

THE FIVE-FACTOR MODEL IN EXPLAINING THE ACADEMIC PERFORMANCE OF ROMANIAN STUDENTS

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Abstract: The aim of this article is to highlight the relationship between the personality factors of the Five-Factor model and the academic performance for 751 Romanian students within the same university. In investigating the personality parameters, we have used the NEO PI-R Personality Inventory and the semi-structured interview technique. The results were correlated with the academic performance achieved by the students in different exam sessions. The academic performance have strong connections with at least 3 factors of the five-factor model of personality; for romanian students, Conscientiousness, Agreeableness and Neuroticism (emotional stability) are key elements in achieving a high academic performance. Assertiveness dimension (Extraversion factor), along with the Openness and Conscientiousness factors are significant predictors for romanian academic performance. Further, limits and implications of the research were discussed.

Keywords: personality factors, academic performance, agreeableness, conscientiousness, openness

Introduction

In previous years, a large number of researches and psychological studies have been highlighted the relationship between personality factors and professional performance.

In the 80's, the researches failed to highlight good predictors for professional activity, in relation with personality factors. As Barrick, Mount and Judge have mentioned (2001), this could be explained by the following issues: "First, no classification system was used to reduce the thousands of personality traits into a smaller, more manageable number. Second, there was lack of clarity about the traits being measured" (Barrick et al., 2001, p. 9).

The five-factor model (FFM) of personality variation has been replicated across a range of human societies, suggesting the FFM is a human universal. Also, many researchers (McCrae & Costa, 1997; Wiggins & Trapnell, 1997; Bouchard & Loehlin, 2001; Yamagata, Suzuki, Ando, Ono, Kijima, Yoshimura, Ostendorf, Angleitner, Riemann, Spinath, Livesley & Jang, 2006; Gurven, von Rueden, Massenkoff, Kaplan & Lero Vie, 2013) have argued that the structure of the FFM is a biologically based human universal that transcends language and other cultural differences. The FFM model has been tested in many countries and numerous languages with the Revised NEO Personality Inventory (NEO-PI-R) of Costa & McCrae (1992) and the Big Five Inventory (BFI) of Benet-Martinez & John (1998) protocols.

In this article we have paid a particular attention to the personality dimension called "assertiveness", part of the extraversion dimension in the Big – Five model and a predictor for academic performance.

For many studies (Hunter & Schmidt, 1990; Barrick & Mount, 1991; Barrick, Mount & Judge, 2001) the validity of measurement with scales from the FFM is affected by the size of the research samples: "meta-analysis has effectively demonstrated that differences in correlations across primary studies are often more a function of small sample sizes than meaningful differences in the nature of the relationship between two variables across settings" (Barick et al. 1991, p.10). Also, Hunter and Schmidt (1990) have called this problem a "second-order sampling error". Also the researchers "implicitly treated each individual personality scale as if it measured a distinct construct, rather than recognizing that each scale from a personality inventory assessed only one aspect or facet of a larger construct" (idem). According to Barrick, Mount & Judge (2001), personality dimensions are most likely to affect job performance, including academic achievements, in situations where job autonomy is high. Results support that Conscientiousness is a valid predictor across performance

measures in all occupations studied. A few years earlier, they found that “Conscientiousness was the only FFM trait to display non-zero correlations with job performance across different occupational groups and criterion types” (Barrick, et al., 2001, p. 10). Also, Salgado (1997), Anderson & Viswesvaran (1998) found that Emotional stability and Conscientiousness displayed non-zero correlations with job performance.

These meta-analyses (Barrick & Mount 1991; Tett, Jackson & Rothstein, 1991; Salgado, 1997; Barrick, Mount & Judge, 2001; Salgado, 2003) have shown that Conscientiousness and Emotional stability have generalized validity across criteria, occupations, organizations and countries. Agreeableness was found to remain consistent between North American and European studies in an exploratory study (Motel & Stoll, 2015). While some traits may be universal, multiple points of cultural variability potentially exist.

