Aleksandra Pajević[1]
First Technical School
Kragujevac, Serbia

Mirsen Fehratović
State University in Novi Pazar
Department of Philosophical Sciences
Study program psychology
Novi Pazar, Serbia

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PSYCHOLOGICAL CHARACTERISTICS OF STUDENTS AS PREDICTORS OF SCHOOL SUCCESS IN ELEMENTARY AND SECONDARY SCHOOL

Abstract

The factors of school success are numerous: individual student characteristics, family factors, characteristics of the student's social environment, school, teachers and the teaching process. Among the individual student factors, the most often distinguished ones are abilities, motivation and personality traits. This study investigated the possibility of predicting students' school success by measures of intelligence, achievement motive, locus of control, and personality traits. The research included 103 eighth grade elementary school students and 104 fourth year grammar school students, so the model of predicting school success with these traits was tested both on the sample as a whole and on each sub-sample (elementary school students and grammar school students) with the desire to test whether the same factors affect school success at different levels of schooling. The following instruments were applied: D 48 Intelligence Test, MOP 2002 Achievement Motive Scale, Rotter Control Locus Scale, and VP + 2 Personality Inventory. The tested model of predicting school success is statistically significant on the sample as a whole (R^2 = .299, p = .000), and on the sample of elementary school students (R^2 = .651, p = .000), while on the sample of secondary school students it has not reached statistical significance (R^2 = .244, p = .120). Intelligence stands out as the most significant individual predictor of student academic success, (across the sample and among elementary school students), and on the sample as a whole, personality traits such as *openness to the experience* and the dimension of achievement motive *planning*, have a significant individual contribution to predicting school success. The results indicate that the student's individual characteristics are significant factors for the school performance of elementary school pupils, while some other factors probably play a bigger role in determining the school performance of grammar school students. One possible reason for this finding is that grammar school students are a selected part of the student population which do not differ significantly from each other according to the tested characteristics.

Keywords: school success, intelligence, motive of achievement, locus of control, personality traits

[1] Corresponding author email: aleksandrapajevic92@gmail.com

Introduction

The concept of school success is often equated with the concepts of school achievement, school competence and school abilities. Procedures for assessing school success can vary and, as a rule, they rely on some form of assessment, testing or measurement in the broadest sense, and are regularly followed by additional information-gathering based on qualitative insights (Sammons, Hillman, & Mortimore, 1995). The success indicator most commonly used in educational psychology is the grade average. It turned out that the grade average is an important predictor of success in both primary and secondary school (Kuncel, Hezlett, & Ones, 2001, as cited in Dević, 2015) as well as at the university level (Ramist, 1984, as cited in Dević, 2015); and the grades at the university level turned out to be a good predictor of success at work (Roth, Be Vier, Switzer, & Schippman, 1996, as cited in Dević, 2015).

Factors related to school success can be divided into the following: the factors concerning the student itself and the factors acting from the family, social environment and school. Under the individual factors of an individual are factors such as intelligence, personality traits, motivation, locus of control, the concept of self and other (Dević, 2015).

Mandić (1987) emphasizes that intelligence is an essential determinant of school achievement, but certainly not the only one. Educational success is only partly determined by intelligence. Genc (1985, as cited in Zlatković, 2007) finds that abilities, personality traits and motivation together explain 75% of the overall success in school work. Each of these determinants of achievement in particular explains about 25% of the success. The remaining percentage is attributed to other physical and social factors. According to Petrović (1985, as cited in Zlatković, 2007), the share of 50% can be explained by the level of intelligence, while the remaining 50% can be explained by factors of non-intellectual nature.

In this paper the significance of some psychological characteristics of pupils in the domain of competence, motivation and personality for school success will be investigated, both in primary and secondary school students, in order to examine whether the significance of studied factors of school success differs at different levels of education.

Intellectual skills and school achievement

Intelligence and learning are in a dynamic process of mutual "reinforcement or weakening", which means that more intelligent students learn more quickly and easily, have better learning strategies, distinguish important information from irrelevant information more easily, and try to remember only the important parts. Therefore, the acquisition of knowledge depends on the intelligence factor, and therefore it is not surprising that the results of general knowledge tests are highly correlated with the achievements of tests of intelligence (Zarevski, 2000). On the other hand, education also affects the development of intellectual abilities. Ceci

and Williams (1997; Stankov, 1991) found the evidence of the positive impact of schooling on intelligence. The results of research conducted in Serbia (Ružić, Vidanović, & Stojiljković, 2015) show that students with excellent academic success have a higher level of general intelligence. The research carried out by Matešić (2015) shows that cognitive intelligence is a significant predictor of general success, grades in mathematics, and grades in the mother tongue.

