Understanding the Role of Inattentional Blindness in Motorcyclists' LBFTS Crashes

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Abstract

There is a growing body of evidence which suggests that the psychological mechanism which leads to a 'Look-But-Fail-To-See' (LBFTS) crash, where a driver looks but fails to perceive and act appropriately, could be through Inattentional Blindness (IB). IB occurs when attention is directed to particular objects or tasks, leading to failures to perceive an unexpected object, even if it appears in the middle of the visual scene (Mack & Rock, 1998). Extending on previous work by Prabhakharan & Chapman (2016), the present study aimed to further examine how 'attentional sets', might play a role in LBFTS crashes with motorcyclists.

Background, Method, Results and Conclusions

Background: Vulnerable road users, which includes pedestrians, cyclists and motorcyclists, make up 54% of all road fatalities worldwide (WHO, 2018). Of these, motorcyclists have the highest fatality rates amongst all road user groups. A common crash type with motorcyclists is a 'Look-But-Fail-To-See' (LBFTS) crash, where a driver makes appropriate head and eye movements, but fails to perceive and subsequently act appropriately towards another vehicle (Brown, 2002).

More recently a psychological phenomenon known as Inattentional Blindness (IB) has been used to explain why this crash type might occur (Prabhakharan & Chapman, 2016; Pammer, Sabadas, & Lentern, 2018). It has been suggested that one of the strategies the brain employs to deal with the vast quantity of information that is required to be processed, is to selectively 'set' attention to look for particular object types in the environment (Pammer et al, 2018, Most, Scholl, Clifford, & Simons, 2005). Whilst, this notion has been demonstrated using static images, the present study aimed to validate and extend upon this idea using a simulated video of a driving scene.

Method: As seen in Table 1, a between subjects' design was employed with three groups. Participants took part in a computer-based IB task where they watched a 30 second video of a simulated driving scene where they pull up to an x-junction with vehicles travelling in the perpendicular direction. Their task was to simply count either white cars (Groups 1 and 2) or blue cars (Group 3) that travelled past. In all of the clips, the same number of vehicles travelled past the observers' view. In addition, in all clips, a blue motorcyclist on a blue motorcycle traveled towards the observer from the opposite intersection, before proceeding to turn left. Following the clip, participants were asked a series of questions including whether they noticed a motorcyclist.

Table 1. study design

Group	Vehicles	Task
Group 1	Black and White Cars + Blue Motorcyclist	"Count White Cars"
Group 2	Red, Green, Blue and White Cars + Blue Motorcyclist	"Count White Cars"
Group 3	Red, Green, Blue and White Cars + Blue Motorcyclist	"Count Blue Cars"

Results: Results revealed that across conditions, there was a significant inattentional blindness effect demonstrated towards the motorcyclist, with only 21.4% of participants freely recalling seeing the motorcyclist. When cued with possible vehicles that may have been present, recall of the motorcyclist increased to 32.1%. Interestingly, 12.5% mistook the motorcyclist for a bicyclist, with this increasing to 21.4% when prompted. Alarmingly, 25% of participants recalled, when prompted, seeing objects that did not appear in the clip (e.g. sports car, van). Results also suggest significant group differences can be attributed to an interplay between attention and visual scanning patterns.

Conclusion: The results of the study are consistent with previous findings in this area (Prabhakharan & Chapman, 2016; Pammer et al., 2018), and further support the notion of Inattentional Blindness as a major contributing factor in LBFTS crashes with motorcyclists.

References

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