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General intelligence, emotional intelligence and academic knowledge as predictors of creativity domains: A study of gifted students

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Abstract: Creativity of the individual is dependent on numerous factors, such as knowledge, general intelligence and emotional intelligence. The general purpose of this study is to investigate the effect of general intelligence, emotional intelligence and academic knowledge on the emerging of domain-specific creativity. The study was conducted on 178 intellectually gifted students who attend high school. As a result of the study, correlations were determined between the scholarly creativity domains and sociability, global emotional intelligence (TEQ), science course, verbal and performance intelligence scores; mechanical/scientific creativity and mathematics and science courses, well-being and self-control; performance creativity and sociability; self/everyday creativity and science courses, well-being, self-control, sociability and global TEQ; artistic creativity and sociability, and global TEQ. Moreover, researcher used a hierarchical regression analysis to see whether independent variants predict the creativity domains or not.

Subjects: Behavioural Management; Creativity; Gifted & Talented

Keywords: creativity domains; general intelligence; emotional intelligence; academic knowledge; gifted students



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PUBLIC INTEREST STATEMENT

Does creativity emerge generally or domain-specifically? Namely; could Thomas Edison, Architect Great Sinan or Picasso who became prominent with their creative products in various fields present creative products in the fields except their own fields? To what extent the knowledge, intelligence and emotional intelligence levels of the aforementioned individuals play a role in the field they study? Such questions are rather difficult to give straight answers. In this study the aim is to investigate the effect of general intelligence, emotional intelligence, and academic achievement on the emerging domain-specific creativity. As results, it is determined that the relationship between emotional intelligence sub-component and general intelligence sub-score and knowledge level and creativity sub-domains .

1. Introduction

Many contemporary theories related to intelligence and creativity have been proposed in the literature and are constantly being substituted for earlier ones. Students are at the center of interest for creativity, since they have skills for both inference and their position and they have creativity, emotions and interpersonal skills. The results of the research, which are related to some factors affecting creativity, are given below under subtitles.

1.1. General creativity vs. domain creativity

Does creativity emerge generally or is it domain-specific? Can people produce works creatively, like Thomas Edison, Beethoven, or Picasso in the artistic domains or does the opposite situation occur? The natural and sexual selection burden in the developmental strengths (such as genetic drift and recombination) has been predominant in predisposing the human mind toward certain kinds of sensations and functions. These functions are distinct structures and domains that solve distinct problems.

There is much evidence for both the domain specificity and generality arguments. The general creativity point of view posits that there are creative individuals in one domain, who should be able to exhibit their creativity across other domains and that a general intellectual ability affects the performance of the individual (e.g. Hocevar, 1980; Torrance, 2008). However, creativity researchers started to shift from the traditional view of creativity in general toward the domain specific point of view. Gardner (1983) indicated that the cognitive function should be considered as being composed of a number of factors, with each factor functioning with regard to its own set of rules. An activity or process may occur in more than one mental domain (Karolyi, Ramos-Ford, & Gardner, 2003). He declared that outstanding responses were connected to specific domains that were involved with different kinds of skills and distinct types of knowledge. In this regard, domain-specific creativity studies used different tasks, such as writing stories and poems (Baer, 2003; Baer, Kaufman, & Gentile, 2004; Han, 2003) or storytelling (Baer, 1994), mathematics or word problems (Han, 2003; Sak & Ayas, 2013), musical compositions (Hickey, 2001) and collage making (Baer, 1994, 1996). However, the results of research on whether creativity is domain-specific or not, are contradictory. In a group of studies, the domain-specificity of creativity was supported (As for, Baer, et al., 2004; Hickey, 2001), while contradictory results were obtained from another group of studies (Conti, Coon, & Amabile, 1996; Eunsook & Milgram, 2010).

1.2. Intelligence-creativity

The relationship between creative ability and intelligence can be explained by the threshold theory. According to this theory, both concepts are related, but the relationship between the two is not linear across different levels of intelligence (Jauk, Benedek, Dunst, & Neubauer, 2013). In a meta-analytic study conducted by Kim (2005), who used 21 studies, it was reported that the empirical findings did not support the threshold hypothesis. In a study by Şahin (2014), which examined the threshold effect and employed seven experimental research papers, it was reported that the results of three of them supported the theory, while four did not.

Some studies, which analyzed the relationship ignoring the aforementioned theory, could not detect a correlation between creativity and intelligence (e.g. Plucker, 2010; Richmond, 1966; Yoon, 2005). Moreover, Şahin (2015) and Wallbrown, Wallbrown, and Wherry (1975) reported that a high degree of separation was evident between these constructs. The relationship between divergent thinking and cognitive competencies was analyzed within the context of general intelligence (*g* factor) and fluent intelligence. In those studies, correlations were determined between divergent thinking and general intelligence and ($r = .34, .21, \text{ and } .12$; Batey, Chamorro-Premuzic, & Furnham, 2009; Silvia, 2008; Furnham, 2015; respectively) and fluent intelligence ($r = .43, .26 \text{ and } .21$; Batey et al., 2009; Batey, Furnham, & Safiullina, 2010; Virgolim, 2005, respectively).

1.3. Emotional intelligence–creativity

The root of TEQ can be dated back to the term of “social intelligence”, which was developed by Thorndike (1920), to refer to the ability to understand and manage people and to act wisely in human relationships. Its direct roots lie in Gardner’s study on multiple intelligences, more categorically, in his terms of intrapersonal and interpersonal intelligence (Petrides, 2011). Petrides (2011) found that emotional intelligence structures could be comprehended as a trait of emotional intelligence (TEQ), about emotion-related self-perceptions and ability emotional intelligence about emotion-related cognitive abilities. Thus, TEQ influences, directly or indirectly, a very wide range of variables in creativity thinking skills.

Creativity thinking skills may emerge as both potential and performance factors. There are two basic criteria for creativity potential. They are divergent thinking and the personal traits of the individual (see meta-analysis by Feist, 1998; see review by Sak, 2009). In this study, the potential dimension of creativity was considered. The individuals with high levels of creativity differed from their peers from the point of their personality traits, too (e.g. Clayton & Snelbecker, 2007). Among the eighty-three studies on scientific and artistic creativity, a positive correlation was found between extraversion, openness and neuroticism, while a negative correlation was found between agreeableness and conscientiousness in a meta-analysis study (Feist, 1998). In another meta-analysis, which included 12 studies, in which the creativity personality traits of the individuals whose fields of interest were measured using the Big Six Interests by Larson, Rottinghaus, and Borgen (2002) were compared to the Big Five Personality traits. Significant correlations were found between artistic and openness ($r = .48$), enterprising and extraversion ($r = .41$), social and extraversion ($r = .31$), investigative and openness ($r = .28$), and social and agreeableness ($r = .19$). In a longitudinal study, which took 45 years and was conducted on 163 males by Soldz and Vaillant (1999), a positive affinity with openness was determined ($r = .40$); while a negative relation was determined with adaptability ($r = -.27$). They could not find any correlation that was determined in the other three personality traits.

