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Research Article

Examining of the Turkish gifted primary school students' creative thinking skills[1]

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Abstract

This research was conducted to examine the creative thinking skills of gifted students studying in primary school. The sample group of the study consists of 83 gifted students who continue their education in Ordu. The level of these students is 2nd, 3rd and 4th grade and refers to all students who have been diagnosed throughout the city. The research was conducted using descriptive survey method. Torrance Tests of Creative Thinking (TTCT) was applied to obtain data. The data obtained from the applied test were analyzed by SPSS. Data were analyzed by Independent t-Test, ANOVA and Post Hoc-Tukey Test. According to the results of the research, a significant difference was determined between the scores obtained by the students from TTCT and the variables of age level, gifted and talented field, and taking preschool education. In the fluency sub-dimension, 10-year-olds compared to 7-year-olds; In terms of the originality sub-dimension, the Creative Strengths sub-dimension, and the scores from the Total of the Creativity Index, children aged 9 and 10 had significantly higher scores than children aged 7 and 8. It was seen that art students got significantly higher scores than gifted and music students. In the Abstractness of Titles sub-dimension, the students who received pre-school education scored significantly higher than the students who did not receive pre-school education. There was no significant difference between the scores of the students in TTCT and gender, parental education level, school type, number of siblings, family income, birth order and parental age.

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Introduction

Creativity has received increasing attention in the fields of psychology and education since the 1950s. It is increasingly recognised as a valuable asset in individuals' problem solving and professional careers, contributing to individual and societal development. Despite more than half a century of research on this subject, this ability is still not fully understood. While studies on creativity continue worldwide, research in Turkey remains insufficient. Developing children's creativity in educational settings is a complex endeavour. Firstly, the nature of creativity needs to be understood by educators, psychologists, teachers and scientists. Then there is a need for instruments that accurately measure creativity. In addition, comments on creativity test scores should provide positive guidance and the correct implementation of creativity education in the classroom (Lubart, Zenasni, & Barbot, 2013).

When the literature is analysed, it is seen that there are different perspectives on creativity. Creativity is the ability to imagine or invent something valuable and new (Yin et al., 2021). Torrance (1974) defined creativity as sensing

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problems, inadequacies, and gaps in knowledge, developing new ideas about these situations, putting forward hypotheses, testing these ideas, comparing the results, changing the hypotheses, and testing them again. According to Isbell and Raines (2003), creativity is defined as putting forward new thoughts or products in line with the knowledge and experiences of the individual. Aslan (2006) described creativity as a cognitive ability that has emerged as an original and talent-dependent product or has not yet turned into a product, which includes the original problem-solving process and uses the individual's intelligence for original production. Creativity is defined as the ability to think differently, to create original products, to create something new from seemingly unrelated things, to go beyond the limits and to look at things from different perspectives (Fox & Schirrmacher, 2014).

Creativity is very important in individual and social areas. From an individual perspective, it helps to solve problems in daily life. From a social point of view, creative individuals are pioneers who innovate in the fields of art, science and technology and affect humanity (Sternberg, 1999). Creativity should be seen as a cognitive skill that exists in all individuals and can be developed. It is very important for education that creativity can be developed (Aslan, 2001). The future success of a society depends on the development of creativity. Treffinger and Isaksen (2005) stated that creativity can emerge in many ways and will be seen more in the area of interest. Every person has different talents that they are born with. Developing these abilities should be started by educating children's senses. In addition, every creative behaviour and product should be supported. Research on creative thinking skills has revealed that this process can be learnt and that this skill is not only in gifted people (Lewis, 2005). The most important function of schools is to provide students with the ability to solve problems creatively in this complex world we live in (Rowe, 2007). It is stated that some principles should be applied to develop creative thinking. In order to support creativity, teachers should reward, care about students' creativity, accompany creativity, create opportunities for children, provide materials that support creativity, provide a psychological environment, and make room in the programme for creativity (Englebright Fox & Shirrmacher, 2012). In addition, research shows that preschool education is effective in the development of creativity. It has been stated that children who receive preschool education reach more original and creative solutions (Pagani, Rubenson, & Runco, 2003). In addition, the environment of the child is important for the development of creativity. As in social learning theories, it is possible for children to acquire creative personality traits by imitating their parents and teachers and through indirect learning (Tortop, 2019).

