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## Personality Traits and Learning Styles of Secondary School Students in Serbia

### Abstract

This paper is concerned with the personality dimensions and learning styles of secondary school students, attending grammar and technical vocational school. The aim of the study is to examine differences in personality traits and learning styles between students from these types of schools, as well as to determine the predictive power of personality traits for certain learning styles of students. The sample consists of 240 fourth-year students attending grammar (120) and secondary technical school (120). Research variables were measured by *NEO PI-R Personality Inventory* (according to Five-factor model) and *Index of Learning Styles* (developed within Felder-Silverman's model). The results show that grammar school students, compared with technical school students, have higher level of all personality dimensions except the Neuroticism, which is higher in technical school students. Grammar school students have higher measures of Sensor, Active and Sequential styles than students from technical school. Multiple regression analysis has shown that certain learning styles could be predicted by some personality traits. In grammar school sub-sample Openness seems to be the best predictor while Consciousness is significant predictor of learning styles in technical school. The findings are discussed in the light of possibility for better understanding the personality-learning-teaching relationships that could contribute to more effective individualization of teaching process.

Keywords: personality traits, Five-factor model, learning styles, secondary school students

### Introduction

The research reported on in this paper is concerned with personality traits and learning styles of secondary school students. Starting point of the study is a plenty of research findings which confirm the correlation of academic success with both personal and cognitive factors (Bratko et al, 2006; Busato et al, 1999; Furnham et al, 2003; Poropat, 2009) as well as the assumption that personality traits and learning styles are interrelated. The importance of this research problem stems from the belief that better understanding of relationship between these variables could contribute to more effective support of students through individualization of teaching process.

One of the key issues in the study of personality is a question of its structure. The most widely accepted model, based on the lexical approach, stands out five broad personality dimensions: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness. This taxonomy was confirmed in numerous studies, showing a significant degree of cross-cultural, linguistic and methodological invariance. Well-known operationalization of the **Five-factor model** is proposed by Costa and McCrae (1992), who also developed Personality Inventory NEO-PI-R. The model implies a hierarchical structure of personality. There are five broad domains at the top of the hierarchy, which encompassed 30 narrow personality traits or facets (six facets build one domain). Each trait and domain is seen as bipolar dimensions and people differ only in the extent of them (Costa & McCrae, 1992).

Neuroticism (N) – refers to the general tendency to experience negative affects such as fear, sadness, anxiety, anger and guilt. People with high Neuroticism are prone to irrational ideas; they poorly control their impulses and have less capacity to overcome stressful situations. Individuals with low Neuroticism are emotionally stable, calm, relaxed and are able to cope with stressful situations without the anxiety or panic.

Extraversion (E) – Extraverts are sociable, assertive, active and talkative, cheerful by nature, they like people and prefer large groups, enjoy the excitement and stimulation. Introverts tend to be reserved (which does not mean antisocial), introspective, quiet and moderate.

Openness (O) – refers to intellectual curiosity and open-mindedness for new experiences, new ideas and unconventional values. Openness is related to intelligence and creativity. People with low Openness show conventional behavior, conservative look and posture, prefer known in relation to the new, have narrower and less intensive interests.

Agreeableness (A) – is a dimension of interpersonal tendencies. Agreeable person is altruistic, sympathizes and empathizes with other people, willing to help them and believing that other people will show the same toward him/her. A person with low Agreeableness is egocentric, skeptical about the actions of other people and competitive-minded.

Conscientiousness (C) – refers to dutifulness, self-discipline and responsibility. Highly expressed C is linked to academic and professional success. People with lower C score are less dedicated to achieving the objectives, but more oriented towards personal pleasures. These people have a more relaxed attitude towards moral principles (which does not necessarily mean that they are immoral persons).