Based on the conclusions that Conscientiousness and emotional stability have generalized validity across occupations, organizations and countries, a group of researchers (Gurven et al., 2013; Henrich, Heine & Norenzayan, 2010) raised the question of choosing research samples from populations with non-WEIRD demographic characteristics; they mentioned that the vast majority of samples from cross-cultural studies are urban students from western, educated, industrialized, rich and democratic populations, “WEIRD populations” (Henrich et al., 2010).

Among emic studies (in emic approaches, a personality structure is indigenously derived with a sampling of the target culture’s personality descriptors), an Openness factor is not consistently extracted (Di Blas & Forzi, 1998; Szirmák & De Raad, 1994). Furthermore, several emic studies have consistently yielded more than five factors (Almagor, Tellegen, & Waller, 1995; Benet-Martínez & Waller, 1997).

In two longitudinal studies, Harris, English, Harms, Gross & Jackson (2017) explored whether Extraversion is prospectively associated with higher levels of satisfaction during college through influencing college social experiences using longitudinal cross-lagged mediation models. As for the other two personality factors (Agreeableness and Openness to experience) the authors' opinions are different (Bouchard, 1997; Barrick, Stewart, Neubert & Mount 1998; Barick et al., 2001). They suggested that the one situation in which Agreeableness appears to have high predictive validity is “in jobs that involve considerable interpersonal interaction, particularly when the interaction involves helping, cooperating and nurturing others. In fact, in those settings, Agreeableness may be the single best personality predictor” Barick et al., (2001, p. 12)

Recently published studies from educational psychology found that the Big Five personality traits are significant predictors of academic performance

for medicine students in Romania. Grama, Botone & Raulea (2016) identified that for about 95% of the participants (254 medicine students), the basic personality factors Agreeableness and Conscientiousness represented significant predictors of academic performance. Although in many studies it has been shown that Assertiveness contributes to the development of professional performance, there are some studies where it has been shown that Assertiveness could have a negative impact on professional performance. For example, in Korean academic environment, Assertiveness can also have a negative impact on efficiency in the communication process (Jing Yu Zhang & Jung Kee Kim, 2017). However, a plausible explanation for the results obtained in this study could be the roots of a predominantly collectivist culture (Hofstede, Hofstede & Minkov, 2010; Markus & Kitayama, 1991) where factors such as high / low power distance would play a major influence.

In cross cultural psychology, many authors argued that Extraversion and Agreeableness items have shown different factor structure in East Asian societies because they are more collectivist cultures in which interpersonal affiliation and obedience to authority are more normative (Cheung, Cheung, Zhang, Leung, Leong & Hui Yeh, 2001; Cheung & Leung, 1998).

As far as these aspects are concerned, we consider that a more extensive research in the whole Romania country is needed to highlight different forms of Romanian self and personality structure. For the moment, it is difficult to say that a Romanian student has rather an “independent view of self” and not an “interdependent view of self” (Markus & Kitayama, 1991, p. 226). How much conscientiousness, openness, warmth, positive emotions, altruism or assertiveness do young Romanian students invest in their professional training and especially in their preparation for life? The research below attempts to provide some answers to this question.

Method

1. Objective and hypothesis

The current research aimed to advance our understanding of the relationship between the personality factors and academic performance of Romanian students.

We aimed to establish that Agreeableness and Conscientiousness are significant predictors for academic performance, measured in average of grades (Hypothesis 1). We have presumed that lower level of Neuroticism (high level of emotional stability) expressed by the subjects, the higher their academic performance should be (Hypothesis 2). Extraversion and Openness were not identified as significant predictors for dependent variable “average of grades” (Hypothesis 3). Positive Emotions and Warmth are relevant predictors for the Assertiveness expressed by the group of students (Hypothesis 4).

