

Active lifestyle and cognitive performance in older adults

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INTRODUCTION

Level of education is known to correlate with performance in some cognitive tests and it is considered a part of the cognitive reserve. Type of profession (manual/mental) and mentally demanding leisure activities are also included in the cognitive reserve concept. Beside the age, lower education is one of the most reported risk factors for the development of a cognitive disorder in older age.

THE AIM OF OUR STUDY

Our aim is to find whether the level of acquired education, the type of profession, and number of regularly performed activities during productive adulthood and retirement predict cognitive performance in older age.

METHODS

Participants:

- 324 cognitively normal community-dwelling older adults (60–74 years of age) without serious neurological or psychiatric disorder, retired and not economically active for minimum 2 years
- All participants had Mini-Mental State Examination¹ score ≥ 26 and Geriatric Depression Scale² GDS15 < 7 or negative clinical interview for depression. None of the participants was socially excluded.
- The level of education – lower (basic or lower secondary schools, such as trade schools without the state leaving exam “maturita”) or higher (secondary/high schools including state graduation exam and tertiary schools or universities)
- Type of profession – manual or mental

Regularly performed activities (at least 1 time per week):

- Attending a course at a university of the third age; attending other courses such as language or ICT; physical exercise or gardening; aerobic activity of medium intensity for at least 2,5 hours per week; a hobby; using a computer; reading books; reading newspapers and magazines; doing crossword puzzles or quizzes

Cognitive performance - Composite scores (CS):

- CSs were created based on mechanisms of the tests and dominant functions each test employs and partly on factor analysis.
- CS MEMORY** – Story³, Boston Naming Test-15⁴
- CS VERBAL** – Prague Stroop Test (Dots, Words, Colors)⁵, Rey Auditory-Verbal Learning Test Trial 1⁶, Category Verbal Fluency – Animals⁷
- CS VISUO-GRAPHOMOTOR** – Trail Making Test A and B⁸, Digit Symbol Substitution Test⁹
- The threshold of the 75th percentile was set to identify better cognitive performance in each CS (analyses c₁ and c₂, see below).

Analyses

- Associations between level of education and type of profession and CS were analyzed with Univariate analysis (η^2), and between number of activities and CS with Pearson correlation coefficient (r).
- Associations between independent variables (predictors) were analyzed with Chi-square test (χ) and ordinal regression analysis.
- Binary logistic regression analysis (method Enter) was performed to identify whether education, type of profession or number of activities predict better cognitive performance in older adults (above the 75th percentile).

c₁) All predictors were analysed separately.

c₂) Block 1 – level of education was inserted into regression, and Block 2 – type of profession and activities (past and current) were inserted into regression

RESULTS

a) Education ($\eta^2=0.08-0.11$; $p<.001$), type of profession ($\eta^2=0.05-0.11$; $p<.001$) and number of regularly performed activities (past ($r=.17-33$; $p<.001$) and current ($r=.23-32$; $p<.001$)) are significantly associated with the performance in all CS.

b) Higher level of education is significantly associated with mental type of profession ($\chi(1)=131.68$; $p<.001$), and more regularly performed activities in past and current (Figure 1).

c₁) All predictors (analysed separately) significantly predict better performance in all composite scores except for activities in the past and CS memory (Table 1).

c₂) Education is significant predictor of better cognitive performance in all three CS (Block 1), however after type of profession and activities (past and current) are inserted (Block 2) its effect disappears, and activities past or current remain the only predictor of better cognitive performance in all CS (Table 1).

➤ Therefore, we may perceive the number of activities as a mediator of the relationship between education and better cognitive performance (Figure 1).

Table 1: RESULTS OF BINARY LOGISTIC REGRESSION

	Block 2								
	Memory			Verbal			Visuo-grapho		
	B	OR	CI	B	OR	CI	B	OR	CI
Education	0.62	1.86	0.95-3.67	0.58	1.79	0.87-3.70	0.67	1.95	0.95-4.01
Profession	0.20	1.22	0.63-2.35	0.64	1.89	0.92-3.90	0.72	2.05	0.99-4.21
Activities Past	-0.08	0.92	0.77-1.11	0.05	1.05	0.86-1.28	0.25*	1.29	1.05-1.59
Activities Current	0.22*	1.25	1.02-1.53	0.34**	1.41	1.13-1.76	0.06	1.07	0.86-1.33

Notes: B – Standardized coefficient Beta; OR – Odds Ratio; CI – 95% confidence interval for OR; * – significance $p < .05$; ** – significance $p < .01$; *** – significance $p < .001$

