

Inattentive Blindness in Expert Drivers

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Abstract

A failure to detect an obvious, but unexpected object when attention is engaged elsewhere, is known as Inattentive Blindness (IB) (Mack & Rock, 1998), and in driving tasks, can be an indication of situation awareness and hazard detection. In this study we used a static, driving-related IB paradigm to investigate how experts allocate attention and filter information when driving. We demonstrated that expert drivers were better than non-expert drivers in selectively filtering important and unimportant information in driving scenarios. The results are central in understanding how expert drivers allocate attention when driving, and have implications for driver training programs.

Background

Attentional set theory in IB suggests that we can tune our attention to search for specific information in our environment that is relevant to the task at hand, and is one of the several possible mechanisms through which IB occurs (Most et al, 2005). Thus, attention can be considered as a 'filter' that rejects unimportant information from the attentional system allowing important information to be attended. We hypothesised that expert drivers would have a more developed attentional filter for driving-related IB stimuli than non-experts because of their better situational awareness (Underwood et al, 2013) and hazard perception (Crundall et al, 2003), however this results in at least two predictions: Expert drivers either have a 'wider' attentional filter in which they detect a greater range of driving-related objects in a simulated driving scenario, or they have a more 'focal' filter in which they are more likely to detect more relevant objects in driving scenarios.

Method

Expert drivers (Paramedics, N = 150) received considerable systematic training in driving. The non-expert drivers (N = 196) consisted of normal drivers who did not drive as part of their profession. The groups differed in general experience measures, but there was no difference in age, or safety measures such as fines or collisions.

Participants were required to make safety judgements on briefly flashed photos of driving scenarios. After a sequence of 7 scenarios, a 'critical' scenario was presented which contained an additional object: either a child standing, a child running, an adult standing, a garbage bin, or a stroller, each one located on the median strip to the right (Pammer et al, 2012; 2015). After the critical trial, participants were asked whether they could identify the additional object on the side of the road from a series of plausible objects. If expert drivers have a wider attentional window, we would expect them to be better at detecting all objects compared to non-experts. However if expert drivers have a more 'focal' attentional window, then we would expect them to detect objects of greater relevance compared with non-experts.

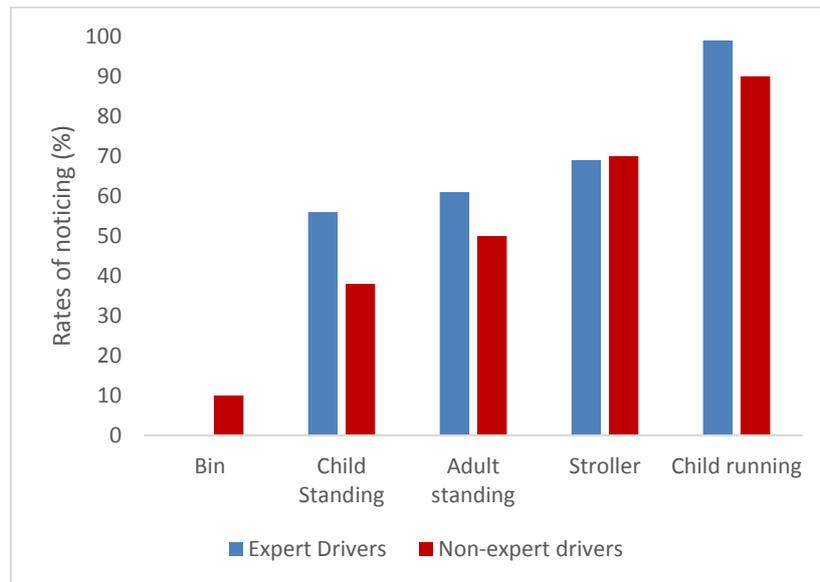


Figure 1. Rates of Inattentional Blindness for expert and non-expert drivers

Results and conclusions

IB is indicated by the number of people who fail to detect the additional object in the critical trial. The results indicate that while both experts and non-expert drivers detected the high threat stimuli such as the stroller and child running, the experts were better at detecting the mid-range threat stimuli $\chi^2(2, N = 160) = 5.2, p = .01$ (, but also demonstrated a clear ability to reject unimportant information, as no experts noticed a garbage bin on the side of the road (Figure 1) $\chi^2(1, N = 66) = 7.6, p = .006$. This result implicates a more ‘focal’ attentional filter for expert drivers. Moreover, such attentional filtering may occur at a fast, pre-conscious level, as we also demonstrated that experts who reported not seeing the unexpected object in the critical trial, were nevertheless more likely to accurately choose the additional object in a subsequent forced-choice task. These results are important in understanding the role of attentional allocation when driving.

References

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