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THE INVESTIGATION OF THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND CREATIVITY AND PROBLEM-SOLVING SKILLS IN GIFTED STUDENTS EDUCATED IN SCIENCE AND ART CENTER

(Research Article)

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Abstract

This study aimed to compare the emotional intelligence levels of gifted students with their creativity and problem-solving skills based on various variables. The research was conducted using the relational survey model, a quantitative research method. A total of 169 participants (102 girls and 67 boys between the ages of 13-17) who were registered at the Çetin Şen Science and Art Center and Murat Kantarcı Science and Art Center (BİLSEM) in Kayseri, Turkey in the 2023-2024 school year, and were determined to be gifted through BİLSEM exam. Data were collected using the Personal Information Form, Emotional Intelligence Trait Scale-Adolescent Short Form, Perception Scale for Problem-Solving Skills for Gifted High School Students, and Individual Creativity Scale(Sarıkaya and Özgöl, 2015). The data were analyzed using SPSS 22.0 software. The results indicated a significant relationship between students' emotional intelligence levels and their creativity and problem-solving skills. However, no significant differences were found in emotional intelligence, creativity, or problem-solving skills based on variables such as gender, grade level, or family income status ($p>0.05$).

Keywords: giftedness, emotional intelligence, creativity, problem solving skills

1.Introduction

The importance of gifted education has been recognized in the world and in our country. The education of gifted individuals has been included in the development plans of countries. In addition, the importance given to studies in this field has increased in our country to discover the talents of gifted individuals and to provide education in line with their talents (MEB, 2013). Giftedness and terms that represent giftedness are nowadays expanded and expressed with the concepts of giftedness and special talent in literature. Instead of considering the concept of giftedness only as mental ability, it is considered together with personality traits such as creativity and leadership (Kaya et al., 2016). Today, when we look at literature, the number of trainings related to giftedness has increased and thus the research topics have also increased gradually (Bilgibir, 2024). However, most of these trainings generally deal with cognitive intelligence (IQ). The aforementioned training and operations are handled only on the basis of cognitive intelligence and studies are carried out in this context (Zeidner & Matthews, 2017). As long as students continue their formal education, they participate in out-of-school hours and gain experiences to discover their potential through different activities and differentiated educational content. Gifted students can continue their education in institutions such as science high schools, conservatories, Anatolian high schools, while they can also improve themselves by receiving education in line with their talents in BİLSEMs opened by the Ministry of National Education. While receiving education in common classrooms with students who follow the

usual course, arrangements can be made in the classroom to deepen and adapt the program for gifted individuals in the classroom. Otherwise, students may get bored with in-class activities (Aral & Gürsoy, 2007; İlik, 2019). However, in addition to these trainings, their emotional intelligence should also be nurtured.

The concept of emotional intelligence, which is considered to be important in gifted education, was first introduced by Mayer and Salovey in 1990 (Şahin vd, 2016). Emotional intelligence is explained as the ability of an individual to understand his/her own feelings, to interpret his/her feelings, to explain the feelings of the person next to him/her and to put himself/herself in the place of the other person, to shape the data related to feelings and to sort them systematically/ Emotional intelligence is explained as the ability to understand and interpret one's own feelings, to recognize and articulate the emotions of others, to empathize, and to organize emotion-related information in a structured way. Kaya et al., 2016) Acording to Goleman (1995), emotional intelligence is explained as the ability to understand and empathise with one's own emotions and other people's emotions. Creativity, on the other hand, is the ability to notice a deficiency, to be sensitive to problems and to find solutions for the problems noticed (Sternberg, 2006; Başalp & Onağ, 2022).

Problem Solving is explained as reasoning, forming hypotheses, generating solutions (Çemşir & Baysal, 2019). Although there are many different definitions, creativity is the ability to recognise the problem and ask the key question (Kartal & Öçal, 2024). To be able to look at the problem from different windows in order to correctly identify the main source of the problem in imagination, to create alternatives by bringing more than one solution to the problem (Kirişçi, 2021). On the other hand, it is to be able to ask new, original questions while seeking solutions to the problem (Kutru & Hasançebi, 2024). We are constantly faced with problems in daily life (İşçi & Karaaziz, 2024). In such cases, in order to solve the problem, we organise our previous knowledge in accordance with the situation and solve the problem. This mental ability is defined as problem solving skills (Karataş, et. al. 2017). Problem solving skills express a systematic process that includes working to achieve a goal, understanding the problem, choosing the appropriate method for the solution, and producing a solution (Kutru & Hasançebi, 2024).