It is stated that the creative individual has some characteristics. Creative individuals are sensitive to problems. They have the ability to produce special answers to problems and search for distant meanings. They deal with problems that are difficult to solve. They believe that everything can be improved. They like to do mental exercises and have a strong sense of humour. They derive different meanings from an ordinary situation. They feel the need to be different and not conform to stereotypes. They are open to new experiences and have many interests. They are tolerant towards uncertainties. They take risks. They are self-confident and have an intelligence above average. They volunteer in difficult jobs and exhibit a strong personality structure. They are curious, determined, patient and sceptical (Vidal, 2004).The theories and approaches put forward to explain creativity differ. In this study, creativity is analysed in terms of Psychometric Approach. Psychometric Approach is the studies related to the measurement of creativity with written scales. Although the creative thinking process cannot be measured directly, it is thought that creativity can be measured by evaluating the creative products created by individuals. In this context, Torrance's (1964) "Torrance Test of Creative Thinking" is widely used to measure creativity. Different models of creativity have led to the use of different ways of measuring creativity (Park, Chun, & Lee, 2016). While some researchers focus on the person (Kirton, 1976), cognitive processes (Guilford, 1967), creative attitudes, behaviours and skills (Ryser, 2007), some researchers are directly based on the measurement of creative performance, product or creative achievement (Amabile, 1983). It can be said that the general and domain-specific approach is effective in explaining creativity as well as in measuring creativity. In parallel with this, some researchers have developed instruments that measure general creativity (Guilford, 1950; Torrance, 1972), while others have developed instruments that measure domain-specific creativity (Ayas & Sak, 2014; Hu & Adey, 2002; Runco, 1987).

The relationship between creativity and giftedness is among the subjects of interest. Giftedness consists of three intertwined elements: These are expressed as creativity above normal, talent and motivation. Creativity is seen as a skill that can be proved when it is finalised with a product. It is thought that all the original works of humanity are the discovery of individuals with creative thinking. It is stated that the future of the world depends on creative people and their creativity-specific education. It is emphasised that one of the most important educational goals of all societies should be to identify and develop creativity skills early (Renzulli, 1978). While Guilford (1968) states that a certain intelligence is absolutely necessary for creativity, Renzulli (1999) considers threshold level intelligence sufficient. Sternberg (2006) stated that creativity and intelligence are unique talents and that there is no relationship between intelligence and creativity over IQ.

When the literature is examined, there are different perspectives on the definition of gifted and talented. Sak (2011) defines gifted and talented as extraordinary performance in areas that have fundamental value for human life. According to Tannenbaum (2003), gifted individuals are individuals who have the capacity to be productive in physical, moral, social, emotional, intellectual or aesthetic areas. According to VanTassel-Baska (2003), giftedness is defined as an advanced level in all cognitive domains or an unconventional organisational power to achieve a targeted outcome. General talents include abilities such as word fluency, numerical and verbal skills, abstract thinking. Gifted and talenteds are skills in areas such as music, dance, painting, theatre, mathematics and science. It is stated that giftedness depends on education and environment as much as it depends on genetic abilities (Davaslıgil, 2004).

There is no standard programme or teaching method that can be applied to develop creativity. Programmes and teaching should be planned according to the conditions (Tomlinson, 2005). Teachers should create more learning opportunities for all students and especially for gifted students. They should find ways to encourage students' creativity. Teachers of gifted students should be creative in order to change and improve their educational programmes (Rejskind, 2000). In Turkey, most of the test results used in the identification of gifted students are not used for educational purposes and are only interpreted as "130 IQ points or not". In fact, these tests provide information to educators about the areas in which students are strong and weak. Accordingly, education programmes can be differentiated (Akkaş & Tortop, 2015).

