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HIGHER SCHOOL OF ECONOMICS

*John Nye, Ekaterina Orel, Ekaterina Kochergina*

# **BIG FIVE PERSONALITY TRAITS AND ACADEMIC PERFORMANCE IN RUSSIAN UNIVERSITIES**

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*John V.C. Nye<sup>1</sup>, Ekaterina Orel<sup>2</sup>, Ekaterina Kochergina<sup>3</sup>*

## **BIG FIVE PERSONALITY TRAITS AND ACADEMIC PERFORMANCE IN RUSSIAN UNIVERSITIES<sup>4</sup>**

We study which Big Five personality traits are associated with academic performance among a sample of Russian university students using results from the Unified State Examination (for university admissions) and their current grade point averages as measures of academic performance. We find that Introversion, Agreeableness, Neuroticism, and Openness to experience have observable ties to academic performance. Those results partially confirm existing international studies, but our findings are notable for the relative unimportance of conscientiousness for success in our Russian sample. We suggest that cross-cultural differences in educational environment may explain why this trait seems less obviously important in the analysis.

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Keywords: personality traits, academic success, psychology of education, Big Five, academic performance measurement.

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<sup>1</sup> George Mason University and National Research University – Higher School of Economics, Moscow, academic advisor of International Laboratory for Institutional Analysis of Economic Reforms.

<sup>2</sup> National Research University-Higher School of Economics, Moscow, research fellow in International Laboratory for Institutional Analysis of Economic Reforms.

<sup>3</sup> National Research University – Higher School of Economics, Moscow, research assistant in International Laboratory for Institutional Analysis of Economic Reforms.

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## **Introduction and background**

Multiple studies have shown that academic achievement is strongly correlated with various measures of individual personality traits. Though meta-analytic studies (Poropat, 2009 and see DeRaad and Schouwenberg, 1996 for one review) give a more or less consistent picture of the relationship between personality and academic success, the evidence given by separate studies has been less clear-cut. The current study adds to this literature by exploring the environmental reasons for different links between the Big Five traits described by the Five Factor model of personality (Costa and McCrae, 1992 by John, Srivastava, 1999) and academic success among university students in Russia.

The Big Five traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness) have been related to a wide range of behaviors (Ozer and Benet-Martinez, 2006), including job performance, academic achievement, leadership and well-being (John, Srivastava, 1999; Heckman, et al. 2006; Judge, Jackson, Shaw, Scott, and Rich, 2007, Fairweather, 2012; Singh, 2012). Though the Big Five model has been criticized as not being theory-driven and for its inability to explain all of personality (Block, 1995), it is still commonly used in a wide range of research in psychology and education.

Since Costa and McCrae first proposed the Big Five model, it has appeared prominently in many studies on educational performance. The meta-analytic studies mentioned above showed that academic success among university students is significantly related with two Big Five traits: conscientiousness and openness to experience (Poropat, 2009; Trapmann et al., 2007; O'Connor et al., 2007). But there are some differences in those studies, which may have been tied to sample peculiarities. Thus, Poropat's study of 70,000 college students adds agreeableness to conscientiousness and openness to experience, primary assigned by O'Connor and Paunonen on the mixed sample of separate studies of college and university students. Trapman's meta-analysis added neuroticism as a negative predictor of performance (Trapmann et al., 2007).

Separate studies give less consistent results. Most of them name conscientiousness as a major performance predictor, but then the results are diverse. Thus, a study of Iranian university students shows that neuroticism and extraversion are also significant predictors and both of them are negative (Hakimi et al., 2011). A UK study by Duff showed conscientiousness to be the only significant predictor of academic success in university (Duff et al., 2004). A study of American college students showed the significance of conscientiousness, agreeableness and extraversion for academic performance (Furnham et al., 2009). And we can name more examples of such differences (Furnham, Moutafi, Chamorro-Premuzic, 2005; Ackerman, Chamorro-Premuzic, Furnham, 2011; Rosander et al., 2011 and so on).