Emotional intelligence, creativity and problem-solving skills are competencies that are believed to be interrelated, influencing an individual's success (Xu et. al. 2019). Emotional intelligence facilitates the application of creative ideas by employing problem-solving skills to address challenges encountered in understanding and managing emotions (Şahin, 2021; İşmen, 2013). The integration of these three competencies is assumed to enhance personal development and success by enabling individuals to generate innovative and effective solutions to the problems they encounter (Duman et al., 2014; Aslan et al., 1997; Otacıoğlu, 2009).

This study aims to demonstrate that emotional intelligence, creativity, and problem-solving skills significantly contribute to both the academic and social lives of gifted individuals and to examine the interrelationship among these three constructs. A review of the literature on giftedness, emotional intelligence, creativity, and problem-solving skills highlights the absence of a study that simultaneously explores all these concepts. This study seeks to bridge that gap by examining the relationship between emotional intelligence, creativity, and problem-solving skills while also analyzing the emotional intelligence, creativity, and problem-solving skills of gifted students at BİLSEM based on variables such as gender, grade level, and family income. The primary objective of this study is to determine the impact of emotional intelligence on the creativity and problem-solving skills of gifted individuals, considering various variables. In line with the purposes mentioned above, the research questions have been determined:

1. Is there a significant relationship between the emotional intelligence scores and problem-solving skills of gifted high school students?
2. Do the emotional intelligence scores of gifted high school students significantly predict their individual creativity?
3. Do the emotional intelligence, problem-solving skills, and creativity scores of gifted high school students significantly differ based on gender, grade level, and family income?

2. Method

2.1. Research design

The study adopted the relational survey model among quantitative research models. The correlational survey model is applied to determine the relationship between multiple variables and the amount and changes, if any, of these variables affecting each other and the relationship between the variables is sought. The correlation between variables is limited to a number value of +1 and a number value of -1. As the correlation value gets closer to +1, it can be said that there is a near-perfect relationship between the variables (Bekman, 2022; Sönmez & Alacapınar, 2019).

2.2. Participants

The participants of the study consisted of 102 girls and 67 boys between the ages of 13-17 with a total number of 169 students who were diagnosed as gifted children at Çetin Şen BİLSEM and Murat Kantarcı BİLSEM in Kayseri province of Turkey during the 2023-2024 school year.

2.3. Data Collection Tools

In the study, personal information form was used for demographic information of the students, Emotional Intelligence Trait Scale - Adolescent Short Form (TEIQue-ASF) was used to determine the level of emotional intelligence, Perception Scale for Problem Solving Skills for Gifted High School Students (Sarıkaya and Özgöl, 2015) was used to determine the level of problem solving skills, and Individual Creativity Scale (Yıldız and at al., 2022) was used to determine the level of creativity. Cronbach's alpha coefficient of Emotional Intelligence Trait Scale was .78, Perception Scale for Problem Solving Skills for Gifted High School Students was .83, Individual Creativity Scale was .95 for the first trial and .92 for the second trial. Descriptive statistics data of the research findings are given in Table 1.

Table 1. *Descriptive Statistics of Emotional Intelligence Trait Adolescent Short Form (TEIQue-ASF) Scale, Perception Scale of Problem-Solving Skills for Gifted High School Students and Individual Creativity Scale*

Variable	$\bar{X}$	Min.	Max.	SS	Reliability
Emotional Intelligence	67,89	21,00	105,00	15,63	.859
Problem Solving	82,91	33,00	129,00	11,17	.868
Creativity	46,79	13,00	71,00	9,25	.837

To assess the reliability of the scales, a Cronbach's Alpha reliability analysis was conducted. According to Kılıç (2016), a reliability coefficient in the range of $0.00 \leq \alpha < 0.40$ indicates an unreliable scale, $0.41 \leq \alpha < 0.60$ suggests low reliability, $0.61 \leq \alpha < 0.80$ denotes moderate reliability, and $0.81 \leq \alpha < 1.00$ signifies high reliability. The analysis revealed that the Emotional Intelligence Trait Scale - Adolescent Short Form (TEIQue-ASF) had a reliability coefficient of 0.859, the Perception Scale for Problem-Solving Skills for Gifted High School Students had a coefficient of 0.868, and the Individual Creativity Scale had a coefficient of 0.837. Based on these values, all three scales demonstrate high reliability.