Sánchez-Ruiz, Hernández-Torrano, Pérez-González, Batey, and Petrides (2011) determined positive and significant correlations between creative personality traits and extraversion and openness. Moreover, negative, significant and slight correlations were determined between the Torrance thinking creativity test (TTCT) (figural form) total score and self-control ($r = -.10$), positive, significant and slight correlations were determined with sociability ($r = .03$), and insignificant relations with well-being, emotionality and global TEQ. In addition to this, Şahin, Özer, and Deniz (2016) determined positive and significant correlations between sociability and scholarly mechanic/scientific performance and art creativity domains ($r = .24, .13, .21, .31$, and $.14$, respectively) and self/everyday creativity and well-being, self-control, emotionality and global TEQ ($r = .14, .19, .23, .31$, and $.28$, respectively). No significant correlation was determined among the other dimensions.

1.4. Knowledge–creativity

Creativity is accepted to be a domain for general everyday skills and it develops into domain specific forms upon the acquisition and utilization of domain relevant skills and knowledge (Amabile, 1996). In the process of general creativity, common sense knowledge, which is simple, general and relatively unstructured, plays a major role. In contrast, in domain-specific creativity, domain specificity and technical knowledge is the foundation of creativity (Ayas & Sak, 2014). Thus, a “deep exploration” approach suggests that the originality of generated ideas is dependent on the degree to which people engage in deep exploration of their knowledge (Rietzschel, Nijstad, & Stroebe, 2007).

Amabile (1983) also stated:

Knowledge organized according to general principles is of greater utility than specific, narrowly applicable collections of facts. Likewise, performance information organized according to general approaches to problems, rather than blind response algorithms, should be more likely to contribute to high levels of creativity ... an increase in domain-

relevant skills can only lead to an increase in creativity, provided that the domain-relevant information is organized appropriately ... that larger stores of properly coded knowledge increase the probability of outstanding responses.

Ward (2008) found that the stored domain-specific information tends to be used extensively while developing a domain-specific product and 69% of the individuals used the old domain-specific information while developing an original product. Academic achievement is an important criterion in evaluating academic knowledge. The literature reveals numerous studies on the correlation between academic achievement and creativity. Some studies indicated the correlation between creativity and academic achievement (Bolindifar & Noordin, 2013; Powers & Kaufman, 2004), but some studies could not find a correlation (Candrasekaran, 2013; Olatoye, Akintunde, & Ogunsanya, 2010). In another study, which included 18 research papers conducted between 1960 and 1990, analyzed the correlations between academic achievement and creativity. A correlation was found in seven of them, while no correlation was determined in eight of them. In three studies, a correlation was determined between the abilities of divergent thinking and productivity, which are necessary for high academic achievement (Ai, 1999).

1.5. Present study

Affective and cognitive processes may influence creative abilities. Affective processes have been investigated in studies, which have indicated that gifted and talented students may have different characteristics from their peers, such as personal differences, like a drive for achievement, willingness to exert themselves, perseverance, thirst for knowledge and inventiveness (Heller, 1991), also having emotional intensity (Chan, 2000; Terman & Oden, 1976), having advanced levels of feelings of humor and esthetics, they are into their independency (Endepohls-Ulpe & Ruf, 2005) and are internally motivated (Chan, 2000).

It was found in a meta-analysis that gifted students had more extravert characteristics (51.30%), intuition (71.60%), thinking (53.80%) and perceiving (60.10%) personality traits than their peers (Sak, 2004). In addition to this, the result of the Munich Giftedness longitudinal study indicated that gifted students had better intelligence, creativity, social competence, artistic (musical), and psychomotor ability domains than their non-gifted peers (Heller, 1991). There is a large volume of available literature, which states that they differ from their peers in their creativity levels (e.g. Preckel, Holling, & Wiese, 2006; Runco, Millar, Acar, & Cramond, 2010; Şahin, 2014; Sligh, Conners, & Roskos-Ewoldsen, 2005) and their capacity for information processing.

On the other hand, the assessment and evaluation experts suggested that each group should be evaluated independently from the others, since the data, which was collected from some subgroups during the research, had values that were different from the general average (Hair, Hult, Ringle, & Sarstedt, 2014). When the aforementioned theoretical aspects and the findings of research summarized above are considered, the domain-specific creativity of the gifted students might differ from their peers, thus, it would be better to establish the study group with the gifted students only.

There are numerous studies, which are related to the determination of general intelligence, emotional intelligence, academic success and the correlations between them. However, there is only one study, which analyzed the correlations between the aforementioned variants and scholarly, mechanic/scientific, performance, self/everyday and art creativity domains.

Gardner (1983) stated that cognition function should be accepted as being composed of several factors, where each factor functions according to its own set of rules. He expressed that exceptional responses were related to specific domains that required different kinds of skills and specific types of knowledge. On the other hand, different suggestions were made in various studies, which were related to the principles that should be formed according to creativity domains (Feist, 2004) or the number of the existing domains (e.g. Carson, Peterson, & Higgins, 2005; Kaufman & Baer, 2004a, 2004b; Kaufman, Evans, & Baer, 2010; Oral, Kaufman, & Agars, 2007; Rawlings & Locarnini, 2007).

Kaufman (2012) suggested the creativity domains, which were analyzed in the study. Scholarly creativity would reflect Ivcevic and Mayer's (2009) intellectual creativity, Feist's (2004) linguistics and Gardner's (1999) linguistic intelligence. Mechanical/scientific creativity would cover Gardner's logical—mathematical and naturalistic intelligences, Ivcevic and Mayer's intellectual creativity, and Carson et al. (2005) science factor. Performance includes Gardner's bodily kinesthetic and musical intelligence, Ivcevic and Mayer's performance arts and Feist's music. Self/everyday creativity would cover Gardner's ideas of interpersonal and intrapersonal intelligence and Ivcevic and Mayer's creative lifestyle. The art creativity theoretical framework would be Gardner's spatial intelligence, Carson and colleagues' art factor, and Feist's art.

The general purpose of this study was to investigate the effect of general intelligence (verbal, performance and index score), emotional intelligence (well-being, self-control, emotionality, sociability and global TEQ), and academic achievement (mathematics and science scores and grade point average) on the emerging of domain-specific creativity (scholarly, mechanic/scientific, performance, self/everyday and art). The answers will be sought for the following questions, within the context of this general purpose:

- (1) Is there any significant correlation between general intelligence, emotional intelligence, academic achievement of the gifted students and their domain-specific creativity?
- (2) Does the general intelligence, emotional intelligence and academic achievement of the gifted students significantly predict their domain-specific creativity?

2. Method

2.1. Participants

The study was conducted on 178 intellectually gifted students who attend high school during the educational year of 2014–2015 and who fill the measurement instruments wholly and completely and whose intelligence scores and academic achievement grades were obtained completely. The students of the aforementioned school have the scores of +2 *Sd* or higher in at least one of WISC-R IV verbal, performance or index scores. Moreover, they were determined to be free of adaptive and behavioral problems during their enrolling to the school. Among the students, 85 of them (47.75%) were female (22 of them at the ninth grade, 21 of them at the tenth grade, 17 of them at the eleventh grade and 25 of them at the twelfth grade) while 93 of them (52.25%) were male (28 of them at the ninth grade, 19 of them at the tenth grade, 20 of them at the eleventh grade and 26 of them at the twelfth grade).

