THE RELATIONSHIP BETWEEN INTELLIGENCE, EMOTIONAL INTELLIGENCE, PERSONALITY STYLES AND ACADEMIC SUCCESS

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ABSTRACT

This paper assesses the effects of general and emotional intelligence and personality preferences on academic performance. The question is examined using surveys among students in economics at the University of Debrecen, Hungary. In our examination we primarily used regression analysis. With our results we answer the question of what kind of relationship exists between the aforementioned variables and academic performance. Based on our findings we can conclude that academic performance was significantly influenced by the sex, intellectual intelligence, introvert or extrovert orientation, thinking or feeling personality preference and, in some parts of the sample, by the emotional intelligence, and perceiving or judging personality preference of the student.

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INTRODUCTION

The objective of this paper is to assess the question of what personality traits and abilities are associated with successful academic performance. Our everyday experiences suggest that success in the education system depends on the existence of certain kinds of abilities (i.e. it seems to be trivial that quick understanding is important). Moreover, some personal characteristics – more hidden to the observer – may also influence educational performance (see e.g. Rosander et al., 2011, Farsides and Woodfield, 2003).

The concrete research question of our empirical examination is: can the average academic achievements (estimated by the mean of average grades from the last two university semesters) be predicted with the help of the intelligence quotient (hereinafter IQ), the emotional intelligence quotient (hereinafter EQ), and the personality preferences, and if yes, to what extent? Our hypothesis is that academic performance is associated with IQ and EQ measured by the appropriate tests, and the personality preferences, taking into account the sex, academic year, place of residence, number of graduate parents and grandparents, and whether or not the student is 'deferred'. We referred to a person as 'deferred' if he/she was born between 31 May and 31 December because in this case he/she attends the same class as those who were born between 1 January and 31 May in the following year. The reason behind asking this in the questionnaire is that the slightly higher age may influence academic performance. The possible relationship between age and academic achievement was confirmed by Pellizzari and Billary (2012), among others.

A brief summary of the literature on the general intelligence, emotional intelligence and personality traits follows in the next section. The data collection method and the introduction of the sample are included in the third section. In the Results section we demonstrate the statistical analysis of two models and determine the role of the above mentioned features in influencing academic performance for the examined population. We draw our conclusions in the last section.

LITERATURE REVIEW

There is no ultimate definition of intelligence, but most researchers accept that it is an ability to solve problems (including problems of comprehension) by thinking (DeYoung, 2011). In other words it is "a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience" (Gottfredson, 1997, p. 13). General intelligence, also known as general cognitive ability, intellectual ability, general mental ability (GMA) or the *g*-factor (henceforth mainly referred to as intelligence) is a well-researched construct with impressive supporting evidence for its capability to predict labor market performance on both an individual (e.g. Bowles et al., 2001, Ferris et al., 2001, O'Reilly and Chatman, 1994) and a national level (e.g. Garett, 2012, Hanushek and Woessmann, 2007, Lynn and Vanhanen, 2012), as well as being a generally accepted determinant of academic success on every level of the education system (Malcolm et al., 2005). Measurement of intelligence defined in this way is well established. It can be measured accurately with many different forms of tests (Gottfredson, 1997, p. 13). If the intelligence test is standardized then the score derived from it is referred to as the intelligence quotient (IQ), where the median of the norming sample is 100 (Carter, 2005, p. 7-11). Among others, Marjoribanks (1979), Laidra et al. (2007) as well as Dodonova and Dodonov (2012) have found evidence for the positive effect of intelligence on school performance; Busato et al. (2000), Song et al. (2010), Furnham (2012), and others have confirmed that intellectual ability associates positively with academic success in higher education. There also exists a strong positive correlation between educational attainment and 'national IQs' calculated from various IQ tests for nations, according to some research studies (e.g. Lynn and Meisenberg, 2010, Lynn and Vanhanen, 2012).