Locus of control and academic achievement

Locus of control construct was created within the framework of Rotter's theory of social learning, which emphasizes the role of cognitive and motivational factors in explaining behavior in social situations (Rotter, 1966). In accordance with the set theory, locus of control is defined as a perceived place of factors that are experienced as sources of personal behavior management and as the causes of what happens to a person, including the person's successes and failures. Attributing the causes to different outcomes is done on the dimension of internality-externality. People in the dimension of internality consider that they have full control of themselves and that their actions affect most of the events in their surroundings. They attribute the outcomes of their behavior to their abilities, actions, efforts or other qualities. In contrast, people on the dimension of externality have beliefs that they have little control over achieving their goals and their experiences, believing that most of them are a product of happiness, fate, and other influences.

The results of the study indicate better learning and memory in people with internal locus of control, i.e. greater activity and ability to gain control over the environment (Phares, 1976).

Research conducted by Mandić (1987) shows that the correlation between the inner locus of control and school success is insignificant. It was noticed that most often, in cases of success, the individuals accept responsibility, whilst in cases of failure, blame is attributed to the circumstances.

Many studies confirm that internally oriented students in most cases have a better academic achievement than externally orientated students. Fanelli (1977) came to the conclusion that the internally orientated students, when faced with a series of tasks, tended to increase their hit-and-run momentum significantly more than the externally orientated ones. The best combination is when a person has an internal locus of control with a little tinge of the external locus. Internally oriented students begin working on their academic assignments at an earlier date; they finish and submit them on time (Jansen & Carton, 1999). Generally speaking, research shows that the perception of the locus of control correlates with the motivational and cognitive factors of individuals who can have a significant impact on academic success (Bar-Tal & Bar-Zohar, 1977).

Achievement motive and school success

The achievement motive is the behavior by which a person seeks to check and prove his or her own competence in relation to some standard of success, the desire

to do something better, to be better than others or to be better than their past selves (McClelland, 1989). According to McClelland (1989), this complex motivation disposition contains two components: a person's tendency to set goals and the tendency of competing with other people. People with a high need for achievement show perseverance in their work, they make great efforts and they are also ready to take a moderate risk in order to achieve their goal. This is described as the balance between the likelihood of a sense of pride in achieving success in performing moderately difficult tasks and avoiding shame because of failure in performing excessive tasks (McClelland, 1985, as cited in Beck, 2003).

Surveys which tested the attitudes of the achievement motive and school success did not yield concordant results. For some researchers, the connection between the two is strong, while for others it is non-existent. One research in particular (Šarčević & Vasić, 2014) shows that socio-demographic characteristics and personality traits are more important for school success, while the role of the achievement motive is much smaller. The discrepancy in the results can be explained by the fact that different schools place different demands on students, so that in schools which place heavier demands on students, the correlations between achievement motive and school success will be low or nonexistent (McClelland, 1961, as cited in Evans, 1975).

Personality traits and school success

There are a large number of definitions for the term "personality", and what is relevant to this research in the definition of this term is its adaptive and driving function. Thus, for example, Eysenck, states that "personality is a relatively durable and stable organization of character, temperament, intellect and body constitution, which determines the individual process of adapting to the outside environment" (Eysenck, 1953, as cited in Fulgosi 1997, p. 8) while Allport defines personality as: "Personality is the dynamic organization within the individual of those psychophysical systems that determine his characteristic behavior and thought" (Allport, 1961, p. 28). Starting from such an understanding of personality, it can be assumed that the personality traits determine behavior related to schooling, and as such, partly determine school success.

The examination of the personality traits in this study was based on the Big Five Plus Two personality model and the questionnaire measuring seven dimensions from this model: neuroticism, extraversion, openness to experience, conscientiousness, aggression, positive valence and negative valence (Smederevac & Mitrović, 2006).

Neuroticism refers to the number and strength of stimuli that negatively affect a person, primarily their emotions. This dimension consists of two poles-reactivity (refers to people who are always concerned and upset about something, and who are generally dissatisfied with life in comparison to other people) and elasticity (describes people who are relaxed, calm, even-tempered, unphased by the negativity of their surroundings). People with high neuroticism score are prone to the feelings of anxiety, anger, discouragement, and impulsiveness.

Extraversion is the dimension in which people differ in the number of interpersonal relationships in which they feel comfortable. A high extraversion score is characterized by

a large number of interpersonal relationships, as well as the fact that those with a higher score tend to spend more time with other people. A low score implies a lower number of interpersonal relationships, as well as a lesser desire for spending time with people.

