YOUNG DRIVERS

Wasted youth

Researchers are trying to assess which ADAS functions would be the most effective at improving the safety of young drivers, but access to these technologies remains a problem

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Crash data tells a tragic story of wasted young lives. In the Netherlands, drivers between the ages of 18 and 24 are five times more likely to die in a car crash than drivers between the ages of 30 and 59, according to figures from the Dutch Institute for Road Safety Research (SWOV). During the period 2012-2014, 22% of all Dutch road deaths in crashes with passenger vehicles involved a young driver. Yet this group constitutes less than 10% of all Dutch license owners.

"Because they're less experienced, younger drivers make more errors of attention and visual search," says Peter Morsink, a senior consultant in transport and road safety at Dutch engineering consultancy Royal HaskoningDHV. "They find it harder to select the appropriate speed and don't spot upcoming hazards as quickly as more experienced drivers, who are able to predict better."

Brain development

Morsink says there is also evidence that the brains of novice drivers are not fully developed, making them more likely to indulge in risky behavior. "They also tend to have greater problems with multitasking so they can miss out on a safety-critical event," he adds.

ADAS functions have great potential to diminish the risks for young drivers, in particular. Right now, most young drivers get behind the

Showing the dangers of drugs

Ford's Drug Driving Suit is designed to show drivers the dangers of driving under the influence of illegal drugs. According to NHTSA, about 18% of all motor vehicle driver deaths involve drugs other than alcohol, such as marijuana and cocaine.

The Drug Driving Suit will be incorporated into Ford Driving Skills for Life, the novice driver education program that has provided free training to more than half a million people globally. The new suit follows in the footsteps of Ford's Drink Driving Suit, which was introduced in 2014.

Ford developed the suit with scientists from the Meyer-Hentschel Institute in Germany to simulate some of the effects of drugs such as cannabis, cocaine, heroin and ecstasy. They include slower reaction time, distorted vision, hand tremors and poor coordination.

"We know that some drugs can cause trembling hands, so we incorporated a device into the suit that creates just such a tremor," explains Gundolf Meyer-Hentschel, CEO of the Meyer-Hentschel Institute. "Drug users sometimes see flashing lights in their peripheral field, an effect recreated by our goggles, while imaginary sounds are generated by the headphones. Additionally, the goggles distort perception and produce colorful visual sensations – which are a side effect of LSD."

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Peter Morsink, *senior consultant in transport and road safety, Royal HaskoningDHV*

wheel of older cars, or smaller and cheaper models. These tend not to be equipped with many ADAS functions. But the pattern is gradually changing as high-end components filter into mass-market vehicles.

Insurance incentives

One way in which younger people could be encouraged to drive newer vehicles is to introduce lower insurance premiums if they use cars fitted with ADAS functions.

"It would help to close the time lag before this age group gets to use ADAS technology," says Richard Cuerden, chief scientist, engineering and technology, at the UK's TRL. "For example, if your car has seatbelt reminders, AEB [autonomous emergency braking] and lane keep assist, your annual insurance could be cheaper to reflect these features. This could be weighted for younger drivers in accordance with their higher collision rates without these technologies. That way ADAS functions would become disproportionally beneficial for younger people."

The Co-op's Young Driver insurance policy is one telematics-based product. The Smartbox is fitted under the hood and monitors how well the young driver is doing. It allocates a safe driving score, which is used to calculate annual insurance premiums. A similar telematics solution is the ChilliDrive app from insurance company Autoline, but this uses the driver's cell phone to record GPS data and assess driving performance.

(Above) Ford's Drug Driving Suit

(Right) Screenshots from instruction videos used to research young drivers' attitudes to adaptive cruise control and blind spot detection, in a study by Royal HaskoningDHV

Group mentality

Cuerden says ADAS technologies that monitor fluctuations in concentration levels could help to address the common problem of young people losing concentration when driving in groups. Driver distraction monitoring, he says, keeps drivers focused on the road ahead and prevents handheld cell phone use. Meanwhile, intelligent speed assistance (ISA) is likely to help younger drivers adhere to speed limits. The more advanced systems can warn drivers about dangers on the road ahead, including queuing traffic and sharp bends. Finally, one of the most important technologies for novice drivers is a seatbelt reminder. "Younger drivers are more likely to be unbelted when involved in a collision and about 30% of car users killed in the UK are not belted," says Cuerden. "Half of these would survive if everyone in the UK wore a seatbelt on every journey."

