Understanding driver/ pedestrian conflicts: Driver behaviour and effect of measures at pedestrian crossings

Truls Vaa
Institute of Transport Economics (TØI)
Postbox 6110 – Etterstad, N-0602 Oslo, Norway
E-mail: tva@toi.no
Phone: + 47 2257 3825
Fax: + 47 2257 0290

Abstract

It is known that elevated pedestrian crossings, refuges on pedestrian crossings, and pedestrian crossings with separate phases at traffic signal controlled intersections, all significantly reduces the number of accidents with pedestrians, while ordinary marked pedestrian crossings significantly increases the number of accidents with pedestrians. This discrepancy between measures is puzzling and calls for explanations of what really contributes to the accident increase. Can the cause of accidents at ordinary pedestrian crossings be attributed to drivers, to pedestrians, or to both? How does driver attention operate at an ordinary pedestrian crossing, and how does pedestrians’ attention operate? Could driver inattention be attributed to unconscious information processing formed by implicit learning (the learning process where the organism is learning without awareness neither of what is learnt nor of the circumstances where learning takes place), be at work in this kind of conflicts between drivers and pedestrians? Ad hoc observations show that it is more likely that a pedestrian will not be present at an ordinary crossing than that some pedestrian will appear here, Could this be the base of what is implicitly learned i.e. that the driver (unconsciously) “learn” that “no pedestrian usually appears at an ordinary pedestrian crossing”, and then fails to perceive and overlook a pedestrian even if he/she is present? This seems to be an international problem as one will see different additional measures at ordinary crossings from country to country, as additional markings in the driving lane and/or blinking amber light at the crossing: Is it likely that such additional measures would succeed in reducing the number of accidents? If not, is there any other alternative, or should ordinary pedestrian crossing simply be removed?

A discussion on these issues will be provided, together with a set of hypotheses and phenomenological observations of pedestrian behaviours.

Key words: Pedestrians, drivers, pedestrian crossings, information processing, attention, implicit learning, accidents, meta-analysis
Background and objectives

This paper is strongly motivated by the ICTCT decision on its General Assembly in Helsinki in October 2005 to work for and further develop an initiative proposed by Rob Methorst and which was especially directed towards the role of pedestrians, their needs and problems in road traffic. Since its launch in Helsinki, the Methorst initiative has attracted a high number of interested researchers and institutions and a proposal have been developed and submitted to the COST Secretariat in Brussels in order to establish a COST Action especially dedicated to pedestrian needs (Methorst et al, 2006). The Methorst initiative was successfully approved as a COST Action on 27th June 2006, then numbered 358 under the heading “Pedestrian Quality Needs” (PQN).1

With the above initiative as background, the objectives of the present paper are the following:

- Describe the effects of road safety measures especially addressed and designed to promote road safety for pedestrians
- Discuss and propose a theoretical explanation why ordinary pedestrian crossings seem to increase the number of accidents involving pedestrians at pedestrian crossings
- Propose elements and dynamics in a suggested “Pedestrian Behaviour Model”

Hence, the general objective is to make an overview of the overall situation which pedestrians encounter as a road user in today’s traffic regarding safety issues. The overview will then be based upon what we know regarding the effects of various road safety measures which particularly address the road user group of pedestrians as we know these from evaluation studies. In addition, the paper also discusses some theoretical issues regarding drivers’ information processing and decision-making which could be significant for understanding conflicts and accidents between vulnerable road users and car drivers.

Pedestrian safety: Effects of road safety measures

The “Handbook of Road Safety measures” (Elvik and Vaa, 2004) presents effects of several traffic control measures which especially address the safety of pedestrians (some safety measures address both pedestrians and cyclists, but the present overview only includes aspects regarding pedestrian safety). Traffic control measures for pedestrians include the following:

- marking pedestrian crossings on carriageways, normally combined with traffic signs
- traffic signal control of pedestrian crossings (at intersections and mid-block)
- raised pedestrian crossings
- refuges (traffic islands on pedestrian crossings)
- pedestrian guard rails
- school crossing patrols
- pavement widening at intersections

1 The COST Action 358 will have its Kick-off meeting in Brussels 13th and 14th November 2006. Per 21st October 2006 11 countries have confirmed their participation by signatures and another 5 countries have announced their intentions to sign for COST Action 358 (http://www.cost.esf.org/index.php?id=240&action_number=358)
Many studies have evaluated the effects on accidents of traffic control measures for pedestrians. The results presented here are based on the following studies:

Mackie and Older 1965 (Great Britain, ordinary and traffic signal controlled pedestrian crossings)

Jacobs 1966 (Great Britain, pedestrian guard rails)

