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COGNITIVE FUNCTION AS A PROXY OF FINANCIAL DECISION MAKING IN OLDER PRIMARY CARE ADULTS

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Background: Adults over 54 in the United States own about 2/3 of all wealth in the country. However, many older adults appear to make sub-optimal financial decisions, leaving them at high risk for financial exploitation and large monetary losses. **Methods**: To provide greater insights into the relationship among aging, diminished cognitive capacity, and financial decision-making, we administered a unique and comprehensive battery of neuropsychological tests, as well as unique assessments measuring financial literacy and mone-tary choice delay discounting, to 60 subjects aged 35-85 years. We then used regression analysis to analyze the relationships among these measures. **Results**: The Executive Function/Organization (EF-O), Attention Working/Memory (AWM), Delay Discounting (DD), and Visuospatial Functions (VF) variables were the best pre-dictors of financial literacy. The EF-O, AWM, and VF coefficients displayed a positive sign, indicating that higher scores on these tests predicted higher levels of financial literacy. The DD variable coef-ficient appeared with a negative sign, suggesting that higher dis-count rates (implying higher levels of impulsivity) predict lower levels of

Table 1
Cognitive Tests by Domain

Domain	Test(s)
Intellectual	Test of Premorbid Functioning (TOPF)
Cognitive Screen	Mini Mental Status Exam (MMSE)
Attention/Working Memory	WAIS-IV Digit Span Forward
	WAIS-IV Arithmetic
Processing Speed	DKEFS Color Naming
	DKEFS Word Reading
	Trail Making Test, Part A
Executive Functions (EF)	
– Inhibitory Control	DKEFS Color Word Interference (response time, errors)
– Cognitive Flexibility	Trail Making Test, Part B
	DKEFS Color Word Interference (DKEFS CWS)
	Wisconsin Card Sorting Test, percent error score
– Organization	Rey Copy Fragmentation
	Clock drawing
Visuospatial Functions	Rey Copy Presence and Accuracy
Verbal Memory	HVLT-R Total Recall
	HVLT-R Delayed Recall
	HVLT-R Retention
Visual Memory	Rey Immediate retention
	Rey Immediate Presence and Accuracy
	Rey Delayed Retention
	Rey Delayed Presence and Accuracy

Definitions: WAIS = Wechsler Adult Intelligence Scale, DKEFS = Delis-Kaplan Executive Function System, HVLT-R = Hopkins Verbal Learning Test-Revised, Rey = Rey-Osterrieth.

Table 2
Correlation matrix

	Age	Financial Literacy	Delay Discounting	Intellectual	Cognitive Screen	Attention Working Memory	Processing Speed
Age	1	0.160	-0.085	0.000	0.076	-0.147	0.100
Financial Literacy	0.160	1	-.336	.395	0.161	.440	-0.002
Delay Discounting	-0.085	-.336	1	-0.080	-0.055	-0.082	0.095
Intellectual	0.000	.395	-0.080	1	.347	.441	0.209
Cognitive Screen	0.076	0.161	-0.055	.347	1	.398	.272
Attention Working Memory	-0.147	.440	-0.082	.441	.398	1	.434
Processing Speed	0.100	-0.002	0.095	0.209	.272	.434	1
EF - Inhibitory Control	0.063	0.251	0.026	.455	.355	.560	.552
EF - Cognitive Flexibility	-0.058	.266	-0.105	0.231	.333	.504	.407
EF - Organization	-0.233	.386	0.082	.339	-0.059	0.199	-0.046
Visuospatial Functions	-0.059	.445	-0.031	.465	.270	.284	0.072
Verbal Memory	0.014	.316	-0.065	.352	.260	.300	0.096
Visual Memory	-0.165	.354	-0.144	0.196	0.132	.271	0.020

	EF- Inhibitory Control	EF- Cognitive Flexibility	EF- Organization	Visuospatial Functions	Verbal Memory	Visual Memory
Age	0.063	-0.058	-0.233	-0.059	0.014	-0.165
Financial Literacy	0.251	.266	.386	.445	.316	.354
Delay Discounting	0.026	-0.105	0.082	-0.031	-0.065	-0.144
Intellectual	.455	0.231	.339	.465	.352	0.196
Cognitive Screen	.355	.333	-0.059	.270	.260	0.132
Attention Working Memory	.560	.504	0.199	.284	.300	.271
Processing Speed	.552	.407	-0.046	0.072	0.096	0.020
EF - Inhibitory Control	1	.575	0.204	.410	.409	0.254
EF - Cognitive Flexibility	.575	1	0.143	.367	0.189	0.227
EF - Organization	0.204	0.143	1	.358	0.172	.378
Visuospatial Functions	.410	.367	.358	1	.373	.353
Verbal Memory	.409	0.189	0.172	.373	1	.535
Visual Memory	0.254	0.227	.378	.353	.535	1

‘ Correlation is significant at the 0.05 level (2-tailed).
“ Correlation is significant at the 0.01 level (2-tailed).

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Table 3
Summary Regression Results

Dependent variable = Financial literacy (total)		
Independent variable	Model 1	Model 2
	R Square Adi = 0.488	R Square Adi = .524
Constant	0.422 (**6.78****)	0.447 (**7.19****)
Age	0.003 (**3.48****)	0.003 (**3.45****)
Delay Discounting	-1.464 (**2.48***)	-1.462 (**2.54***)
Intellectual	0.001 (0.06)	0.005 (0.25)
Cognitive Screen	-0.008 (0.46)	-0.002 (0.13)
Attention Working Memory	0.063 (**2.95****)	0.052 (**2.40***)
Processing Speed	-0.013 (0.56)	-0.011 (0.47)
EF - Inhibitory Control	-0.021 (0.76)	-0.022 (0.80)
EF - Cognitive Flexibility	0.002 (0.20)	-0.001 (0.06)
EF - Organization	0.047 (**2.33***)	0.020 (**2.07**)
Visuospatial Functions	0.027 (1.65)	0.026 (1.66)
Verbal Memory	0.012 (0.63)	0.003 (0.86)
Visual Memory	0.030 (1.15)	0.036 (1.38)
Personal Loss		-0.059 (1.83)

Note: Probabilities based on t-tests are provided in parentheses, with a single asterisk indicating p<.05 and 2 asterisks p <.01.

financial literacy. The age variable was highly significant in a positive direction, suggesting that financial literacy rates increase with age. Performance on standard tests of intelligence, including the MMSE and the Test of Premorbid Functioning, did not appear to be significant predictors of financial literacy. Measures of verbal and visual memory also did not appear significant. **Conclusions:** Much of the attention on preventing financial exploita-tion among the elderly, especially within the financial services in-dustry, has been focused on memory loss. However, our results suggests that the executive function-related deficits associated with Alzheimer's disease (or other forms of dementia) are the biggest threats to an individual's capacity to make good financial decisions. The significance of executive-function related capabilities suggests that memory loss is not the only, and perhaps not even the most consequential, indicator of diminished financial de-cision-making capacity. Executive function-related measures remained significant even after controlling for age. The study points to the desirability of closer communication among mental health professionals, family members, and financial advisers. Because they are often the first to observe behavioral changes in their clients, financial advisers need more training and tools to help them identify potential warning signs.