We assume that such discrepancies are conditioned by the cultural and institutional differences in the educational process. Different requirements for students in different countries and in different levels of education result in selection effects that change the observed correlation between various personality differences and achievement in different educational systems.

### **The educational process in Russian Universities**

Students need to apply for admission to a specific course of study at the same time as applying for admission to university. In most universities students need to provide the results of the Unified State Examination (USE) – a mandatory test from the final year of high school. The USE for Math and Russian language are obligatory for all students; other subjects may also be required by selected majors in various universities. Each student may apply to a maximum of five universities.

The set of USE required for given majors in different universities is more or less alike. For example, most of the economics departments require math, Russian language, social science, and a foreign language (English, French, Spanish or German). So students can apply to as many as five universities with the same set of exams. Each university assesses the given USE results and forms the list of selected students. After those preliminary lists are announced, applicants that were admitted decide in which university they wish to study. To be accepted, students need to bring the origin school-leaving certificate.

The best universities generally select students with the highest USE results. We should note that there is no official school ranking system in Russia, so the USE results are the primary selection criteria.

Another option to get to the universities is to win an Olympiad – a test-based competition between secondary students in different areas: economics, biology, math, physics and so on. Although Olympiad winners can be admitted to any university even if their USE results are not the best, Gordeeva and Osin have shown that Olympiad success is, unsurprisingly, highly correlated with high USE results (Gordeeva and Osin, 2011). In this study we use USE results for all the participants as a proxy for high school success.

Russian universities prescribe both obligatory courses, which must be taken by everybody, and electives. The number of obligatory courses decreases as the student advances, and the number of electives, in contrary, increase. Obligatory courses consist of the basic knowledge in the major and electives are usually about related areas (in the first few years) and advanced material in the major subjects towards the later years. All the electives each term are of the same length and give an equal number of credits.

## **Method**

The aim of this study is to investigate the interrelations between the psychological peculiarities of Russian students, measured by Big five model, and their academic achievements. We assume that those relations will depend on the country-specific educational environment.

### **Participants**

Our survey sample is based on 176 (106 males and 70 females) second and third year students (age 18 – 21) of economics and Information Technology departments of the Nizhny Novgorod branch of the National Research University – Higher School of Economics. This sample was selected for several reasons:

- 1) The Nizhny Novgorod branch of HSE is less selective than HSE Moscow, although it provides a high quality of education for the region. So we can consider this sample as a less elite and potentially more varied representative of the general student population in Russia. For example, the passing scores for economic department for our sample in 2009 were 222 (the sum of 3 USE scores) and 218 – for computer science department. The passing score for the same departments in Moscow branch of HSE were 254 for economics (also the sum of 3 USE scores), and 257 – for computer science. On contrary, the passing scores for the similar majors in Lobachevsky State University of Nizhny Novgorod were 192 for economic department (the sum of the same 3 USE scores) and 201 – for computer science department.
- 2) The Unified State Exam, which is being used as one of the academic success index, became obligatory for all school leavers only in 2009. So students, who had passed this exam in 2009 were in their third year at the time of the survey. On the other hand, we did not have enough data for the academic performance for the first year students so they were excluded. Thus our sample was taken from second and third year students only.

### **Measures**

To measure the personality traits we used the Russian ipsative version of a standard Big Five questionnaire (Shmelyov, 2002). The five Russian scales exactly represent the classic Big Five factors. The Russian ipsative Big Five test proved to be valid and reliable. Chronbach's coefficients for scales are: Extraversion – 0.61, Agreeableness – 0.56, Conscientiousness – 0.60, Neuroticism – 0.58, Openness to experience – 0.62. This level of reliability is received on a large sample of adult Russians and is quite satisfactory for the ipsative tests (Bartram, 1996). The

retest coefficients, provided by the test authors are higher (0.85, 0.79, 0.73, 0.76, 0.77 correspondingly)<sup>5</sup>.