2.2. Measures

2.2.1. Kaufman domains of creativity scale (KDOCS-TR)

The scale developed by Kaufman (2012) was adapted into Turkish culture by Şahin (2016). As a result of the adaptation process, a structure with five factors, which the structure in the original scale with 42 items was preserved, emerged. The scale is assessments according to self-evaluation method. The scale is in five-point Likert form. The scores to be obtained from sub-dimensions are as follows; 5–55 for creativity, 7–35 for mechanic/ scientific, 9–45 for artistic performance and self/ everyday, 5–25 for art domain, and 42–201 for total scale. As a result of the confirmatory factor analysis (CFA), the fit indices of the model were above the average ($\chi^2/df = 1.94$, $GFI = .78$, $CFI = .93$, $RMSEA = .06$, and $SRMR = .07$). The internal consistency reliability coefficient of KDOCS-TR was determined as .87 for the sub-factor of scholarly creativity, .84 for mechanical/scientific, .86 for performance, .77 for self/ everyday, .83 for artistic, and .90 for total. In this study, KDOCS sub-dimensions are computed between .78 and .86.

2.2.2. Emotional intelligence specialty scale–short form (TEQ–SF)

TEQ–SF is a scale developed by Petrides and Furnham (Petrides & Furnham, 2000, 2001) based on the conceptualization of emotional intelligence as “the trait of personal character” in order to determine self perception levels of the individuals related to their emotional sufficiency. The scale was adapted into Turkish culture by Deniz, Özer, and Işık (2013). As a result of adaptation, a structure with 20 items and four factors was established. The fit indices confirm the validity of the structure ($\chi^2/df = 2.46$, GFI = .95, AGFI = .92, CFI = .91, RMSEA = .056, and SRMR = .060). The internal consistency reliability coefficient of TEQ–SF was found .72 for well-being, .70 for self-control, .66 for emotionality, .70 for sociability and .81 for the whole while test–repeat test reliability coefficient was found .86 (Deniz et al., 2013). In this study, TEQ–SF sub-dimensions Cronbach’s alpha internal consistency coefficient values are computed between .60 and .67.

2.2.2.1. *Wechsler intelligence scale for children–R IV (WISC–R IV)*. The notion that one-dimensional intelligence is a measurement tool provided a basis for the development of WISC–R. Wechsler developed it in 1949 and revised in 1974. The test was compiled to Turkish by Savaşır and Şahin (1994, cit. Tan, Soysal, Aldemir, & Işık, 2012) for 6–16 age group. Split half-test reliability was calculated as .97 for index score. It was found that there was a correlation between sub-tests between .51 and .86. WISC–R IV Guttman split-half reliability was determined as .87.

2.2.2.2. *Academic achievement grades*. The academic knowledge levels of the students were evaluated within the context of academic achievement grades. Grade point average score was calculated from the average of grades from the courses of science, mathematics, literacy, ethics, social science, arts and the optional courses. The grades were calculated through the system of 100. The grade point average and science courses’ Guttman split-half reliability was computed as .82, and .86, respectively.

2.2.3. Procedure

KDOCS and TEQ–SF were applied to the students who were voluntary in the evening courses. The results of the intelligence tests are the results of individual results of the tests conducted while their application for enrolling the school. Academic achievement scores are the grades obtained at the end of autumn term in the 2014–2015 education years. Both scores were obtained from the school administration.

2.2.4. Data analysis

The data, which was obtained from the participants, was transferred to the computer and analyzed using the SPSS (16.00) statistical analysis software program. The data-set was primarily evaluated in terms of missing values and normality assumptions. Accordingly, no missing value was observed, while the normal distribution assumptions of Kurtosis and Skewness coefficients were found. In seeking for answers to the first sub-question of the study, Pearson’s correlation test was employed and the analysis of the forward method multiple hierarchical regression was used for the second sub-question. In the regression analysis, the VIF and Tolerance coefficients for the sub-fields of scholarly, mechanical/scientific, performance, self/everyday and art creativity were determined as 1.014–.986, 1.041–.961, 1.009–.991, 1.042–.875, and 1.009–.991, respectively. These results indicate that there are no multiple linear relationships among the independent variants.

3. Results

3.1. Descriptive statistics and correlations

Mean, standard deviation, Cronbach’s alpha internal consistency coefficients and Pearson’s correlations for all variables in this study are presented in Table 1. Significant and positive correlations were observed between scholarly and sociability, global TEQ, science course, WISC–R IV verbal and performance ($r = .41$, and $.20$, $p < .01$; $r = .15$, $.18$, and $.16$, $p < .05$, respectively); Mechanical/scientific and mathematics and science course scores, well-being and self-control ($r = .11$, $.25$, $p < .05$; $r = .17$, and $.25$, $p < .01$, respectively); Performance and sociability ($r = .23$, $p < .01$; $r = .17$, $p < .05$, respectively);

Table 1. Descriptive statistics, reliability and Pearson inter—correlation for all measures

		M	SD	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
KDOCS	1. Scholarly	39.32	7.82	.86	-	.12	.38**	.44**	.40**	.08*	-.06	.09	.08	.09	.07	.41**	.20**	.18*	.16*	.02
	2. Mechanical/scientific	21.92	6.83	.86		-	.05	.30**	.41**	.11*	.25*	.11	.17**	.25**	-.18*	.01	.14	.02	.05	.09
	3. Performance	30.01	8.40	.85			-	.30**	.30**	.12	-.17*	-.06	.11	.04	-.03	.23**	.08	.01	-.10	.02
	4. Self/ everyday	33.57	5.97	.78				-	.34**	.20**	.05	-.15	.34**	.05**	-.03	.33**	.28**	.11	.06	.06
	5. Art	17.32	4.92	.81					-	-.02	-.20*	-.06	.11	.07	.13	.26**	.20**	-.05	.12	.05
Course scores	6. Science	84.12	7.92	-						-	.60**	.81**	.15*	-.01	-.06	.01	.18*	.03	.09	.04
	7. Mathematics	78.08	14.48	-							-	.79**	.12	.12	-.10	-.10	.02	.05	-.05	-.03
	8. Grade point average	83.87	6.58	-								-	.17*	.02	-.06	-.01	.12	.09	.01	.01
TEQ-SF	9. Well-being	19.12	4.44	.62									-	.13	-.05	.29**	.32**	-.01	.13	.09
	10. Self-control	15.69	3.62	.61										-	.15*	.16*	.19**	.03	.01	.13
	11. Emotionality	15.47	3.71	.60											-	.24**	.15	-.07	.12	.04
	12. Sociability	17.88	3.79	.67												-	.41**	-.08	.09	.01
	13. Global EQ	16.94	3.78	.63													-	-.06	.10	.03
WISC-RIV	14. Verbal	123.68	5.63	-														-	-.07	.56**
	15. Performance	134.57	7.25	-															-	.69**
	16. Index score	132.28	4.72	-																-

Note: N = 178.

* $p < .05$.

** $p < .01$.

self/ everyday and science course scores, well-being, self-control, sociability and global TEQ ($r = .20, .34, .05, .33$, and $.28, p < .01$, respectively); art and sociability and global TEQ ($r = .26$, and $.20, p < .01$). On the other hand, a significant and negative correlation was determined between mechanical/scientific and emotionality ($r = -.18, p < .05$), performance and art and mathematics course scores ($r = -.17$ – $-.20, p < .05$).

