

# CRITICAL

## Cross-modal Intervention To Improve Cyclist Awareness Levels

### Background

- Cyclists are ten times more likely to be killed on the road than a car occupant. In 2019, 2.6 car occupants were killed, compared to 28 cyclists (per billion vehicle miles)<sup>1</sup>
- Typical cycling accidents include the motorist emerging into, or turning across, the path of the cyclist and cyclists' riding off the pavement into the path of a vehicle or making right turns into the path of a vehicle.
- In bicycle-vehicle interactions the most common contributory factor recorded by the police is 'failed to look properly' by either the driver (57% of serious collisions) or cyclist (43% of serious collisions), especially at junctions.

1. DfT confirms 2019 casualty statistics ([roadsafetygb.org.uk](https://roadsafetygb.org.uk))

### What can be done about it?

- Researchers from the Transportation Research Group at the University of Southampton developed and evaluated a cross-modal training programme (**CRITICAL** project)
- Cross-modal training is where one group (e.g. car drivers) experience training from the perspective of another group (e.g. cyclists), and vice-versa
- It was anticipated that by participating in cross-modal training, compatible Situation Awareness will increase, thus leading to safer interactions
- Car drivers were trained to interact with cyclists through a mixture of theoretical-based learning and on-road practical experience via cycling lessons to understand what it is like to be a cyclist
- Cyclists were trained to interact with drivers through an online, self-directed course

Image source: The Times, 2021



Making Roads Safer



# Situation Awareness of different road users

- These dangerous interactions can be understood from the perspective of incompatible Situation Awareness
- Situation Awareness can be understood as someone's understanding of what is going at a specific point in time
- On the road, this can manifest as different road users interpreting the same road situation differently
- It is also known that negative attitudes and aggressive driving behaviour towards cyclists is more pronounced in non-cyclist drivers than drivers who also cycle

## Research Approach

- A data-driven approach was used to inform the design of the training programs
- Data gathered from on-road observations, focus groups and an online survey allowed us to understand where there were gaps in knowledge, where drivers and cyclists saw the world differently and where the formal rules of the road in the Highway Code were least understood
- The results enabled the cross-modal training programs to be tailored to drivers and cyclists user groups

### On-road 'think aloud' studies

Drivers (6), driver-cyclists (9) and cyclists (6) drove/cycled a route in Southampton

Their 'think aloud' processes were captured to understand what information was used in a naturalistic environment

Specific focus given to the decision making processes when over-taking cyclists

### Focus Group sessions

Held with drivers (9), driver-cyclists (13) and cyclists (5) to discuss experiences of interacting with the other road-user group Knowledge of the highway code assessed Highlighted the importance of intra-group differences during interactions (e.g. leisure vs. commuter cyclists)

### Online survey

Completed by 409 people (47 cyclists, 101 drivers, 260 driver-cyclists)

Investigated perceptions of other road users 'Test your knowledge' on formal rules of the road from the Highway Code related to driver/cyclist interactions

### Development of cross-modal training programmes



Structured around a framework of knowledge, skills and attitudes



### Training delivery



Theoretical training on what it is like to be a cyclist  
Theoretical training on what it is like to be a driver Practical training to experience on-road



### Training evaluation

Questionnaires assessing knowledge, skills & attitudes  
Pre-training, immediately post-training, 6-weeks-training

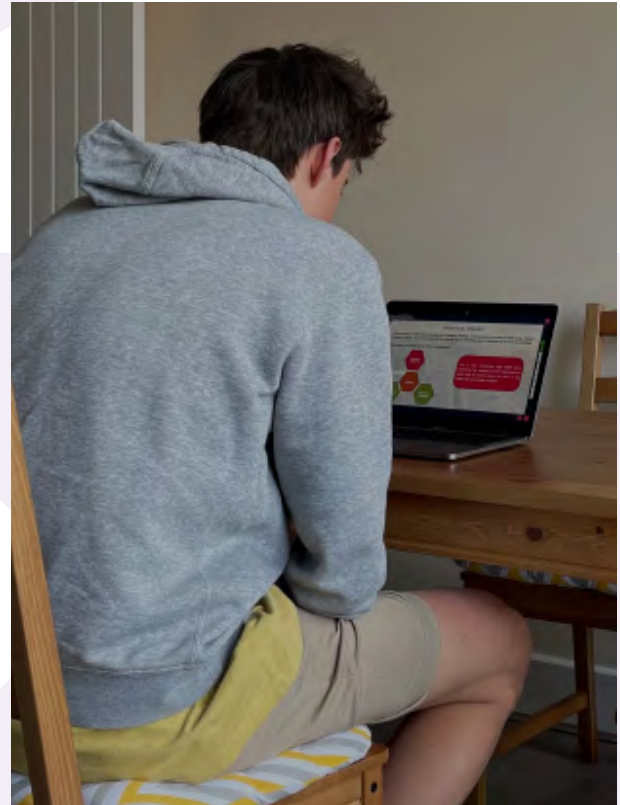
# Theoretical training

- 7 modules were developed and could be completed remotely, at a self-directed pace
- The course was structured around the three key components of competency; Knowledge, skills and Attitudes, which together combine to result in the behaviour that is displayed

