



To: Place Directorate

From: Adrian Davis

Date: 7th August 2018

Subject: Essential Evidence on a page: No 171 Visual looming & child pedestrian safety

Top line: Children may not be able to detect vehicles approaching at speeds in excess of 20 mph. This creates a risk of injudicious road crossing in urban settings when traffic speeds are higher than 20 mph. The risk is exacerbated because vehicles moving faster than this speed are more likely to result in pedestrian fatalities.

The ability to detect and avoid looming objects is critical to survival. Almost all locomotor animals are sensitive to visual looming or changes in optical size. Sensitivity to objects getting larger – as they get closer - is critical for selection of an appropriate response in order to avoid a collision (e.g., when crossing the road). Failure to detect and process looming information accurately can have serious consequences. Globally, pedestrian injuries are the third leading cause of death for 5- to 9-year-olds, and children's visual limitations in gauging speed and distance are cited as a key deficit contributing to such injuries. In the United Kingdom alone, there are more than 6,500 pedestrian casualties per annum, and 30% of the individuals killed are children ages 0 to 15 years.

A study by UK researchers is the first to demonstrate that the neural mechanisms for detection of looming are not fully developed until adulthood.¹ The perceptual threshold for looming detection has not typically been considered in research to estimate the time available before the vehicle passes (TTP) the pedestrian. Detection of looming is an essential component in making robust TTP judgments, which dictate effectiveness in skills such as catching, hitting, and road crossing. The study provided evidence of clear improvements in looming thresholds with increasing age, showing that younger children's poorer perceptual acuity potentially exposes them to greater risk at the roadside.

The researchers determined that children could not reliably detect a vehicle approaching at speeds higher than approximately 25 mph and did not reach adult levels of perceptual performance under most viewing conditions. The findings have important implications for road-safety policy in terms of the upper limits of vehicle speed that allow children to make accurate judgments, and these findings converge with evidence that the risk of pedestrian accidents involving children is nearly 3 times higher in places where mean speeds exceed 25 mph compared with places with lower mean speeds. The data support the case for reduced speed limits outside schools and in other areas densely populated by children.

Results suggest that children's perceptual limitations place them at greater risk of stepping out in front of cars that are traveling at higher speeds. The combined implication is that driving in excess of 20 mph in a residential or school area not only increases the potential severity of any impact with a pedestrian, but also increases the risk that a child will injudiciously cross in front of the vehicle.

¹ Wann, J. Poulter, D., Purcell, C. 2011. Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road, *Psychological Science*, 22(4) pp. 429–434.