Openness to experience implies the scope of different interests a person has been occupied with, as well as the depth of those interests. A high score implies that a person has relatively more interests but they often do not explore these interests deeply enough, while people with low scores typically show a more narrow range of interests, but they exhibit a more in-depth approach to them. Openness to experience is an integral part of creativity and is related to aspects of intelligence such as divergent thinking but it is not the equivalent to intelligence.

Conscientiousness is described as the number of goals which someone is directed to. A high score implies focus on fewer goals, but it also implies greater dedication in achieving these goals. On the other hand, people with a lower score tend to have a larger number of set goals, but they exhibit superficiality in achieving them. Conscientious people are ambitious, self-disciplined, hard-working, while people with low scores on this dimension show a tendency to give up, as well as exhibiting lower expectations of themselves and others.

Aggressiveness as a personality dimension can be described as a tendency to satisfy one's own needs, even at the expense of others. There is a need for domination, a desire to always be ahead of others, to be a leader. A high aggressiveness score suggests that these people have poor control of their impulses, they stumble into conflicts, they express the need of wanting everything done in their own way, they are opposed to the opinions of others and are very easily upset.

Positive and negative valence can be viewed as two poles of the same dimension. Both represent evaluation factors. A positive valence refers to a favorable experience of one's own value and the negative valence refers to an assessment of oneself as an evil or a terrible one. It is considered that positive valence is an extreme form of pleasantness (Smederevac & Mitrović, 2006).

Regarding the personality traits of the Big Five model, conscientiousness has distinguished itself in several studies as a significant success factor in school at all ages (Bratko, Chamorro-Premuzic & Saks, 2006; Poropat, 2009; Poropat, 2011; Vrdoljak, Lovaković, & Kurtović, 2018) while openness to experience is a significant predictor of school success in older respondents (Poropat 2009; Šarčević and Vasić, 2014; Vrdoljak, Lovaković, & Kurtović, 2018). Some authors have even argued that conscientiousness, in importance and quantity, is an equal or better predictor of school success than cognitive abilities and does not decline with the transition to higher levels of education (Furnham, Chamorro-Premuzic, & McDougall, 2003; Poropat, 2009). Openness to experience is, in most studies, a positive correlate of school achievement (Costa & McCrae, 1992; Laidra, Pullman, & Allik, 2007).

The main objective of the research is to examine the possibility of predicting the school achievement of elementary school and grammar school students using measures of intelligence, achievement motives, locus of control and personality traits from the Big Five Plus Two model. Considering the numerous findings on the factors of school success, individual characteristics of students in the domain of competence, motivation and personality traits were included in the research

as predictors of school success, with the intention of examining their individual contribution to predicting school success. Furthermore, it will be examined whether there is a specific combination of individual predictors involved in predicting school performance in elementary school students and grammar school students.

Method

Sample and procedure

Two hundred and seven students in total participated in the research. The students were divided into two age groups: the first one consisted of 103 pupils (41 boy and 62 girls) of the eighth grade of elementary school and the second group consisting of 104 (36 male and 68 female students) students of the fourth grade of the Kragujevac Gymnasium. The study was conducted during February 2019, in a Kragujevac elementary school and the Second Kragujevac Gymnasium. The students filled in questionnaires during their homeroom classes with the teacher present. Prior to conducting the examination, the students received information about the examiner, the institution from which they come and the reason for conducting the research. Furthermore, respondents were informed about the purpose of the research, how collected data will be utilized, and that the test was both anonymous and voluntary. Before completing the tests, respondents received clear and precise instructions on how to respond to the requests. Prior to assigning the instruments to students, the consent for children participating in the research was obtained from their parents.

Measures

The students' school success rate was operationally determined based on the final mean grade the student had finished the previous school year with. The range of the mean grade is between 2.00 and 5.00.

Intelligence Test D-48 (Pichot, 1948). This test is highly saturated by the "G" factor. It consists of 4 examples and 44 tasks sorted by difficulty within the series. It is intended for subjects over the age of 12. Each correct answer yields one point. The time given to solve the tasks is limited to 25 minutes. The intelligence measure is expressed in the percentiles. The reliability expressed by Cronbach's Alpha coefficient on our sample is .81.

Achievement motivation scale (MOP 2002 scale; Franceško, Mihić, & Bala, 2002). The scale was used to assess the achievement motive. The scale includes 55 items in the form of a 5-point Likert's type scale (5 – *the claim refers entirely to the respondent*, 1 – *the claim does not apply to the respondent at all*). The questionnaire examines four components of the achievement motive: *1.* Competing with other people (e.g. "*I tend to be ahead of others in all*"); *2.* Perseverance in achieving the goal (e.g. "*I always pursue my goal*"); *3.* Achieving the goal as a source of satisfaction (e.g. "*Successfully done work for me is the greatest reward*"); *4.* Orientation towards planning (e.g. "*I plan everything in advance in order to achieve better results*").