In Turkey, Science and Art Centres (BİLSEM) were established for the education of gifted and talented individuals. BİLSEM is opened by the ministry in order to enable students to realise, develop and use their talents at the highest level (MEB, 2016). The procedures related to the identification of students to be admitted to BİLSEM are carried out by the Guidance and Research Centre (RAM), the provincial commission and BİLSEM. Education and training activities in BİLSEM are carried out according to the planning prepared by the ministry. Educational environments are prepared in a supportive manner in accordance with group and individual work of students. An interdisciplinary, enriched, project-based education programme is implemented in line with the abilities of students in order to make original productions. While designing the programmes, activities that develop high-level thinking skills are implemented. In addition, the aim of the studies carried out in BİLSEM is to produce and develop projects (MEB, 2016).

Purpose and Importance of the Research

The aim of this study is to examine the creative thinking skills of gifted primary school students in terms of various variables. In this direction, the factors that can affect creativity according to the literature were determined comprehensively.

Creativity is one of the most important skills that human beings emphasise in today's world where change and competition are dominant and has an important place in the development of society. In the age we live in, doing something differently rather than doing it better emphasises the importance of creative thinking once again. For this reason, creative thinking has become an indispensable element of today and the future. When we look at societies from the past to the present, it is seen that those who guide humanity are gifted individuals. Therefore, the creative thinking skills of these individuals and the factors affecting their creativity are a matter of curiosity.

In Turkey, there are Science and Art Centres for the education of gifted children. Science and Art Centres Directive was issued to regulate the principles regarding the establishment, education, management and functioning of BİLSEM. With this directive, the principles regarding the establishment of BİLSEMs, the selection of students and teachers, registration procedures, and the conduct of education and training services are determined. The procedures related to the identification of students to be admitted to BİLSEM are carried out by MEB, Provincial Examination Commission, BİLSEM, Guidance and Research Centres (RAM). According to the directive published by the Ministry, students are nominated in the fields of general mental ability, visual arts and music. Nominated students are entitled to enrol in BİLSEM after passing two stages called group screening and individual examination. The group screening exam of the nominated students is conducted according to the principles organised by the ministry. Students who exceed the threshold determined in the fields of general mental ability, painting and music in the group screening exam are entitled to individual examination. Individual examinations are carried out by experts with objective and standardised measurement tools. Education and training activities in BİLSEM are carried out according to the planning prepared by the ministry. The education and training process is carried out in the form of individual or group education, except when the student receives formal education. Classroom environments are prepared to support the developmental characteristics of students suitable for individual and group education. A project-based, interdisciplinary, enriched and enriched education programme is implemented in line with the talents of the students in order to make original productions. In addition, activities such as summer school, winter school and student camps are also organised upon request. At the end of each term, an evaluation report is prepared by BİLSEM and sent to the ministry (MEB, 2016). Students enrolled in BİLSEM participate in adaptation, support education, individual talent recognition, gifted and talented development, project production and management programmes respectively. While designing the programmes, activities that enable the development of high-level thinking skills are included. Adaptation programme is carried out to ensure the adaptation of students enrolled in BİLSEM to the institution. This programme includes getting to know the mission, vision, functioning, programmes, teachers and other students. Support education enables gifted students to associate the basic skills they need to acquire with all disciplines. Students' potentials are revealed through the individual talent recognition programme. With the gifted and talented development programme, students' talents are developed in depth. With the project production and management programme, students develop projects related to their chosen field. Considering all these programmes implemented in BİLSEM, there is no study on students' creative thinking skills. Measurement and evaluation of creative thinking skills are neglected. For this reason, there is no data on the development of creativity. It is important that this study is the first study to comprehensively examine the creative thinking skills of gifted primary school students (7,8,9,10 years old) in Turkey. Considering the literature, it is predicted that this study will fill the gap in this field and shed light on future research.

