THE MONEY TEST

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Background

The majority of screening tests to detect cognitive impairment are strongly influenced by educational level, and most of them are not useful for illiterate subjects.

These circunstances imply that the utility of these screening tests is very low in populations with a high prevalence of low educational level subjects, in which there will be more convenient to apply tools not influenced by education and feasible to perform by illiterate subjects.

Objective

Design and evaluation of a screening test to detect cognitive impairment in low educational level populations, to be applied to illiterate subjects.

Design

TOTAL

The Money Test (MT) is based on the knowledge and practical use of 12 local coins, exploring items of recognition, recall, handling, calculation and memory of the used coins. (Figure 1; Appendixl)

APPENDIX



Methods

The MT was administered to 309 subjects older than 60 years-old without cognitive impairment or dementia, recruited from the general neurology clinics. For each subject different parameters were controlled: age, gender, handling of coins (never, occasionally, frequent), years of education (none, less than 10, more than 10), educational level (illiterate, can read and write but not fluently, can read and write fluently) and the neurological problem to attend the clinic (potential capability to induce or not cognitive impairment). Multiple linear regression was performed to examine the relationship between the total score of the MT and qualitative variables of interest. A factorial analysis of the MT was performed by the principal component method with Varimax rotation.

Fig. 2:	Time (minut	tes)	Fig. 3: 8	Scores	
		50 40 10 10 10 10 10 10 10 10 10 10 10 10 10			CONTRACTO
Years of Education	13,53% IN0 ILe 44,55% M	one ss than 10 ore than 10	68,75%	Educational I	Level Illite Non and Flue
	85,33%	Handling of coi 3%10,33%	in Never Occasionally Frequent	2018	

Results

305 subjects (98.7%) concluded the MT in 4.7+ 1.7 minutes (fig. 2) with scores of 24±3 (fig 3) with a median =25 and score of 20 and 18 for percentiles 10 and 5, respectively. The distribution of subjects according to years of education, educational level and handling of coins is presented in graphics. The total score was not influenced by gender, years of education or neurological problem, but was influenced by age (>70 y.o. $\beta = -1.37$ p<0.001), handling of coins (never= ref.; occasionally: β = 2.15 p < 0.001; frequent: $\beta = 3.68 p < 0.001$), and educational level (illiterate =ref.; no fluent read and write: $\beta = 2.38 \text{ p} < 0.001$; fluent: $\beta = 3.32 \text{ p} < 0.001$). (Table 1). The 4 factors with autovalue >0.9 attained the 64% of the variance of the MT score and were independently correlated with the memory and fluency items (the first), calculations (second) and recognition (third), the last factor had a negative correlation with intrusions number in fluency tasks (Table 2).

Table 1: Factorial Analysis								
n = 305	T. Factorial Analysis							
H = 505	1	1 2 3		4				
orrect Coins	0.55	0.33	0.38	0.14				
trusion Coins	0.14	0.25	0.08	-0.75				
orrect Bills	0.51	0.34	0.34	0.32				
trusion Bills	0.19	0.02	0.06	-0.83				
ecognition 5	0.37	0.09	0.63	0.20				
ecognition 25	0.12	0.19	0.77	0.1				
ecognition 100	0.07	0.16	0.82	0.05				
ounting	0.05	0.81	0.08	0.08				
nange	0.22	0.65	0.31	0.05				
lding	0.48	0.48	0.27	0.14				
viding x 2	0.44	0.62	0.15	0.09				
viding x 3	0.62	0.44	0.10	0.16				
call number	0.78	0.10	0.04	0.09				
antity recall	0.81	0.06	0.16	0.15				
oins recall	0.62	0.39	0.41	0.18				

Conclusions

The MT is easy to perform, fast, ecological and well accepted by the subjects. It was concluded for most subjects, including illiterate subjects. The total score is not influenced by years of education but it is influenced by educational level. The factorial design suggests that the MT explores different cognitive domains, specially memory and calculation, in an independent way. Moreover, it can evaluate indirectly the functional capability of the subject and his/her social adaptation. It is useful to be applied to any culture or country.

Money Test Group

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