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Cyclists and left turning drivers: an examination of safe and legal aspects of the interaction

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Abstract

Priority on Australian roads is the safe and efficient movement of people and goods with an emphasis on the movement of motor vehicles. Comparatively there has been little consideration of safety when we are vulnerable road users, particularly cyclists. Fundamental to safety when we ride on the roads, is safe interactions between cyclists and drivers. This study involved an investigation into a specific interaction is not well understood – when a cyclist is travelling straight and a driver is turning left. More specifically, this study aimed to provide new insights to understand how engineering and legal aspects influence safety issues related to this interaction. To achieve this, definitions of safe and legal were explored and then applied video observations from interactions at intersections in metropolitan Melbourne, Victoria (n=275). Two thirds of interactions (188, 68.4%) had elements of non-compliance and potential contributing influences included infrastructure/road design (i.e. road markings, bikes lanes, pedestrians and number of vehicle lanes) as well as observed behaviours (cyclists and drivers). Findings highlight that while there is a connection between engineering (road design) and law (road rules), the two currently operate in parallel and are likely to be contributing to inconsistent behaviours and confusion among road users.

1 Introduction

A safe cycling environment is fundamental for bicycles to be a legitimate mode of transport, especially in situations of cyclist-driver interactions. Currently in Victoria, there seems to be a general lack of focus on vulnerable users when considering road safety (Victoria Walks, 2015). This has particularly dangerous repercussions, especially in the case of left turning drivers and cyclists travelling straight through an intersection; which has been found to be a common driver-cyclist interaction contributing to ‘collisions’ or ‘near collisions’ (Johnson et al, 2014). There is ‘a lack of understanding about this rule’ (Tierney, 2015), particularly in terms of what amounts to ‘turning’.

Previous research in relation to this interaction identified a relationship between road rules and safety but suggested that there is little understanding about this connection

(Nicholls et al., 2017). This study extended that research and sought to establish the nexus between road design and a cyclist's compliance with the overarching road rules.

2 Method

This study involved three stages, including 1) obtaining objective definitions of 'safe' and 'legal', 2) reviewing the Victorian *Road Safety Road Rules* 2017 ('Road Rules'); and 3) analysing a series of video observations of this cyclist-driver interaction, in light of the definitions of 'safe' and 'legal'.

2.1 Definitions and Road Rules review

Objective definitions of safe and legal were required so as to understand cyclists' behaviours in practice. Obtaining these working definitions involved reviewing a range of sources, including road rules, engineering standings and previous research. The current Road Rules (Road Safety Road Rules, 2017) were reviewed in order to clarify some of the extracted rules.

2.2 Video observations

Secondary analysis of previously recorded video observations formed the extent of the data analysis here. This video footage was obtained from a study that remains underway. Small video cameras (GoPro) were attached to roadside poles facing the intersection at four locations across metropolitan Melbourne and recorded all road users who entered the space. Variables coded from the observation footage included characteristics of the site and the observed cyclists. The expected line of travel as indicated by the continuous bike lane to the intersection hold line and the position of cyclists in relation to the turning motor vehicle were analysed. In this study, 'turning' was taken to be one continuous movement.

3 Results

3.1 Definition of Safe

While many sources attempt to define safe, or refer to safety standards, there is little guidance on what an objective definition of safety actually encompasses. For example, Austroads provide some direction in terms of clearance distances to ensure cyclists remain protected, while previous research tends to define safety as the number or risk of crashes (Mosslemi and Sorenson, 2009). The former could not be achieved from observational data, while the latter was too subjective and did not provide objective criteria on what constituted a risk. Given the lack of consensus and high subjectivity, it was not possible to identify a suitable definition of 'safe' for this study.

3.2 Definition of legal and Road Rules review

There are several road rules that apply in the interaction between a driver turning left and a cyclist continuing straight. In Victoria, the three key road rules are:

> **R141(2):** The rider must not ride past, or overtake, to the left of a vehicle that is turning left and is giving a left change of direction signal
>
> **R247:** Ride in a bicycle lane on a road unless impracticable to do so
>
> **R253:** Bicycle riders not to cause a traffic hazard

In this study, the focus was on the main rule, 141(2) and this was used to determine cyclists' compliance/non-compliance. In addition, rules 247 and 253 were flagged as possibilities of non-compliance.

3.3 Video observations

In total, 275 video observations were analysed and of these, 188 (68.4%) showed elements of non-compliance. Cyclists' behaviour was identified as: strictly non-compliant (i.e. illegal under rule 141(2)) or possibly non-compliant with rules 247 or 253. Individual sites' compliance values ranged from 20% to 60%. In addition, the presence of pedestrians crossing the intersecting road were noted to have been a potential influence on cyclist behaviour at 107 (38.9%) observations.

4 Discussion

Non-compliance with the road rules was observed by the majority of cyclists. In many cases, this appeared to be influenced by the road design/cycling infrastructure. For example, at sites with continuous bike lane to the intersection, cyclists did not give way to turning vehicles (R141(2)) as the bike lanes seemed to indicate a 'universal' cue that cyclists had right of way. According to the road rules, however, this is incorrect. Further, sites with more than one vehicle lanes may have provided cyclists with greater opportunity to overtake the turning motor vehicle on the right. While this did not directly contravene the Road Rules, it raised questions of non-compliance under R247 and R253.

Further, it is possible that social contagion also affected some cyclists' behaviour. When cyclists deviated from the expected line of travel, subsequent cyclists followed. This tended to be the case particularly where cyclists opted to lane filter. Road design and social contagion appeared to have the greatest influence on cyclist compliance.

5 Conclusion

This study confirmed that there is a lack of interaction between legal and engineering factors that govern this cyclist-driver interaction. Cyclist safety is impacted by both disciplines and solutions must stem from a combination of these two fields. Not only is this imperative in improving safety specifically for cyclists and left-turning drivers, but it also critical for safety in cyclist-driver interactions in general.

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