

Rogé, et al (2018). *Does a yellow jacket enhance cyclists' sensory conspicuity for car drivers during daylight hours in an urban environment?*

There are two main ways to examine the effect of conspicuous garb such as 'hi-visibility clothing' on safety. One is to study the record of real-world collisions and injuries and conduct interviews and surveys. The other is to set up experimental scenarios and directly observe how drivers behave in the presence of cyclists, which is the method chosen by the authors of this paper. The experiments were conducted inside of a fully-immersive driving simulator built out of the cabin of a Peugeot 308 with computer monitors placed over all the windows in order to project a virtual reality urban driving environment. Participants were asked to drive through a diverse set of road situations, in daylight conditions, with a wide variety of scenery and other road users presented in a controlled but randomised order. Cyclists appeared in the virtual reality environment and were depicted as wearing grey street clothing or a yellow jacket. Each driver experienced numerous scenarios of encounters with cyclists, both those wearing a yellow jacket and not. Drivers were asked to flag the moment that they perceived the cyclist in a given scenario and then to subjectively rate the difficulty of seeing the cyclist. The simulation recorded two objective measures: the distance of the cyclist at first sight and also if the driver subsequently crashed into the cyclist.

A new and interesting element of the experiments is that the authors divided the scenarios into two main categories: 'high cyclist visibility' and 'low cyclist visibility' based upon criteria developed from studies and discussions with drivers and cyclists as part of prior research. For example, high visibility scenarios include: overtaking a cyclist from behind and arriving at a junction where the driver had priority over the cyclist. Low visibility scenarios included: drivers making a left or right turn across the path of a (possibly obscured) cyclist and entering a gap in traffic in front of a cyclist. At the end of the simulation, for an additional low visibility test, the drivers were asked to 'parallel park' the car and open their door (while a cyclist may be approaching from behind).

The findings were surprising. Regardless of scenario, drivers hit yellow-jacketed cyclists at a slightly higher rate, although the difference was not statistically significant. Similarly, when participants rated the subjective difficulty of detecting the cyclist, there was no significant difference based on the colour of their clothing. There was only one significant difference based on clothing: in the high cyclist visibility scenarios the drivers were able to perceive the yellow-jacketed cyclist at a longer distance. However, the yellow jacket was not helpful in the low cyclist visibility scenarios.

The authors suggest that the physiology of the human eye can explain these results: colour perception tends to be best at the centre of the field of vision, and drops off rapidly towards the periphery of the eye. In high cyclist visibility scenarios, the cyclist first appears at the centre of the field of vision, where colour perception is greatest. But in low cyclist visibility scenarios the cyclist first appears in the corner of the eye or in peripheral view, where the colour of their clothing is irrelevant. In daylight hours, for the cases where visibility help is most needed, wearing a yellow jacket is pointless.

Reviewer Notes

- Given that overtaking is a 'high cyclist visibility' scenario, that wearing a yellow jacket raised perception distances in such high visibility scenarios, yet did not improve collision rates, the result appears to be consistent with Walker (2014) who found that drivers passed more closely to cyclists wearing a yellow jacket.
- It would be interesting to see a more detailed breakdown of measures, such as collision rates for specific scenarios.
- The physiological explanation would lead to the conclusion that safer infrastructure means ensuring that drivers are fully facing crossing points and can easily see any crossing cyclists or pedestrians within the centre of their field of vision. This seems to generally match up with Dutch guidance for cycleway design.