

Three Types of Intelligences and their Relationship to Students' School Performance

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Abstract

The contribution examines three types of intelligences (emotional, social and general) in relation to school performance of secondary school students (N=169). Empirical analysis indicated its zero to weak negative correlations ($0.01 \leq R \leq 0.30$) with factors, dimensions and global emotional intelligence measured by the *Trait Emotional Intelligence Questionnaire – Adolescence Form (TEIQue-AF)*, Petrides, 2001) and weak negative correlations ($0.18 \leq R \leq 0.29$) with dimensions of social intelligence measured by *The Tromso Social Intelligence Scale (TSIS)*, Silver, et al., 2001). On the other hand, the general intellect assessed by the non-verbal standardized *Test of Intellectual Potential (TIP)*, Říčan, 1971) had a moderately negative relationship with school performance expressed by an average of marks in Mathematics ($R = -0.39^{**}$).

Keywords: *emotional intelligence, social intelligence, general intelligence, academic achievement, correlation study*

Introduction

One of the psychological constructs of perpetual interest even for more than a hundred years has been the concept of intelligence. Intelligence and its dispositions are associated with success in the social and school life. Results of intelligence tests are predictors of school success. However, a high score in an IQ test does not guarantee a full and successful life in future.

New conceptions of intelligence (successful, practical, creative) view intelligence as a multidimensional construct conceived not only on the basis of the ability to

solve logical tasks but reflecting a socio–personality approach (Ruisel, 1999), they emphasize the outer world of social interactions and structures, role behaviour in social systems and the maintenance and development of interpersonal relationships. These types of intelligences, too, may be a prerequisite for the student’s success at school.

The primary aim of this study is theoretical analysis of new old constructs of social and emotional intelligence; at present, the interest in them grows not only at the theoretical, but also at the empirical level. At the application level, they are associated with students’ school achievement in the process of education humanization. We refer to both concepts as new old constructs, because social intelligence was defined by E.L.Thorndike already in 1920 and emotional intelligence by B. Launer already in 1966 and they have been intensely verified since the second half of the 20th century. Both intelligences belong to system intelligences, because they attempt to seize the inner and outer world of the individual (Ruisel, 1999, Schulze, Roberts, 2007).

Conception of trait emotional intelligence

At present, there are 2 approaches distinguished in the emotional intelligence (EI) study. EI is perceived either as an ability (model by Salovey, Mayer, 1997) measured with the use of maximum–performance tests, or it is connected with personality traits and abilities (so–called mixed models, e.g. the model by Neubauer, Freudenthaler, Bar–On’s model, Goleman’s model). The third approach is perceived by Ellen as a personality trait (models by Cooper, Sawaf, Weisinger, Higg, Dulewicz, Petrides).

The trait model of emotional intelligence (*Trait Emotional Intelligence, TEI*) was introduced by K.V. Petrides and A. Furnham in 2001 together with questionnaires also used in our research. The trait EI includes recognition of emotions, self–perception and personality dispositions. It is designated also as emotional efficiency of self or emotional self–efficacy and is measured by self–report inventories. The term self–efficacy represents a potential for perception and processing of emotions in self and others, as well as a potential for management and regulation of emotions and reflects rather the efficacy attributed to self as “efficiency”, which already connotatively indicates an objective result or effect (Salbot, Nábělková, 2011, p. 3).

Petrides’ model of trait EI consists of 15 dimensions loaded with 4 factors. The *Emotionality Factor* includes trait empathy, emotion perception, emotion expression and relationship competence. Its high level shows the ability to perceive,

mirror and share one's own and others' emotions. Its low level indicates difficulties in recognizing emotions and problems in expressing them. Relationship competence represents the student's relationships with close persons, influencing his/her emotional well-being, productivity and ability to listen to others. Its low level gives evidence of an inability to form deeper emotional bonds.

The *Self-control Factor* consists of the following dimensions: emotion regulation, low impulsiveness and stress management. A healthy level of self-control, a low level of impulsiveness and use of effective coping strategies represent a potential for combating negative emotions (emotional seizure, psychic instability, depression) in school conditions.

The *Sociability Factor* emphasizes social relationships and social influence. This factor includes the following dimensions: others' emotions management, assertiveness and social awareness. They represent the ability to move in school social interactions without difficulties and successfully, while a low score indicates uncertainty, shyness, timidity and reserve, manifested not only in normal situations, but more significantly in school stress situations.

The *Well-Being Factor* includes dimensions of optimism, trait happiness and self-esteem. Its high level shows subjective satisfaction and a feeling of happiness, positive view of life, inner fulfilment and well-being based on achievements in the past and expectations of the future against tendencies leading to life disappointments, feelings of failure and lack of appreciation (Salbot et al., 2011, Petrides, 2009).