Emotional intelligence was first defined by Mayer and Salovey (1993, p. 433) as "a type of social intelligence that involves the ability to monitor one's own and others' emotions, to discriminate among them, and to use this information to guide one's thinking and actions". Emotional intelligence is the set of skills people use to read, understand, and react effectively to emotional signals sent by others and by oneself. These are skills such as empathy, problem-solving, optimism, and self-awareness, which allow people to reflect, react to, and understand various environmental situations (Romanelli et al., 2006). Emotional intelligence as defined by Daniel Goleman includes self-control, enthusiasm, persistence and self-motivation. These are abilities that can be developed and taught (Goleman, 1998). In simpler terms, emotional intelligence is the ability to perceive, understand, and manage one's emotions (see, among others, Salovey and Mayer, 1990, Salovey et al. 1993, Goleman, 1995, Bar-On, 1997, Cooper and Sawaf, 1997, Mayer and Salovey, 1997, Ciarrochi et al., 2000, Mayer et al., 2001, 2004, Salovey & Grewal, 2005, Salovey et al., 2008). Its role as a predictor of academic performance is confirmed by several studies (e.g. Song et al., 2010, Ferrando et al., 2011). However, the finding of research on the relationship between emotional intelligence and academic success are controversial. Several authors have found that emotional intelligence measured by different tests showed no significant relationship with academic success (see e.g. O'Connor and Little, 2003; Rode et al., 2007, Lotfi Kashani et al., 2012, Ng et al., 2012, Chandana Jayawardena and Gregar, 2013), while some (Lotfi Kashani et al., 2012) have revealed a significant positive correlation between IQ and academic success. Some of the empirical studies revealed a significant positive relationship between emotional intelligence and college students' results (see, among others, Barchard, 2003; Brackett and Mayer, 2003, Codier and Odell, 2013, Parker et al., 2004, Baljinder and Kuldip, 2009) or high school students' results (e.g. Paramasivam and Mani, 2013, Gil-Olarte Márquez et al., 2006). However, in three studies with college students, EQ total scores and grades were correlated only modestly (Barchard, 2003; Brackett and Mayer, 2003, Codier and Odell, 2013). The study by Gil-Olarte et al. (2006) with high school students showed scores on the EQ correlated with final grades after controlling for both personality and academic intelligence.

The personality model used in our research determines four preference pairs (dichotomies): introvert-extrovert (independence from or dependence on the environment), intuitive-sensing (holistic or analytic

thinking), thinking-feeling (rationally or personal values-based thinking), perceiving-judging (a tendency towards the extensive collection of information or towards the quick closure of the decision making process). This description of the personality with these four preference pairs originates from K. C. Briggs and I. Briggs-Myers who developed C. G. Jung's model (Quenk, 2009, p. 1-3). Hogan and Champagne (1980) used the term 'personality styles' for the concept of 'personality preference', which can be described as that way of experiencing the world that you feel 'most natural and comfortable with' (Bayne, 1997, p. 4). According to Bayne, preferences have a strong influence on, but are not identical to, behavior, because the latter is usually affected by many other factors at the same time. All the eight above mentioned preference-poles are used at least some of the time by all individuals, although the preferred ones tend to be used more frequently. Much research has already been conducted concerning the relationship between personality preferences and academic success (see among others Ziegert, 2000, Hengstler, 1981, Ditiberio and Hammer, 1993, Borg and Stranahan, 2002, Borg and Shapiro, 1996), and this paper also attempts to contribute to this line of research. Borg and Shapiro (1996) found that for their sample of 119 students on Principles of Macroeconomics courses personality preferences measured by the Myers–Briggs Type Indicator (Briggs-Myers at al., 1998) had a significant influence on academic success. They demonstrated that being an introvert had a significant positive effect on the chance of getting a good grade. Ziegert (2000) replicated Borg and Saphiro's work with a much larger sample (617 students). The course examined was Microeconomics Principles. She found that the sensing and the thinking preferences contributed positively to grades, while for the Test of Understanding College Economics (TUCE) score measured at the end of the semester only the judging preference was insignificant, and while the sensing preference modified the TUCE performance negatively. Borg and Stranahan (2002b) continued Borg, Shapiro and Ziegert's line of research and investigated the personality effects on a sample of 166 students from three advanced-level economics courses. They found only the effect of the introversion type significant; this had a positive effect.