3.2. Multiple regressions

To examine the extent to which general intelligence, emotional intelligence, course scores and grade point average scores could predict variance in creativity subdomains, a series of forward

method multiple hierarchical regressions were performed. Therefore, WISC–R were the verbal, the performance, and the index scores, TEQ were the well-being, self-control, emotionality, sociability and global TEQ scores, course scores of the science and mathematics courses, and the grade point averages were regressed onto each of the five different creativity domain-dependent variables. The results of these analyses are presented in Table 2. The variants, which did not provide significant contributions, were excluded from the table.

WISC–R IV verbal and performance scores provide a significant contribution to the regression model, which was established to clarify scholarly creativity. Sociability solely predicts the .17% of variance ($F_{(1,176)} = 36.49, p < .01$), .21% of it with WISC–R IV verbal ($F_{(2,175)} = 23.99, p < .01$), and .24% of it with three of them ($F_{(3,174)} = 19.30, p < .01$). Self-control, mathematics and emotionality can significantly explain the mechanical/scientific domain. Self-control can solely predict the .06% of variance ($F_{(1,177)} = 11.81, p < .01$), .10% of it with mathematics ($F_{(2,175)} = 11.10, p < .01$) and .14% of it when the emotionality is included ($F_{(2,175)} = 10.28, p < .01$). Sociability and mathematics provide significant contributions to the performance. Sociability can solely predict .05% of the variance ($F_{(1,177)} = 9.80, p < .01$), while it can predict .06% of it when mathematics is included ($F_{(2,175)} = 7.07, p < .01$). Well-being, sociability and science courses can significantly explain the self/everyday variable. Only, well-being can predict .11% of the variance ($F_{(1,177)} = 23.57, p < .01$), .17% of it when sociability is included ($F_{(2,175)} = 18.80, p < .01$) and .19% in with science ($F_{(3,174)} = 14.78, p < .01$). Sociability and mathematics courses provide significant contributions to the model established to clarify art. Sociability can solely explain .06% of it ($F_{(1,176)} = 12.97, p < .01$), while it may explain .09% of it when accompanied with mathematics ($F_{(2,175)} = .50, p < .01$).

4. Discussion

First of all, the relationships between the subdomains of creativity and general intelligence, emotional intelligence and academic achievement were analyzed in the study. Then, we examined whether the aforementioned variants predict the creativity subdomains or not. The findings related to the sub-questions of the research are given in the subtitles below in the given rank.

4.1. Scholarly creativity

Modest level correlations were determined between this domain and the science course score, WISC–R IV verbal, and WISC–R IV performance, while moderate level correlations were determined with this domain and sociability and global TEQ. In the regression analysis, it was found that sociability, WISC–R IV verbal, and WISC–R IV performance scores provided significant contributions to the model and the three of them were able to predict 0.24% of the variance. According to Gardner's analysis, only two forms of intelligence, such as linguistic and logical mathematical intelligence, may be considered to be beneficial and are useful for that language—logic combination as “academic” or “scholarly intelligence” (Davis, Christodoulou, Seider, & Gardner, 2012). According to Feist (2004), the ability of language is the perceptive ability to achieve syntactical and semantic rules of language, in addition to the ability to use sentences spontaneously, in a novel and flexible way. Kaufman (2012) asserted that intellectual abilities play a significant role in the emerging of creativity in the domain of scholarly creativity. In this study, the existence of a significant relationship between the verbal and performance dimensions of the intelligence test indicates that there is a close correlation between this domain and the field of intellectual abilities. Moreover, the results of the Munich Giftedness longitudinal study also support these findings. It was reported that highly intelligent students received greater results in extracurricular activities in the field of science than their peers who had average or high creativity (Heller, 1991).

Şahin et al. (2016) determined a modest level correlation ($r = .24$) between the scholarly and sociability variables, too. The variance explained at the end of hierarchical regression analysis was reported as .07%. The results of the study by Sánchez-Ruiz et al. (2011), indirectly supported the findings of this study. The researchers determined that there was a significant modest correlation between general creativity and sociality, but an insignificant correlation between global TEQ, well-being, self-control, and emotionality. In both the research studies, no significant correlations were

Table 2. Multiple regression analysis of creativity domains

			β	t	
Scholarly	1.	Sociability	.41	6.04	
		$F_{(1,176)} = 36.49$	Adj. $R^2 = .17$		
	2.	Sociability	.43	6.42	
		WISC-R IV verbal	.21	3.11	
		$F_{(2,175)} = 23.99$	Adj. $R^2 = .21$		
	3.	Sociability	.45	6.76	
		WISC-R IV verbal	.20	2.99	
		WISC-R IV performance	.19	2.83	
		$F_{(3,174)} = 19.30$	Adj. $R^2 = .24$		
Mechanical/scientific	1.	Self-control	.25	3.34	
		$F_{(1,176)} = 11.81$	Adj. $R^2 = .06$		
	2.	Self-control	.22	3.13	
		Mathematic	.22	3.13	
		$F_{(2,175)} = 11.10$	Adj. $R^2 = .10$		
	3.	Self-control	.26	3.60	
		Mathematic	.20	2.84	
		Emotionality	-.20	-2.79	
		$F_{(3,174)} = 10.28$	Adj. $R^2 = .14$		
	Performance	1.	Sociability	.23	3.13
			$F_{(1,176)} = 9.80$	Adj. $R^2 = .05$	
		2.	Sociability	.22	2.95
Mathematic			-.15	-2.04	
$F_{(2,175)} = 7.07$			Adj. $R^2 = .06$		
Self/everyday	1.	Well-being	.34	4.85	
		$F_{(1,176)} = 23.57$	Adj. $R^2 = .11$		
	2.	Well-being	.27	3.77	
		Sociability	.25	3.53	
		$F_{(2,175)} = 18.80$	Adj. $R^2 = .17$		
	3.	Well-being	.24	3.41	
		Sociability	.26	3.67	
		Science	.16	2.39	
		$F_{(3,174)} = 14.78$	Adj. $R^2 = .19$		
Art	1.	Sociability	.26	3.60	
		$F_{(1,176)} = 12.97$	Adj. $R^2 = .06$		
	2.	Sociability	.25	3.41	
		Mathematic	-.17	-2.38	
		$F_{(2,175)} = 9.50$	Adj. $R^2 = .09$		

Note: $N = 178$. All of the F and t values are significant at the level of $p < .01$.

determined between scholarly and global TEQ. The significant correlations with the other dimensions are parallel to the results of this study, while the findings related to global TEQ are contradictory to the findings of this study.

According to Ivcevic and Mayer (2009), science is one of the three sub-dimensions of intellectual creativity, while the other is academic orientation. The science factor is described as involvement and accomplishment in science. Academic orientation refers to an active pursuit of advanced educational opportunities. This similarity is thought to support the emerging of a significant correlation between the scholarly variable and the science score.

4.2. Mechanical/scientific creativity

A positive correlation was determined between mechanical/scientific creativity and the mathematics and science scores. The results of the regression analysis indicate that self-control, mathematics, and emotionality scores can predict .14% of the variance, while the other dependent variables provide no significant support. Gardner's logical-mathematic intelligence is the ability to think conceptually and abstractly, with the capacity to discern logical and numerical patterns. According to the researcher, the correlation between the mathematics score and this domain is an expected one. Moreover, the first two factors, which have been mentioned above, constitute Ivcevic and Mayer's intellectual creativity field, which directly explains the science score but indirectly explains the mathematical scores. The third field that forms intellectual creativity is technology. It is described as behavior related to mathematics and engineering. These sub-factors may also indirectly explain the correlation with mathematical scores.