The reliability of the sub-scales on our sample was high (80≤ α <.90), with the scale Competing with others (Cronbach's α = .89) having the highest reliability, while the scale Setting and achieving goals (Cronbach's α = .79) had the lowest (acceptable) reliability. High reliability was also recorded for both, scale Perseverance in achieving the goal (Cronbach's α = .81) and scale Orientation towards planning (Cronbach's α = .82). The reliability of the entire scale was very high (Cronbach's α = .92).

Rotter's Internal–External (I–E) Scale (Rotter, 1966). The scale consists of 29 pairs of assertions, with the respondent being given a task of selecting one of the two options. Respondents answer by choosing descriptions (sentences w/e) that better describe their experience of maintaining control over various life situations, such as the academic, social and political areas for example. One claim in the pair refers to internality while the other claim refers to externality. According to Rotter's report (1966), an increase in externalities was observed in the American population. Our sample exhibited an unacceptable reliability (Cronbach's α = .38). Although an adaptation of the I-E scale was included in our sample, in this research the instrument proved to be quite unreliable and the results obtained on these measures should be taken with some reservation.

Big Five Plus Two Questionnaire (VP+2-70; Čolović, Smederevac & Mitrović, 2014) The questionnaire was used to evaluate personality traits. The questionnaire was developed on the basis of a psycho-lexical study carried out in Serbia, on the basis of which a seven-factor personality model was formulated. The questionnaire consists of 70 claims to which respondents respond by expressing their degree of agreement on the five-level Likert scale (5 – *the assertion fully applies to the respondent*, 1 – *the assertion does not apply at all to the respondent*). The questionnaire has seven subscales that measure seven dimensions of personality: Neuroticism, Extraversion, Openness to Experience, Conscientiousness, Aggressiveness, Positive Valence and Negative Valence. Most of the scales of the Big Five Plus Two Questionnaire have high reliability (Aggressiveness, Extraversion, Neuroticism, Negative and Positive Valence; .80≤ α <.90), while acceptable reliability (.70≤ α <.80) was recorded on the Openness to experience scale. The Positive Valence scale (Cronbach's α = .88) has the highest, and at the same time, high, reliability; while the Conscientiousness scale (Cronbach's α = .43) has the lowest and at the same time unacceptable reliability (α <.50).

Results

First, descriptive indicators of the investigated psychological variables (measures of intellectual ability, dimension of achievement motives, locus of control and personality traits from the Big Five Plus Two) and the school success of the students at the level of the whole sample were determined, both separately with elementary school students and with grammar school students (Table 1).

Table 1

The degree of expression of school success and the tested psychological characteristics on the whole sample and in primary school students and grammar school students

Variable	*M*	*SD*	SCHOOL	*M*	*SD*
School success	4.25	.60	PS	4.20	.59
			SS	4.30	.61
Measure of intellectual abilities (percentiles)	30.71	18.13	PS	26.27	14.34
			SS	35.06	20.35
Aggressiveness	3.14	.81	PS	3.15	.88
			SS	3.13	.75
Extraversion	3.93	.76	PS	3.99	.65
			SS	3.86	.86
Neuroticism	2.68	.94	PS	2.66	.91
			SS	2.70	.97
Openness	3.75	.62	PS	3.70	.62
			SS	3.81	.62
Conscientiousness	3.35	.49	PS	3.41	.51
			SS	3.28	.47
Negative valence	2.28	.94	PS	2.30	.97
			SS	2.26	.91
Positive valence	3.41	.88	PS	3.39	.85
			SS	3.43	.91
Planning	3.07	.89	PS	3.14	.84
			SS	3.01	.94
Perseverance	3.70	.61	PS	3.79	.53
			SS	3.62	.68
Competing	3.23	.77	PS	3.29	.77
			SS	3.16	.78
Setting and achieving goals	4.16	.57	PS	4.21	.50
			SS	4.10	.63
Locus of control	13.04	3.08	PS	11.90	2.46
			SS	14.27	3.22

The differences in the degree of expressiveness of the measured psychological characteristics (measures of intellectual abilities, dimension of motive of achievement, locus of control and personality traits from the Big Five Plus Two model) and school success among pupils of elementary school and grammar school students were also examined. The significance of these differences was tested by Mann-Whitney's U test. The analysis shows that statistically significant differences in the measurements of the examined variables exist only in three dimensions: grammar school students have more pronounced levels of intellectual abilities ($U = 3997.50$, $Z = -3.090$, $p = .002$) and locus of control ($U = 2605.50$, $Z = -5.551$, $p = .000$), while elementary school pupils have a more pronounced score on conscientiousness as a dimension of personality ($U = 3956.50$, $Z = -2.129$, $p = .033$).