DATA AND METHODOLOGY

In our research we used an IQ test edited by H. J. Eysenck that was adapted for the Hungarian examinations (Eysenck, 1995). This test attempts to measure general understanding and problem solving abilities. The test contained 40 questions and students had 30 minutes to answer them. The maximum score was 40. The emotional intelligence test used in our research (Benkőné et al., 2004:55-62) contained 40 questions and the students had 25 minutes to answer them. The maximum score was again 40 but the lower limit was -20. The test selected to measure the four Myers–Briggs personality dichotomies (Hogan and Champagne, 1980, p. 96-97) had a maximum score of 40 points on the scales related to the preference pairs. For simplicity we marked the preference pairs with only one of the two preferences which can be ranged from 0 to 40 (the other pole of the preference pair can be calculated if we deduct the previous values from 40). 40 indicates the perfect dominance of the specified preference, 0 indicates that of its complementary preference.

The source of our data is established from three surveys conducted at the University of Debrecen Faculty of Economics and Business Administration among full time second, fourth and fifth year students. Intelligence and emotional intelligence tests were completed by the students of all the aforementioned years, while the personality test was completed only by the second year students. Data collection was carried out between September and November 2005. Because some students may be behind in their studies, and some may complete their courses later or sooner than prescribed by the educational syllabus our groups theoretically formed according to academic years may contain some students not in that particular year.

Surveys were filled in anonymously, so establishing which questionnaire was filled in by the same person was only possible if the student chose the voluntary option of using a coded identity, or the complete consistency of the other data made the identity of the respondent obvious. Students in our surveys were

asked to state their sex and their average grade in the previous two completed semesters. Beside these variables we asked about the number of parents and grandparents with university degrees, the place of residence (the students had to declare if they had lived mainly in a village or in a town/city until they were 14 years old, and which they regarded as their main place of residence), whether the student had lost a year (become deferred), whether he/she had taken time out between the baccalaureate and university studies, and whether he/she had already taken similar tests. Familiarity with the IQ test was asked, because multiple repetition of intelligence tests usually causes an increase in the points achieved (Eysenck, 1995, p. 33); however, this is not significant after the third repetition. This phenomenon is mainly caused by proficiency in test-completion, i.e. to knowledge of the process, as well as to the decreasing level of anxiety. The last two variables were not used because of the low response levels.

Two samples were analyzed for the corresponding IQ and EQ data of the second, fourth and fifth year students (134 students in total), and the corresponding IQ, EQ, and personality data of the second year students (61 students in total). Table 1 shows the frequency distributions of both samples according to the relevant demographic variables, whilst Table 2 contains the mean and standard deviation data of the samples, relating to the mean of the grade averages of the last two semesters (on a scale from 1 to 5), the IQ score on a 0 to 40 scale, the EQ score on a 0 to 40 scale and the introversion, the intuitive, the thinking and the perceiving preferences on a 0 to 40 scale.

Table 1: Frequency Distributions of the Samples

Sample	Year	Sex		Number of Graduate Parents			Number of Graduate Grandparents						Residency			Number of Deferred Students	N
		Male	Female	0	1	2	0	1	2	3	4	N/A	Village	Town/City	N/A		
IQ, EQ	2nd	24	57	42	19	20	58	9	11	2	0	1	26	53	2	20	134
	4th	10	24	17	7	10	23	6	2	0	1	2	14	20	0	12	
	5th	8	11	9	4	6	12	2	2	2	0	1	5	14	0	11	
IQ, EQ, Personality	2nd	17	44	33	14	14	43	6	10	1	0	1	16	43	2	17	61

This table presents the frequency distributions of the two samples by year, sex, the number of graduate parents and grandparents, residence, and the number of students had been deferred.