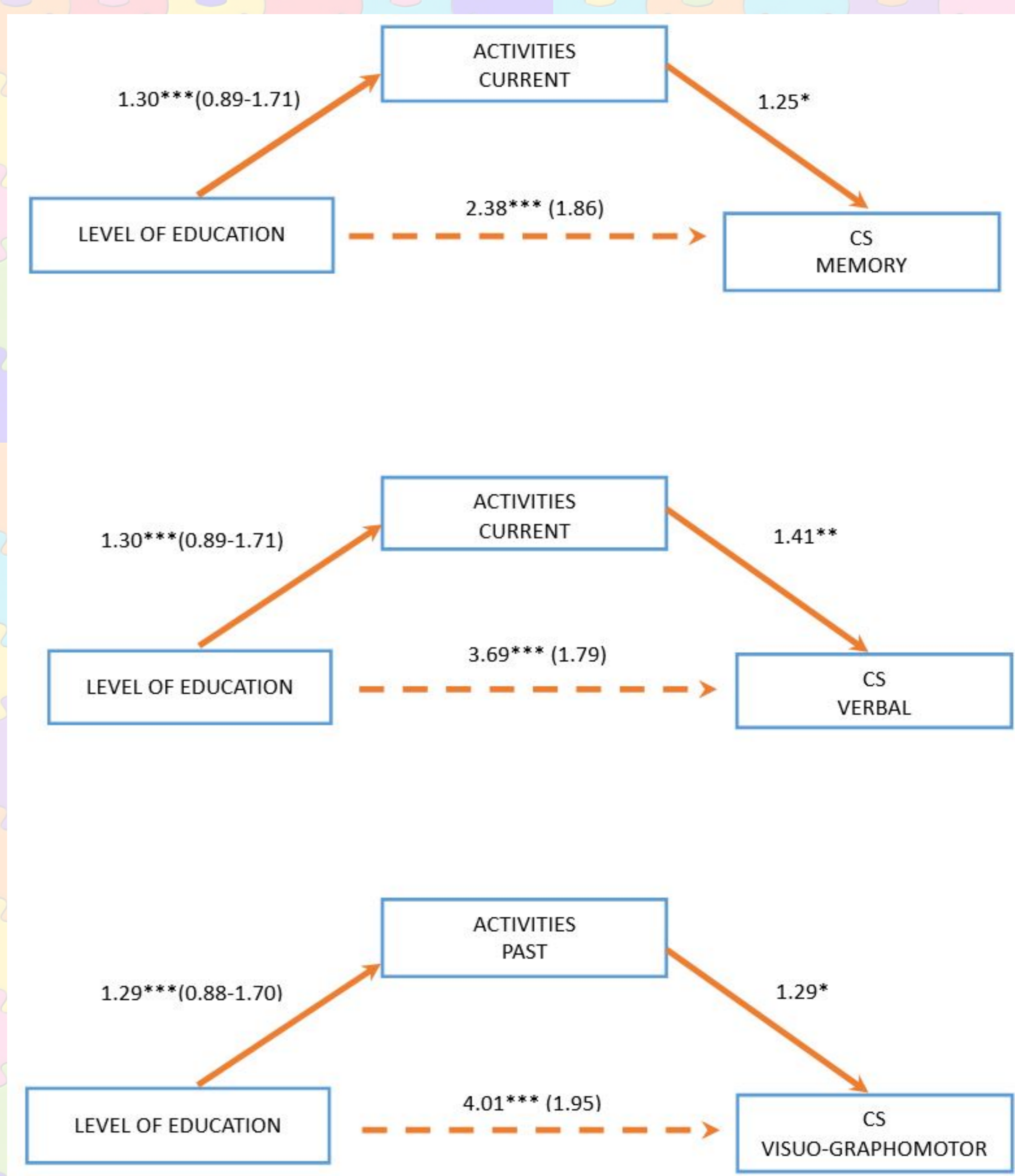


Figure 1: MODELS

Notes: Odds Ratio (OR) is presented to illustrate the relationship between predictor and dependent variable; 95% confidence intervals for OR are presented in brackets for Level of education – Activities; Indirect effect is in brackets for Education and dependent variable; * – significance $p < .05$; ** – significance $p < .01$; *** – significance $p < .001$

CONCLUSION

Even though the probability of better cognitive performance rises with more activities only slightly, we may conclude that there is a potential positive effect of active lifestyle on the cognitive performance in older age. If we are optimistic, the message is that it is possible to escape from the predicament of lower education.

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