

Misunderstanding of right-of-way rules at various pedestrian crossing types: Observational study and survey

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Abstract

Misunderstanding of right-of-way rules may contribute to pedestrian trauma, especially at crossings where pedestrian and traffic signals appear to give contradictory messages. Two thousand eight hundred and fifty-four pedestrians were observed crossing at signal-controlled intersections to compare attention to traffic for different combinations of pedestrian and traffic signals. In addition, a survey was conducted at signal-controlled intersections and nearby car parks in metropolitan and rural areas. Five hundred and seventy-four participants took the role of pedestrian or driver when responding to questions regarding beliefs about pedestrian right-of-way for a range of situations at signal-controlled crossings, zebra crossings, and unmarked sections of road (specifically: alone, with pedestrian refuge, or paved). Results suggest that at signal-controlled crossings pedestrian right-of-way is erroneously thought to be influenced by the pedestrian signal. Many respondents thought that a pedestrian refuge or paving gave a pedestrian right-of-way at an otherwise unmarked section of road. In many situations more than 20% of *both* drivers and pedestrians reported that they would take right-of-way. Pedestrian crossing types should be rationalised, and education should be provided regarding rules and responsibilities at available crossings.

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1. Introduction

1.1. The pedestrian road trauma problem

Pedestrian casualties represent a substantial proportion of relatively severe road trauma. In 2004, traffic crashes killed 4641 pedestrians in the US (NHTSA, 2006) and 223 pedestrians in Australia (Australian Transport Safety Bureau, 2005), comprising 11% and 14% of those countries' respective road fatalities. Pedestrian injury numbers are also high, with 68,000 pedestrians injured in the US in 2004 (NHTSA, 2006). Substantially higher rates are observed in low and middle income countries (WHO, 2002).

Crashes involving pedestrians are most likely to occur when the pedestrian is crossing the road. For example, in the US 63% of crashes involving pedestrians between 1995 and 1998 occurred while the pedestrian was crossing, and a further 19% when the pedestrian darted out on the road (daSilva et al., 2003). Similarly, at least 79% of pedestrian crashes in New South Wales, Australia (NSW) in 2004 occurred while the pedestrian was crossing the road (Roads and Traffic Authority of NSW [RTA], 2005a). In NSW, while most pedestrian crashes occur when the pedestrian fails to cross at a marked crossing, a sizeable proportion of pedestrian crashes occur at marked crossings, especially for older pedestrians (RTA, 2002; Rouse, 2002). In the US, between 1995 and 1998, almost all pedestrian crashes at non-intersections occurred when the pedestrian was not at a marked crossing, whereas at intersections 38% were within a marked crossing (daSilva et al., 2003). US data suggests that pedestrian crashes often involve vehicles turning at intersections, frequently signal-controlled intersections (daSilva et al., 2003; Preusser et al., 2002).

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1.2. The role of failure to observe rules and responsibilities

Several researchers have recognised that vehicle-pedestrian crashes may result from drivers and/or pedestrians failing to observe rules and responsibilities when pedestrians are crossing the road. For example, from a study of police records in Riyadh, Al-Ghamdi (2002) concluded that pedestrian-vehicle crashes may result from drivers failing to yield right-of-way to pedestrians. Preusser et al. (2002) examined police reports of pedestrian crashes that occurred in Washington and Baltimore during 1998, and found that turning vehicle crashes (the most common crash type) typically involved a driver's failure to grant a legally-crossing pedestrian right-of-way, although obliged to do so. Several further US studies have identified that pedestrian crashes may be caused at least in part by drivers' failure to yield right-of-way (Baker et al., 1974; Lee and Abdel-Aty, 2005; Stutts et al., 1996). Pedestrians may also contribute to crashes by failing to adhere to their responsibilities (e.g. crossing against the pedestrian signal; Baker et al., 1974; Stutts et al., 1996).