To evaluate the academic performance we used the following indicators:

- 1) The Unified State Exam results in three subjects: Russian language, Math, and Social Science.
- 2) GPA – the average grades of all subjects the students took during their course of study in university.

Data collection process was organized as follows. The students were asked to complete the computer based version of the Russian ipsative Big Five test. The process was organized in computer classes with witness of the researchers on a voluntary basis. Immediately after the test the students received a feed back in terms of their personality traits. We have managed to cover at least 70% of each year.

The information about the academic performance were taken from the HSE “ASAV” database which contains the performance records of all students in HSE.

## Data analysis

To test our hypothesis we used correlation and stepwise regression analysis. In stepwise regression we used students’ GPA and USE results as dependent variables and gender (on the first step) and Big Five scores on the surveys (on the second step) as independent variables.

## Results

### Correlation analysis

Descriptive statistics, Pearson’s correlations (first row for each variable) and partial correlations with gender as a control variable (second row for each variable) are presented in table 1. There are no missing data in dataset.

**Table 1**

**Descriptive statistics and correlations between variables**

	1	2	3	4	5	6	7	8	9
1. B5 E	1								
2. B5 A	-,188*	1							
	-,175*								

<sup>5</sup> Reliability coefficients are provided by the testing service provider. More information about reliability and validity of ipsative Big Five can be found on its web-site (<http://www.ht.ru/cms/component/content/article/10978>, in Russian). Unfortunately, according to the terms of the contract with the testing service provider, the researches do not have an access to the full data of the ipsative Big Five test. So we are not able to provide a Chronbach’s coefficients received on our sample.

3. B5 C	-,487***	-,016	1						
	-,510***	-,052							
4. B5 N	,124	,560***	,118	1					
	,116	,584***	-,017						
5. B5 O	,211**	,005	-,287***	,054	1				
	,265***	-,001	-,292***	,150					
6. USE Math	-,104	,283***	-,087	,194*	,148	1			
	-,124	,278***	-,096	,174*	,166*				
7. USE Social Science	-,107	,205**	-,011	,237***	,189*	,611***	1		
	-,125	,200**	-,018	,227***	,206**	,607***			
8. USE RUS	-,148	,104	,137	,214**	,086	,458***	,539***	1	
	-,194*	,089	,121	,150	,124	,443***	,547***		
9. GPA	-,117	,128	,018	,157*	,099	,581***	,538***	,494***	1
	-,142	,130	,021	,184*	,099	,57***	536***	,487***	
Mean	6,95	4,57	4,84	4,91	6,01	68,55	71,18	75,81	7,00
Standard Deviation	1,9	1,8	1,9	1,8	1,7	10,2	6,5	8,7	,9
Min.	1,7	1,1	1,5	1,5	1,0	41,0	48,0	55,0	4,7
Max.	10	10	10	10	9	100	85	100	9

Notes: B5 E – Extraversion; B5 A – Agreeableness; B5 C – Conscientiousness; B5 N – Neuroticism, B5 O – Openness to experience. The personality traits were measured in stens.

\*\*\* – p-value < 0,001; \*\* – p-value < 0,01, \* – p-value < 0,05

Positive and significant correlations on the whole sample were found between Neuroticism and all educational variables. Agreeableness is positively correlates with USE results for Math and Social Science. Correlations of Conscientiousness and Extraversion and all academic variables are all insignificant. Openness to experience is significantly correlated only with USE scores on social science, and its relation with GPA is insignificant.

When we use partial correlation all coefficients are close to the ones received on the whole sample, the directions of ties have not been changed. P-value for the correlation between Neuroticism and USE results for Russian language increased (from  $p < 0,01$  to  $p < 0,05$ ), and for the correlation between Openness to experience and USE results for social science decreased (from  $p < 0,05$  to  $p < 0,01$ ). Also the correlation between Neuroticism and USE results for Russian language became insignificant.