Numerous studies (Poropat, 2009) show that basic personality dimensions are good predictors of academic success, especially at higher education context. The most consistent findings refer to the correlation between Conscientiousness and school achievement. Also many authors reports about connectedness between learning styles and personality traits (Busato et al, 1998) so it is useful to explore these personal characteristics together.

**Learning styles** may simply be described as the ways in which people learn the easiest and most often (Đigić, 2012). Some authors consider learning styles as personality traits that include different aspects of the individual's functioning (cognitive, affective, physiological) in a learning situation (Keefe, 1987). Classifications of learning styles are based on different criteria: personality traits, the way of information processing, neuro-physiological basis of certain mental functions, stages of experiential learning, perceptual modalities of cognitive functioning.

One of common used is Felder-Silverman model of learning styles which is determined by the mode of reception and processing information (Felder & Silverman, 1988). Learning styles vary depending on the answers to four questions: (1) Which type of information a person prefers to use: *sensory*, external (visual information, sounds, physical sensations) or *intuitive*, internal (opportunities, insights)? (2) What type of sensory information is easier for a person to perceive: *visual* (pictures, diagrams, graphs, demonstrations), or *auditory* (words, sound)? (3) Which way of information processing characterizes the person: *active* (through

participation in a practical activities or discussion) or *reflective* (through introspection)? (4) What kind of progress in understanding learning content is person's characteristic: *sequential* (step by step) or *global* (bouncy, holistic)?

One of recently conducted studies into individual differences in learning styles among secondary and high school students (Alumran, 2008) showed that Visual style is the most common, and that Active, Sensory and Sequential are more frequent than Reflective, Intuitive and Global style. It is shown that Visual style was negatively correlated while Sequential style was positively correlated to school achievement. Some differences in learning styles were found among students of different professional orientations. Also some empirical findings suggest that characteristics of personality may be important in studying learning styles. Starting from these findings, we have designed the research being reported in this paper.

## Method

**The research problem** referred to the profile of personality and learning styles of secondary school students. Three research questions were posed:

(1) Are there differences in the level of certain personality dimensions between students attending grammar and technical schools?

(2) Are there differences in the level of some learning styles among students of grammar and technical schools?

(3) Could certain learning styles be predicted by the dimensions of personality of students?

**Participants:** The sample consisted of 240 four-grade students attending two different types of secondary schools in Serbia: grammar school (N=120) and vocational technical school (N=120), 126 (52.5%) males and 114 (47.5%) females.

**Measures:** Dimensions of personality were defined according to Five-factor Model (Costa & McCrae, 1992) and measured by *NEO PI-R Personality Inventory*, revised in Serbia (Đurić-Jočić et al, 2004). The questionnaire consists of 240 statements using five-point Likert-like formats, intending to measure five broad domains of personality and 30 facets. The instrument showed good psychometric properties in Serbian population (Knežević et al, 2004). Cronbach Alpha coefficients obtained from our sample range from .81 to .85.

Learning styles were based on Felder-Silverman model (Felder & Silverman, 1988) and measured by *Index of Learning Styles* (Solomon & Felder, 2014). The original questionnaire consisted of 44 pairs of items and respondent answered by selecting one of two offered claims choosing better fit for him/her. For the purposes of this study, the instrument was converted to a Likert-like formats (strongly disagree, disagree, neutral, agree, and strongly agree) and respondent is asked to answer to 88 items. Each of eight learning styles (Sensory, Intuitive, Visual, Verbal, Active, Reflective, Sequential, Global), is assessed by 11 statements. Cronbach Alphas ranged from .65 to .76 (most of them were above .70).

**Procedure and data analysis:** The survey was conducted during the school lessons. Before completing the questionnaires, students were informed about the objectives of the research which was anonymously. Their participation was completely voluntary. SPSS 18.0 was used to perform necessary statistical analysis.