After the participants were identified, the necessary permissions were obtained from the Ministry of National Education, and the data were collected by face-to-face interviews and analyzed by transferring them to the computer environment.

2.4. Data Analyses

The data collected from the data collection tools used within the scope of the research were processed on the computer with excel and data were analyzed using t test and ANOVA test in the SPSS 22.0 package program.

3. Findings

In this part of the study, findings related to the data obtained from the participants are presented referring to each research question as in the following.

3.1. Findings Based on the Relationship between Emotional Intelligence, Creativity and Problem-Solving Skills

The results of the correlation analysis to reveal the relationship between emotional intelligence and creativity and problem-solving skills are given in Table 2.

Table 2. *Pearson Correlation Statistics of Emotional Intelligence Trait Scale, Problem Solving Skills and Individual Creativity Scales*

		Emotional Intelligence Total	Problem Solving Total	Individual Creativity Total
Emotional Intelligence Total	Pearson Correlation (r)	1	0,546*	0,424*
	P		0,000	0,000
	N	169	169	169

Looking at the Table 2, a Pearson Correlation analysis was conducted to examine the relationship between emotional intelligence, problem-solving skills, and creativity. The results indicate a positive ($r = 0.546$) and statistically significant ($p = 0.000 < 0.01$) correlation between emotional intelligence and problem-solving skills. This suggests that higher emotional intelligence is associated with enhanced problem-solving abilities. Additionally, a positive ($r = 0.424$) and statistically significant ($p = 0.000 < 0.01$) correlation was found between emotional intelligence and creativity, implying that as emotional intelligence increases, creativity also tends to improve.

3.2. Findings Based on the Power of Emotional Intelligence to Predict Creativity and Problem-Solving Skills

Statistical data on the power of emotional intelligence to predict creativity and problem-solving skills are given in Table 3.

Table 3. *Emotional Intelligence Trait Scale, Problem Solving Skills and Individual Creativity Multiple Regression Statistical Information*

Variable	B	SH	β	t	p	T	VIF
Emotional Intelligence	3,183	7,567		0,421	0,675		
Problem Solving	0,640	0,113	0,457	5,660	0,000	0,635	1,575
Creativity	0,250	0,137	0,148	1,829	0,069	0,635	1,575

According to Table 3, the coefficient of determination R Square (R2) was found to be 0.312. Accordingly, the independent variables explain 0.312 per cent of the variance in the dependent variable. Since VIF values are close to 1, they are at the desired level for multiple regression. Cook's Distance was found to be 0.620 and since it is less than 1, there is no outlier. The R value, which is the correlation between the predicted values by multiple regression, is 0.559. In other words, there is a moderately significant relationship between emotional intelligence and problem solving and creativity.

3.3. Findings Based on the Investigation of Emotional Intelligence, Creativity and Problem-Solving Skills in Terms of Different Variables

Emotional intelligence, creativity and problem-solving skills were evaluated according to whether there was a difference between genders and the results given in Table 4.

Table 4. *Emotional Intelligence Trait Scale t-test information according to gender*

			N	$\bar{X}$	Ss	t	p
Emotional Intelligence	Gender	Girl	102	66,89	15,97	-1,028	0,574
		Male	67	69,42	15,08		
Problem Solving	Gender	Girl	102	66,89	1,582	-1,104	0,457
		Male	67	69,42	1,842		
Creativity	Gender	Girl	102	46,49	0,86	-0,514	0,229
		Male	67	47,24	1,23		

P<0,05

As presented in Table 4, the analysis revealed no statistically significant difference between male and female students in the Emotional Intelligence Trait Scale (EQTS) ($p = 0.574 > 0.05$), the Perception Scale for Problem-Solving Skills (PPPS) ($p = 0.457 > 0.05$), and the Individual Creativity Scale (ICS) ($p = 0.229 > 0.05$). Emotional intelligence, creativity, and problem-solving skills were analyzed in relation to various variables and examined using One-Way ANOVA. The results of these analyses are presented in Table 5.