It should be mentioned that intercorrelations between Big five scales are rather paradoxical. For example, Agreeableness is significantly positive correlated with Neuroticism ( $r = 0.56$ ,  $p\text{-value} = 0.001$ ), though John and Srivastava provide the opposite result ( $r = -0.37$ ,  $p\text{-value} = 0.001$ ). The same tendency can be observed with Extraversion and Conscientiousness: our results show negative interscales correlation ( $r = -0.49$ ,  $p\text{-value} = 0.001$ ) and John and Srivastava

provide the positive one ( $r = 0.23$ ,  $p$ -value = 0.001) (John, Srivastava, 1999). So the interscales correlations of Russian Big five ipsative version were tested on large sample of Russian-speaking respondents ( $N = 5000$ , adults aged from 20 to 53). The Spearman's coefficients are presented in table 2.

**Tab. 2. Cross-correlations of ipsative Big Five scales on Russian-speaking sample.**

	1	2	3	4	5
1. B5 E	1				
2. B5 A	-0.235***	1			
3. B5 C	-0.457***	-0.017	1		
4. B5 N	0.046	0.495***	-0.048	1	
5. B5 O	0.247***	0.145***	-0.312***	0.098	1

This test supports our results, though we still can not explain, why we receive the correlations, which are opposite to the ones provided by John and Srivastava. We assume that this result can be culture specific, but this statement requires further research.

### 3.1.2 Gender differences

The results of partial correlation analysis show that gender effect on the relationship between personality traits and educational outcomes is quite weak. But we decided to divide the subsamples by gender and perform the correlation analysis separately.

**Table 2. Correlations between personality and academic variables for male and female samples separately**

	Male (N = 70)				Female (N = 106)			
	USE M	USE R	USE SS	GPA	USE M	USE R	USE SS	GPA
B5 E	-0.232	<b>-0.304*</b>	-0.216	-0.140	-0.051	-0.123	-0.076	-0.109
B5 A	0.228	0.187	0.220	0.147	<b>0.310**</b>	0.029	0.191	0.100
B5 C	-0.070	0.107	0.004	-0.124	-0.111	0.128	-0.029	0.095
B5 N	0.071	0.015	-0.137	-0.142	<b>0.245**</b>	<b>0.241**</b>	<b>0.281***</b>	<b>0.378***</b>
B5 O	0.201	0.191	<b>0.324*</b>	0.038	0.149	0.090	0.155	0.161

Notes: \*\*\* –  $p$ -value < 0,001; \*\* –  $p$ -value < 0,01, \* –  $p$ -value < 0,05.



Controlling for gender, the correlation between Neuroticism and all academic variables remains significant only in the women’s subsample, and the effect size increases for all educational outcomes. The correlations between Agreeableness and academic variables also remain significant only for the Math USE results for women ( $r = 0.31$ ;  $p\text{-value} < 0.05$ ).

For men, we found a significant positive correlation between Openness to experience and USE scores in Social Science. We found a negative relationship between Extraversion and USE scores for Russian language.

### Regression analysis

We performed a stepwise regression, where educational outcomes were the dependent variables and gender (on the first step) and Big Five traits (on the second) – independent.

**Table 3. Stepwise regression results**

	R <sup>2</sup> on the first step (gender)	R <sup>2</sup> on the second step (Big Five traits)	Δ
USE Math	0.001	0.107***	0.106
USE Social Science	0.000	0.098***	0.098
USE Russian language	0.033	0.098***	0.065
GPA	0	0.028	0.028

Notes: \*\*\* –  $p\text{-value} < 0,001$

Big Five explains the dispersion of all USE results on statistically significant level, but fails with GPA. Gender, which were included to equation on the first step, is insignificant for all educational outcomes. Δ from the table 3 shows that the largest part of educational outcomes dispersion is explained by personality traits.

Summing up, we can say that personality traits are the significant predictors of USE results, but they do not predict GPA. This is confirmed by both correlation and stepwise regression analysis.