The possibility of predicting school success by examined variables from the domain of students' individual characteristics was first tested by multiple regression analysis on the sample as a whole (Table 2).

Table 2
Inter-correlation coefficients for all variables on the sample as a whole

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. School success	/	.39*	.03	.13	-.01	-.09	.01	-.02	.08	.07	-.02	.06	.06	.11
2.Measure of intellectual abilities		/	.01	.11	.04	-.01	.02	-.05	.06	-.05	-.06	-.01	-.06	.17*
3.Aggressiveness			/	.07	.49*	.13	.26*	.44*	.52*	-.04	.01	.29*	.03	.02
4.Extraversion				/	-.17*	.36*	.35*	-.01	.50*	.15*	.38*	.30*	.38*	-.17*
5.Neuroticism					/	.06	.25*	.52*	.11	.06	-.18*	.11	-.06	.14
6.Openness						/	.40*	.06	.28*	.18*	.33*	.30*	.35*	-.06
7.Conscientiousness							/	.32*	.43*	.24*	.40*	.35*	.34*	-.22*
8.Negative valence								/	.47*	.09	-.05	.26*	-.01	-.21*
9.Positive valence									/	.12	.32*	.51*	.31*	-.21*
10.Planning										/	.43*	.35*	.50*	-.27*
11.Perseverance											/	.34*	.50*	-.29*
12.Competing												/	.43*	-.30*
13.Setting and achieving goals													/	-.24*
14.Locus of control														/

*$p < .05$

In the Table 2, we can see that coefficients of correlation for all variables used in this study on the sample as a whole go as high as .52 (between Aggressiveness and Positive valence and also Neuroticism and Negative valence). According to that, we can say that the intensity of those correlations does not significantly affect the results of regression.

Table 3
Multiple linear regression: Displaying multi-correlation coefficients and determinations, ANOVA results and standardized coefficients of the set model of prediction of school success on the sample as a whole

Variable	School success		Model Summary
	β	*p*	
Measure of intellectual abilities (percentiles)	.453	.000	
Aggressiveness	.114	.306	
Extraversion	.143	.104	
Neuroticism	-.068	.503	
Openness	-.179	.024	
Conscientiousness	.117	.189	$R = .547$
Negative valence	-.082	.448	$R^2 = .299$
Positive valence	.039	.732	$F(13, 157) = 5.147$
Planning	.199	.026	$p = .000$
Perseverance	-.170	.076	
Competing	.022	.813	
Setting and achieving goals	.030	.768	
Locus of control	.069	.386	

The model, comprised of the measures of the student's psychological traits (measures of intellectual abilities, dimensions of the achievement motive, locus of control and personality traits from the Big Five Plus Two model), explains 29.9% of the variance of the school success from the examined sample, and this model is statistically significant overall. Significant individual contributions to predicting students' academic achievement are the measures of intellectual ability, the openness to experience trait, and planning as a dimension of the achievement motive. The most important predictor of school success on the sample as a whole is intelligence.

Then, the same predictive model was examined separately on each sub-sample – primary school pupils (Table 5) and grammar school students (Table 7).

Table 4

Inter-correlation coefficients for all variables on the sub-sample of primary school students

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. School success	/	.55*	-.01	.02	.07	-.15	.10	.01	.08	.00	-.13	.03	-.08	.08
2.Measure of intellectual abilities		/	.03	-.03	.08	-.11	.06	-.01	.15	.05	-.01	.12	.04	-.00
3.Aggressiveness			/	.07	.49*	.11	.27*	.47*	.45*	-.14	.05	.34*	-.08	.06
4.Extraversion				/	-.02	.46*	.35*	-.07	.40*	.05	.31*	.19	.30*	-.03
5.Neuroticism					/	.09	.39*	.53*	.37*	.06	-.02	.17	.01	.10
6.Openness						/	.46*	.09	.36*	.18	.40*	.32*	.38*	-.12
7.Conscientiousness							/	.41*	.46*	.21*	.44*	.34*	.28*	-.14
8.Negative valence								/	.48*	.07	-.01	.26*	-.12	-.15
9.Positive valence									/	.03	.27*	.53*	.15	-.05
10.Planning										/	.42*	.19	.549*	-.28*
11.Perseverance											/	.26*	.53*	-.14
12.Competing												/	.32*	-.25*
13.Setting and achieving goals													/	-.07
14.Locus of control														/

*$p < .05$

In the Table 4, we can see that coefficients of correlation for all variables used in this study on the sub-sample of primary school students go as high as .55 (between School success and Measure of intellectual abilities). According to that, we can say that the intensity of those correlations does not significantly affect the results of the regression.