Jacobs and Wilson 1967 (Great Britain, ordinary and traffic signal controlled pedestrian crossings)

Wilson and Older 1970 (Great Britain, ordinary pedestrian crossings)

Jørgensen and Rabani 1971 (Denmark, ordinary and traffic signal controlled pedestrian crossings)

Herms 1972 (USA, ordinary pedestrian crossings)

Lalani 1977 (Great Britain, refuges on pedestrian crossings)

Cameron and Milne 1978 (Australia, pedestrian crossings)

Inwood and Grayson 1979 (Great Britain, refuges on pedestrian crossings)

Engel and Krandsgård Thomsen, 1983 (Denmark, pavement widening and raised pedestrian crossings)

Bagley 1985 (Great Britain, pedestrian guard rails)

Yagar 1986 (Canada, ordinary pedestrian crossings)

Vodahl and Giaever 1986 (Norway, ordinary and traffic signal controlled pedestrian crossings)

Yagar, Ropret and Kaufman 1987 (Canada, ordinary pedestrian crossings)

Boxall 1988 (Great Britain, school crossing patrols)

Ekman 1988 (Sweden, ordinary and traffic signal controlled pedestrian crossings)

Stewart 1988 (Great Britain, pedestrian guard rails)

Jones and Farmer 1988 (Great Britain, raised pedestrian crossings)

Hunt and Griffiths 1989 (Great Britain, refuges on pedestrian crossings)

Daly, McGrath and Van Emst 1991 (Great Britain, pedestrian crossings)

Downing, Sayer, Zaheer-Ul-Islam 1993 (Pakistan, raised pedestrian crossings)

Blakstad 1993 (Norway, refuges on pedestrian crossings, raised pedestrian crossings)

Ward, Cave, Morrison, Allsop, Evans, Kuiper and Willumsen 1994 (Great Britain, school crossing patrols, refuges and ordinary pedestrian crossings)

Summersgill and Layfield 1996 (Great Britain, normal pedestrian crossings)

The effects on accidents of the different measures are summarised in table 1.
Table 1: Traffic control measures for pedestrians with statistically significant effects on accidents. Percentage change in the number of accidents. (from: Elvik and Vaa, 2004).

<table>
<thead>
<tr>
<th>Accident severity</th>
<th>Types of accident affected</th>
<th>Percentage change</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mid-block traffic signal controlled pedestrian crossings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>-12 (-18; -4)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Vehicle accidents</td>
<td>-2 (-9; +5)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>-7 (-12; -2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pedestrian crossings with mixed phases at traffic signal controlled intersections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>+8 (-1; +17)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Vehicle accidents</td>
<td>-12 (-21; -3)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>-1 (-7; +6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pedestrian crossings with separate phases at traffic signal controlled intersections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>-29 (-40; -17)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Vehicle accidents</td>
<td>-18 (-27; -9)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>-22 (-29; -14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raised pedestrian crossings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>-49 (-75; +3)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Vehicle accidents</td>
<td>-33 (-58; +6)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>-39 (-58; -10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refuges on pedestrian crossings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>-18 (-30; -3)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Vehicle accidents</td>
<td>-9 (-20; +3)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>-13 (-21; -3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pedestrian guard rails</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>-24 (-35; -11)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Vehicle accidents</td>
<td>-8 (-33; +27)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>-21 (-32; -9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pedestrian guard rails with sight gaps (visi-rail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>-33 (-47; -15)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Vehicle accidents</td>
<td>-50 (-65; -30)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>-39 (-50; -26)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>School crossing patrols</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>-35 (-67; +30)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pavement widening at intersections or at pedestrian crossings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>-5 (-58; +117)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ordinary marked pedestrian crossings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Pedestrian accidents</td>
<td>+28 (+19; +39)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>Vehicle accidents</td>
<td>+20 (+5; +38)</td>
<td></td>
</tr>
<tr>
<td>Injury accidents</td>
<td>All accidents</td>
<td>+26 (+18; +35)</td>
<td></td>
</tr>
</tbody>
</table>

Traffic signal control of a mid-block pedestrian crossing reduces the number of accidents by 7%, while accidents with pedestrians are reduced by 12%. At signalised intersections, only pedestrian crossings where pedestrians have separate phases appear to reduce the number of accidents. In the majority of traffic signal controlled intersections in Norway, pedestrians have a green light in a mixed phase, i.e. at the same time as vehicles which are turning right or left at the intersection.