Table 5. *ANOVA Statistical Information of Emotional Intelligence Trait Scale, Problem Solving Skills and Individual Creativity According to the Grade Level of the Student*

	Class Level	ANOVA				
			Ss			Difference
Emotional Intelligence Total	9	68,23	1,98	490	062	-
	10	65,63	2,29			
	11	74,81	2,22			
	12	64,78	2,99			
Problem Solving Total	9	83,17	1,20			-
	10	82,48	1,89	62	980	
	11	83,42	2,04			
	12	82,59	2,03			
Individual Creativity Total	9	46,94	1,08	86	836	-
	10	47,52	1,29			
	11	45,69	2,25			
	12	46,07	1,62			

*p< 0,05, F=ANOVA, Difference= Tukey Test

According to Table 5, there is no significant difference between the scores obtained from Emotional Intelligence Trait Scale (p= 0,062> 0,05), Perception Scale for Problem Solving Skills for Gifted High School Students (p= 0,980> 0,05), Individual Creativity Scale (p= 0,836> 0,05) in terms of grade level.

Table 6. *ANOVA Statistical Information of Emotional Intelligence Trait Scale, Problem Solving Skills and Individual Creativity According to the Income Status of the Student's Family*

Variable	Category	ANOVA				
		X̄	Ss			Difference
Emotional Intelligence Total	Not specified	0,286	4,51	,105	0,957	-
	Low Income	67,38	3,61			
	Middle Income	68,03	1,47			
	High Income	68,06	2,76			
Problem Solving Total	Not specified	79,00	6,66	,142	0,935	-
	Low Income	82,38	3,60			
	Middle Income	82,96	1,06			
	High Income	83,25	1,66			
Individual Creativity Total	Not specified	42,00	5,51	,445	0,722	-
	Low Income	48,62	3,54			
	Middle Income	46,79	,81			
	High Income	46,50	1,58			

*p< 0,05, F=ANOVA, Difference= Tukey Test

As shown in Table 6, no statistically significant difference was found in students' scores on the Emotional Intelligence Trait Scale (p = 0.957 > 0.05), the Perception Scale for Problem-Solving Skills for Gifted High School Students (p = 0.882 > 0.05), and the Individual Creativity Scale (p = 0.722 > 0.05) with respect to family income level.

4. Conclusion and Recommendations

This section presents the discussion, conclusions, and recommendations based on the study's findings. Our research indicates a positive relationship between the emotional intelligence levels of gifted high school students and both creativity and problem-solving skills. The findings demonstrate that as emotional intelligence increases, problem-solving skills also improve (Şahin, 2018; Temeloğlu, 2018; Tetik & Açıkgöz, 2013; Chen& Cheng, 2023; Bayraktar et. al. 2021). Emotional intelligence stands out as a meaningful predictor of both creativity and problem-solving skills in gifted students, and a review of the literature reveals parallel results (Şık Akıncı, 2018; Karasulu Kavuncuoğlu, 2019). For instance, Başalp and Onağ (2022) investigated the impact of emotional intelligence on employees' creativity levels and found that emotional intelligence significantly enhances individual creativity, with highly emotionally intelligent individuals exhibiting greater creative potential. Similarly, Kılıç (2019) determined that emotional intelligence positively influences problem-solving skills. The positive relationship between emotional intelligence and creativity shows that being aware of one's emotions also has a positive effect on flexible thinking, which is a finding supported by the literature (Koçak & İçmenoğlu, 2012). Additionally, Karasulu Kavuncuoğlu (2019) identified a significant positive relationship between problem-solving skills and creativity, including its sub-dimensions. Uçar (2021) examined the relationship between emotional intelligence and creativity among Generation Z and found a significant positive correlation between these variables.