## Results and discussion

### *Personality dimensions*

Data showed that secondary school students from our sample scored 30-50 points higher on all personality domains in comparison with Serbian normative sample (Knežević et al, 2004). Means for measured dimensions were:  $M=140.31$ ,  $SD=18.92$  (Neuroticism),  $M=151.86$ ,  $SD=11.64$  (Extraversion),  $M=151.95$ ,  $SD=12.58$  (Openness),  $M=150.76$ ,  $SD=13.22$  (Agreeableness) and  $M=157.07$ ,  $SD=19.06$  (Conscientiousness). These differences could be partially explained by sample characteristics, sample size and age differences of participants from these two surveys. For example, Serbian normative sample consisted of people aged 18 to 65 years while our sample included only 19 years old students. Also, the time distance between two surveys could be the reason for obtained differences.

In order to determine whether there are significant differences in the level of personality dimensions between two groups of students, t-tests was used. Technical school students were higher on Neuroticism ( $t=4.877$ ,  $p<.001$ ) and lower on the other four dimensions than grammar school students: Extraversion ( $t=2.385$ ,  $p<.018$ ), Openness ( $t=2.426$ ,  $p<.016$ ), Agreeableness ( $t=3.914$ ,  $p<.000$ ), Conscientiousness ( $t=4.584$ ,  $p<.000$ ). It means that technical school students showed disposition to be more emotionally unstable, anxious, depressive and impulsive than their peers from grammar school. This finding was unexpected because the majority of students of technical school were males while many previous studies revealed that this disposition is to a large extent the characteristic of females (Costa & McCrae, 1992; Đurić-Jočić et al, 2004; Stojiljković, 2014). It should be noted that students of technical school mostly come from families that have a lower level of education, their parents are therefore paid less or more often remain unemployed, especially at a time of social crisis and the transitional period. This can contribute to creating an atmosphere of insecurity as a result of what may increase anxiety and pessimism in children who grow up in these circumstances. On the other hand, higher scores on personality dimensions E, O, A and C indicated that grammar school students are, in comparison with their peers from technical school, more sociable, active, assertive, cooperative, intellectually curious and open to new experiences, self-confident and more optimistic.

These findings can be understood from the perspective of Holland's typology and belief that there is a connection between personality traits and occupational interests. According to this model, people choose the occupation that fits their personality traits (Holland, 1997). Some studies showed that Investigative, Social and Artistic type are more present in grammar than in technical school students and positively correlated to Extraversion, Openness and Agreeableness (Hedrih, 2008; 2009; Larson et al, 2002). It is well-known that grammar school students set to themselves higher academic goals and tend to reach better school achievement so it is expected higher Conscientiousness in these students.

### *Learning styles*

Starting from Felder and Silverman (1988) understanding that each person uses many different learning styles, combining them to enable the most effective learning, the research was aimed to determine learning styles profile of students

attending different types of schools. Firstly the average scores were calculated as measures of eight learning styles which represent extremes of four dimensions: Sensor – Intuitive, Visual – Verbal, Active – Reflective, and Sequential – Global. All obtained means were higher than theoretically expected means (33.00), ranged from  $M=35.67$ ,  $SD=6.37$  for Global style to  $M=38.31$ ,  $SD=7.56$  for Active style. It could mean that students are ready to accommodate to the requests of different school subjects and learning tasks making different learning styles' combinations in accordance with particular school subject. Also, such finding could be the result of balanced education (Felder & Brent, 2005) which contributes to development of different learning styles. Intuitive, Reflective and Global learning styles tend to be considered as connected to creativity (Maksić, 2006) but students from our sample showed lower measures on them than on the other ones. If we believe in the influence of education on development of learning styles, this finding raised question whether Serbian education is less oriented to development of styles related to creative thinking.

