

Cognitive conspicuity of cyclists for motorists: the effect of knowledge concerning risky situations?

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Keywords: attention, vulnerable road user, cyclist, conspicuity, car driver

In France, 14% of fatal accidents involved a pedestrian, 5% a cyclist and 24% a motorcyclist (World Health Organization, 2015). Collisions with passenger cars may be explained, at least in part, by the low visibility of vulnerable road users (VRU) for car drivers.

The low visibility of VRUs can be due to their physical characteristics (such as their visual angular size, eccentricity in relation to the point of gaze, contrast against the background, colour, etc.) that make them difficult to be distinguished from their environment (notion of low sensory conspicuity). According to Theeuwes, the momentary need for information could play a key role in the process of actively directing the observer's attention (Theeuwes, 1991). The observer could engage in active filtering based on knowledge related to the nature of probable stimulus inputs. These top-down processes can be put forward to explain, at least in part, the low visibility of VRU. Drivers' ability to detect a VRU could then depend on its cognitive conspicuity. This conspicuity is linked to the fact that the focus of attention is strongly influenced by the observer's expectations, objectives and knowledge. According to Crundall (2008), the detection of a motorcycle in the road environment is partly related to top-down influences (such as attitude, knowledge, skills and strategies) which lead to driving schemata concerning the interactions between car and motorcycle. The objective of this study is to see whether this model is relevant to the detection of cyclists by motorists.

It is possible that, due to infrequent exposures to specific risky situations and based on their previous experience about what is likely to happen next, some car drivers might have incorrect expectations. It is also possible that car drivers misinterpret what they see or the location where the cyclist might show up. The corollary of these suggestions is that car drivers who also ride a bicycle (cyclist-motorists) could draw upon their riding knowledge or practical experience when they drive a car to help them detect cyclists and avoid collisions.

Therefore, the performance of two groups of motorists (not cyclist-motorists versus cyclist-motorists) has been compared in a task which consists of detecting cyclists during a simulated car driving. The scenarios included 16 (risky and not risky) situations which have been partly elaborated after an analysis of crashes in France and the observation of urban cyclists in their natural environment. The analysis of the number of collisions and the visibility distance leads us to conclude that cyclists properly identify the risky situations in terms of low conspicuity. In all driving situations, cyclist-motorists easily detected cyclists compared to the other group. These results raise the question of the effect of knowledge and lead us to suggest other possible explanations for the lack of cyclists' visibility.

This work (VISIBLE project) was supported by the Fondation Sécurité Routière fund.

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