ACC versus BSD

When Morsink of Royal HaskoningDHV carried out a research project assessing the value of ADAS functions for young drivers, he opted to evaluate the perception

Distraction was a factor in nearly

60%

of crashes involving teenage drivers studied in 2016 by the AAA Foundation for Traffic Safety and the University of Iowa

Drivers had been talking to or attending to other passengers in the vehicle in the lead-up to

15%

of the crashes

Drivers had been talking on, texting on or operating a cell phone prior to

12%

of the crashes

Drivers had been looking at something inside their vehicle before

10%

of the crashes

European crash data

EU-wide data compiled by the European Road Safety Observatory shows novice drivers are heavily over-represented in single-vehicle and loss-of-control crashes. There are also far more fatal alcohol-related crashes and fatal weekend night crashes involving drivers under the age of 25 than for older groups.

There are some gender differences. For example, speeding causes 30% of accidents involving male drivers, and 21% with female drivers.

Meanwhile, in a comparison of data for the UK, Sweden and the Netherlands, there were more than twice as many alcohol-related deaths among young drivers in Sweden than in the UK. The Netherlands showed a similar result to Sweden. However, older drivers in Sweden were even more likely to die in alcohol-related incidents than younger Swedish drivers, whereas in both the Netherlands and the UK, older drivers had far fewer accidents involving alcohol.

Adult supervision

Some European countries – including Sweden, the Netherlands and Germany – have decided to allow young people to take the driving test and get a license when they are 17, on the condition that they are accompanied by an adult until they are 18 years old. The hope is that being guided by a more experienced driver for a year will lower the crash risk once they can drive alone.

In the Netherlands, the 2toDrive accompanied driving scheme was introduced in November 2011 and the experiment will continue until November 2017. Youngsters can begin driver training and take the theory test at 16.5 and take the driving test at 17.

"One of the biggest issues is peer pressure and showing off to others so this program is useful in building up experience in a controlled environment, with a mature role model," says Peter Morsink of Royal HaskoningDHV.

According to SWOV, the crash rate per kilometer of the 2toDrive respondents was considerably lower than that of respondents who got their license in the traditional way, although more research is required to confirm the results and provide more precise data.

"WE'VE ALREADY SEEN ABS AND ESP ROLLED OUT IN THE TYPES OF SMALLER MODELS THAT YOUNGER DRIVERS ARE DRIVING"

Michael Hafner, *director of driver assistance systems and active safety, Mercedes-Benz*

of learning drivers towards two systems in particular – adaptive cruise control (ACC) and blind spot detection (BSD). "We chose to study these two systems because they address the main difficulties of young drivers, including speed selection, risk detection and driver distraction," he says.

A series of questionnaires completed by 40 learning drivers revealed that BSD was considered more useful than ACC. "They thought both systems were effective, but intuitively felt BSD would prevent more accidents, whereas ACC was more about increasing the comfort of the driving experience and therefore more of a luxury item," says Morsink. "BSD relieved them from the stress of multitasking, which is something we know they tend to struggle with."

Learning curve

The continual evolution of ADAS technologies takes cars closer to full automation. Morsink says the transitional period must be negotiated carefully. Many of the ADAS technologies can be switched on and off by drivers and may not be 100% reliable. Care must be taken, he says, to ensure that drivers learn to drive without their aid and only then are they incorporated into the learning experience. The next stage of his study will be to conduct driver simulations and field studies to examine driving behavior and performance both with and without ADAS functions.

The multitude of applications already available in luxury cars gives a good indication of what could be seen in mass-produced models in a few years' time. Michael Hafner, director of driver assistance systems and active safety at Mercedes-Benz, says young drivers of the company's cars benefit especially from Collision Prevention Assist Plus, which is designed to reduce the risk of rear-end collisions through autonomous partial braking, and also Attention Assist, which he says allows adjustable sensitivity to enhance safety on long and tiring journeys.

Other useful Mercedes functions include Intelligent Drive Next Level, which equips drivers to drive in a partially automated way on all roads, and Active Brake Assist (ABS), which uses radar sensors to provide warnings about imminent crashes and detects crossing traffic and pedestrians.

(Above) Features like Mercedes-Benz's Attention Assist could be particularly beneficial to young drivers, but wider application in lower segments is needed

"ADAS development is advancing very quickly, which means these systems are available in more and more vehicles," says Hafner. "We've already seen ABS and ESP [Electronic Stability Program] rolled out in the types of smaller models that younger drivers are driving and many other technologies will follow rapidly."

Demographic shift

TRL's Cuerden says that further research is needed to understand exactly how effective new ADAS technologies are in the real world and also how drivers interact with them, to gain maximum benefit.

"As we move to a digital age, there are big challenges for collision investigators in ensuring the onboard event data is captured and analyzed, so we can evaluate how vehicle safety systems perform," says Cuerden. "We need a precise answer to the key question: Does their effectiveness vary for different driver demographics?" ‹