2. Participants and procedure

The sample consisted of Romanian students, 751 students (222 male, 529 female) from a Romanian university. For choosing the students sample, we used the simple random sampling technique. Also, the student samples were extracted from a finite and specified population of the students from the same university. The sampling unit is made up of students aged between 18 and 26. The sampling base was made up of the lists of students enrolled in academic year, at the beginning of academic semester. Also, we focused our attention on the representativeness of the research sample, especially on the size of students' sample. They are 81% graduates of the 2nd and 3th year. Also, a proportion of about 7% are students in two faculties or they have already graduated from the first faculty. The students completed the survey individually under the supervision of an interviewer. Prior to conducting the survey, participants were informed about the purpose of the study. All of the students were assured that they were free to refuse participation if they did not agree with the goal of the study. The respondents' confidentiality was also assured.

3. Measures

In investigating the personality factors we have used the NEO PI-R Personality Inventory and the semi-structured interview technique mainly regarding the student's academic behavior and exam situation. The NEO Psychological Inventory Revised, NEO PI-R has been cultural adapted and standardized on Romanian population by Iliescu, Minulescu, Ispas & Nedelcea. Academic performance was rendered operational by calculating the average score of each student throughout the entire period of study in the university. For the testing of the research assumptions we have used several statistical methods (ANOVA and linear regression) processed in SPSS 23 program. We ran ANOVA to identify possible effects of "gender", "age", "faculty specialization" on personality factors. We also used the linear regression model to identify possible predictors of academic achievement from the five factors of personality. We have considered the five factors of personality as well as their dimensions in relation to academic achievements. Specifically, we first aimed to rigorously examine the effects of characteristics such "gender", "age", "academic specialization" on academic achievements, as well as possible reciprocal effects of academic achievements on the structure of students' personality.

Results and Discussion

The results shows the beta significant coefficients for dependent variable "average of grades", obtained through multiple regression analyses:

Neuroticism ($\beta = -.101$; sig. 0.014), Agreeableness ($\beta = 0.209$; sig. 0.000) and Conscientiousness ($\beta = 0.145$; sig. 0.001). This result supports Hypothesis 1.

In relation to Neuroticism factor, we have obtained a negative value Neuroticism ($\beta = -.101$; sig. 0.014), which indicates that a low level of neurotic behavior and basically a high emotional stability leads us to achieve a high academic performance. This result supports Hypothesis 2.

Therefore, we could conclude that the two factors of Agreeableness and Conscientiousness are significant predictors for academic performance, measured in average of grades; also, a low level of Neuroticism (high level of emotional stability) is associated with a high average of grades, expressing high academic performance.

The results from table 1 show significant correlations between the variables "average of grades", Neuroticism, Openness, Agreeableness, Extraversion and Conscientiousness at significance levels ($p < .01$) and ($p < .05$); so, we have obtained a positive correlation between the variables: Agreeableness and Conscientiousness ($r = .261^{**}$; $p < .001$); Agreeableness and Neuroticism ($r = -.139$; $p < .001$); Conscientiousness and Extraversion ($r = .365^{**}$; $p < .001$); Neuroticism and Extraversion ($r = -.308^{**}$; $p < .001$); Neuroticism and Average of grades ($r = -.190$; $p < .001$); Average of grades and Agreeableness ($r = .259^{**}$; $p < .001$); Average of grades and Conscientiousness ($r = .233^{**}$; $p < .001$). Also, the data show significant correlations between Openness and Extraversion ($r = .421$; $p < .001$); Openness and Conscientiousness ($r = .187$; $p < .001$); Conscientiousness and Neuroticism ($r = -.493$; $p < .001$).

More, the results allowed us a quasi-experimental analysis; Levene's Test of Equality of Error Variances^a which tests the null hypothesis that the error variance of the dependent variable is equal across groups had an insignificant coefficient ($F = 1.104$; sig. = 0.345). The ANOVA results for Conscientiousness as dependent variable and variables "age", "gender", Neuroticism, indicated an insignificant main effect ($F = 1.583$; sig. 0.126; $\eta^2 = 0.017$) of "Age" variable on the Conscientiousness factor. In the case of the other two variables Gender has a significant main effect ($F = 37.619$; sig. 0.00; $\eta^2 = 0.048$) and Neuroticism factor ($F = 264.212$; sig. 0.00; $\eta^2 = 0.263$) as well. Although, the results showed significant main effects, the effects sizes of the two variables (Gender and Age) on Conscientiousness factor are very weak, both partial η^2 coefficients were less than 0.50. Also, for dependent variable Agreeableness, "Gender" factor has a significant main effect ($F = 13.887$; sig. 0.001; $\eta^2 = 0.019$), and "Age" factor ($F = 3.041$; sig. 0.002; $\eta^2 = 0.03$) as well. Just as with the Conscientiousness factor, partial η^2 coefficient expresses a very weak effect sizes. However, there are differences in the expression of Agreeableness, by "Gender" and "Age" variables that can be better visualized

