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THE ASSESSMENT OF FITNESS TO DRIVE IN OLDER ADULTS

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Theoretical Background

- Driving is a complex task that requires having adequate operational, cognitive and higher executive functions that work together (*Michon, 1985; Yale et al., 2003*).
- **Fitness to drive** assessment concerns the evaluation of the requirements for safe driving. Assessing people's ability to drive has become a public health concern in most industrialized countries.
- The aim of determining fitness to drive is to achieve a balance between minimizing driving-related road safety risks for the individual and the community and maintaining the driver's lifestyle and mobility independence (*Autsroads, 2016*).
- Individuals aged 65 years and over represent the most rapidly growing segment of the driving population, and are keeping their licenses longer (*Lyman et al., 2002*). Even in normal aging there is a decline in many cognitive abilities that are relevant to performing complex tasks such as driving (*Anstey et al., 2005*).
- Age-related changes in sensory-motor and cognitive abilities, in addition to medical conditions such as dementia, strokes, and Parkinson disease, can affect driving safety (*Marino et al., 2013*).
- In this study, we examine test results obtained in a sample of older adults undergoing cognitive assessment upon request of the Milan Provincial Medical Commissions of Public Health Services over the period 2015-2016 at the Service of Psychodiagnostic Assessment of Driving-Related Cognitive Abilities, Catholic University of Milan.

Method

SAMPLE

116 older adults (age range 65-94, *M* = 82.78, *SD* = 6.46; Male = 95 %). The sample included:

- **35%** No indication of cognitive impairment or brain pathologies (M age = 86.15, SD = 3.57; 80-94)
- **14%** MMSE screening < 26 (M age = 85.75, SD = 1.94; 82-98)
- **16%** Strokes (M age = 79.05, SD = 7.28; 66-85)
- **10%** Chronic cerebrovascular disease (M age = 80.64, SD = 7.07; 70-93)
- **12%** Mild Cognitive Impairment (M age = 82.21, SD = 7.14; 70-91)
- **13%** Parkinson disease (M age = 77.67, SD = 7.34; 65-88)

Education (years): M = 10.82, SD = 5.52 (34% primary school; 18% junior high school; 24% senior high school; 24% university degree). **Status**: 85% married, 10% widow, 5% single. **Occupation**: 90% retired.

27% of the sample reported prior car accidents (either as victims or guilty party).

14% driving license with additional time/road restrictions.

45% suffering from high blood pressure and/or cardiovascular disease; 17% diabetes mellitus.

ANALYSES

Regression analyses were conducted with age, education, and intelligence (Raven score) as predictors. Performances at each DRIVESTA sub-tests were included as dependent variables.

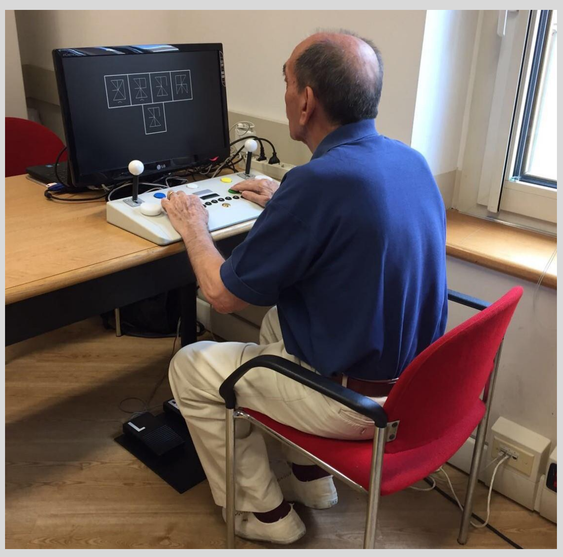
DRIVESTA sub-tests – Assessment of Fitness to Drive

Reaction Test (RT, reaction speed). The respondent is instructed to react to a critical stimulus combination consisting of an acoustic and a visual stimulus (go/no go).

Determination Test (DT, stress tolerance): The DT measures reactive stress tolerance and the related reaction speed. The stressful aspect of the DT lies in the need to sustain rapid and varied reactions to rapidly changing stimuli.

Cognitrone (COG): Assessment of selective attention and concentration through comparison of the congruence (yes/no) of various figures.

Adaptive Tachistoscopic Traffic Perception Test (ATAVT, obtaining an overview). The ATAVT tests observational ability by briefly (< 1sec) presenting pictures of traffic situations. After viewing the picture, the respondent is asked to identify whether the picture included (1) pedestrians, (2) vehicles, (3) bicycles and/or motor bicycles, (4) road signals, and/or (5) traffic lights.



MEASURES

Four standardized subtests of the **DRIVESTA test Battery (Vienna Test System Traffic**, Schuhfried, Austria): this battery has been shown to predict drivers' performance in standardized on road driving tests (e.g., Risser et al., 2008; Sommer et al., 2008).

The **Raven's Colored Progressive Matrices (CPM)** were used as a measure of general intelligence.

Results

		Predictors					
		Age		Education		Raven score	
Measure	R^2	β	*t*	β	*t*	β	*t*
Reaction Time (Mean)	.06*	.05	.55	.04	.36	**-.24**	-2.30
Reaction Time (SD)	.09**	.11	1.18	.04	.37	**-.29**	-2.85**
Errors (Inhibition control)	.16***	-.00	-.03	.01	.05	**-.41**	-4.14***
Stress Tolerance (n° correct answers)	.25***	**-.20**	-2.10*	**-.24**	-2.24*	**.49**	4.66***
Stress Tolerance (n° omissions)	.07*	.20	1.88	-.15	-1.18	.22	1.84
Selective attention (accuracy)	.36***	**-.19**	-2.43*	**.22**	2.64*	**.46**	5.47
Selective attention (time)	.16***	.03	.34	.05	.46	**-.41**	-4.19
Getting an overview	.05*	-.01	-.12	.01	.07	**.22**	2.09

Conclusions

- Overall, general intelligence was a more consistent predictor of performances to driving-related tests than age.
- Age, education, and intelligence were significantly associated with the ability to correctly react to rapidly changing visual and acoustic stimuli, as well as with accuracy in an attentional task, while no associations were found with observational abilities. Intelligence also predicted reaction speed and inhibitory control.