Conception of social intelligence

We are aware of the fact that the trait EI model contains several interpersonal components also corresponding to social intelligence (SI). At present, it is the research on SI that focuses on empirical operationalization (Silvera, Martinussen, Dahl, 2001), on differences in individual dimensions of SI (Baumgartner, 2005) and on relationships between SI and close constructs (emotional, moral or practical intelligence). E. L. Thorndike (1920) explained SI as the ability to understand others and act in agreement with social requirements. S. Weis and H. M. Süß (2007) consider this definition as the most precise and using factor analysis they arrive at 3 domains of SI – social understanding, social memory and social knowledge. On the basis of Thorndike's definition, SI is divided in two domains: social cognitive and social behavioural. The social cognitive domain is considered to

encompass the student's perception of verbal and non-verbal behaviour, understanding of others and mastery of social rules; and the social behavioural domain explains the ability to deal with school-fellows, understand their thinking, feeling and behaviour and to choose one's appropriate behaviour accordingly (Austin, Saklofske, 2007; Silver, Martinussen, Dahl, 2001; Baumgartner, Vasilová, 2005; Birknerová, 2011 and others). Other research on SI has determined its three factors: social information processing, social awareness and social skills (Silvera, Martinussen, Dahl, 2001), which is also the basis for the scale for its measurement in our research.

Conception of general intelligence

The above constructs of intelligence, however, do not suppress interests also in general intelligence (GI), expressed by the general G-factor (Spearman and Terman), as the basic ability to create concepts and solve problems. R. B. Cattell has modified Spearman's theory of intelligence and introduced innate *fluid* (biological, abstract) intelligence determined genetically. It is the capability of abstract reasoning, synthesizing, systemizing, connecting information quickly and effectively. On the other hand, there is *crystallized* (cultural, specific) intelligence determined by the environment, upbringing, education and developed by training and experience.

The idea to think about crystallized and fluid social and emotional intelligence in agreement with the characteristics and principles of general intelligence was presented in the form of considerations by Kang et al. (2007). EI could be a reflection of achieved declarative and procedural knowledge, thus the crystallized ability, however, S. Kagan (2007) considers this definition incomplete, observing that declarative and procedural knowledge about familiar social events (e.g. rules of social etiquette) are reflected also by SI. Also according to S. Kang (2007), it should be noted that EI and SI as well as GI also contain fluid components that may be demonstrated by the ability to apply knowledge flexibly to solve novel problems. Although extensive social, emotional and general academic knowledge is a prerequisite for flexible application in education, the very fact that one possesses it does not guarantee its flexible use. It means that the student may be very perceptive about his/her own and others' emotional experiences, have a deep understanding of social situations, be emotionally and socially competent, but fail to consider alternative explanations or alter his/her behavioural strategies, thus

he/she may fail to respond flexibly in social situations (Kang et al., 2007) in life and at school.

Academic achievement

Such considerations lead us to the school environment which should not be a place where only GI is facilitated and the student's capability of abstract and flexible thinking assessed. It is here that space should be made for the development of EI and SI crystallized components, since the process of upbringing and education is carried out in the company of others. However, mostly only the student's cognitive performance is taken into account, reflected in the form of marks and based on them the student is assessed as an achiever or failure. J. Hvozdič (1970), L. Ďurič et al. (1991) and others state that a positive correlation between the general intellectual potential and academic achievement is generally accepted. Differences persist mostly in opinions about the size of this relationship. Higher correlations ($r = 0.6 - 0.7$) have been achieved in students of lower grades and since the influence of other factors (self-esteem, motivation, ambitions, responsibility for learning habits) grows with age, later the correlations achieved a lower level ($r = 0.3 - 0.6$).

In his research findings, J. Hvozdič (1970) points to the fact that GI does not determine academic achievement. D. Goleman, K. Petrides, R. Sternberg, F. Baumgartner, Z. Helus, Z. Vašašová and others assess the contribution of personality factors to academic achievement. In her assessment of the pupil's academic achievement Z. Heinzová (2012) focuses on the observation of the student's personal engagement, self-motivation and conscientiousness facilitating school-work and his/her relationship to school. Humanization of education emphasizes the level of new forms of intelligence (e.g. R.J. Sternberg's conception) in the analysis of academic achievement. It may be emotional or social intelligence that is the key to personal and professional achievements. K.V. Petrides, N. Frederickson, A. Furnham (2004) consider EI to be even a predictor of at least a significant part of academic achievement and believe that a higher EI disposition brings better academic results. And J. Povrazník (2011) highlights SI as the form of one's own potential development, which is the essential prerequisite for good results in any, i. e. also school, activity.