In our study, a positive correlation was also determined between well-being and self-control and negative and emotionality variables. It can be concluded that these results are parallel to the results of the former studies, in which a correlation between creative personality traits and creative performance were analyzed (e.g. Feist, 1998; Furnham & Bachtiar, 2008; Ivcevic & Mayer, 2009; Soldz & Vaillant, 1999). In other words, general features, such as openness to experiences, extraversion, high levels of self-awareness, persistency, resisting external pressures and taking risks, which substantially overlap well-being and self-control are exhibited by individuals with high creativity. On the other hand, some of the behavior, which is under emotionality, partly overlaps the behavior described as the obstacles facing creativity (Sak, 2009).

In addition to this, Şahin, Özer and Deniz determined significant correlations between mechanical/scientific creativity and sociability, while insignificant correlations were determined between self-control, well-being, emotionality and global TEQ. In the study by Sánchez-Ruiz et al. (2011), a positive correlation was observed between creative personalities and well-being and self-control, while a negative correlation was found between TTCT total scores and self-control. No significant relationship was determined between TTCT total scores and well-being and emotionality. The result of this study is contradictory to the correlations reported in the aforementioned studies. According to the researcher, the reasons for these contradictory results should be analyzed in detail in another study.

4.3. Performance creativity

A positive correlation was determined between performance creativity and sociability, while a negative correlation was determined with the mathematics course score. It was also determined that only those two variants contributed to the regression analysis and could predict .06% of the variance. Considering the theoretical context, performance and sociability consisted of parallel traits. Feist (2004) defined music as the capability to produce, perceive and appreciate rhythmic and melodic sounds that elicit an emotional response in oneself and others. Ivcevic and Mayer (2009) posited that performance arts consists of those having performance skills enabling them to enter public competitions, such as dance competitions, being a member of dance team, playing music in public, or participating in band competitions, etc. According to Gardner (1999), musical intelligence is the ability to produce and appreciate music and consists of competencies in musical abilities, such as rhythm, pitch and timber. Sociability emphasizes social network and social impact (Petrides, 2011).

Şahin, Deniz and Özer determined a positive correlation between sociability and performance sociability, which was able to predict the .07% of the performance creativity. Their research results are parallel to the results of this study. A negative correlation between the mathematical course score

and performance domain is parallel to the findings of the study by Jeon, Moon, and French (2011), who contrasted forecasters of creative performance in art and mathematics. It was found that the significance of domain knowledge was higher than divergent thinking for mathematics creativity; however, art had a contrary pattern.

4.4. Self/everyday creativity

It was determined that there was a significant correlation between the self/everyday creativity variable and science score, well-being, self-control, sociability and global TEQ and the domains, except self-control, could provide significant contributions in the regression model, which could clarify .19% of the variance. According to Petrides (2011), the roots of emotional intelligence date back to Gardner's interpersonal and intrapersonal intelligence. The aforementioned types of intelligence have been an inspiration to Kaufman (2012), while developing self/everyday creativity. He asserted that the creativity subdomains are expected to employ the majority of the correlations between self/everyday creativity and emotional intelligence. This theoretical ground may have revealed the correlation between well-being, self-control, sociability and global TEQ and intra-personal and TEQ, which is also called an interpersonal intelligence domain (Petrides, 2011).

A study related to the topic supports this theoretical interpretation; Şahin, Özer and Deniz, determined a correlation between self/everyday creativity and well-being, self-control, emotionality, sociability, and global TEQ. The study conducted by Sancez-Ruiz and their colleagues indirectly supports the findings of this research. The researchers reported a positive correlation between the total score of general creativity and well-being, emotionality, sociability, and global TEQ, while a negative correlation was determined with self-control. The findings obtained from this study completely overlap the research findings of Şahin, Özer, and Deniz, except emotionality, while they overlap the research findings of Sancez-Ruiz and their colleagues, except for self-control.

In our study, the existence of a correlation between the science course and self/everyday creativity was proved. According to the researcher, this finding is one of the most surprising results of the study. In the science courses, activities such as hypothesizing and conducting experiments were enjoyed by the gifted students (Terman & Oden, 1976). These skills support creativity in the other domains, such as mechanical/scientific or scholarly creativity. Thus, the impression that domain-specific skills support the skills in different creativity domains was formed. However, this topic should be analyzed in detail in order to support that conclusion.

4.5. Art creativity

A positive correlation was found between art and sociability and global TEQ, while a negative modest correlation was found with the mathematical course scores. In the regression analysis, it was found that the sociability and mathematics scores provided significant contributions to the model and both of them could clarify .09% of the variance. Şahin et al. (2016) reported that there was a correlation at the modest level between art and sociability only. The findings of our research conform to the findings of Şahin, Deniz and Özer.

On the other hand, the results obtained from Jeon et al. (2011), which were mentioned in the domain of performance; also explain the negative and significant correlation between the art and mathematical scores. According to Jeon and colleagues, the mathematical field information also negatively influences creativity in the domain of art. Our findings are consistent with the findings of Jeon, Moon and French.

5. Conclusion

The findings obtained from the study may be classified into two subtitles. The first is the relationship, which emerged specifically to definite creativity domains and the second one is the creativity domain, which is associated with more than one variant. The negative and significant correlation between emotionality and the mechanical/scientific sub-dimensions of emotional intelligence may be given as an example of the first group.

Higher emotionality scores among the individuals can be interpreted as the skills of the individuals related to the emotions, which are rather more developed, and the emotions are effectively employed in perceiving and explaining their feelings and establishing and developing relationships with very important people. In a study by Feist (1998) which he compared the scientists to the nonscientists; it was found that scientists were half a standard deviation higher than nonscientists on traits of aggressive, cold, egocentric, impersonal, impulsive, antisocial, emphatic and tough-minded. Helson (1996) discussed that creative architects, college graduates in artistic and investigative domains, mathematicians, and writers of imaginative literature can be reliably distinguished based on their personality type employing the California Psychological Inventory. For instance, architects have high energy, they are goal-oriented. Mathematicians are introverted, prefer solitary work. Writers of imaginative literature are also norm-doubting, but they experience internal struggles. The findings obtained from this study are not consistent with literature. According to the researcher, this result is rather surprising. The causes of those findings should be analyzed in further and detailed studies.

One of the common findings, which emerged under the topics given previously, is the nonexistence of any correlations between intelligence and creativity. In the literature, there are findings reporting the nonexistence of a relationship between self-rated creativity and intelligence (Furnham & Bachtiar, 2008; Furnham, Batey, Anand, & Manfield, 2008). No correlation was found between creativity and intelligence in the other domains, except the scholarly one. This finding is parallel to the findings in the literature. Furthermore, a longitudinal study by Perleth and Sierwald (2001, cit. Heller, 2007) demonstrated that highly creative individuals in the domains of art, social skills, and theater achieved higher results than averagely creative people.