in Figure 1. For example, between males and females, the differences of Agreeableness' expression are major for age groups 23-24 and 24-25.

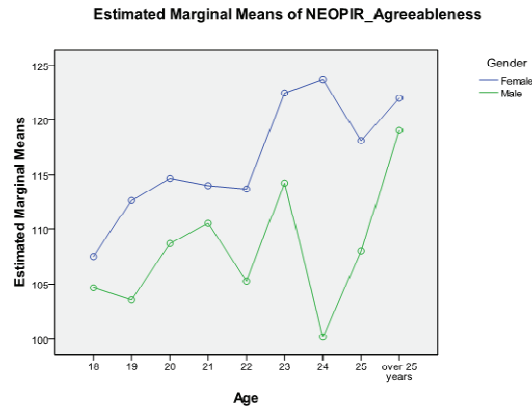


Figure 1. Age and gender differences in expressing Agreeableness

Table 1.
Means, standard deviations and Pearson's coefficients between variables

	M	SD	1	2	3	4	5
1. Average of grades	7.98	1.14					
2. Neuroticism	92.54	20.93	-.190**				
3. Openness	111.83	15.32	.005	-.038			
4. Extraversion	111.60	17.34	.050	-.308**	.421**		
5. Agreeableness	113.54	17.77	.259**	-.139**	.038	.042	
6. Conscientiousness	124.7	19.34	.233*	-.493**	.187**	.365**	.261**

N=751, **p<.001, *p<.05

Table 2.
Means, standard deviations and Pearson's coefficients
between variables of
the five-factor model and "faculty" variable

	1	2	3	4	5	6
1. Neuroticism	1					
2. Openness	-.038	1				
3. Extraversion	-.308**	.421**	1			
4. Agreeableness	-.139**	.038	.042	1		
5. Conscientiousness	-.493**	.187**	.365**	.261**	1	
6. Faculty	-.025	-.118**	-.059	.130**	-.125**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Regarding the factor "Openness", we hypothesized that there are significant differences between students from different faculties, considering the level of Openness (Hypothesis 3).

As can be seen (table 2) there are significant differences between the students from different faculties considering the level of "Openness" ($r = -.118^{**}$; $p < .001$). This result supports Hypothesis 3. Although the correlation between the two variables is significant at $p < .001$, the correlation is weak. We assume that the level of correlation is weak due to the diversity of occupational profiles that made up the research sample; also we mention that the research sample was made up of students from faculties of medicine, law, sports, mathematical sciences, informatics, theatrical arts, theology, humanities and social sciences.

According to McCrae (1996, p. 323), there are six facets of Openness: "vivid fantasy, artistic sensitivity, depth of feeling, behavioral flexibility, intellectual curiosity, and unconventional attitudes". Also, individual differences in Openness are related to differences in the fluidity of their cognitive structure (McCrae, 1994). For this reason, a more in-depth research would have been useful and necessary in this case, because the methodology of our study did not included psychological instruments for assessing cognitive abilities. It is very likely that the ability for absorption, (possible for an open person) of the students are very different, this fact causing a high variability of the results and implicitly a weak correlation between the "faculty" variable and the Openness factor. Also, the results from table 2 show significant correlations between Openness and Extraversion ($r = .421^{**}$; $p < .001$); it is very likely that a student with a high level of Openness tends to behave, act, think, and feel in

an extraverted way. The correlation between Openness and Extraversion has led us to carefully analyze this aspect and to identify which dimension of Extraversion would have a strong link with the Openness factor. Conscientiousness, Openness, and Assertiveness ($F=14.883$; sig. 0.00; eta = 0.019) act as simultaneous predictors for academic achievements (average of grades).

