask drivers to observe computer-based traffic-scene movies filmed from a driver's perspective and to press a response button each time they detect a hazard (e.g., Horswill and McKenna, 2004; Wallis and Horswill, 2007; Borowsky et al., 2010). Typically, experienced drivers are more aware of potential hazards than young-inexperienced drivers and respond faster to hazards. Borowsky et al. (2010), for example, have shown that experienced drivers indicate intersections as hazardous locations more often than young-inexperienced drivers and that experienced drivers tend to gaze towards emerging roads when they approach intersections. Young-inexperienced drivers, on the other hand, tend to gaze straight forward and ignore emerging roads. Pollatsek et al. (2006) have further showed that young-inexperienced drivers are not fixating at areas that contain potential traffic risks compared to experienced drivers who scan these areas much more often. Furthermore, Chapman and Underwood (1998) have shown that experienced drivers adopt different scanning patterns according to the type of traffic environment (e.g., urban, residential, and intercity) whereas young-inexperienced drivers apply similar scanning patterns independent of the traffic environment.

Accumulated evidence suggests that experienced drivers relate to traffic scenarios in which pedestrians are present, as less haz-