Using t-test it was determined that grammar school students, compared with technical school students, have higher measures of three learning styles: Sensor ( $t=2.979$ ,  $p<.003$ ), Active ( $t=3.910$ ,  $p<.000$ ) and Sequential ( $t=3.248$ ,  $p<.001$ ). This is in line with results from Alumran's (2008) investigation. The question is whether this finding is consistent with the results of a recent longitudinal study (Felder & Brent, 2005) which showed that students belonging to Intuitive type were more successful in abstract learning, while students belonging to Sensor type were more successful in practical learning. Having in mind the nature of main learning tasks in grammar and in technical school it is important to explain the fact that students in grammar school scored higher on Sensor style than students attending technical school.

### *Prediction of learning styles by personality dimensions*

Starting from the point of view that concept of learning styles refers to a complex construct which is partly related to personality traits (Montgomery & Groat, 1998) the regression analysis was performed in order to determine whether it is possible to predict some learning styles by personality dimensions. Precisely, multiple regression analysis was used to determine the predictive power of personality dimensions on Sensor, Active and Sequential learning styles (because they make difference among students of grammar and technical schools).

Data obtained in our students sample showed following:

(1) When the whole students sample is observed, the regression model including personality dimensions explains 23.0% of the variance in Sensor learning style by two significant predictors – Openness ( $Beta=.208$ ,  $p<.002$ ) and Conscientiousness ( $Beta=.258$ ,  $p<.005$ ); 21.6% of variance in Active style by three significant predictors – Openness ( $Beta=.237$ ,  $p<.000$ ), Conscientiousness ( $Beta=.208$ ,  $p<.023$ ) and Extraversion ( $Beta=.174$ ,  $p<.004$ ); only 8.4% of variance in Sequential style is explained by Openness ( $Beta=.232$ ,  $p<.001$ ).

(2) The regression models explain greater amount of learning styles variance in grammar school students' sub-sample than in a whole research sample. Openness ( $Beta=.264$ ,  $p<.002$ ) and Agreeableness ( $Beta=.271$ ,  $p<.021$ ) could predict 37.3% of variance in Sensor style. 25.3% of variance in Active style could be predicted by

Openness ( $\text{Beta}=.351, p<.000$ ) and 18.5% of variance in Sequential style could be predicted by Extraversion ( $\text{Beta}=-.342, p<.000$ ) and Openness ( $\text{Beta}=.267, p<.006$ ). Openness has shown as the best predictor of all learning styles.

(3) The regression model explains a much smaller percentage of the variance of learning styles in the sub-sample of students of technical schools, compared with the sub-sample of grammar school students. Conscientiousness ( $\text{Beta}=.224, p<.018$ ) could predict 13.6% of Sensor style, Conscientiousness ( $\text{Beta}=.199, p<.033$ ) and Extraversion ( $\text{Beta}=.223, p<.018$ ) could predict Active style but model is not statistically significant for Sequential style.

## Conclusion

The research findings have shown that there are some differences between students attending grammar and technical school regarding the level of all five personality dimensions and of three learning styles (Sensor, Active and Sequential). As well, it was found that these learning styles could be predicted on the bases of personality traits but prediction is better in grammar school sub-sample than in the other one. Openness seems to be the best predictor of learning styles in grammar school while Conscientiousness is shown as the best predictor in technical vocational schools.

The results suggest that higher measures of Sensor, Active and Sequential learning styles in grammar than in technical school students could be partly explained by differences in personality profile of adolescents who choose to attend grammar schools and technical vocational schools respectively. On the other hand, this finding is in line with Holland's emphasizing that there is a link between personality traits and occupational interests as well as personality traits relevance in the choice of profession and occupation.

Considering practical implications of the results, it is clear that knowing students' personality characteristics and learning styles could contribute to more effective support of students through individualization of teaching process. It is useful to keep in mind that there is no unambiguous consent of the researchers related to instructional methods that are the most effective for students with certain learning styles (Pashler et al, 2008).

So, additional research is needed in this area. On the basis of recent knowledge, it could be suggested use of the variety of instructional methods and learning tasks, aimed to arise different kinds of thinking and to deal with different students' learning styles. Finally, in our opinion, the results of this research indicate that Serbian teachers should consider how to change their instructional practice in order to contribute to the development of the learning styles mainly connected to creative thinking (Intuitive, Reflective and Global style).