**Attitude module:** covered different attitudes drivers and cyclists hold about each other, how the simplest variations such as what someone is wearing can influence attitudes and in turn behaviour. Plus opportunities to reflect on attitudes held and how accurate these might be

**Knowledge modules:** Introduced a simple model of information processing to learn how awareness of the road environment is developed and how this influences behaviour. Introduced to relevant elements of the Highway Code and how to view the road as a shared space 2

**Skills modules:** vehicle control (either bike or car) to understand how and why each road user behaves like they do. Introduced to the IPSCA method of vehicle control, which is a simple decision making tool for any road user to implement to support interaction with other road users



- The interactive course used a range of learning
- techniques including text to read, videos to watch and quizzes to complete
- The course was designed to be completed in between 60-90 minutes
- Cross-modal Intervention To Improve Cyclist Awareness Levels

# Practical training

- Practical, on-road, cycling training was delivered to car drivers by a fully qualified instructor
- It consolidated the theoretical content and enabled theory to be put into practice
- In a typical two hour session, drivers learnt basic cycling skills, bike handling, journey preparation, hazard identification, and how to ride safely
- The ongoing Covid-19 pandemic prevented an equivalent practical session being offered to Cyclists in the Southampton University Driving Simulator



# Questionnaires

- Three questionnaires assessed knowledge, skills and attitudes
- Completed at three time points: pre-course, immediately post-course and six-week follow-up
- Overall, the results demonstrated a positive change in perceptions about the other road user group

## For both training groups

- 'Knowledge' increased post-course, compared to pre-course and between post-course and six-week follow up, indicating road user's had greater agreement with statements asking about experience of the other road user group, understanding and knowledge (e.g. 'I use information from cyclists to inform my decisions and behaviour' and 'I understand why cyclists behave the way they do in different situations' or 'I understand the actions a driver might take in different situations')
- Scores relating to skills increased at post-course and follow-up time points, when compared to pre-course. For drivers, the biggest changes were observed in confidence when over-taking cyclists and cyclists reported an increased understanding of why cars position how they do at roundabouts and junctions
- There was a trend for attitudes to other road users to positively change across the assessment timeframe, e.g. 'I consider the road environment a shared space for all road users' and 'I hold positive attitudes towards drivers'

## Conclusions and future work

- Preliminary results point to the positive impact of cross modal training on enhancing compatible Situation Awareness between different road user groups
- Extending practical training, particularly to cyclists in the University of Southampton driving simulator will provide an additional opportunity to consolidate the theoretical training
- Explore the potential to enhance the retention of training content via in-person delivery of theoretical content and longer duration training courses with repeat exposure
- The training content will be available as a PDF on the Road Safety Trust website

## Contact information

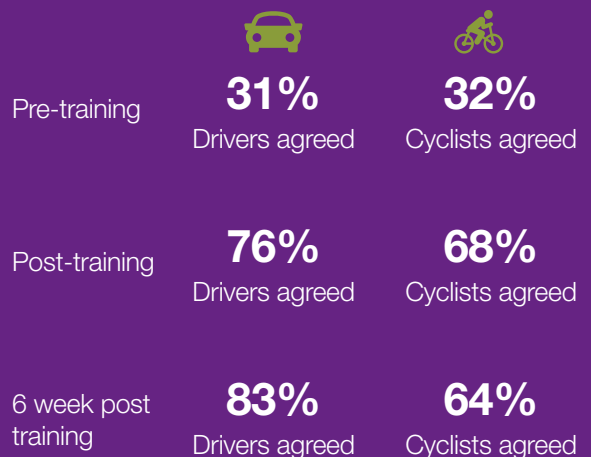
For more information on the CRITICAL project, please contact Dr Katie Plant, Associate Professor in Human Factors Engineering at the University of Southampton: [k.plant@soton.ac.uk](mailto:k.plant@soton.ac.uk)

## Results

***"I understand why road user groups behave the way they do when in different situations."***



***"I understand why cyclists might not use the cycle lanes that are available to them."***



***"I understand that drivers have two blind spots despite having three mirrors."***