### Discussion

Our analysis shows that personality is a significant predictor of educational outcomes measured as the results of Unified State Examinations. We found four traits that were significant for academic success: Intraversion (negative relationship), Agreeableness, Neuroticism, and Openness to experience.

First of all we should mention that personality is not a significant predictor of GPA. We use GPA in its classical way: as a mean score of all marks a student gets during the study. It includes both full examinations and pass-fail exams (in HSE a student gets a mark in 10-point scale even in pass-fail exams; but exact mark is not important, it just should be higher than 4 to pass). So the reason why personality is not important for GPA can lay in the way it is measured.

We suppose that if we take mean of only full examination marks, the personality will become a significant predictor of success in higher education. But unfortunately we don't have data to test our hypothesis.

According to McCrae and John (McCrae and John, 1992), Agreeableness appears in altruism and support. But the most interesting for our study are such traits as conflict avoidance, gentleness, and tendency to agree with other people rather than to enter the conflict.

Social interaction is an important part of the educational process. Students in university need to interact with different people on different levels: with other students, with professors, with university administration. The components of Agreeableness listed above help to communicate more effectively. Even if it were true that those traits would not be necessary for their future professional life, they are clearly relevant to the current university environment.

According to Poropat (2009), people who have greater Emotional Stability (or lower Neuroticism) “are more anxious and tend to focus on their emotional state and self-talk; such a focus interferes with attention to academic tasks and thereby reduces performance (p. 325, citing De Raad and Schouwenberg, 1996)” and their meta-analysis tends to support this.

But neurotic traits, which are tied to a relatively high level of anxiety, fear of failure, and avoidance of failure can also be seen as beneficial for academic success under certain conditions. Those traits help students to keep deadlines and to study harder to pass the examinations. They are definitely useful in very formal environments with many rigid rules and regulations. We suppose that the higher the level of selectivity for a given university and the greater the risk of being pushed out for failure to perform, the more important Neuroticism is for academic success. Indeed, this latter set of interpretations seems consistent with the findings for our Russian sample. But this hypothesis requires further research.

In addition, it is worth noting that Poropat (2009) found that the effect of Emotional Stability on grades was moderated as he considered studies that ran from primary to tertiary education with negative effects (positive effects of Neuroticism) accumulating as you moved higher up the educational ladder (p. 329).

The findings of the current study differ from the results of similar studies performed in Western European and American universities. The key difference is that Conscientiousness is not significant for academic success in our Russian sample. Yet most studies name Conscientiousness as one of the most significant predictors of academic achievement (Poropat, 2009; Trapmann et al., 2007; O'Connor et al., 2007). The first possible explanation could be that we have already selected students with high levels of Conscientiousness: students who were able to get into good universities are already conscientious. But if we look at the mean level of Conscientiousness (mean – 4,84, standard deviation – 1,9) we found in our study, we can see that

it is significantly lower than for the general population (mean = 5.5, standard deviation = 2):  $t = -4.609$ , sig. (2-tailed) = 0.000. So the other explanation could be the difference in educational environment and in the requirements for the students.

In Russian higher education students' trajectories are quite rigid. Students select the major before entrance and all their study activities are arranged only by the selected department. They have some core courses that are obligatory and some electives; all of them are in the selected major. Of course students are not forbidden to attend classes in other departments, but the study process (timetables, university building locations, etc.) usually do not give students much opportunity to pursue elective courses. So most of the students study within the frameworks that are provided by university authorities. Under those conditions students are not fully responsible for their educational trajectories so Conscientiousness may be less necessary than is usually observed in other studies. On the other hand, Neuroticism, instead of Conscientiousness, makes students follow deadlines and study harder to avoid failure.

Our work both confirms the bulk of existing findings but provides some suggestive results that indicate how the significance of different Big Five traits might vary in different cultural and educational environments worldwide.

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Ekaterina Orel

National Research University-Higher School of Economics, Moscow, research fellow in International Laboratory for Institutional Analysis of Economic Reforms.

E-mail: eorel@hse.ru, Tel. +7 (495) 709-65-69

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