Table 2: Means and Standard Deviations of the Variables Measured on a Metric Scale in the Two Samples

Variables	Samples			
	IQ, EQ (N = 134)		IQ, EQ, Personality (N = 61)	
	Mean	Std. Deviation	Mean	Std. Deviation
Mean Of Grades	3.577	0.5277	3.477	0.4906
IQ Score	19.925	4.105	20.000	3.782
EQ Score	11.425	5.271	11.885	5.076
Graduate Parents	0.7612	0.8512	0.6885	0.8275
Gr. Grandparents	0.4846	0.8737	0.4833	0.8335
Introvert	–	–	19.623	4.855
Intuitive	–	–	19.131	4.291
Thinking	–	–	18.689	5.012
Perceiving	–	–	18.213	4.838

This table presents the means and the standard deviations of two samples by the mean of grade averages (1-5), IQ score (0-40), EQ score (0-40), the number of graduate parents, the number of graduate grandparents and introvert, intuitive, thinking and perceiving personality preference-poles (0-40). The means of extrovert, sensing, feeling and judging preferences are computable by subtracting the mean of their pair from 40.

RESULTS

In the examination of the relationships between IQ, EQ, and academic achievements our hypothesis was that the mean of the second, fourth, and fifth year students' average grades in the last two completed semesters are significantly positively associated with the intelligence quotient and the level of their

abilities measured by the emotional intelligence quotient (i.e. higher IQ and EQ likely indicate a higher academic performance), if variables of sex, year, residency, number of graduate parents and grandparents, and being deferred are taken into account. As our research was exploratory we did not possess a starting model, rather the models were formed during the analysis of the data of the given sample; i.e. regression relationships were described by different types of functions.

In the tested model we used three higher scale and five artificial binary (dummy) variables. The latter were the sex (1 if female, 0 if male), the residency (1 if town/city, 0 if village), the year loss (1 if deferred, 0 if not), and the variables of the university years (1 if he/she is attending the given year, 0 if not). In this way the second year was the benchmark compared to which the other years could explain the difference between the academic achievements.

We did not find any model describing academic performance in the last two completed semesters of the second, fourth and fifth year students significant at the 0.05 level. The variable of sex and some influence of EQ were not acceptable at the 0.05 significance level. At the 0.10 significance level we found five valid models that can be divided into two major groups according to their function shape. The models with the highest R^2_{adj} value in these two groups are the following (results of these models are presented in Table 3):

$$Y = b_0 + b_1 \cdot \frac{1}{x_{IQ}} + b_2 \cdot x_{EQ} + b_3 \cdot x_{EQ}^{\ 2} + b_4 \cdot x_{EQ}^{\ 3} + b_5 \cdot x_{SEX} + \\ + b_6 \cdot x_{PARENT} + b_7 \cdot x_{YEAR5} + \varepsilon \quad (1)$$

$$Y = b_0 + b_1 \cdot \frac{1}{x_{IQ}^{\ 2}} + b_2 \cdot x_{EQ} + b_3 \cdot x_{EQ}^{\ 2} + b_4 \cdot x_{EQ}^{\ 3} + b_5 \cdot x_{EQ}^{\ 4} + b_6 \cdot x_{SEX} + \\ + b_7 \cdot x_{PARENT} + b_8 \cdot x_{YEAR5} + \varepsilon \quad (2)$$

where X_{SEX} is 1 if the student was female, 0 if male; X_{PARENT} is the number of graduate parents; X_{YEAR5} is 1, if the student was in his or her 5th year at the University, 0 otherwise; X_{IQ} is the IQ score; X_{EQ} is the EQ test score; ε represents all the factors measured.

