Why do car drivers fail to give way to motorcycles at t-junctions?

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Studies of accident statistics suggest that motorcyclists are particularly vulnerable to collisions with other vehicles which pull out of side roads onto a main carriageway, failing to give way to the approaching motorcycle. Why might this happen? The typical response of the car driver is that they looked in the appropriate direction but simply failed to see the motorcycle. To assess the visual skills of drivers in such scenarios we compared the behaviour of novice and experienced drivers to a group of dual drivers (with both car and motorcycle experience). Participants watched a series of video clips, displayed across three screens, depicting the approach to various t-junctions. On reaching the junction, participants had to decide when it was safe to pull out. Responses and eye movements were measured. The results confirmed that dual drivers had the safest responses at junctions, especially in the presence of conflicting motorcycles. On a range of visual measures both novice and experienced drivers appeared inferior to dual drivers, though for potentially different reasons. There were however no differences in the time it took all drivers to first fixate approaching motorcycles. Instead the differences appeared to be due to the amount of time spent looking at the approaching motorcycle. The experienced drivers had shorter gazes on motorcycles than cars, suggesting that they either process less salient motorcycles faster than cars, or that they terminated the gaze prematurely perhaps because they did not realise they were fixating a motorcycle. We argue that this is potential evidence for an ocularmotor basis for Look But Fail To See errors.

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1. Introduction

Of all road users in the UK motorcyclists are the most over-represented sub-group to appear in the crash statistics. Despite making up only 1% of annual vehicle miles in the UK (DfT, 2010a, b), they account for nearly 21% of fatalities (DfT, 2010c). A recent study of motorcycle collisions (Clarke et al., 2007) identified three primary causes. The most common cause was that of another vehicle pulling into the path of a motorcycle when exiting from a side road onto the main carriageway. In such instances as the motorcycle is travelling on the main carriageway, the other vehicle should give way. Although there is no legal right-of-way in the UK, such collisions are often termed right-of-way violations (ROWVs). Such right-of-way violations have also been reported as a major cause of collisions with motorcyclists in the US (Hurt et al., 1981) and Australia (Haworth et al., 2005). Brown (2002) noted that such accidents are often referred to as Look But Fail To See errors (LBFTS). Typically car drivers report acting with due care and attention and performing all necessary visual checks, yet still failing to see another road user. While LBFTS errors can occur with any other road users including bicyclists (Summala et al., 1996) and even liveried police cars (Langham et al., 2002), they are most often discussed in regard to collisions with motorcycles. The high prevalence of such LBFTS collisions (as, for instance, reported in Brown’s (2002) re-analysis of Sabey and Staughton’s data, 1975) may however be inflated by self-report biases. One could imagine alternative causes: a failure to look in the appropriate direction; or having looked and perceived the approaching motorcycle the car driver might fail to judge the level of risk that the conflicting motorcycle presents. Both of these alternatives are, effectively, admissions of guilt on behalf of the car driver. However, claiming that the collision was due to a LBFTS error might be considered to mitigate the blame, as the resultant collision occurred despite the best efforts of the car driver, rather than due to their negligence. Crundall et al. (2008c) provided a framework for interpreting car-motorcycle collisions at t-junctions which focussed upon these three potential causes. We argued that future research should aim to identify where the chain of behaviour breaks down, based upon three questions: Did the driver look at the approaching motorcycle? Did the driver perceive the approaching motorcycle? Did the driver correctly appraise the approaching motorcycle? The framework is represented in Fig. 1.

There are several possible reasons why any of these three behaviours may fail, resulting in a collision with a motorcycle. Bottom-up factors such as the higher spatial frequency of moto-