Predicting on-road performance of older drivers with cognitive impairment: Brief in-office screening of attention, visuospatial ability, and planning and foresight

Carol Snellgrove

Flinders University of South Australia (SA)

Abstract

The Snellgrove Maze Task (SMT; Snellgrove, 2005) was developed in SA to screen for specific cognitive domains required for safe driving (attention, visuospatial ability, planning and foresight), and discriminated with high accuracy older drivers with mild cognitive impairment (MCI) or early dementia who passed or failed an on-road driving test. Independent US studies have supported the utility of the SMT in predicting on-road pass or fail in older drivers, and those experiencing dementia and stroke. These studies will be presented, with a view to illustrating the potential for brief in-office cognitive screening to identify the most competent and dangerous older drivers without costly on-road driving tests.

Background, Method, Results and Conclusions

The psychometric properties of the SMT were examined using a sample of 115 older drivers with MCI or early dementia. Participants completed the SMT and immediately thereafter a standardized on-road driving test. SMT scores were not influenced by sociodemographic variables, and discriminated with high accuracy those participants who passed a standardized on- road driving test from those who failed the same test. On the basis of these findings, cognitive screening of older drivers in the primary care setting with the SMT has received further independent investigation.

A prospective observational study of the prediction of Washington University Road Test pass or fail in drivers with dementia was conducted in the US (Carr et al., 2011). Ninety-nine community dwelling people with dementia completed tests of visual, motor and cognitive functioning. Visual and motor functioning was not associated with road test failure. The best predictive model with an overall accuracy of 85% included the 8-item Informant Interview to Differentiate Ageing and Dementia, the Clock Drawing Test, and the SMT.

A cross-sectional observational study of the prediction in the office setting of unsafe driving in older adults with normal cognition (n = 47) versus cognitive impairment (n = 75) was conducted in the US (Ott et al., 2013). The Assessment of Driving-related Skills (ADReS) and additional cognitive tests (SMT, Trails A & B, MMSE) were administered, and followed by the Rhode Island Road Test. Although the ADReS and the MMSE was found to have limited utility as an office screen for those who should undergo formal driving assessment, Trails A time, Trails B errors, and SMT time were significantly different between the normal and impaired cognition groups.

A prospective observational study of the prediction of Washington University Road Test pass or fail in 72 drivers who had experienced a stroke was also conducted in the US (Barco et al., 2014). Predictor measures were tests of visual, motor and cognitive functioning. Visual and motor functioning was not associated with road test failure. The best predictive model with an overall accuracy of 87% included Trails A and the SMT.

A random sample of ninety GPs across SA were invited to trial the SMT (Mwanri et al. 2013). Some 58% of GPs trialled the SMT on 119 older patients who presented for license renewal. The SMT was found to be simple, brief to administer and score, acceptable to patients, and had a very high acceptability rate (96%) among GPs.

With high criterion-referenced validity for on-road driving competence in older drivers with cognitive impairment, easy administration and scoring, and independence from sociodemographic factors, the SMT fulfils all essential criteria for a cognitive screening instrument that could be used by a range of professionals, including GPs. Current Australian drivers license renewal practices (where they exist) of physical and visual screening do not tap into those cognitive skills deemed necessary for safe driving. The SMT may eventually serve as an adjunct screening measure in the license renewal process of older drivers in Australia. Requests for the SMT have in the past come from across the US and Europe.

References

Barco, P., Wallendorf, M., Snellgrove, C., Ott, B., Carr, D. (2014). Predicting road test performance in drivers with stroke. *American Journal of Occupational Therapy, 68*, 221-229.

Carr, D., Barco, P., Wallendorf, M., Snellgrove, C., Ott. (2011). Predicting road test performance in drivers with dementia. *Journal of the American Geriatrics Society, 59*, 2112 – 2117.

Mwarni, L., Snellgrove, C., Somers, R. (2013). General practitioners' perceptions of the new cognitive screening tool for older drivers in South Australia. *Research in Psychology and Behavioural Sciences, 1 (4)*, 54 – 60.

Ott, B., Davis, J., Papandonatos, G., Hewitt, S., Festa, E., Heindel, W., Snellgrove, C., Carr, B (2013). Assessment of driving-related skills prediction of unsafe driving in older adults in the office setting. *Journal of the American Geriatrics Society, 61*, 1164-1169.

Snellgrove, C. (2005). Cognitive screening for the safe driving competence of older people with mild cognitive impairment or early dementia. Canberra: Australian Transport Safety Bureau [online]. Available at http: www.infrastructure.gov.au/roads/safety/publications/2005/pdf