The models in Table 3 do not involve independent variables that are not significant at the 0.10 level. Results can be summarized as follows: 1.) female students performed significantly better than males; 2.) 5th year students had better grades than 2nd and 4th year students; 3.) higher intelligence contributed to higher academic performance, but as IQ increases, its positive effect decreases (but still remains positive); 3.) in the 1st model a higher EQ indicates weaker performance (between 8 and 13 EQ points the EQ was in positive correlation with the mean of average grades); 4.) in the 2nd model there was a U-shaped connection between EQ and the mean of average grades (if the EQ is below 8 points, the correlation was negative, whilst at higher EQ levels it was positive).

With the use of Kolmogorov–Smirnov (K–S) test for normality the possibility that the distribution of residuals was not normal at the 0.10 significance level could be rejected. The value of the K–S statistic was 0.5529 for the 1st and 0.7734 for the 2nd model. To test the homoscedasticity of the residuals we used the Goldfeld–Quandt test. As explanatory variables we used EQ, IQ and X_{PARENT}, too. The *c* value was 15% in the case of all three explanatory variables. The distribution of the residuals were homoscedastic for both models (the *F* value in the 1st model was 1.145 for the IQ as an explanatory variable, 1.038 for the EQ and 1.076 for the X_{PARENT}; in the 2nd model the values were 1.157, 1.057 and 1.041 respectively).

Table 3: Results of Two Linear Regression Models Significant at the 0.10 Level

Dependent: mean of the average grades in the last two semesters							
	Independent Variable	**Coefficient**	***t***	***F***	$\mathbf{R^2}_{adj}$	***df***	***N***
1st model	*constant*	4.133	12.557***	4.430***	0.1529	1.885	
	X_{IQ}^{-1}	-8.215	-2.710***				
	X_{EQ}	-0.1511	-1.973*				
	X_{EQ}^{2}	0.0143	2.167**				
	X_{EQ}^{3}	-0.0003	-2.203**				
	X_{SEX}	0.1795	1.884*				
	X_{PARENT}	0.1109	2.176**				
	X_{YEAR5}	0.4699	3.797***				
2nd model	*constant*	4.384	0.3890***	4.325***	0.1666	1.879	134
	X_{IQ}^{-2}	-69.846	22.303***				
	X_{EQ}	-0.4228	0.1634**				
	X_{EQ}^{2}	0.0560	0.0236**				
	X_{EQ}^{3}	-0.0027	0.0013**				
	X_{EQ}^{4}	0.4541	0.2523*				
	X_{SEX}	0.2033	0.0953*				
	X_{PARENT}	0.1243	0.0510**				
	X_{YEAR5}	0.4894	0.1231***				

*This table presents the results of the regression analyses of two models. It contains the coefficient estimations (coefficient) and the values of the t statistic (t) for all independent variables. It also shows the F statistic (F), the adjusted R^2 (R^2_{adj}), and the degree of freedom (df) for both models, and the sample size (N). X_{IQ} is the IQ test score, X_{EQ} is the EQ test score, X_{SEX} is 1 if the student is female, 0 if not, X_{PARENT} is the number of graduate parents, and X_{YEAR5} is 1 if he/she is attending the given year, 0 if not. * Significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.*

We also tested the contribution of IQ, EQ and personal traits to academic success. According to our hypothesis the mean of the average grades of second year students is positively correlated with IQ and EQ scores, and affected by personality traits (direction is not important) if we take into consideration their sex, residency, number of parents and grandparents with a higher education degree and if the student had been deferred. We built up two models, both significant at the 0.05 level. The first model (equation 3) contained only those independent variables that were significant at the 0.05 level, whilst in the 2nd model (equation 4) all variables were significant at least at the 0.10 level. The two models were different in the exponent of the X_{IQ} variable. This was -6 in the 1st and -5 in the 2nd model.