The relationships between mechanical/scientific creativity and the mathematics and science courses may be regarded as a general finding. Mathematics provides positive contributions to the creativity studies conducted in the domain of mechanical/scientific creativity. When the creative studies in the technical domains are compared to those in the artistic domain, they are seen to be more intensive (e.g. Amabile, 1983, 1996; Rietzschel et al., 2007; Ward, 2008).

The positive relationship between the science course and mechanical/scientific creativity confirms this perspective. Even if it is minor, a negative relationship was determined between mathematics and the art-dominated domains called performance and art. Of course, the individuals in the domains of art and science do not share similar personal traits (Feist, 1998). One of the theoretical structures, which the art creativity domain is based on, is the field of spatial intelligence (Gardner, 1999). The aforementioned field of intelligence consists of the skills of the individual, such as objective observation or the displaying of visual and spatial ideas in graphics. There is a vast quantity of literature, which is related to the positive relationships between the visual-spatial abilities and achievement in mathematics. Within this context, the negative correlation between mathematics and art is very surprising. However, in the 18 studies reviewed by Ai (1999) where he analyzed the relationships between creativity and academic achievement, a significant relationship was obtained from seven studies, while the other eight had no significant relationship. According to the researcher, the reason for obtaining such results may be the contents of the creativity subdomains and the fields measured within the context of academic achievement, although it may be domain-specific.

The positive relationship between sociability, which is one of the sub-dimensions of emotional intelligence, and all the domains except the mechanical/scientific domain, may be given as an example of general results. This finding largely corresponds to the findings of the study in which Şahin et al. (2016), who analyzed the relationships between gifted high school students and the emotional intelligence sub-dimensions and the subdomains analyzed in this study. In the aforementioned study, positive relationships were determined between the sociability and creativity subdomains of scholarly, mechanic/scientific, performance, self/everyday and art creativity. Sociability emphasizes social relationships and social effects and includes the positive relationships with family and close friends. Namely, it is expected that the individuals who are strong and effective in social relationships have higher scores than the others. The achievement of the individuals in the

forementioned field is closely related to the levels of attitudes displayed, such as social, social presence, active and gregarious. These attitudes are also defined under the extraversion personality traits among the big five personality traits. Extraversion also contributes to the creativity of individuals (Furnham & Bachtiar, 2008; Furnham et al., 2008; Larson et al., 2002). Moreover, the attitudes, such as being friendly, agreeable, emphatic, parental, peaceful, cooperative, communality and affiliative attitudes are defined under the agreeable trait, which is one of the big five personality traits. The individuals displaying these traits may be expected to have higher sociability scores.

The aforementioned traits are related to the creative personality traits of the individuals. Although no measurement was conducted in this study to determine the relationship between the big five personality traits and emotional intelligence, consistent results are expected with the measurement instrument employed in this study when the principle of the consistency and uniformity of the personality structure of the individual is considered. However, when analyzing this anticipation, the existence of a relationship between sociability and extraversion and agreeable traits will provide a clearer interpretation.

When the findings of the study mentioned above are considered in general, it can be said that the creativity responses of the individual occur, dependent on some competences, which may be classified under cognitive and extra cognitive processes and a series of interactions that are non-linear on every occasion (Sternberg & Lubart, 1991). The interactions between these characteristics do not always emerge at the same level. A characteristic, which creates synergy in a technical domain, may trigger controversial results in another domain, such as art.

The assessment of creativity through a self-rated method is an important limit of the study because, the self-rated method has some problems, such as inattentively filling the responses by its very nature (Silvia, Wigert, Reiter-Palmon, & Kaufman, 2012) or high/ low scores obtained from the evaluation instrument parallel to the responses of the teachers (Beghetto, 2006). However, this method is extremely informative on the occasions where no information is available on the levels of the participants (Kaufman et al., 2010; Şahin & Şahin, 2012, 2013). In order to avoid this limitation, some precautions should be given, such as giving the students enough time, explaining the results individually and excluding the extreme values from the analysis.

It is important to note from this study that any researchers who are planning to study this topic should consider that no correlation occurred between the grade point average and creativity; thus, the other course scores could mask the grade point average. Hence, employing the course grades related to the analyzed domains, rather than the grade point average, will provide more explanatory results. The study was conducted with a group of gifted high school students. Thus, analyzing the differences between groups through a study including their non-gifted peers may provide more comprehensive information. According to the researcher, the researchers who are interested in the topic should also seek for answers to this question from the results, which emerged from this study: although general intelligence, emotional intelligence and academic achievement may predict some parts of domain-specific creativity between .06 and .24, what are the other variants affecting other parts of the variance? The researchers who are interested in the topic may execute a study to compare those who achieve academically and those who underachieve and those with higher emotional intelligence levels and those with lower levels and provide detailed information related to the topic. Moreover, using a measurement instrument in another study, which employs divergent thinking abilities instead of a self-rated evaluation instrument, may provide deeper information about the topic.

