Training to prolong safer driving among older people

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There will be an increase in older drivers on the road over the next 20-30 years. On the whole older drivers are not a particular risk to road safety. Collisions involving older people as a casualty increase in later life across Great Britain, but much of this is due to frailty; they are more likely to become a statistic (Mitchell, 2013; see figure 1).

However, they are over represented in crashes resulting in injury and death that involve:

- junctions, in merging traffic, with turns across the road and in busy traffic (Clarke et al., 2009) esp. judgements of relative speed, time gap judgements (Oxley et al., 2006; Preusser et al., 1998)
- Navigating unfamiliar routes (Holland, 2001)
- Maintaining speed and tracking (Brendemuhl, Schmidt and Schenk, 1988; Mussewhite and Haddad, 2008, 2010; Schlag, 2003)
- Being distracted by radio, passengers, outside (Holland, 2001; Musselwhite and Haddad, 2008, 2010)
- An inability to see under poor lighting (glare, darkness, luminance) (Janke, 2004; Musselwhite and Haddad, 2008, 2010b)
- Slower reaction times (Musselwhite and Haddad, 2008, 2010)
- Tiredness/fatigue (Musselwhite and Haddad, 2008, 2010)

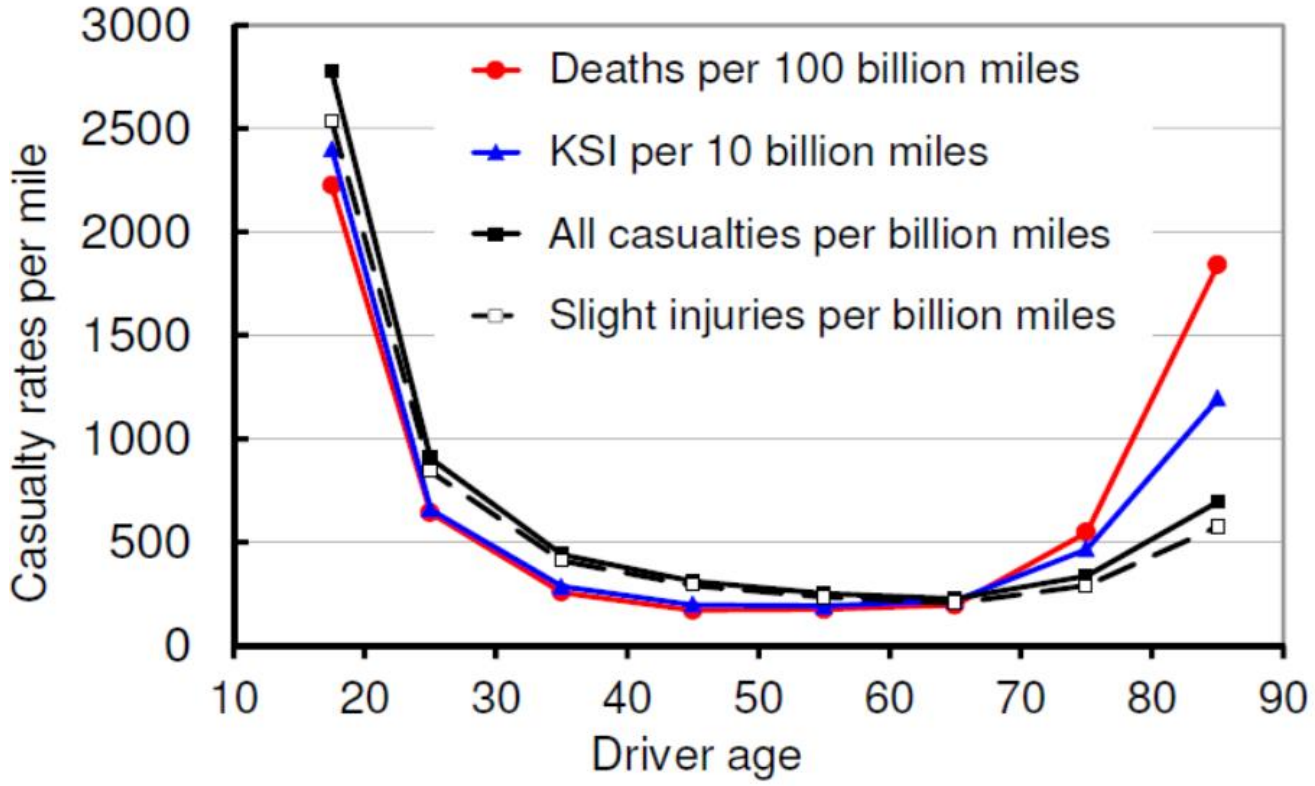

Figure 1: Casualty rates for drivers by age and types of casualty, Great Britian 2012 (Mitchell, 2013).

Research suggests that the following cognitive and physiological changes could account for these types of crash:

- Attention
- Cognitive Overload
- Cognitive processing speed
- Perceptual speed
- Working memory
- Task switching
- Eyesight
- Physiological changes in movement of neck.
- Physiological changes in muscular strength
- Changes in optical lobe functioning
- General physiological changes

Cognitive tests can be used to predict driver performance including being involved in a crash. Performance by older people on the following tests have been shown to predict driver collisions in older adults:

- Useful Field of View (UFOV), a computer based test that examines processing speed, divided and selective attention (Ball et al., 2010)
- Trail Making Test part A and B (TMT/A, TMT/B), consists of two tests, Part A (figure 3) requires a participant to join up numbered shapes in sequential order from 1 to 25 as quickly as possible. This measures visual search capability. Part B requires the participant to join numbers and letter together in order 1-A-2-B-3-C and so on. Part B measures working memory and task switching ability. Emerson et al (2012)
- Motor-Free Visual Perception Test, The Visual Closure subtest of the Motor-Free Visual Perception Test (MVPT/VC) is a multiple-choice test that measures a person's ability to visualize incomplete figures when only fragments are presented (Staplin et al., 2003a,b).

- Delayed Recall. Performance on the test is related to working memory and requires participants to recall three words, once achieved delayed recall condition is added by allowing a certain amount of minutes (often 10 minutes in the first instance) to pass before repetition is required (participants are told they should remember them for recall). (Staplin et al., 2003a,b).
- Maze test. Participants complete trace a path through a computerised maze (Ott et al. 2003, 2008)

Performance on the UFOV and Maze test also predict general driver performance in older drivers. Training has been shown to improve performance on the UFOV, TMT A/B, Delayed Recall, Speed of Processing, and also two physical tests (general fitness and specific neck and shoulder training). Research has found training improving performance on the UFOV, Dual N, neck and shoulder and general fitness training translates into improved driver behaviour. The four tests combined cover all the

cognitive and physiological changes associated with increase in crash risk among older people noted above. It is therefore suggested these form the basis of any future training programme.

There are some promising examples of bringing together these cognitive and physical tests currently run at local driver assessment centres across the United Kingdom and also some at-home self-assessment style programmes. These are always very positively received by older people and there is tentative evidence they improve driver behaviour yet little evidence that crashes are reduced. There is also a tendency for drivers to disengage with learning after an initial intervention, so effects tend to be short-lived (for an overview see Korner-Bitensky, et al., 2009 , Hawley 2015 and St Louis et al., 2011) More research is needed about the best combination of training and tests and how to lock-in training benefits that translate to driver behaviour.

Recommendations for future training programmes for older people to improve driver behaviour should include the UFOV and the TMT A and B test, with potentially involving neck and shoulder and general fitness programmes too. A screening procedure linked to incremental training programmes with feedback akin to a game style package is suggested.

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