Another key finding of our study is that the emotional intelligence levels of gifted high school students have a significant effect on both their problem-solving skills and individual creativity. This suggests that, when controlling for other variables, changes in emotional intelligence scores directly influence problem-solving and creativity scores. The findings support the view that developing emotional intelligence can directly contribute to the development of higher-order thinking skills (Palancı et al., 2023); Yılmaz, 2021). Consequently, initiatives aimed at enhancing students' emotional intelligence are expected to positively impact their creativity levels (Sunar, 2020). Supporting this, Büyükşalvarcı (2018) explored the relationship between emotional intelligence and creativity among university students, concluding that the correlation was positive, moderate, and significant. Şahin (2018) further determined that increased creativity in adolescents corresponds with enhanced interpersonal, adaptability, and general mood dimensions of emotional intelligence. Moreover, Şık Akıncı (2018) found that emotional intelligence was a strong predictor of creativity among school administrators. Overall, when considering our findings alongside previous studies, it is evident that emotional intelligence is a key predictor of both creativity and problem-solving skills. Furthermore, individuals with higher emotional intelligence tend to exhibit higher levels of creativity and problem-solving ability.

Our study also examined problem-solving and creativity skills in relation to various demographic variables. The results suggest that male and female students have similar emotional intelligence levels when assessed using the Emotional Intelligence Trait Scale (EQTS). This aligns with previous research (Bayraktar et. al. 2021; Gür et. al., 2019; Aslan &Yağcı Özen, 2021; Çelik & Akyıldız, 2021). For example, Şahin (2018) investigated social-emotional problems among gifted children and found no significant gender differences in emotional intelligence sub-dimensions such as interpersonal skills, cohesion, positive affect, and general mood. Likewise, Başkak (2020) examined the relationship between emotional intelligence, handedness, and creativity, finding no gender-based differences in emotional intelligence levels. Similarly, Kantek & Yeşilbaş (2019) studied university students and reported no significant gender differences in the problem-solving skills of gifted individuals (Akdeniz & Alpan, 2022). Additionally, Karasulu Kavuncuoğlu (2019) investigated creativity

and problem-solving skills in 60-72-month-old children and found no significant gender-based differences in creativity levels (Tan, 2022).

However, some studies contradict these findigs (Altınışık & Çelik, 2022; Geçe et. al., 2025; Chen& Cheng, 2023). For instance, Tekin Mender (2006) reported significant gender differences in emotional intelligence levels among art students, with female students scoring higher. Tüysüz (2013) examined problem-solving skills in gifted students and found that female students exhibited superior metacognitive skills in problem-solving. Doğan (2009) explored emotional intelligence and problem-solving skills among high school students, finding that males tended to manage challenging situations more creatively and composedly, leading to a significant gender-based difference favoring males. These discrepancies suggest that gender-based variations in creativity and problem-solving skills may be influenced by differences in participants groups and research contexts.

Regarding grade level, our study found no significant effect on problem-solving or creativity skills associated with emotional intelligence. Similar findings were reported by Kontaş and Topal (2015), who studied 106 gifted middle school students at BİLSEM and found no significant grade-level differences in problem-solving skills. Likewise, Büyükşalvarcı (2018) concluded that creativity levels among university students did not significantly differ based on factors such as grade level, age, or academic department.

Another notable finding of our study is that family income level does not significantly influence emotional intelligence or creativity. This aligns with previous research (Başkak, 2020). While it might be expected that higher economic status would enhance educational opportunities and learning experiences, other factors such as cultural background, family dynamics, parenting attitudes, and child-rearing practices may play a more critical role in shaping these skills. Based on the research findings, the following recommendations are proposed;

1. Future studies should examine the relationship between emotional intelligence, creativity, and problem-solving skills in both national and international contexts.
2. To gain a more comprehensive understanding of these relationships, future research should incorporate perspectives from teachers and parents.
3. Experimental studies should be conducted to explore ways to enhance students' emotional intelligence and its subsequent impact on creativity and problem-solving skills.

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6. Declaration of Conflicting Interests and Ethics

The authors declare no conflict of interest. The ethical approval of the research was obtained from Necmettin Erbakan University Social and Humanity Scientific Research Ethics Committee on 08.09.2023 with the registration number of 2023/371.

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