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## References

- Alumran, J. I. A. (2008): Learning styles in relation to gender, field of study, and academic achievement for Bahraini University students. *Individual Differences Research*, 6(4), 303-316.
- Bratko, D., Chamorro-Premuzic, T. & Saks, Z. (2006): Personality and School Performance: Incremental Validity of Self- and Peer-Rating over Intelligence. *Personality and Individual Differences*, 41(1), 131-142.
- Busato, V. V., Prins, F. J., Elshout, J. J. & Hamaker, C. (1999): The relation between learning styles, the Big Five personality traits and achievement motivation in higher education. *Personality and Individual Differences*, 26(1), 129-140.
- Costa, P. T. & McCrae, R. R. (1992): Four ways five factors are basic. *Personality and Individual Differences*, 13, 653-665.
- Đigić, G. (2012): Stilovi učenja kao faktor postignuća. In S. Stojilković, J. Todorović & G. Đigić (Eds.) *Ličnost i obrazovno-vaspitni rad* (pp. 73-86). Niš: Filozofski fakultet.
- Đurić-Jočić, D., Džamonja-Ignjatović, T. & Knežević, G. (2004): *NEO PI-R primena i interpretacija*. Beograd: Centar za primenjenu psihologiju Društva psihologa Srbije.
- Felder, R. M. & Brent, R. (2005): Understanding student differences. *Journal of Engineering Education*, 94(1), 57-72.
- Felder, R. M. & Silverman, L. K. (1988): Learning and teaching styles in engineering education. *Engineering Education*, 78(7), 674-681.
- Furnham, A., Chamorro-Premuzic, T. & McDougall, F. (2003): Personality, cognitive ability, and belief about intelligence as predictors of academic performance. *Learning and Individual Differences*, 14, 49-66.
- Hedrih, V. (2008): Structure of vocational interests in Serbia: Evaluation of the spherical model. *Journal of Vocational Behavior*, 73(1), 13-23.
- Hedrih, V. (2009): Profesionalna interesovanja i osobine ličnosti. *Godišnjak za psihologiju*, 6(8), 155-172.
- Holland, J. L. (1997): *Making vocational choices: A theory of vocational personalities and work environments*. 3<sup>rd</sup> Edition. Odessa, FL: Psychological Assessment Resources.
- Keefe, J. W. (1987): *Learning style: Theory and practice*. Reston: National Association of Secondary School Principals.
- Knežević, G., Džamonja-Ignjatović, T. & Đurić-Jočić, D. (2004): *Petofaktorski model ličnosti*. Beograd: Centar za primenjenu psihologiju Društva psihologa Srbije.
- Larson, L., Rottinghaus, P. & Borgen, F. (2002): Meta-analysis of Big Six Interests and Big Five Personality Factors. *Journal of Vocational Behavior*, 61, 217-239.
- Maksić, S. (2006): *Podsticanje kreativnosti u školi*. Beograd: Institut za pedagoška istraživanja.
- Montgomery, S. & Groat, L. (1998): *Student learning styles and their implications for teaching*. University of Michigan: CRLT Occasional paper No. 10.
- Pashler, H., McDaniel, M., Rohrer, D. & Bjork, R. (2008): Learning styles – concepts and evidence. *Psychological Science in the Public Interest*, 9(3), 105-119.
- Poropat, A. E. (2009): A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin*, 135(2), 322-338.
- Solomon, B. A. & Felder, R. M. (2014): *Index of Learning Styles Questionnaire*. <http://www.engr.ncsu.edu/learningstyles/ilsweb.html> (Accessed July 2014).
- Stojilković, S. (2014): *Psihološke karakteristike nastavnika*. Niš: Filozofski fakultet.

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