Raised pedestrian crossings lead to a significant reduction of 39% in the total number of all accidents at raised crossings, but the separate effects on accidents with pedestrians and also with vehicles are not significant. Constructing refuges (traffic islands) in pedestrian crossings appears to lead to a significant reduction of 13% in the total number of accidents and also for accidents with pedestrians (18% reduction) but not for accidents between vehicles.
Refuges make it possible for pedestrians to divide the road crossing into several stages, where only one direction of traffic requires attention at each stage.

Pedestrian guard rails between the pavement or footpath and the road leads to a significant reduction of 21% in the total number of accidents and for accidents with pedestrians the reduction is 24%, also significant, while there is no effect on accidents between vehicles. Pedestrian guard rails can obstruct sight conditions between vehicles and pedestrians walking behind the guard rails who are about to walk out onto the carriageway in order to cross the road (Stewart, 1988). This problem can be avoided by using so-called sight guard rails, where individual posts are removed to make the railings more transparent. This type of guard rails appears to have a greater effect on accidents than ordinary pedestrian guard rails. The effects of guard rails with sight gaps (visi-rail) show significant reductions on the total number of accidents, on pedestrian accidents and on accidents between vehicles of 39%, 33% and 50%.

Introducing school crossing patrols can lead to fewer accidents involving pedestrians who cross the road, there is a tendency of accident reduction but the reduction is not statistically significant. A Danish study concludes that school crossing patrols reduce car speeds by 3 km per hour compared with areas where school crossing patrols do not operate (Kjærgaard and Lahrmann 1981).

Widening the pavement at intersections does not appear to lead to statistically significant changes in the total number of accidents. However, the studies which are available were based on very few accidents.

Ordinary pedestrian crossings increase the number of accidents

As shown in table 1, marking an ordinary pedestrian crossing is associated with an increase in the total number of all accidents, in the number of accidents with pedestrians and in accidents involving vehicles only. The reductions in these types of accidents are 26%, 28% and 20%, respectively. All reductions are statistically significant. The reason for this is not very well known, but it is known that not all drivers comply with the duty to give way to pedestrians on pedestrian crossings. The most recent Norwegian figures (Sakshaug 1997) show that little more than 50% of drivers give way to pedestrians at pedestrian crossings. Nor do all pedestrians make use of nearby pedestrian crossings. Studies carried out by the Norwegian Public Roads Administration (Askildsen, Leite and Muskaug 1996) show that 25% of pedestrians cross the road away from the pedestrian crossing, in a zone of 25 metres from a pedestrian crossing. It has been found that crossing the road in a zone of up to 50 m from a pedestrian crossing entails an increased accident rate (Mackie and Older 1965, Jørgensen and Rabani 1971, Vodahl and Gjæver 1986, Ekman 1988). However, studies indicate that pedestrian accidents on the pedestrian crossing itself are not reduced (best estimate is an increase of 15% ± 13%). The increase in vehicle accidents may be due to more rear-end collisions. There is no difference between pedestrian crossings at intersections and mid-block pedestrian crossings with respect to the effect on accidents.

Hypotheses about accident causes: Results from an in-depth study

A more recent, Norwegian accident study may contribute to a better understanding of the dynamics at a pedestrian crossing and to describe the qualitative aspects of the interaction between a pedestrian and a vehicle at a pedestrian crossing (Statens vegvesen Buskerud, 2001). The study is small, it comprise only some 36 accidents with pedestrians, but, as it applied an in-depth accident investigation approach, the findings are interesting. This study conclude with the following:
In 17 of the 36 accidents, the cause of the accident was attributed to pedestrian errors, i.e. that the pedestrians were hit by a car because they the ran or "staggered" into the roadway without forewarning. This type of pedestrian behaviour is especially dangerous in combination with darkness and obstructions of sight. In about 50% of the accidents, the pedestrian did not see the vehicle.

The study is too small to conclude, but it put forward the hypothesis that the pedestrians involved in these accidents very often belonged to subgroups who are more exposed than the average Norwegian also in other contexts, i.e. that the pedestrians often were impulsive adolescents, mentally disabled, children, elderly people, intoxicated, or female immigrants.

In 24 of the 36 accidents the cause of the accidents were attributed to the drivers: Their driving speeds were too high, and/or “too low awareness about risks although the circumstances called for something different”.

In 28 of the 36 accidents the drivers did not see the pedestrians “before it was too late”.

The two most pronounced explanations regarding why drivers did not see the pedestrian were that drivers do not check blind spots when needed and that drivers are more directed towards the other road traffic than to spot pedestrians.