Problem of Study

Main problem: Is there a difference in the creative thinking skills of Turkish gifted primary school students in terms of demographic variables?

Sub-problem 1. Is there a significant differences Turkish gifted student' creative thinking skills according to their age/being gifted/taking preschool education/gender/mother education level/father education level/family income/school type/mother age/father age/number of siblings/birth order?

Method

Research Model

This research was carried out based on the descriptive survey model. The descriptive research model is used to describe the structure of objects, societies, organisations as well as the mechanism of events (Cohen, manion ve Marrison, 2007). It was assumed that the students answered the TTCT scale sincerely and that the parents stated the real situation in the Personal Information Form. In addition, this study was diagnosed in Ordu. It is limited to gifted students studying in 3rd and 4th grades.

Participants

Purposive sampling method was used in this study. In accordance with the purposeful sampling, attention was paid to the fact that the students were primary school students, gifted and talented. The research was carried out with 83 Gifted or Talented primary school students diagnosed in Ordu city in Turkiye. The 83 students included in the sample is the number of all gifted primary school students diagnosed in Ordu. Ordu is one of the official 30 metropolitan cities in Turkey. It is the 29th most populous city in Turkey (There are 81 cities in total). According to the data of 2020, its population is 761400. It is a medium-sized city in terms of population located in the Eastern Black Sea Region of the Black Sea Region. The individual characteristics of these students are presented in the table below.

Table 1. Personal characteristics of the students in the study group

Variable	Variable Type	f	%
Gender	Female	43	51.8
	Male	40	48.2
Grade level	2nd grade	23	27.7
	3rd grade	21	25.3
	4th grade	39	47.0
Age	7 years	11	13.3
	8 years	19	22.9
	9 years	39	47.0
	10 years	14	16.9
Gifted or Talented Department	Gifted Student	45	54.2
	Art Student	24	28.9
	Music Student	8	9.6
	Gifted-Art Student	3	3.6
	Gifted-Music Student	3	3.6
Mother Graduation	Secondary School	5	6.0
	High School	18	21.7
	Universty	54	65.1
	Postgraduate	6	7.2
Father Graduation	Secondary School	3	3.6
	High School	13	15.7
	Universty	57	68.7
	Postgraduate	10	12.0
Mother Age	25-34 years	16	19.3
	35-44 years	59	71.1
	45+ years	8	9.6
Father Age	25-34 years	3	3.6
	35-44 years	67	80.7
	45+ years	13	15.7
Number of Siblings	Only Child	13	15.7
	Two Siblings	57	68.7
	Three Siblings	13	15.7
Birth Order	First	61	73.5
	Second	19	22.9
	Third	3	3.6
School Type	State School	73	88.0
	Private School	10	12.0
Pre-school Education	Graduated	77	92.8
	Nongraduated	6	7.2
Family Income Level	Low	23	27.7
	Medium	43	51.8
	High	17	20.5

According to the Table 1, 43 (51.8%) of the students in the study were girls, 40 (48.2%) were boys, 23 (27.7%) were in the 2nd grade, 21 (25.3%) were in the 3rd grade, and 39 of them were in the 3rd grade. (47.0%) consists of 4th grade students. 11 (13.3%) of the students were 7 years old, 19 (22.9%) were 8 years old, 39 (47.0%) were 9 years old and 14

(16.9%) were 10 years old. According to the giftedness area, 45 (54.2%) Mental, 24 (28.9%) Art Students, 8 (9.6%) Music, 3 (3.6%) Gifted-Art Students and 3 (3.6%) Gifted-Music Students.

Instruments

In this study, TTCT was used to measure the creative thinking skills of gifted primary school students. In addition, a personal information form was used for demographic characteristics.

