

THIS WEEK

Deadly illusion brings death on the roads

Mick Hamer

CHILDREN are being killed on Britain's roads because of an optical illusion, warn researchers at the University of Aberdeen. The illusion fools drivers into underestimating how long it will take them to stop, and by the time they discover their mistake it is too late to avoid an accident.

About 50 children are injured on Britain's roads every day. Investigators looking at this problem have tended to blame children's inexperience and carelessness. But the researchers at Aberdeen suggest that the problem lies with the drivers. Doug Stewart of the university's engineering department says that the optical illusion is responsible for more than half the injuries to children on the roads.

People normally judge the time it will take an approaching object to reach them by the rate at which its size increases, a phenomenon called optic flow. This is adequate for catching a ball or ducking a projectile, Stewart says, but for car drivers it is only effective in the final second or so before collision. At speeds of 50 kilometres an hour, which are typical for traffic in towns, it takes around 3 seconds to stop a car.

Stewart and his colleagues Chris Cudworth and Roly Lishman say that instead drivers judge the time before a collision by subconsciously measuring the angle between the top and the bottom of the pedestrian's image (see Diagram). In the absence of any other clue they assume

that the pedestrian is an adult and judge the distance accordingly.

If the pedestrian turns out to be a child this assumption can be lethal, as it leads drivers to believe the child is farther away than it really is. By the time the error has become apparent it can be too late for the driver to avoid hitting the child.

Stewart and his colleagues conducted a series of tests in which volunteers acted as drivers in a computer simulation of a car approaching a pedestrian. In the test, volunteers were presented with a child 1 metre tall and an adult 1.8 metres tall. The volunteer "drivers" were asked to stop a safe distance in front of the pedestrian.

Describing their results in the journal *Perception*, the researchers say that drivers were more likely to make errors when the image was a child's. They also found that the driver's height above the road influenced the number of errors. A driver sitting 1.8 metres above the road was less likely to misjudge the distance than one sitting 1 metre above the road.

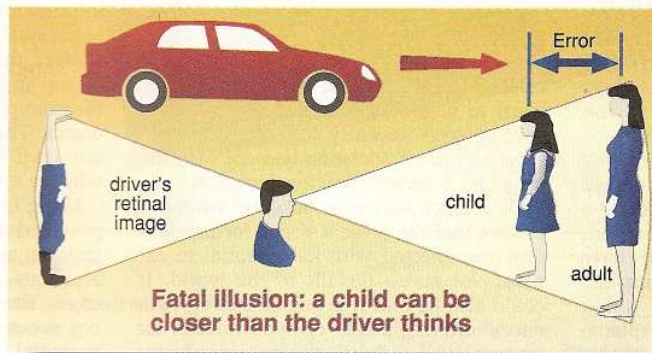
This seems to be borne out by the road accident statistics. Cars are two to three times more likely than lorries to hit children, when the number of each type of vehicle on the road is taken into account. Lorry drivers sit higher up than car drivers.

Stewart says that the risk of drivers making potentially fatal errors can be reduced by providing visual cues for drivers about the size of the object they are approaching. Britain has one of the worst child safety records in Europe. One reason, says Stewart, is that other European countries have more zebra crossings, and that the markings on the road help drivers to distinguish between a child and an adult.

Britain's zebra crossings are gradually being replaced by pelican crossings, which have traffic lights but no striped markings on the road. Stewart says that pelican crossings should also have road markings to help drivers judge the size of a pedestrian.

In correspondence with Stewart, the Department of Transport describes the research as "interesting", though it does

not accept that the paper "demonstrates that perceptual error in the way described is the main reason for children having a much higher accident rate". The DoT does agree, however, that marking the road with stripes at pelican crossings could improve things. Unfortunately, says Stewart, there is no indication that the positive tone of some of the DoT's comments has led to "action to curb child pedestrian accidents or to promote further research". □



COMMENT

Building bridges

IF YOU want an example of how even the most academic ideas in psychology can turn out to be relevant to our daily lives, then you need look no further than the work of Douglas Stewart (see This Week).

Stewart is a road safety engineer who became interested in what information a driver uses at the wheel. That led him to the work of David Lee at the University of Edinburgh's Department of Psychology.

Lee had realised that the optic flow field—the way objects change in size as they approach you—might contain a lot of information which could be used to guide behaviour. He developed equations which showed that measuring simple parameters

of an approaching object could predict, for example, the time to collision with the object. These are the kind of calculations our own brains might make, explaining why we are so adept at catching balls.

Using Lee's work as a basis, Stewart has provided an explanation for why small children are particularly at risk from traffic accidents, and how that risk might be lessened. The work is controversial, and may not necessarily be right, but it shows the potential for building bridges between psychology and other disciplines. □