Inadequate knowledge of relevant rules and responsibilities has been identified as a possible reason for failure to observe them, and so as a possible reason for vehicle-pedestrian crashes (Job, 1998; Martinez and Porter, 2004; Rouse, 2002). However, surprisingly little research has investigated road-users' beliefs about the various types of crossings. Before considering the Australian research (which is most relevant to the present research), the relevant Australian Road Rules must be presented. Although the rights and responsibilities associated with pedestrian road-crossing are likely to differ from country to country (and even from state to state), similar issues are likely to pertain.

1.3. The Australian road rules: rights and responsibilities when pedestrians are crossing

According to the Australian Road Rules (Australian Transport Council, 1999), drivers are required to give way to pedestrians whenever making a turn, and in NSW whenever there is a danger of colliding with the pedestrian (RTA, 2005b). At marked pedestrian crossings (i.e. zebra crossings [see showcard 9 in Table 4]), drivers are required to slow down and stop when a pedestrian is on the crossing.

In addition, there are Australian Road Rules (Australian Transport Council, 1999) that govern the behaviour of pedestrians, without impacting pedestrian right-of-way. Pedestrians should cross at a marked crossing if it is no more than 20 m away. At signal-controlled intersections: pedestrians may start to cross on a Walk signal; must not start to cross, but may finish crossing, on a Flashing Don't Walk signal; and must not start crossing on a Don't Walk signal. A pedestrian must not cause a traffic hazard by moving into the path of a driver (Australian Transport Council, 1999).

1.4. Possible confusion regarding these rules and responsibilities

At signal-controlled intersections, some signal configurations may promote confusion regarding pedestrian right-of-way.

In particular, confusion may arise when a driver facing a green traffic signal turns left or right across the path of a pedestrian crossing on a Walk signal, a Flashing Don't Walk signal, or a Don't Walk signal (see showcards 7, 1, and 4, in Table 4). Drivers may feel (erroneously) that they have right-of-way because they are facing a green traffic signal, and this may be particularly pronounced when they are turning across pedestrians who are facing a Flashing Don't Walk signal or Don't Walk signal.

Anecdotally, there also appears to be some confusion regarding right-of-way for other crossing types; such as pedestrian refuges, and sections of road that are paved, but not marked to indicate a crossing. In Australia, neither of these installations operate as marked crossings, but the public may believe that they do.

1.5. Research regarding rules and responsibilities when pedestrians are crossing the road

Job (1998) found that a significant proportion, though a minority, of drivers in NSW believed they had an automatic right-of-way when turning left or right while facing a green light.

In a recent Australian survey (Rouse, 2002), "the majority of drivers and pedestrians were aware of the rules or what they felt to be correct and courteous behaviour" (p. 9), but also reported making "sensible judgements" to sometimes break these rules. Participants demonstrated some confusion regarding right-of-way during the Flashing Don't Walk signal, which the pedestrians often interpreted as signalling a need to "hurry up". Both drivers and pedestrians were also confused about the right-of-way of left and right turning vehicles, and correct procedure at zebra crossings and pedestrian refuges was poorly understood. Some confusion between "official" crossings (e.g. signal-controlled crossings, zebra crossings, pedestrian refuges²) and "unofficial" crossings (median strips, traffic islands, and speed humps) was also apparent.

US research, though not directly comparable in part due to differing road rules, highlights that confusion regarding right-of-way rules may not be restricted to Australia. Preusser et al. (2002) reported a high number of crashes in a situation analogous to the Green/Walk situation researched in Australia by Job (1998); turning vehicle crashes in which the driver was obeying traffic signals but failed to grant right-of-way to a legally-crossing pedestrian. In a telephone survey of 1096 licensed Virginia drivers, Martinez and Porter (2004) found that, although Virginia law does not always yield right-of-way to pedestrians crossing at an unmarked crossing, 55% of respondents believed that a pedestrian always has right-of-way, and 77% of respondents reported always or almost always yielding to a pedestrian, in this situation.

Any confusion resulting from misunderstanding of right-of-way rules may be exacerbated by people endorsing different

² In fact, unless marked as a zebra crossing, a pedestrian refuge is not an official crossing.

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