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References

- Ai, X. (1999). Creativity and academic achievement: An investigation of gender differences. *Creativity Research Journal*, 12, 329–337.
http://dx.doi.org/10.1207/s15326934crj1204_11
- Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45, 357–376.
doi:10.1037/0022-3514.45.2.357
- Amabile, T. M. (1996). *Creativity in context: Update to the social psychology of Creativity*. Boulder, CO: Westview Press.
- Ayas, M. B., & Sak, U. (2014). Objective measure of scientific creativity: Psychometric validity of the creative scientific ability test. *Thinking Skills and Creativity*, 13, 195–205.
doi:10.1016/j.tsc.2014.06.001
- Baer, J., Kaufman, J. C., & Gentile, C. A. (2004). Extension of the consensual assessment technique to nonparallel creative products. *Creativity Research Journal*, 16, 113–117.
doi:10.1207/s15326934crj1601_11
- Baer, J. (1994). Divergent thinking is not a general trait: A multidomain training experiment. *Creativity Research Journal*, 7, 35–46. doi:10.1080/10400419409534507
- Baer, J. (1996). The effects of task-specific divergent-thinking training. *The Journal of Creative Behavior*, 30, 183–187.
doi:10.1002/j.2162-6057.1996.tb00767.x
- Baer, J. (2003). The impact of the core knowledge curriculum on creativity. *Creativity Research Journal*, 15, 297–300. doi:10.1080/10400419.2003.9651422
- Batey, M., Chamorro-Premuzic, T., & Furnham, A. (2009). Intelligence and personality as predictors of divergent thinking: The role of general, fluid and crystallised intelligence. *Thinking Skills and Creativity*, 4, 60–69.
doi:10.1016/j.tsc.2009.01.002
- Batey, M., Furnham, A., & Safiullina, X. (2010). Intelligence, general knowledge and personality as predictors of creativity. *Learning and Individual Differences*, 20, 532–535. doi:10.1016/j.lindif.2010.04.008
- Beghetto, R. A. (2006). Creative self-efficacy: Correlates in middle and secondary students. *Creativity Research Journal*, 18, 447–457. doi:10.1207/s15326934crj1804_4
- Bolindifar, S., & Noordin, N. (2013). Investigating the relationship between creativity and academic achievement of Malaysian undergraduates. *Jurnal Teknologi (Social Science)*, 65, 101–107.
- Candrasekaran, S. (2013). Creativity and academic achievement of higher secondary school students in Tamilnadu. *International Journal of Humanities and Social Science Invention*, 3, 32–36.
- Carson, S., Peterson, J. B., & Higgins, D. M. (2005). Reliability, validity, and factor structure of the creative achievement questionnaire. *Creativity Research Journal*, 17, 37–50.
doi:10.1207/s15326934crj1701_4
- Chan, D. W. (2000). Exploring identification procedures of gifted students by teacher ratings: Parent ratings and student self-reports in Hong Kong. *High Ability Studies*, 11, 69–82. doi:10.1080/713669176
- Clayton, C., & Snelbecker, G. (2007). General, artistic and scientific creativity attributes of engineering and music students. *Creativity Research Journal*, 19, 213–225.
doi:10.1080/10400410701397271
- Conti, R., Coon, H., & Amabile, T. M. (1996). Evidence to support the componential model of creativity: Secondary analyses of three studies. *Creativity Research Journal*, 9, 385–389.
doi:10.1207/s15326934crj0904_9
- Davis, K., Christodoulou, C., Seider, S., & Gardner, H. (2012). The theory of multiple intelligences. In R. J. Sternberg & J. C. Kaufman (Eds.), *The cambridge handbook of intelligence* (pp. 485–503). Cambridge, MA: Cambridge University Press.
- Deniz, M. E., Özer, E., & Işık, E. (2013). Duygusal Zekâ Özelliği Ölçeği-Kısa Formu: Geçerlik ve güvenilirlik çalışması [Trait emotional intelligence questionnaire-short form: Validity and reliability studies]. *Education and Science*, 38, 407–419.
- Endepohls-Ulpe, M., & Ruf, H. (2005). Primary school teachers' criteria for the identification of gifted pupils. *High Ability Studies*, 16, 219–228. doi:10.1080/13598130600618140
- Eunsook, H., & Milgram, R. M. (2010). Creative thinking ability: Domain generality and specificity. *Creativity Research Journal*, 22, 272–287. doi:10.1080/10400419.2010.503535
- Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, 2, 290–309. doi:10.1207/s15327957pspr0204_5
- Feist, G. J. (2004). The evolved fluid specificity of human creative talent. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 57–82). Washington, DC: American Psychological Association.
<http://dx.doi.org/10.1037/10692-000>
- Furnham, A. (2015). The bright and dark side correlates of creativity: Demographic, ability, personality traits and personality disorders associated with divergent thinking. *Creativity Research Journal*, 27, 39–46. doi:10.1080/10400419.2015.992676
- Furnham, A., & Bachtiar, V. (2008). Personality and intelligence as predictors of creativity. *Personality and Individual Differences*, 45, 613–617. doi:10.1016/j.paid.2008.06.023
- Furnham, A., Batey, M., Anand, K., & Manfield, J. (2008). Personality, hypomania, intelligence and creativity. *Personality and Individual Differences*, 44, 1060–1069.
doi:10.1016/j.paid.10.035
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York, NY: Basic Books.
- Gardner, H. (1999). *Intelligence reframed: Multiple intelligence for the 21st century*. New York, NY: Basic Books.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks, CA: Sage.
- Han, K. (2003). Domain-specificity of creativity in young children: How quantitative and qualitative data support it. *The Journal of Creative Behavior*, 37, 117–142.
doi:10.1002/j.2162-6057.2003.tb00829.x
- Heller, K. A. (1991). The nature and development of giftedness: A longitudinal study. *European Journal of High Ability*, 2, 174–188. <http://dx.doi.org/10.1080/0937445910020207>
- Heller, K. A. (2007). Scientific ability and creativity. *High Ability Studies*, 18, 209–234. doi:10.1080/13598130701709541
- Helson, R. (1996). A in search of the creative personality. *Creativity Research Journal*, 9, 295–306.
- Hickey, M. (2001). An application of amabile's consensual assessment technique for rating the creativity of children's musical compositions. *Journal of Research in Music Education*, 49, 234–244. doi:10.2307/3345709
- Hocevar, D. (1980). Intelligence, divergent thinking and creativity. *Intelligence*, 4, 25–40.
[http://dx.doi.org/10.1016/0160-2896\(80\)90004-5](http://dx.doi.org/10.1016/0160-2896(80)90004-5)