Not all of these accidents were at pedestrian crossings, they also took place in other situations as parking areas, etc. Apparently, the causes of the accidents could in some cases be attributed to erroneous acts by both parties, as \(17 + 24 = 51 > 36\). Other aspects that are listed as contributing causes are the feeling of confidence felt by the pedestrian in a pedestrian crossing, which could be erroneous when he/she is detected by the driver, further that some pedestrians were hidden behind vehicles and that some pedestrians did not use any reflective device in darkness.

### The contra-intuitive effect of ordinary pedestrian crossings: Discussion

The above hypotheses give some interesting clues to a discussion of the dynamics of the interaction between a pedestrian and a vehicle at an ordinary pedestrian crossing. Of special interest are the following comments:

"too low awareness about risks although the circumstances called for something different"

or simply that the drivers "

"did not see the pedestrian before it was too late”,

By categorising along the dimension of attention we can come up with the following, simple table:

<table>
<thead>
<tr>
<th>Degree of attention</th>
<th>The pedestrian</th>
<th>The driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inattentive</td>
<td>Inattentive</td>
<td>At risk, but may be saved by the other</td>
</tr>
<tr>
<td>Vigilant</td>
<td>At risk, but may be saved by the other</td>
<td>No problem</td>
</tr>
</tbody>
</table>

The table shows that the main problem arises when both parties are inattentive. The parties may also be at risk when one of the parties is inattentive, but he/she might escape an accident because the other part, who is attentive, makes an evasive action and the accident is avoided. In the ideal situation were both parties are attentive and vigilant, there of course
should be no conflict or any accident. The Norwegian study attempts a classification along
the attention dimension and categorises as many as 53 of the 72 parties involved in
accidents in this study, i.e. 74%, as “inattentive” (Statens vegvesen Buskerud, 2001).

It is no wonder that accidents arise when the degree of inattentiveness is so pronounced. An
additional problem seem to be that many of the pedestrians involved in accidents often seem
to belong to subgroups who are more vulnerable than the average pedestrian, i.e. the
injured pedestrians may have higher frequencies of being impulsive children and
adolescents, mentally disabled, elderly people or that they are intoxicated. Hence,
pedestrians is a more heterogeneous group than drivers, “everyone” is in principle a
pedestrian, while drivers are a selected group, a group that has passed several tests to
allowed to enter the road traffic systems as drivers. Pedestrians, who already at the outset is
a group of high vulnerability compared to drivers in a car, should be regarded as even more
vulnerable because of characteristics as impulsivity (children, adolescents), limitations in
their cognitive capacity affecting their ability to understand and solve problems in traffic
(mentally disabled, elderly, elderly with dementia), or by being intoxicated. As these
subgroups “are facts of life” – they are and will always be pedestrians, they cannot be
denied a participation in road traffic because there is no such thing as a “pedestrian walking
licence” which can be revoked because of improper or reckless walking”, higher demands for
solving conflicts and for avoiding accidents must be the responsibility of drivers and the road
transport authorities to find solutions for traffic control measures that secures the safety of
pedestrians. Because the problem is asymmetrical at the outset, the solution(s) also has to
be asymmetrical.

Going back to the problem of “ordinary pedestrian crossings”, which undoubtedly increase
the number of accidents, let me discuss what the driver might experience by the different
solutions he or she is facing when it comes to pedestrian crossings. As shown in table 1,
raised pedestrians crossings reduce the number of accidents by 39% (Elvik and Vaa, 2004)

Figure 1: Raised pedestrian crossing

The reason why raised pedestrian crossings reduce accidents could a combination of several,
first of all by reducing driving speeds, but also that drivers “increase their attention”
regarding the characteristics of the crossing, “drivers may identify the features of the
crossing” in order to decide the driving speed by which they can pass the raised crossing
without to much dislike and without risking damage to their car. By this increased attention
and information processing, the chance of spotting pedestrians near or on the crossing also
might be raised. The process of “identifying the features” may go like this, by identifying and
by taking into account the different desings a raised crossing might have:
Figure 2: Design 1 - Circle segment

Passing a raised crossing designed as a circle segment can be very unpleasant if the speed is too high. The driver may risk a considerable “jump” by the rear part of the car. Then, by the driver’s identification of a circle segment is “Slow down, otherwise a big jump of the car may arise”.

Figure 3: Trapeze-designed pedestrian crossing

When a driver approach a raised crossing designed as a trapeze, the driver will again inspect the characteristics of the crossing, i.e. calculating how much speed he/she will tolerate without too much dislike. The driver then has to consider the height of the crossing also how steep the ascending part of the crossing, which basically is a question of the angle of the ascending part. The message to the driver from this kind of design is then: “The smaller the ascending angle, the higher driving speed I can tolerate”.