Empirical analysis of three constructs of intelligence and their relationship to academic achievement expressed by school marks

The empirical section covers research analysis of three constructs of intelligence (general intelligence – GI, emotional intelligence – EI, social intelligence – SI) and their relationship to school performance expressed by average marks in Mathematics (Ma) and the Slovak Language (SL). We assumed that better marks would not be reflected only in good results in a standardized intelligence test measuring GI. Based on the theoretical conclusions, the research question was formulated:

RQ1: Is there a significant correlation between average marks in Ma and SL and three types of intelligence: EI, SI and GI?

The research sample obtained by convenience selection consisted of students of secondary school 3rd and 4th grades. A more detailed description of the research sample is presented in the following table.

Table1. Research Sample Characteristics

	PgSocA	SVS B&S	SSN	SVS	Total	%
3 rd grade	44	18	17	0	79	46.75
4 th grade	44	15	18	13	90	53.25
Total	88	33	35	13	169	
%	52.1	19.5	20.7	7.7		100

PgSocA – Pedagogical and Social Academy, SVS B&S – Secondary Vocational School of Business and Services, SSN – Secondary School of Nursing, SVS – Secondary Vocational School

Trait EI was measured by the unabbreviated Slovak version of *TEIQue-AF* (*Trait Emotional Intelligence Questionnaire – Adolescence Form*) developed by K.V. Petrides (2001) based on the conception of EI as a personality trait. *TEIQue* offers examination of EI through the global score and score in 15 dimensions (self-esteem, emotion expression, self-motivation, emotion regulation, trait happiness, trait empathy, social awareness, low impulsiveness, emotion perception, stress management, management of others' emotions, optimism, relationships competence, adaptability, assertiveness) forming 4 basic factors (well-being, self-control, emotionality, sociability). The instrument consists of 153 items where respondents answer by means of a 7-point scale (1 – disagree completely to 7 agree completely). Administration takes 20 minutes. *TEIQue – AF* meets the basic psychometric properties verified by K.V.Petrides (2009) while also its Slovak version shows sufficient validity and reliability (Nábělková, 2011).

To measure SI, the *TSIS (The Tromso Social Intelligence Scale)* instrument, developed by D.H. Silver, M. Martinussen and T. I. Dahl in 2001, was used. Respondents respond to 21 statements on a 7-point scale (1 – describes me extremely poorly and 7 – describes me extremely well). SI is analyzed through the total score and 3 dimensions: social information processing, social skills and social awareness. F. Baumgartner's (2005) interpretation of TSIS dimensions is that the cognitive aspect of SI is represented by the dimensions of social information processing and social skills and the behavioural aspect is represented by social awareness. Administration takes 6 minutes on average.

To estimate the general level of intelligence, *TIP (Test of Intellectual Potential)* was used, developed by P. Řičan in 1971. The test consists of 29 items and is non-verbal. It is an intelligence test based on Spearman's conception of the general intellectual factor (G-factor). It is a standardized version of intelligence test, administered in 13 minutes.

Academic achievement was assessed by means of school performance, average marks in Mathematics and Slovak Language, based on the traditional perception of a school mark as the degree by which the student meets performance requirements of school. It was assumed that Mathematics and Slovak Language were the subjects with the highest level of intelligence quotient prediction (Hrabal, 2002).

Statistic analysis was carried out using Spearman's non-parametric correlation analysis, because verification of the normal distribution of the analysed variables by Kolmogorov-Smirnov's test returned not normal distribution of the variables of academic performance and emotional intelligence ($0.007 \leq p \leq 0.200$).

Research results

RQ1: Is there a significant relationship between marks in Mathematics and Slovak Language and three types of intelligence: EI, SI and GI?

The analysis of correlations between school marks in Mathematics and Slovak Language and three types of intelligence EI, SI and GI, respectively, by means of Spearman's non-parametric correlation analysis (R) is shown in Table 2. The relationships between the dimensions and factors of EI and SI and marks in Ma and SL show mostly weak to zero negative correlations ($0.01 \leq R \leq 0.30$). The relationship competence (dimension EI: emotion perception, social awareness and well-being factor and marks in Ma, as well as the relationship between relationship competence and marks in SL; and the dimensions of SI: social awareness and marks in SL and social skills and social awareness and marks in Ma) are statistically significant

Table2. Correlations between marks in Ma and SL and three types of intelligence EI, SI and GI