- Ivcevic, Z., & Mayer, J. D. (2009). Mapping dimensions of creativity in the life-space. *Creativity Research Journal*, 21, 152–165. doi:10.1080/10400410902855259
- Jauk, E., Benedek, M., Dunst, B., & Neubauer, A. C. (2013). The relationship between intelligence and creativity: New support for the threshold hypothesis by means of empirical breakpoint detection. *Intelligence*, 41, 212–221. doi:10.1016/j.intell.2013.03.003
- Jeon, K. N., Moon, S. M., & French, B. (2011). Differential effects of divergent thinking, domain knowledge, and interest on creative performance in art and math. *Creativity Research Journal*, 23, 60–71. doi:10.1080/10400419.2011.545750
- Karolyi, C. V., Ramos-Ford, V., & Gardner, H. (2003). Multiple intelligences: A perspective on giftedness. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (3rd ed., pp. 100–112). Boston, MA: Sage.
- Kaufman, J. C. (2012). Counting the muses: Development of the Kaufman domains of creativity scale (K-DOCS). *Psychology of Aesthetics, Creativity, and the Arts*, 6, 298–308. doi:10.1037/a0029751
- Kaufman, J. C., & Baer, J. (2004a). Sure, i'm creative—but not in mathematics!: Self-reported creativity in diverse domains. *Empirical Studies of the Arts*, 22, 143–155. doi:10.2190/26HQ-VHE8-GTLN-BJJM
- Kaufman, J. C., & Baer, J. (2004b). The amusement park theoretical model of creativity. *The Korean Journal of Thinking & Problem Solving*, 14, 15–25.
- Kaufman, J. C., Evans, M., & Baer, J. (2010). The American idol effect: Are students good judges of their creativity across domains? *Empirical Studies of the Arts*, 28, 3–17. doi:10.2190/EM.28.1.b
- Kim, K. H. (2005). Can only intelligent people be creative? A meta-analysis. *Journal of Secondary Gifted Education*, 16, 57–66.
- Larson, L. M., Rottinghaus, P. J., & Borgen, F. H. (2002). Meta-analyses of big six interests and big five personality factors. *Journal of Vocational Behavior*, 61, 217–239. doi:10.1006/jvbe.2001.1854
- Olatoye, R. A., Akintunde, S. O., & Ogunsanya, E. A. (2010). Relationship between creativity and academic achievement of business administration students in South Western Polytechnics. *Nigeria. African Research Journal*, 4, 134–149
- Oral, G., Kaufman, J. C., & Agars, M. D. (2007). Examining creativity in Turkey: Do Western findings apply? *High Ability Studies*, 18, 235–246. doi:10.1080/13598130701709590
- Petrides, K. V. (2011). Ability and trait emotional intelligence. In T. Chamorro-Premuzic, A. Furnham, & S. von Stumm (Eds.), *The blackwell-wiley handbook of individual differences* (pp. 656–678). New York, NY: Wiley. doi:10.1002/9781444343120.ch25
- Petrides, K. V., & Furnham, A. (2000). On the dimensional structure of emotional intelligence. *Personality and Individual Differences*, 29, 313–320. doi:10.1016/S0191-8869(99)00195-6
- Petrides, K. V., & Furnham, A. (2001). Trait emotional intelligence: Psychometric investigation with reference to established trait taxonomies. *European Journal of Personality*, 15, 425–448. doi:10.1002/per.416
- Plucker, J. A. (2010). Is the proof in the pudding? Reanalyses of Torrance's (1958 to present) longitudinal data. *Creativity Research Journal*, 12, 103–114. doi:10.1207/s15326934crj1202_3
- Powers, D. E., & Kaufman, J. C. (2004). Do standardized tests penalize deep-thinking, creative, or conscientious students? Some personality correlates of Graduate Record Examinations test scores. *Intelligence*, 32, 145–153. doi:10.1016/j.intell.2003.08.003
- Preckel, F., Holling, H., & Wiese, M. (2006). Relationship of intelligence and creativity in gifted and non-gifted students: An investigation of threshold theory. *Personality and Individual Differences*, 40, 159–170. doi:10.1080/10400410409534553
- Rawlings, D., & Locarnini, A. (2007). Validating the creativity scale for diverse domains using groups of artists and scientists. *Empirical Studies of the Arts*, 25, 163–172. <http://dx.doi.org/10.2190/Q538-2307-2627-1256>
- Richmond, B. O. (1966). *Creativity in monozygotic and dizygotic twins* (ERIC Number: ED109580). Retrieved June 25, 2015, from ERIC <http://eric.ed.gov/?id=ED109580>
- Rietzschel, E. F., Nijstad, B. A., & Stroebe, W. (2007). Relative accessibility of domain knowledge and creativity: The effects of knowledge activation on the quantity and originality of generated ideas. *Journal of Experimental Social Psychology*, 43, 933–946. doi:10.1016/j.jesp.2006.10.014
- Runco, M. A., Millar, G., Acar, S., & Cramond, B. (2010). Torrance tests of creative thinking as predictors of personal and public achievement: A fifty-year follow-up. *Creativity Research Journal*, 22, 361–368. doi:10.1080/10400419.2010.523393
- Şahin, F. (2014). Yaratıcılık-zeka ilişkisi: Yeni deliller [Relationship of creativity and intelligence: New evidence]. *İlköğretim Online Journal*, 13, 1516–1530. doi:10.17051/ıo.2014.02374
- Şahin, F. (2015). A Research on the structure of intelligence and creativity, and creativity style. *Turkish Journal of Giftedness and Education*, 5, 2–20.
- Şahin, F. (2016). Kaufman Alanları Yaratıcılık Ölçeği'nin Türkçeye uyarlanması ve psikometrik özelliklerinin incelenmesi [Adaptation of the Kaufman Domains of Creativity Scale into Turkish and examination of its psychometric properties]. *Elementary Education Online*, 15, 855–867. doi:10.17051/ıo.2016.70479
- Şahin, F., & Şahin, D. (2012). Engelli bireylerle çalışan özel eğitim öğretmenlerinin tükenmişlik düzeyinin belirlenmesi [Examining the burn-out level of special education teachers working with disabled individuals]. *Öğretmen Eğitimi ve Eğitimcileri Dergisi*, 2, 275–294.
- Şahin, F., & Şahin, D. (2013). Bilim ve sanat merkezinde çalışan öğretmenlerin tükenmişlik düzeyi [Examining the burn-out levels of talented students teachers working at science-arts centres]. *Üstün Yeteneklilerin Eğitimi Araştırmaları Dergisi*, 1, 51–66.
- Şahin, F., Özer, E., & Deniz, M. E. (2016). The predictive level of emotional intelligence for the domain-specific creativity: A study on gifted students. *Education and Science*, 41, 181–197. doi:10.15390/EB.2016.4576
- Sak, U. (2004). A synthesis of research on psychological types of gifted adolescents. *The Journal of Secondary Gifted Education*, 15, 70–79.
- Sak, U. (2009). *Üstün yetenekliler eğitim programları* [Gifted education programs]. Ankara: Maya Publishing.
- Sak, U., & Ayas, B. (2013). Creative scientific ability test (C-SAT): A new measure of scientific creativity. *Psychological Test and Assessment Modeling*, 55, 316–329.
- Sánchez-Ruiz, M. J., Hernández-Torrano, D., Pérez-González, J. C., Batey, M., & Petrides, K. V. (2011). The relationship between trait emotional intelligence and creativity across subject domains. *Motivation and Emotion*, 35, 461–473. doi:10.1007/s11031-011-9227-8
- Silvia, P. L. (2008). Creativity and intelligence revisited: A latent variable analysis of Wallach and Kogan (1965). *Creativity Research Journal*, 20, 34–39. doi:10.1080/10400410701841807
- Silvia, P. J., Wigert, B., Reiter-Palmon, R., & Kaufman, J. C. (2012). Assessing creativity with self-report scales: A review and empirical evaluation. *Psychology of Aesthetics, Creativity, and the Arts*, 6, 19–34. <http://dx.doi.org/10.1037/a0024071>
- Sligh, A. C., Connors, F. A., & Roskos-Ewoldsen, B. (2005). Relation of creativity to fluid and crystallized intelligence.

- The Journal of Creative Behavior*, 39, 123–136. doi:10.1002/j.2162-6057.2005.tb01254.x
- Soldz, S., & Vaillant, G. E. (1999). The big five personality traits and the life course: A 45-year longitudinal study. *Journal of Research in Personality*, 33, 208–232. doi:10.1006/jrpe.1999.2243
- Sternberg, R. J., & Lubart, T. I. (1991). An investment theory of creativity and its development. *Human Development*, 34, 1–31. <http://dx.doi.org/10.1159/000277029>
- Tan, S., Soysal, Ş., Aldemir, S., & Işık, B. (2012). Üstün zeka düzeyindeki bir grup öğrencinin WISC-R profillerinin incelenmesi [A group of students at the level of gifted investigation of WISC-R profiles]. *Yeni Tıp Dergisi*, 29, 170–173.
- Terman, L. M., & Oden, M. H. (1976). *Genetic studies of genius: Volume IV, the gifted child grows up twenty-five years' follow-up of a superior group*, Stanford, CA: Stanford University Press.
- Torrance, E. P. (2008). *The torrance tests of creative thinking: Norms-technical manual*. Bensenville, IL: Scholastic Testing Service.
- Virgolim, A. M. R. (2005). *Criatividade e inteligência: Um estudo com alunos superdotados brasileiros* [Creativity and intelligence: A study with Brazilian students] (Unpublished doctoral dissertation). Storrs, CT: University of Connecticut.
- Wallbrown, F. H., Wallbrown, J. D., & Wherry, R. J. (1975). The construct validity of the wallach-kogan creativity test for inner-city children. *The Journal of General Psychology*, 92, 83–96. <http://dx.doi.org/10.1080/00221309.1975.9711330>
- Ward, T. B. (2008). The role of domain knowledge in creative generation. *Learning and Individual Differences*, 18, 363–366. doi:10.1016/j.lindif.2007.07.002
- Yoon, S. (2005). *Comparing the intelligence and creativity scores of Asian American gifted students with Caucasian gifted students*. Unpublished doctoral dissertation, Purdue University, West Lafayette.



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