

Brains behind the wheel—could virtual reality teach us to avoid real life accidents?

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Could virtual reality teach us to avoid real life accidents? Credit: The University of Nottingham

Using their state-of-the-art simulation facility in the School of Psychology scientists at The University of Nottingham are exploring the

use of car driving simulators as tools for training and testing drivers in order to reduce road traffic accidents and fatalities.

Each year over 24,000 people are killed or seriously injured on roads in Great Britain highlighting the need for more successful techniques to help drivers cope with and avoid hazardous situations.

Research led by Hannah Foy, a 2nd year PhD student in Psychology and Cognitive Neuroscience, is looking at whether future interventions could prioritise the use of [driving simulators](#) to make us safer at the wheel and our roads a safer place to be. In order to make this possible it is important to understand if drivers behave comparably in both simulated and real world driving environments.

Hannah's research has been funded the Defence Science and Technology Laboratory (Dstl).

Annalise Whittaker, Behavioural and Cultural Systems Team, Dstl said: "Comparisons of [brain activity](#) in real-world versus synthetic environments are important because they allow us to better understand the relationship between synthetic environments and training transfer. This particular piece of research will inform simulator training developments for all military land, air and maritime vehicle operators while also providing useful outcomes for civilian driver safety. Our personnel operate in fast paced and highly mobile environments where their performance is affected by a number of physical and cognitive burdens, it is vital that their training is fully supported by cutting edge developments in research."

Limited previous research provides evidence that simulated behaviours do reflect those observed on road. However, Hannah's research goes above and beyond previous work by investigating the brain activity of drivers using the new driving simulator facility on University Park.

Hannah, who graduated with a BSc in Psychology at The University of Nottingham in 2013, said: "Driving simulators provide the opportunity to safely train drivers to deal with hazardous situations that may arise on road but which would be too dangerous to examine otherwise. They therefore create the possibility of significant accident reduction through driver testing and training interventions."

Hannah's PhD "Using near Infrared Spectroscopy to Assess Workload and Inhibitory Control in Real and Simulated Driving Environments" is supervised by Associate Professor Peter Chapman.

The research is carried out using the Nottingham Integrated Transport and Environment Simulation (NITES) facility (details of which, along with how to get involved can be found at <http://www.lifelongdriving.org>). Participants drive a 12 mile loop of Nottingham in an instrumented on-road car, this route is also programmed into a high fidelity motion based simulator meaning participants can then drive an identical route in the simulator. Both environments record eye movements and driving behaviours such as speed. For this research brain activity is also being recorded using a technique called functional near infrared spectroscopy (fNIRS), which uses light to measure changes in blood concentration in the prefrontal cortex, it is a non-invasive and highly portable technique meaning it can be easily interchanged between car and simulator. After both drives have been completed the measures are then compared in order to examine the similarities and differences between simulated and on-road driving.

Dr Chapman said: "This project showcases the way in which psychological research can be at the cutting edge of both neuroscience and road safety. It will enable us to understand whether behaviours such as eye movements, brain activity and driving related activities, for instance speed, are the same in a simulator as when [driving](#) an identical route in a car."

Provided by University of Nottingham

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