		R	Subjects		
			SL	Ma	
Emotional intelligence (TEIQue-AF)	Dimensions	Self-esteem	- 0.07	- 0.20	
		Emotion expression	- 0.12	- 0.06	
		Emotion regulation	- 0.08	- 0.09	
		Trait happiness	- 0.15	- 0.17	
		Trait empathy	- 0.15	- 0.09	
		Social awareness	- 0.13	- 0.28*	
		Emotion perception	- 0.20	- 0.30**	
		Stress management	- 0.03	- 0.21	
		Others' emotions management	0.01	- 0.14	
		Optimism	- 0.10	- 0.18	
		Relationships competence	- 0.26*	- 0.22*	
		Factors	Well-being	- 0.17	- 0.26*
			Self-control	- 0.12	- 0.19
Emotionality	- 0.23*		- 0.22		
Sociability	0.04		- 0.18		
Total score	Global trait EI	- 0.17	- 0.29**		
Social intelligence (TSIS)	Dimensions	Social info. Processing	- 0.20*	- 0.24*	
		Social skills	- 0.18	- 0.29**	
		Social awareness	- 0.25*	- 0.27*	
General intelligence (TIP) (N=81)			- 0.21	- 0.39**	

*p<0.05 **p<0.01

(p<0.05) though, but close below the boundary of the moderate strength of a negative correlation.

Also, we found a statistically significant (p<0.01) moderately close negative correlation between marks in Ma and the level of general fluid intelligence measured by TIP. Thus, better marks in Ma were achieved by students who had a higher level of the general intellectual potential (G-factor).

Discussion and recommendations

The existing research studies show sufficient reliability in the sense of test–retest stability of test results (Kaliská, Salbot, 2013) as well as inner consistency of several Slovak versions of the instruments *TEIQue* (Kaliská, Salbot, 2013, Nábělková, 2011) and *TSIS* (Silver et al. 2001, Baumgartner, Vasiřová, 2005), thus the above results contribute to the considerations about the construct validity of the constructs EI and SI.

The traditional view of an intelligent and successful student at school is associated with excellent school performance. This assumption was verified by means of correlation analysis examining the relationship between school performance and three types of intelligence. Although it is true that according to the obtained results, better marks in Ma were reflected in a higher level of the general intellectual potential ($R = -0.39^{**}$), the correlation ($R = -0.21$) with marks in SL was weak. The above findings approximate the findings of V. Hrabal (2002) who found out that the correlation coefficient of marks and results in an IQ test ranged from 0.50 to 0.70. J. Hvozďík's research (1970), however, supports the fact that the IQ correlates with performance in Mathematics the highest.

We had expected that good school performance would not be so significantly reflected in emotional and social competences, which was also proved. The high correlation between EI and SI ($0.25 \leq R \leq 0.52$) supports the finding that the relationships between EI and SI and marks in Ma and SL show only a weak to zero level ($0.01 \leq R \leq 0.30$). EI and SI consist of cognitive and behavioural factors forming socially aware students. Socially sensitive, adaptable and perceptive personalities are those who are able to control their emotions (Petrides, 2009) and the combination of their emotional and behavioural dispositions is part of the crystallized form of intelligence, which should be facilitated at school. On the basis of our findings we state that the student gets better school marks, in our case from Math teachers, if he/she is more competent in the social system (i.e. the class), if he/she feels confident in the company of familiar as well as unfamiliar people, moves easily in social situations, gets on well with people, acts appropriately in a given situation, asks for help, tackles group tasks, is empathetic and uses his/her personal charm. Hvozďík (1970) writes that the student's attitude is one of the most sensitive indicators of learning performance (almost as many as 94% of failing students have a negative attitude to school activities).

Conclusion

The contemporary constructs of emotional and social intelligence are currently being verified as contributors to the mitigation of somatic difficulties (Petrides, 2011) and reduction of negative psychological experience (Mavrovelli, 2007) of students in the school environment. They are even considered significant prerequisites for personal and professional success (Goleman, 1995). Our findings as well as other research show that students with approximately the same level of general intelligence get different marks at school (only a moderately close correlation), which is determined by various intervening variables entering into assessment also on the part of teachers (e.g. social misperception). However, even a student with a significant intellectual potential may be marked unjustly just for his/her failure to manage tension, anxiety, pre-examination states or nervousness and exam-fever (Salovey, Sluyter, 1997; Valihorová, 2007). K. Petrides (2004) asserts that trait EI is a mediator of school performance, this especially in students with a lower level of cognitive abilities. A student with a lower intellectual potential, but a higher level of EI is able to better manage stress, he/she finds support in a wider social environment, by which he/she increases his/her school performance. Thus, increasing the level of emotional and social competences facilitates the student's more effective work at school with a more favourable impact on his/her school performance as well as social relationships in the class (Heinzová, 2012; Lugt, 2014). Managing negative emotions, stress and tension during exams, the ability to regulate one's experience and form a positive attitude towards school result in increased attention during lessons, which determines achievement of higher performance and subsequently better assessment in the form of marking (Vašašová, 2006). It contributes to academic achievement as part of emotionally and socially intelligent behaviour.

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