ИНСТИТУТ ПСИХОЛОГИИ
РОССИЙСКОЙ АКАДЕМИИ НАУК

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The results supporting the validity of the approach, as well as the prospects for its practical application are discussed.

Specific features of the method that enhance the potential of experimental studies into cognitive processes are considered. The potential of the method to identify image elements those are in most demand for recognition is demonstrated by perceiving familiar objects (which element priority assessment seems to be problematic under the conditions of simultaneous perception).

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COGNITIVE ABILITIES, SOCIAL INTELLIGENCE AND INDIVIDUAL DIFFERENCES IN MATHEMATICAL ACHIEVEMENT

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Educational achievement at the end of compulsory schooling represents a major tipping point in life, which makes understanding its causes and correlates important for individual children, their families, and society[1].

Differences among children in their educational achievement and mathematical effectiveness, especially culminating at the end of compulsory schooling, propel children on different lifelong pathways that affect higher education, occupation, and even health and mortality [2, 3].

For these reasons, it is important to understand the factors of differences among children in their educational mathematical achievement.

The aims of the study was to investigate the relationship between social intelligence and Mathematics General State Exam performance in 17 year old high school students and to investigate whether intelligence, spatial abilities and mathematical abilities interact with performance in General State Exam.

The study was conducted on personality and intellectual characteristics and mathematical achievement in a sample of 870 first-year university students, school graduates, for 230 of whom Social intelligence was also measured.

The General State Examination in mathematics (GSE) (wich they pass in the end of compulsory schooling) was the indicator of mathematical effectiveness.

To examine the social intelligence we applied the Evaluation of Choice in Conflict Situations Questionnaire [4]. Test measuring the behavior strategies in conflict: competition, avoidance, compromise, collaboration, concession, help of others and acrimony. Reliability of the test was measured. Cronbach $\alpha > 0{,}783$ (for all strategies).

We measured cognitive abilities also: intelligence, spatial abilities and mathematical abilities.

Intelligence was measured by the Raven's matrices test. Spatial ability were measured by the Mental rotation test. And spatial working memory were measured by the Corsi Blocks test. Mathematical abilities was measured by the Number series test. And "Semantics" test, in which participants had to choose an appropriate math term as a synonym to another term. Also was used test Number sense.

Social intelligence and mathematical effectiveness

Negative correlation between social intelligence and results of maths GSE. With the strategy «compromise» ($r=0.144$, $p=0.03$) and summ of index of social intelligence ($r=0.142$, $p=0.02$). The tendency to make compromises in conflict weakly correlates with results of GSE.

No significant predictors were found in the regression with with dependent variable General State Exam and predictors strategies behavior in conflict (social intelligence).

Cognitive abilities and mathematical effectiveness

Regression analyses with dependent variable General State Exam and predictors cognitive abilities (Raven's matrices, Mental rotation, Corsi Block, Number series, Number sense and Semantics). Model was significant F (7, 533)= 11.725 p<.001, and explaining 11.7% of the variance.

Significant predictors were general intelligence, spatial abilities and working memory and math abilities. Results you can see in table 1.

Dependent variable — Math General State Exam					
	B	St.Err.	Beta	t	Sig.
Raven's matrices	0,505	0,129	0,175	3,901	0,000
Mental rotation	0,144	0,056	0,085	2,017	0,044
Semantics	0,200	0,079	0,112	2,538	0,011
Number series	0,481	0,170	0,132	2,831	0,005
Number sense	0,051	0,052	0,042	0,967	0,334
Corsi Block	0,100	0,100	0,016	0,361	0,718

Table 1. *Results of regression analyses with dependent variable General State Exam and predictors cognitive abilities*

Cognitive abilities, social intelligence and mathematical effectiveness

When both social intelligence and cognitive abilities were include in the model- the model was not significant. It is likely that this result is due to lack of power as only 230 participants had both, cognitive and social measures collected.

In research was investigated correlations of cognitive abilities, social intelligence and

Cognitive abilities and social intelligence are weakly correlated with performance in General State Exam. Cognitive abilities, together (as measured in this study), explain ≈12% of the variation. The results open up a few questions for further research: what additional factors can explain the results of GSE performance and is the GSE appropriate way to measure the mathematical effectiveness as a criteria for enter to the university?

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Krapohl, E., Rimfeld, K., Shakeshaft, N. G., Trzaskowski, M., McMillan, A., Pingault, J. B., … & Plomin, R. 2014. The high heritability of educational achievement reflects many genetically influenced traits, not just intelligence. Proceedings of the National Academy of Sciences, 111(42), 15273-15278.

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CHICKEN-AND-EGG PARADOX IN EVOLUTION OF LANGUAGE AND COGNITION: THE EGG WINS?

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The problem of emergence of language in human evolution, as well as its cognitive foundation, is extremely complex and interdisciplinary. Its successful solution requires collaborative efforts of anthropology, linguistics, psychology, genetics and neuroscience.

Various points of view on cerebral basis for cognitive and linguistic competence in respect to human evolutionary history are considered: nativism vs. connectionism, modular vs. network neurophysiologic organization of language and cognition, the idea of a macro-mutation vs. a series of micro-mutations that have resulted in the appearance of human language and cognition and consecutively given rise to quick cultural development.

As distinct from biology*, evolutionary ideas in linguistics* were not well recognized until recently. In the XXth century, through the influence of Saussure and Jakobson up to Chomsky, language came to be viewed as a static system, regardless of how it may have evolved from protolanguages. The contribution of paleo-anthropological research to language evolution is well-acknowledged (Cavalli-Sforca et al. 1994, Sia et al. 2013). A growing interest is currently focused on the mechanisms underlying the complexity of human behavior and language (Hauser et al. 2002, Cartmill et al. 2014). Givón formulates general principles that control both language and biological evolution (Givon 2009): graduality of change; adaptive-selection motivation; functional change and ambiguity before structural change and specialization; addition of new structures to older ones; local causation, and uni-directionality of change. Attempts have been made to discuss language development in terms of biology: neoteny, recapitulation, language hybridization, mono- and polygenesis, etc.

Generatists insist that it is only with genetic basis that formation of algorithms in the language ontogeny is possible. However, Chomsky considers the *grammatical explosion* a result of macro-muta-