$$Y = b_0 + b_1 \cdot x_{SEX} + b_2 \cdot x_{PARENT} + b_3 \cdot x_{GRAND} + b_4 \cdot x_{RESIDENT} + b_5 \cdot x_{DEFERRED} + \\ + b_6 \cdot x_{INTRO} + b_7 \cdot x_{INTRO}^{\ 2} + b_8 \cdot \frac{1}{x_{INTU}^{\ 3}} + b_9 \cdot x_{THINK} + b_{10} \cdot x_{THINK}^{\ 2} + b_{11} \cdot x_{THINK}^{\ 3} + \\ + b_{12} \cdot e^{x_{PERCEIVE}} + b_{13} \frac{1}{x_{IQ}^{\ 6}} + b_{14} \cdot \frac{1}{x_{EQ}^{\ 2}} + \varepsilon \qquad (3)$$

$$Y = b_0 + b_1 \cdot x_{SEX} + b_2 \cdot x_{PARENT} + b_3 \cdot x_{GRAND} + b_4 \cdot x_{RESIDENT} + b_5 \cdot x_{DEFERRED} + \\ + b_6 \cdot x_{INTRO} + b_7 \cdot x_{INTRO}^{\ 2} + b_8 \cdot \frac{1}{x_{INTU}^{\ 3}} + b_9 \cdot x_{THINK} + b_{10} \cdot x_{THINK}^{\ 2} + b_{11} \cdot x_{THINK}^{\ 3} + \\ + b_{12} \cdot e^{x_{PERCEIVE}} + b_{13} \frac{1}{x_{IQ}^{\ 5}} + b_{14} \cdot \frac{1}{x_{EQ}^{\ 2}} + \varepsilon \qquad (4)$$

where X_{SEX} is 1 if the student was female, 0 if male; X_{PARENT} is the number of graduate parents; X_{GRAND} is the number of graduate grandparents; $X_{RESIDENT}$ is 1 if the student was living in a city or town, 0 otherwise; $X_{DEFERRED}$ is 1 if the student is deferred from school, 0 otherwise; X_{INTRO} is the percentage value

of the introversion preference; X_{THINK} is the percentage value of the thinking preference; $X_{PERCEIVE}$ is the percentage value of the perceiving preference; X_{INTU} is the percentage value of the intuitiveness preference; X_{IQ} is the IQ score; X_{EQ} is the EQ test score; ε represents all factors not taken into consideration.

Table 4 contains two models; both of them are significant at the 0.01 level according the *F* test. The 1st includes independent variables that are significant at least at the 0.05 level, the 2nd involves those that are significant at least at the 0.10 level. The dependent variable is the mean of the average grades of the last two semesters. X_{INTRO}, X_{THINK}, $X_{PERCEPT}$, and X_{IQ} variables are significant in both models but X_{SEX} and X_{PARENT} have significant impacts only in the second one.

Table 4: Results of Two Regression Models

Dependent: mean of the average grades in the last two semesters							
	Independent Variable	**Coefficient**	***t***	***F***	$\mathbf{R^2}_{adj}$	***d***	***N***
1ST Model	*constant*	10.670	5.689***	3.776***	0.2446	2.057	61
	X_{INTRO}	-0.1638	-2.478**				
	X_{INTRO}^2	0.0043	2.452**				
	X_{THINK}	-0.9427	-3.094***				
	X_{THINK}^2	0.0495	3.030***				
	X_{THINK}^3	-0.0008	-2.964***				
	$e^{X_{PERCEPT}}$	-0.0000	-3.057***				
	X_{IQ}^{-6}	-898,185	-2.090**				
2ST Model	*constant*	9.997	5.421***	3.961***	0.3075	2.111	
	X_{SEX}	-0.2247	-1.698*				
	X_{PARENT}	0.1461	2.174**				
	X_{INTRO}	-0.1546	-2.426**				
	X_{INTRO}^2	0.0040	2.435**				
	X_{THINK}	-0.8595	-2.849***				
	X_{THINK}^2	0.0454	2.798***				
	X_{THINK}^3	-0.0008	-2.750***				
	$e^{X_{PERCEPT}}$	-0.0000	-2.302**				
	X_{IQ}^{-5}	-88,668	-2.168**				

