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# Transcultural issues on the assessment of executive functions and processing speed in older adults with low formal education: Usefulness of The Five Digits Test in the assessment of dementia

Dear Editor,

The assessment of older adults with low formal education and cognitive complaints is still a challenge in clinical gerontology.<sup>1</sup> Although, in developed countries, the clinicians have a wide selection of cognitive tests for the patient's assessment, much of these traditional tests demand a set of abilities that much of the older adults in developing countries is still lacking.<sup>2</sup>

For example, a classical measure of processing speed and executive functions is the Stroop Color-Word Test, which requires the subject to name the color of dots, then name the color of neutral words and finally name the color in which color names are printed.<sup>3</sup> The test is feasible for the assessment of older adults in developed countries and is used in large normative studies.<sup>4,5</sup> However, in countries where the elderly population has low formal education, the Stroop Color-Word Test usually does not work, as the reading routines (necessary for the interference effect) are not fully efficient.

An alternative in these cases is the use of “mini-verbal tests”: cognitive assessment tools developed to be less influenced by cultural particularities, language and formal education.<sup>6</sup> A mini-verbal version of the Stroop Color-Word Test is the Five Digits Test (FDT).<sup>7</sup> FDT investigates the interference effect by using two automatic attentional process trials: reading numbers (e.g. 2-2-2, “two”) and counting small quantities (e.g. \*\*\*, “three”); and two controlled attentional process trials: choosing to count how many numbers are in each incongruent stimuli (e.g. 2-2-2-2, “four”), and shifting between the reading and counting routines. In the present Letter to the Editor, we aim to show the appli-

cability and clinical value of the assessment of dementia in older adults with advanced age ( $76.4 \pm 7.5$  years) and low formal education ( $5.3 \pm 4.0$  years).

We studied 80 older adults from a memory clinic in Brazil, divided into two groups: controls ( $n = 40$ ) and mild dementia ( $n = 40$ ), matched by age, education and sex. We carried out the diagnoses by multidisciplinary assessment as reported in a previous article.<sup>8</sup> The participants performed the FDT (not used for participants' diagnosis) and other cognitive measures. Receiver operating characteristic curve analysis assessed FDT accuracy on the participant's diagnoses, and assessed the FDT correlations with other cognitive measures of executive functions (Digit Span<sup>8</sup>), processing speed (Digit-Symbol Coding and Symbol Search<sup>8</sup>) and instrumental activities of daily living.<sup>9</sup>

Table 1 shows the group comparisons and test correlations. We found a moderate accuracy of several FDT measures in these participants, with a significant area under the curve ranging from 0.70 (choosing time) to 0.78 (shifting errors). Correlations between the FDT times and the other measures ranged from  $-0.28$  (shifting  $\times$  Digit Span) to  $-0.78$  (choosing  $\times$  Symbol Search), suggesting construct validity. We have also found moderate associations between the FDT times with performance on activities of daily living, evidence of ecological validity.

The present results show the feasibility of a “mini-verbal” version of the classic Stroop Color-Word Test for the assessment of executive functions and processing speed in older adults with low formal education. We believe that the development of mini-verbal tests is of utmost importance, as most of the dementia cases are found in developing countries.<sup>10</sup>

**Table 1** Participant's description, receiver operating characteristic curve analysis and correlations between the Five Digits Test and other cognitive measures

FDT	Controls			Mild dementia			ROC curve		Correlations <sup>†</sup>			
	Pc.25	Pc.50	Pc.75	Pc.25	Pc.50	Pc.75	AUC	SE	DS (79)	DSC (23)	SS (31)	IADL (80)
Reading (T)	37	32	27	58	41	35	0.72*	0.05	-0.55*	-0.71*	-0.72*	0.43*
Counting (T)	41	34	30	63	46	37	0.75*	0.06	-0.50*	-0.69*	-0.80*	0.39*
Choosing (T)	78	60	47	105	86	62	0.70*	0.06	-0.41*	-0.60*	-0.78*	0.34*
Shifting (T)	114	91	75	157	124	96	0.74*	0.06	-0.28*	-0.68*	-0.69*	0.35*
Reading (E)	0	0	0	0	0	0	0.55	0.07	-0.07	-0.28	-0.36	0.08
Counting (E)	0	0	0	1	0	0	0.61	0.06	-0.23*	-0.11	-0.22	0.28
Choosing (E)	3	1	0	6	2	1	0.62	0.06	-0.36*	-0.20	-0.50*	0.15
Shifting (E)	10	4	1	23	13	8	0.78*	0.05	-0.35*	-0.29	-0.47*	0.43*

\* $P < 0.01$ . <sup>†</sup>Spearman's rank-order correlations, sample sizes are reported into brackets. AUC, area under the curve; DS, Digit Span; DSC, Digit Symbol-Coding; E, errors; FDT, Five Digits Test; IADL, instrumental activities of daily living; Pc., percentile; SE, standard error; SS, Symbol Search; T, times.

A link to the Five Digits Test original presentation (in Spanish) is available on the TEA Ediciones website: <http://www.web.teaediciones.com/Ejemplos/FDT.pps>

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