Table 5
Multiple linear regression: Displaying the coefficients of multiple correlation and determination, the ANOVA results and the standardized coefficients of the set model of predicting school success on the sub-sample of primary school students

Variable	School success		Model summary
	β	*p*	
Measure of intellectual abilities (percentiles)	.769	.000	
Aggressiveness	.027	.820	
Extraversion	.128	.134	
Neuroticism	-.071	.489	
Openness	-.069	.436	
Conscientiousness	.187	.058	$R = .807$
Negative valence	.019	.867	$R^2 = .651$
Positive valence	-.098	.432	$F(13, 80) = 11.485$
Planning	.080	.350	$p = .000$
Perseverance	-.130	.152	
Competing	.010	.914	
Setting and achieving goals	-.125	.188	
Locus of control	.104	.175	

The model of predicting school success, which includes the same predictor variables in the sample of elementary school students, is also statistically significant, and explains as much as 65.1% of the variance of school achievement of the eighth grade of elementary school pupils, with the measure of intellectual ability being the only significant individual predictor (Table 5).

Table 6
Inter-correlation coefficients for all variables on the sub-sample of the grammar school students

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. School success	/	.10	.07	.25*	-.08	-.03	-.05	-.06	.06	.15	.08	.11	.20	.08
2.Measure of intellectual abilities		/	.01	.23*	.01	.02	.07	-.07	-.01	-.09	-.04	-.06	-.07	.11
3.Aggressiveness			/	.07	.54*	.14	.24*	.48*	.39*	.06	-.04	.24*	.14	-.02
4.Extraversion				/	-.28*	.30*	.35*	.04	.51*	.20	.40*	.39*	.42*	-.24*
5.Neuroticism					/	.02	.12	.35*	-.14	.06	-.31*	.06	-.11	-.17
6.Openness						/	.28*	.03	.20*	.19	.30*	.30*	.35*	-.07
7.Conscientiousness							/	.20	.41*	.26*	.35*	.36*	.39*	-.24*
8.Negative valence								/	.47*	.11	-.10	.25*	.06	-.28*
9.Positive valence									/	.20*	.37*	.53*	.45*	-.41*
10.Planning										/	.44*	.48*	.53*	-.27*
11.Perseverance											/	.40*	.47*	-.35*
12.Competing												/	.49*	-.34*
13.Setting and achieving goals													/	-.33*
14.Locus of control														/

*$p < .05$

In the Table 6, we can see that coefficients of correlation for all variables used in this study on the sub-sample of the grammar school students go as high as .54 (between Aggressiveness and Neuroticism). According to that, we can say that the intensity of those correlations does not significantly affect the results of the regression.

Table 7
Multiple linear regression: Displaying the multi-correlation and determination coefficients, ANOVA results and standardized coefficients of the set model based on a sub-sample of the grammar school students

Variable	School success		Model summary
	β	*p*	
Measure of intellectual abilities (percentiles)	.165	.163	
Aggressiveness	.312	.083	
Extraversion	.281	.075	
Neuroticism	-.118	.504	
Openness	-.164	.192	
Conscientiousness	-.023	.867	$R = .494$
Negative valence	-.180	.306	$R^2 = .244$
Positive valence	-.070	.720	$F(13, 63) = 1.564$
Planning	.285	.069	$p = .120$
Perseverance	-.158	.340	
Competing	-.023	.891	
Setting and achieving goals	.128	.512	
Locus of control	.012	.931	

The model composed of the same predictor variables on a sample of grammar school students is not statistically significant. Therefore, the measures of the examined psychological traits of students (measure of intellectual abilities, dimensions of the achievement motive, locus of control and personality traits from the Big Five Plus Two model) do not represent a statistically significant predictors of school success in the sub-sample of grammar school students (Table 7).

Discussion

When comparing elementary school and grammar school students in terms of expressiveness of the examined individual characteristics, statistically significant differences were identified in score values of intellectual ability, conscientiousness as a personality trait, and locus of control. Grammar school students have more pronounced intellectual skills and locus control (prone to externality), and elementary school students have a more prominent result on conscientiousness as a personality dimension.

The result that grammar school students have more pronounced intellectual abilities is consistent with the view that education affects the development of

intellectual abilities. Ceci and Williams (1997) have found evidence of a positive impact of education on intelligence. Furthermore, considering the essence of fluid and crystallized intelligence, Stankov (1991) indicates that their development is possible through education and learning. Starting with Piaget's understanding of cognitive development (Pijaže, 1967) according to which eighth-grade students should already have reached the level of formal operations, i.e. that at that age the cognitive development was already complete, the differences in intelligence measures between high school graduates and students of the eighth grade of elementary school could indeed be related to the effects of education.