Table 3.
Pearson's coefficients between sub-dimensions of
five-factor model

	1	2	3	4	5	6	7
1. Openness							
2. Extraversion	.421**						
3. Assertiveness	.272**	.671**					
4. Agreeableness	.038	.042	.168**				
5. Conscientiousness	.187**	.365**	.363**	.261**			
6. Warmth	.365**	.718**	.336**	.333**	.318**		
7. Positive Emotions	.394**	.734**	.368**	.067	.272**	.524**	

** . Correlation is significant at the 0.01 level (2-tailed).

For the descriptive indicators of the population surveyed (N=751), among the variables, Conscientiousness has recorded the highest average (mean = 124.72; std. dev. 19.34), followed by Agreeableness (mean = 111.54; std. dev. 17.77), Openness (mean = 111.83; std. dev. 15.32) and Extraversion (mean = 111.60; std. dev. 17.34). The sub-dimension “Warmth” from Extraversion, factor obtained the highest score (mean = 21.25; std. dev. 3.875) in relation to the sub- dimension “Assertiveness” (mean = 16.36; std. dev. 4.51) and sub-dimension Positive emotions (mean = 20.06; std. dev. 3.98).

On a population of 751 students, the results show a significant effect ($F = 73.202$; sig. 0.000^a) of the two prediction variables Warmth and Positive Emotions on the variable criterion “Assertiveness”. We can conclude that Positive Emotions and Warmth are relevant predictors for the Assertiveness expressed by the group of students (hypothesis no. 4 has been confirmed). So, the students who tend to express in their general academic a high level of Positive Emotions along with a high level of Warmth tend to finally develop academic behavior generally characterized by a good level of Assertiveness.

The results of the entire students' sample showed many positive correlations (table 3) between the dimensions and sub-dimensions of Agreeableness, Openness and Extraversion; so, we have: Openness and Extraversion ($r = .421^{**}$; $p < .001$); Openness and Assertiveness ($r = .272^{**}$;

p<.001); Openness and Conscientiousness ($r = .187^{**}$; $p<.001$); Openness and Warmth ($r = .365^{**}$; $p<.001$); Openness and Positive Emotions ($r = .394^{**}$; $p<.001$); Extraversion and Assertiveness ($r = .671^{**}$; $p<.001$); Agreeableness and Assertiveness ($r = -.168^{**}$; $p<.001$); Agreeableness and Warmth ($r = .333^{**}$; $p<.001$); Agreeableness and Positive Emotions ($r = .734^{**}$; $p<.001$); Conscientiousness and Assertiveness ($r = .363^{**}$; $p<.001$); Conscientiousness and Agreeableness ($r = .261^{**}$; $p<.001$), etc. Assertiveness and Warmth ($r = .336^{**}$; $p<.001$); Assertiveness and Positive Emotions ($r = .368^{**}$; $p<.001$); Warmth and Positive Emotions ($r = .524^{**}$; $p<.001$). Also, Neuroticism correlates negatively with all four sub-dimensions previously analyzed: Assertiveness and Neuroticism ($r = -.324^{**}$; $p<.001$); Warmth and Neuroticism ($r = -.176^{**}$; $p<.001$); Positive emotions and Neuroticism ($r = -.207^{**}$; $p<.001$); Neuroticism and sub-dimension Altruism ($r = -.161^{**}$; $p<.001$). Among the sub-dimensions of the Agreeableness factor, only the sub-dimension Altruism, correlates positively with the sub-dimension Assertiveness. From all the above-mentioned variables, Neuroticism ($r = -.324^{**}$; $p<.001$); and Agreeableness ($r = -.168^{**}$; $p<.001$) negatively correlate with Assertiveness, which determines us to conclude that emotional stability (low level of neuroticism) is a necessary condition for developing a high level of Assertiveness and consequently good academic performance.

