

Are self-driving cars really the answer for older drivers?

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With more of us living longer, driving is becoming increasingly important in later life, helping us to stay independent, socially connected and mobile.

But driving is also one of the biggest challenges facing [older people](#). Age-related problems with eyesight, motor skills, reflexes, and cognitive ability increase the risk of an accident or collision and the increased frailty of older [drivers](#) mean they are more likely to be seriously injured or killed as a result.

"In the UK, older drivers are tending to drive more often and over longer distances but as the task of driving becomes more demanding we see them adjust their driving to avoid difficult situations," explains Dr. Shuo Li, an expert in Intelligent Transport Systems at Newcastle University, UK.

"Not driving in bad weather when visibility is poor, avoiding unfamiliar cities or routes and even planning journeys that avoid right-hand turns are some of the strategies we've seen older drivers take to minimise risk. But this can be quite limiting for people."

Self-driving cars, says Li, are seen as a potential game-changer for this age group. Fully automated, they are unlikely to require a licence and could negotiate bad weather and unfamiliar cities under all situations without input from the driver.

But, says Li, it's not as clear cut as it seems.

"There are several levels of automation, ranging from zero where the driver has complete control, through to level five where the car is in charge," he explains.

"We're some way off level five but level three may be a trend just around the corner. This will allow the driver to be completely disengaged—they can sit back and watch a film, eat, even talk on the phone.

"But, unlike level four or five, there are still some situations where the car would ask the driver to take back control and at that point, they need to be switched on and back in driving mode within a few seconds.

"For [younger people](#) that switch between tasks is quite easy but as we age, it becomes increasingly more difficult and this is further complicated if the conditions on the road are poor."

Led by Newcastle University's Professor Phil Blythe and Dr. Li, the Newcastle University team have been researching the time it takes for older drivers to take-back control of an automated car in different scenarios and also the quality of their driving in these different situations.

Using the University's state-of-the-art DriveLAB simulator, 76 volunteers were divided into two different age groups (20-35 and 60-81).

They experienced automated driving for a short period and were then asked to 'take-back' control of a highly automated car and avoid a stationary vehicle on a motorway, a city road, and in bad weather conditions when visibility was poor.

The starting point in all situations was 'total disengagement' - turned away from the steering wheel, feet out of the foot well, reading aloud from an iPad.

The time taken to re-gain control of the vehicle was measured at three points; when the driver was back in the correct position (reaction time), 'active input' such as braking and taking the steering wheel (take-over time), and finally the point at which they registered the obstruction and indicated to move out and avoid it (indicator time).

"In clear conditions, the quality of driving was good but the reaction

time of our older volunteers was significantly slower than the younger drivers," says Li. "Even taking into account the fact that the older volunteers in this study were a really active group, it took about 8.3 seconds for them to negotiate the obstacle compared to around 7 seconds for the younger age group. At 60mph that means our older drivers would have needed an extra 35m warning distance—that's equivalent to the length of 10 cars.

"But we also found older drivers tended to exhibit worse takeover quality in terms of operating the steering wheel, the accelerator and the brake, increasing the risk of an accident."

In [bad weather](#), the team saw the younger drivers slow down more, bringing their reaction times more in line with the older drivers, while driving quality dropped across both age groups. In the city scenario, this resulted in 20 collisions and critical encounters among the older participants compared to 12 among the younger drivers.

The research team also explored older drivers' opinions and requirements towards the design of automated vehicles after gaining first-hand experience with the technologies on the driving simulator.

Older drivers were generally positive towards automated vehicles but said they would want to retain some level of control over their automated cars. They also felt they required regular updates from the car, similar to a SatNav, so the driver has an awareness of what's happening on the road and where they are even when they are busy with another activity.

The research team are now looking at what changes and improvement could be made to the vehicles to overcome some of these problems and better support [older drivers](#) when the automated cars hit our roads.

Newcastle University's Professor Phil Blythe, who led the study and is

the UK's Chief Scientific Advisor for the Department for Transport, said:

"I believe it is critical that we understand how new technology can support the mobility of older people and, more importantly, that new transport systems are designed to be age friendly and accessible.

"The research here on older people and the use of automated vehicles is only one of many questions we need to address regarding older people and mobility.

"Two pillars of the Government's Industrial strategy are the Future of Mobility Grand Challenge and the Ageing Society Grand Challenge.

"Newcastle University is at the forefront of ensuring that these challenges are fused together to ensure we shape future mobility systems for the older traveller, who will be expecting to travel well into their eighties and nineties."

Provided by Newcastle University

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