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Pedestrians' behaviour in cross walks: The effects of fear of falling and age

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ABSTRACT

Pedestrians are exposed to risks when crossing roads in urban areas. The crossing behaviour of pedestrians was studied as a factor contributing to their exposure to risks on the road and to their involvement in road accidents. This work explores two specific aspects of crossing behaviour: crossing speed and head pitches—the proportion of time pedestrians point their heads down (rather than towards the traffic) when crossing a road. The last one is used as an indicator of the (lack of) attention to cross-traffic. We also explored the possible effect of fear of falling (FOF) among pedestrians, as it might be associated with slow walking, less attention to cross traffic, and more attention to the pavement and their footsteps. This paper reports on a field study that combined an observatory technique with short survey. 203 pedestrians in two sites (signalised and unsignalised crosswalks) were video recorded while crossing the road. The FOF of pedestrians and other measures of pedestrian behaviour at crosswalks were revealed by means of questionnaire. Age and gender had the most significant effects on crossing speed, and FOF had a significant effect on the proportion of downward head pitches during crossing.

1. Introduction

Understanding and analysing the risks pedestrians are exposed to when crossing a road has been the subject of many studies addressing aspects relating to the traffic, road design, traffic signals and road users' behaviours. There is extensive research on pedestrian behaviour and the evaluation of safety measures for pedestrians at urban areas. Two specific aspects of crossing behaviour that are studied in this work are pedestrians' crossing speed and head pitches—the proportion of time pedestrians have their heads down. Both measures are interesting because they might be associated with pedestrians' age and the so-called 'fear of falling' (that is associated by itself with older age) that has not been studied in the context of crossing behaviour.

The increasing proportion of older people in the community in industrialized countries (in many of them this proportion has reached 10% and above it), and the increase in their level of mobility and physical activity, make the safety of older road users an increasingly critical issue.

Older people are seen as a vulnerable group of road users. A wide range of factors has been examined in this context. Older people are those individuals who are most likely to be physical vulnerable (DfT, 2001; Musselwhite, 2006). They experience deterioration in sensory and cognitive skills (Dunbar et al., 2004; Kovalchik et al., 2004; Salthouse, 1996), and a progressive loss of feeling independent (Orimo et al., 2006). Some or all of these factors might have affect on the crossing behaviour of older pedestrians.

Observational techniques have been widely used to understand crossing behaviour and identify risky behaviours of different age groups (see, for example, Oxley et al., 1997). The effects of age-related attitudinal factors and their contribution to road crossing behaviour have been also addressed in the literature, but most of the research has focused on the risk taking attitudes of younger adults (Holland and Hill, 2007; Parker et al., 1992). There have been very few studies on the attitudes of older pedestrians towards risky behaviour. For an older pedestrian not paying enough attention to crossing traffic might be described as a risky behaviour. But, in general, older pedestrians exhibit safer behaviour when crossing a street (see for example Harrell, 1991). The hypothesis of high level of risk-taking among older pedestrians contradicts the general observation that risk taking decreases with age; older road users tend to take fewer risks than younger people in many different road safety contexts, and in road crossing in particular (Holland and Hill, 2007).

One shortcoming of older people is their slower gait. Older people walk more slowly when crossing the road (Coffin and Morrall, 1995; Oxley et al., 1997). Thus, the time spent by the pedestrian at crossing a road (so-called "the time of exposure")

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