The following finding suggests that grammar school students have an external locus of control. The findings obtained are consistent with the specific adolescence period which grammar school students find themselves in. More precisely, persons on the dimension of externality have the belief that they have little control over the achievement of their goals as well as little control over their experiences, believing that most of them are the product of happiness, fate, outsider influence, or some other foreign influence (Petz, 2005). The adolescence period is characterized by students' rebellious behavior towards their parents, as well as orientation and loyalty to their peer group. Research has shown that a child's beliefs in internal control are related to the level in which parents provide emotional support to the child, do not criticize or punish them, approve and accept the child's actions, so that they feel protected (Lefcourt, 1966). During the adolescent period, the relationship between the children and the parents also changes by reducing the importance of emotional support from parents at the expense of an increasingly important relationships with peers, and at the same time parents, in an effort to maintain educational influence, more often criticize children in the period of adolescence.

The finding that elementary school students have a more prominent score on conscientiousness as a dimension of personality can also be explained by the pre-adolescent period. Younger students are more willing to accept the norms and values, as well as the tasks assigned to them by adults and, to an extent, such behavior corresponds to the description of conscientiousness as a personality trait. On the other hand, students who conscientiously perform their tasks, who are persistent, reliable, self-disciplined and accept school obligations as part of their everyday activities, adopt the norms and values of teachers and the school environment, have more opportunities to achieve success, as shown in numerous studies (Šarčević & Vasić, 2014).

Using the regression analysis, it was found that the models of school success predictions that constitutes the measures of the students' psychological characteristics, is statistically significant, on the sample as a whole and on the sub-sample of elementary school pupils, while this model of prediction is not statistically significant on the sample of grammar school students. Significant individual contribution to predicting students' academic achievement from the sample as a whole have measures of intellectual abilities, the trait openness to experience and planning as the dimensions of achievement motive. The most important predictor of school success on the sample as a whole is intelligence. A model of predicting

school success that includes the same predictor variables on a sample of elementary school students is also statistically significant, and only a measure of intellectual abilities is distinguished as a significant individual predictor. Similar results were obtained in other studies. Namely, Mandić (1987) emphasizes that intelligence is an important determinant of school achievement, but certainly not the only one. Success in education is only partly determined by intelligence. On the other hand, acquiring knowledge depends on intelligence (Zarevski, 2000). In his research, Genc (1985, as cited in Zlatković, 2007) found that intelligence accounts for 25% of school achievement. Furthermore, Petrović (1985, as cited in Zlatković, 2007) points out that 50% of the school achievement can be explained by the level of intelligence, while the remaining 50% can be explained by the factors of non-intellectual nature. These include the characteristics of emotional and social development, the level of motivation for learning, personality traits, socio-economic and cultural level of the family, as well as many others. Furthermore, the research carried out by Matešić (2015) shows that cognitive intelligence is an important predictor of general success, grades in mathematics and in the mother tongue.

Additionally, in this research, openness to experience as a personality trait represents a statistically significant predictor of school success, when it comes to the sample as a whole. Furthermore, in one study (Šarčević & Vasić, 2014), it had been found that conscientiousness and openness to experience were important predictors of school success, in older respondents.

The following finding shows that planning as a dimension of the achievement motive is a statistically significant predictor of school success when it comes to the sample as a whole. This finding is in line with the explanation that people who are striving for long-term planning have better academic achievement and obtain a higher level of education. Then, students like these set goals and tasks more clearly, more thoroughly and are more specific in terms of what constitutes success and what failure. They are also more competent in defining what needs to be done in the individual stages of promotion in order to achieve success (Franceško, Mihić & Bala, 2002).

For grammar school students, the model of predicting school success is not statistically significant. One of the possible reasons for this finding is that grammar school students are a selected part of the student population and do not differ significantly from each other according to the tested characteristics. Another possible reason may be that at an older age some other factors gain a more significant role as factors of academic achievement. In addition to the above, we can associate the obtained result with the previous findings that the factor of intelligence drops in significance as a factor of academic performance when moving from lower to higher levels of education. In accordance with the findings, we can emphasize that schools place different demands on students (McClelland, 1961, as cited in Evans, 1975). More specifically, grammar schools are schools that exert heavier pressure on students due to a more complex school curriculum, higher demands set by teachers, and competition within the class itself deriving from the selected structure of students. It can also be assumed that the graduates have developed an intrinsic

motivation for learning because of the school they have chosen as well as being at that age where they already have clearer professional goals in terms of necessary success in the grammar school.