*This table presents the results of the regression analyses of two models. It contains the coefficient estimations (coefficient) and the values of the t statistic (t) for all independent variables. It also shows the F statistic (F), the adjusted R^2 (R^2_{adj}), and the degree of freedom (df) for both models, and the sample size (N). X_{IQ} is the IQ test score, X_{SEX} is 1 if the student is female, 0 if not, X_{PARENT} is the number of graduate parents, and X_{INTRO} is the percentage value of the introversion preference, X_{THINK} is the percentage value of the thinking preference, $X_{PERCEIVE}$ is the percentage value of the perceiving preference. * Significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.*

Distribution of the standardized residuals was likely to be normal according to the Kolmogorov–Smirnov test (the K–S statistic was 0.5251 in the case of the first and 0.8182 in the case of the second model) at the 0.10 significance level. *F* statistics of the Goldfeld–Quandt tests are shown in Table 5. Regression analyses were run on the first and last 25 elements of the sample to obtain the residual variances for the *F* test. At the second model the assumption of homoscedasticity was rejected for the introversion variable at the 0.05 significance level.

Table 5: *F* statistics of the Goldfeld–Quandt Test (*c* value was 18 percent)

1ST Model		2ND Model	
Non-standardized Variable	***F***	**Non-standardized Variable**	***F***
X_{INTRO}	1.584	X_{INTRO}	2.832*
X_{THINK}	1.155	X_{THINK}	1.277
$X_{PERCEPT}$	2.161	$X_{PERCEPT}$	2.064
X_{IQ}	1.179	X_{IQ}	1.189
–	–	X_{PARENT}	1.363

*This table shows the values of F statistics (F) of the Goldfeld–Quandt tests according to the independent variables measured on interval scale. X_{IQ} is the IQ test score, X_{PARENT} is the number of graduate parents, and X_{INTRO} is the percentage value of the introversion preference, X_{THINK} is the percentage value of the thinking preference, $X_{PERCEIVE}$ is the percentage value of the perceiving preference. * Significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.*

CONCLUDING COMMENTS

Our research goal was to reveal whether general intelligence, emotional intelligence and personality traits are associated with successful academic performance. Our hypothesis was that academic success in higher education is associated with IQ and EQ and the Myers–Briggs personality preferences, taking into account the sex, academic year, place of residence, number of graduate parents and grandparents, and whether or not the student is 'deferred'. The source of our data is established from three surveys conducted at the University of Debrecen Faculty of Economics and Business Administration among full time second, fourth and fifth year students. We used regression analyses for the corresponding IQ and EQ data (134 students in total), and the corresponding IQ, EQ, and personality data (61 students in total) to assess the effect of the two types of intelligence and the personality preferences on the grade averages.

Summarizing our findings we found that both IQ and EQ were in a significant relationship with the mean of average grades at the 0.1 level, and with three of the four personality traits at the 0.05 level. The IQ was an inverse function with a negative exponent in all models in our analysis; however, the exponent varied. This can lead us to the conclusion that education cannot indicate individual cognitive differences at higher levels of intelligence, but lower IQ will hinder good academic performance. Nevertheless, this hypothesis needs further examination. The explanatory power of EQ was significant only when personality traits were not involved in the model. At lower EQ levels it was in a negative, while at higher EQ levels it was in a positive relationship with academic success. If IQ was involved in the model, the explanatory power of personality traits was almost 12 percent. Three dichotomies (personality preference pairs) had significant effects on performance: introversion-extraversion, thinking-feeling and judging-perceiving.

The greatest limitations of our findings are that the data were collected only in one semester; furthermore, the results stem from only one university faculty. Further research should explore the reproducibility of our findings on the examined major at the examined faculty. It would be also interesting to extend the sample of students to other majors and other levels of higher education (bachelor, master) or to other institutions. Similarly, the robustness of the results could be tested with the use of alternative IQ, EQ and personality tests on a comparable sample in new research.

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