Table 4.
Means and std. deviations of Assertiveness depending
on faculty's type

Faculty	Mean	N	Std. Deviation
Law School	18.44	108	4.346
Faculty of Letters and Arts	16.38	52	4.939
Faculty of Medicine	15.58	252	4.383
Faculty of Agricultural Sciences and Food Industry	16.08	129	3.999
Faculty of Sciences	16.26	139	4.211
Faculty of Social and Human Sciences	16.62	71	5.455
Total	16.36	751	4.516

As we can see in table 4, the highest level of Assertiveness was obtained by students from Law School.

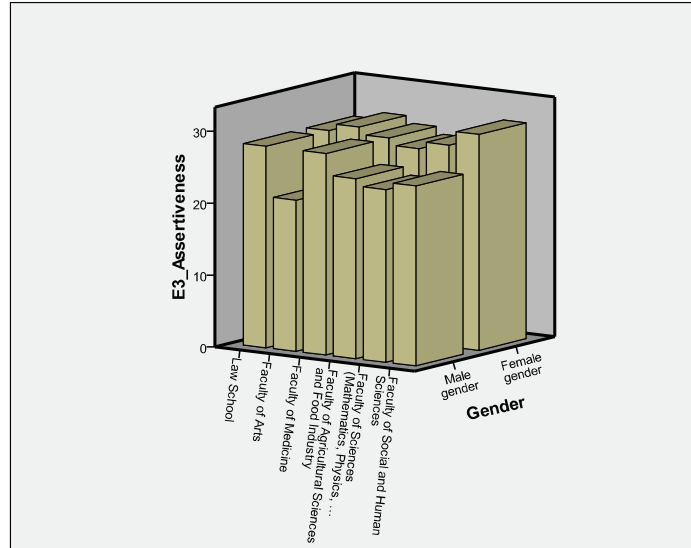


Figure 2. The means of Assertiveness, depending on students's gender and faculty's type

Also in Figure 2, we can track small differences between male students and female students in terms of Assertiveness from different faculties. Female students from Faculty of Social and Human Sciences have obtained a slightly higher score than the female students from Faculty of Letters and Arts and male students from Law School.

Conclusions

This article aims to highlight the presence of the five universal personality factors in academic performance, taking into account the dynamics of culture and self (Markus & Kitayama, 2013), whether we are talking about academic training for a physician, mathematician or lawyer.

Also, the exam grades have strong connections with at least 3 factors of the five-factor model of personality for Romanian students. Thus, Conscientiousness, Agreeableness and Neuroticism (emotional stability) are key elements in achieving high academic performance for our research, operationalized in the average of exam grades. Despite the fact that Romanian students, coming from a predominantly individualist culture, personality factors such as Warmth, Positive emotions, Assertiveness and Agreeableness are key factors in the development of academic performance, along with the other two universal factors Conscientiousness and Openness to experiences.

As a general conclusion, all four hypothesis have been confirmed by research findings. The Extraversion and Openness factors individually considered have not achieved significant correlations with the average of grades for Romanian students. However, important sub-dimensions of these factors play an important role in achieving academic performance. For example, the Assertiveness sub-dimension (Extraversion factor), along with the Openness and Conscientiousness factors are significant predictors for academic performance, regardless the faculty where the student is enrolled. From our analysis, the highest average for Assertiveness was recorded by the Law School students, followed by students from Faculty of Social and Human Sciences. According to the results obtained, living Positive emotions and Warmth in academic life can lead to a higher level of Assertiveness and implicitly to a higher academic performance for Romanian academia.

As a limitation of our research, we identified the following: the relatively large difference between male and female students could have affected the effects sizes of the statistical coefficients obtained in our research. This is mainly due to the higher number of female students than men students who are enrolled in the faculties concerned. Another aspect previously mentioned was the lack of tools for assessing cognitive abilities, which would have led us to more significant results regarding the connection Openness factor- academic performance. The relationship between personality dimensions and job performance should be studied with larger samples and by using predictive validity designs in various Romanian universities.

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