Conclusion

The most important predictor of school success is intelligence (in the whole sample and in elementary school students), and on the sample as a whole, personality traits *openness to experience* and *planning as the dimension of the achievement motive* make significant individual contributions to predicting of school success. The results indicate that the tested individual student characteristics play a significant role in determining the school performance of elementary school students, while some other factors probably play a more prominent role in determining the school performance of grammar school students. Possible reasons for this phenomenon could lie in the fact that grammar school students are a selected part of the student population who do not mutually differ according to the tested characteristics. Furthermore, different schools have different demands for students. It can be said for sure that grammar schools exert greater pressure on students due to their curriculum, the expectations of teachers, and competencies within the department resulting from the selected student structure. We can also assume that the graduates have a better developed intrinsic motivation for learning.

The practical implications of these findings can be examined in several ways. When it comes to elementary school students, whose intelligence stands out as the most significant predictor of school success, such a finding can be considered expected. It is reasonable to expect that the more intellectually advanced individuals would be able to handle more complex school tasks, which are valued by higher school grades. On the other hand, if intelligence is considered a product of the combined action of hereditary and environmental factors, this means that the development of intelligence can at least be partially influenced by environmental stimuli. Bearing this in mind, it can be suggested that the intellectual development of children should be more intensively stimulated as early as the preschool age. Exercise of various mental operations (especially the more complex ones) that form the core of intelligence using various activities should be encouraged. Such activities should find a significant place in the context of full-time educational work with children and students, in extracurricular activities, and in various forms of non-formal education. The more positive effect an activity has on the development of intelligence, the more intensively it should be supported, and thus the academic achievement of students would generally be improved. When it comes to high school students, the finding that the characteristics of an examined student are not significant predictors of school success indicates that external factors are more responsible for school performance, primarily those produced in the school setting. This means that it is very important to pay full attention to improving the quality of teaching and learning in high schools, thus providing a more intensive contribution to improving students' school achievement.

More precisely identifying other factors (factors related to the student themselves, family, social environment and school factors) that predict school success, especially for grammar school students, would be of great importance for the timely direction of the academically oriented behavior of young grammar school students.

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Aleksandra Pajević[2]
Univerzitet u Nišu
Prva tehnička škola
Kragujevac, Srbija

Mirsen Fehratović
Državni univerzitet u Novom Pazaru
Departman za filozofske nauke
Studijski program psihologija
Novi Pazar, Srbija

PSIHOLOŠKE KARAKTERISTIKE UČENIKA KAO PREDIKTORI ŠKOLSKOG USPEHA U OSNOVNOJ I SREDNJOJ ŠKOLI

Apstrakt

Faktori školskog uspeha su brojni: individualne karakteristike učenika, karakteristike porodice, socijalnog okruženja, škole, nastavnika i nastavnog procesa. Među individualnim karakteristikama učenika se najčešće izdvajaju sposobnosti, motivacija i osobine ličnosti. U ovom istraživanju ispitivana je mogućnost predviđanja školskog uspeha učenika merama inteligencije, motiva postignuća, lokusa kontrole i osobina ličnosti. U istraživanje je uključeno 103 učenika osmog razreda osnovne škole i 104 učenika četvrtog razreda gimnazije, pa je model predviđanja školskog uspeha ovim osobinama ispitan i na uzorku u celini i na svakom poduzorku (učenika osnovne škole i učenika gimnazije) sa željom da se proveri da li isti faktori deluju na školski uspeh na različitim nivoima školovanja. Primenjeni su instrumenti: test inteligencije D 48, Skala motiva postignuća MOP 2002, Rotterova skala lokusa kontrole i inventar ličnosti VP+2. Testirani model predviđanja školskog uspeha je statistički značajan na uzorku u celini (R^2 = .299, p = .000) i na uzorku učenika osnovne škole (R^2 = .651, p = .000), dok na uzorku učenika srednje škole ovaj model nije dostigao statističku značajnost (R^2 = .244, p = .120). Kao najznačajniji pojedinačni prediktor školskog uspeha učenika izdvaja se inteligencija (na celom uzorku i kod učenika osnovne škole), a na uzorku u celini značajan pojedinačni doprinos predviđanju školskog uspeha imaju i osobina ličnosti *otvorenost za iskustvo* i dimenzija motiva postignuća *planiranje*. Rezultati ukazuju da ispitivane individualne karakteristike učenika predstavljaju značajne faktore školskog uspeha učenika osnovne škole, dok kod gimnazijalaca verovatno neki drugi faktori preuzimaju ulogu u determinisanju školskog uspeha. Jedan mogući razlog za ovakav nalaz je i to što su učenici gimnazije selekcionisani deo populacije učenika i međusobno se manje razlikuju po ispitivanim karakteristikama.

Ključne reči: školski uspeh, inteligencija, motiv postignuća, lokus kontrole, osobine ličnosti

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[2] Adresa autora: aleksandrapajevic92@gmail.com