Figure 4: Sinus-designed pedestrian crossing

In the first place a sinus-designed crossing has the advantage over a circle-segment design by tolerating higher driving speeds and lower risk of a jump of the rear of the car. Hence, the consideration of a sinus-designed pedestrian crossing is quite analogous to the trapeze-designed crossing. The lower the height of the crossing, the less steep the ascending part will be, and, consequently, higher driver speeds can be tolerated.
Figure 5: Pedestrian crossing with refuge

As shown in table 1, the effects of a pedestrian crossing with refuge is a 13% reduction of all accidents and 18% reduction in the number of accidents involving pedestrians. The mechanism behind accident reduction is probably that the pedestrian can concentrate on one direction at a time, then making the information-processing and decision-making less demanding, cognitively speaking. Further, probably drivers attention might be somewhat increased because they have to “hit” the passage between the kerb and the refuge. Hence, this concentration may enhance the chance of spotting a pedestrian in or about to enter the crossing. On the other hand, there might be a disadvantage with this solution by the sign pole which might reduce or completely cover a pedestrian behind, especially pedestrians with the size of children.

Figure 6: Ordinary pedestrian crossing

I shall end this discussion by considering an ordinary pedestrian crossing, i.e. pedestrian solution where the number of accidents increases. Why exactly is that? Is there an explanation for this? More precisely, how often does a driver actually observe a pedestrian in an ordinary pedestrian crossing? I have done some counts on my trips with my car by simply counting this frequency of pedestrians. These ad hoc observations are presented in table 2:
Table 2: Frequency of pedestrians in ordinary pedestrian crossings in some selected cities and villages – (primarily in Norway). Ad hoc observations

<table>
<thead>
<tr>
<th>Location</th>
<th>City or village</th>
<th>Number of trips</th>
<th>Number of observations</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sokna</td>
<td>Village</td>
<td>105</td>
<td>314 : 9</td>
<td>35 : 1</td>
</tr>
<tr>
<td>Bærum</td>
<td>Village</td>
<td>66</td>
<td>355 : 6</td>
<td>59 : 1</td>
</tr>
<tr>
<td>Jevnaker/Hønefoss</td>
<td>Village/City</td>
<td>28</td>
<td>703 : 28</td>
<td>25 : 1</td>
</tr>
<tr>
<td>Kongsberg</td>
<td>City</td>
<td>14</td>
<td>67 : 1</td>
<td>67 : 1</td>
</tr>
<tr>
<td>Rjukan</td>
<td>City</td>
<td>22</td>
<td>526 : 2</td>
<td>263 : 1</td>
</tr>
<tr>
<td>Oslo</td>
<td>City</td>
<td>12</td>
<td>198 : 13</td>
<td>15 : 1</td>
</tr>
<tr>
<td>Paris-Nancy-Colmar-Dijon-Paris</td>
<td>Roundtrip (C + V)</td>
<td>1</td>
<td>116 : 0</td>
<td>116 : 0</td>
</tr>
</tbody>
</table>

As can be seen from the table is that the occurrence of pedestrians in an ordinary pedestrian crossing is generally low. The range is from a ratio of 15 : 1 in the city of Oslo, the most frequent, to 263 : 1 in Rjukan (also a Norwegian city) as the most infrequent. My simple question is then: What do we, as drivers, actually learn at an ordinary pedestrian crossing, keeping in mind that passing the crossing does not give any “bump” in the car? My hypothesis is then that we generally, learn: “Nothing happens” at an ordinary pedestrian crossing”. Or in other words: No firm association between the passing of a pedestrian and an pedestrian crossing is likely to be established. Probably, this is also my hypothesis, by implicit learning (i.e. unconscious learning, we do not know that we learn or how we learn), we learn that no danger is likely to occur a pedestrian crossing. It might be a case were the processing of information, again unconscious, is automated in such a way that drivers do not increase their attention at pedestrian crossings of this type.

Conclusion

Elvik and Vaa (2004) state simply that “The reason for this [increase] is not very well known”, but I will propose two hypotheses that might shed light on this phenomenon:

1. Man’s deepest motive is survival (Damasio, 1994). The human organism is designed to primarily look for dangers. Drivers are looking for what they regard as threats to their survival, which is predominantly cars, not pedestrians (Vaa, 2003).

2. Drivers’ processing of information at ordinary pedestrian crossings, where pedestrians generally are infrequent, might be automated in such a way that no special attention is directed towards searching for pedestrians, because of the process of automation itself.

3. Ordinary pedestrian crossing might be regarded as a trap where pedestrians falsely may feel they are safe while in fact they are not. Hence, this kind of pedestrian crossing should be removed or replaced by another type of crossing which has been confirmed to reduce the number of accidents.
References