Data Collection Tools

Torrance Tests of Creative Thinking (TTCT) was used to measure creativity in this study. It was developed by E. Paul Torrance in 1966 to measure creativity. TTCT consists of two parallel forms: formal (A, B) and verbal (A, B). Reliability, validity and linguistic equivalence studies were conducted by Aslan (1999) for kindergarden, primary school, high school and adult. English and Turkish test forms were applied to the group of 30 people who knew both languages. As a result, a significant difference was found for the verbal form, ranging from r= .64 to r= .86 and at the p<.01 level. Significant difference was found in p<.01 and p<.05 levels varying between r=.50 and r=.96 for the figural test (Aslan & Puccio, 2006).

In this study, TTCT Formal Form was used. In this form, there are three subtests titled "Picture Creation", "Picture Completion" and "Lines". The answer time for each section is 10 minutes and the total test time is 30 minutes. With the figural form, Originality, Elaboration, Fluency, Creative Strengths, resistance to premature closure and creativity index total scores are obtained. These dimensions can be summarized as follows.Fluency: It has been explained as presenting many ideas at a certain time. Originality: The answer is infrequent, unconventional and original. Elaboration: Developing existing ideas by not accepting them as they are. Abstractedness of Titles: Expresses the effectiveness of the titles given in the drawings. Resistance to Premature Closure: The original idea is to delay closure in drawings. Creative Strengths: It is the sum of its criteria-based elements (Torrance, 1974).

In addition to the TTCT scale, a form was prepared to determine the individual characteristics of the students. With the form filled in voluntarily by the families of the students, information about the students' gender, age, number of siblings, birth order, pre-school education status, mother/father education level, family income level, school type, gifted department and mother/father age were collected.

Procedure

Permission was obtained from the Governorship of Ordu for the collection of data, and the ethics committee approval of the study is also available. The researcher participated in the course related to the scoring of the Torrance Tests of Creative Thinking. At the end of the course, with the certificate of test scoring competence, the permission to use the test was also obtained. In addition, necessary permissions were obtained from the parents in the form of a consent form for the application of the test and student information.

The test was administered on a voluntary basis within 30 minutes by the researcher himself, as stated in the directive, in an order formed in groups of four where the students did not see each other. The purpose and instructions of the test were explained to the students, and efforts were made to create a comfortable practice environment. It is stated that the test to be applied is not an exam, but the results will be used in a scientific study.

Data Analysis

Research data were analyzed with SPSS. Normality analysis was performed with the Kolmogorov-Smirnov test and it was determined that the distribution was normal (p>.05). The homogeneity control of group variances was done by Levene test (p>.05). In the analysis of data; ANOVA, Independent Groups t-Test and Tukey Test were used and 5% significance level was taken into account in the interpretation of the results. Krippendorff Alpha statistics were used to calculate the reliability between raters. Krippendorff Alpha (α) to different data types; It can be applied to different scale types (classification, ordinal, range, ratio) and to samples of different sizes. This study was scored by two raters and Krippendorff Alpha $\alpha = 0.84$. This value shows the high power of agreement between the raters ($0.80 \leq \alpha$). The effect size value was also taken into account in the interpretation of the research results. Effect size is a concept that has been emphasised in recent years in educational researches. At the same time, the APA defines the effect size with p

significance value in researches. it is stated that the effect size value must be reported together with the effect size value (Özsoy & Özsoy, 2013). The effect size is calculated in two categories according to the difference between the researchers' group means and variance (Kotrlik & Williams, 2003). For the mean difference in this study, Cohen's d (Cohen, 1988); eta-square ($\eta 2$) formulas were used for effect size by variance (Maxwell & Delaney, 1990). Eta-square ($\eta 2$) was converted to Cohen's f value and interpreted.

Results

In this section, statistical data related to the research are given and these data are interpreted. As a result of the analysis, significant differences were found between creative thinking skills and age, gifted department and pre-school education status ($p<.05$). Details of the findings are presented below. However, no significant difference was found between creativity scores and gender, parental education level, family income, school type, parent age, number of siblings, and birth order ($p>.05$).

Table 2. Arithmetic mean and standard deviation values of students' TTCT scores

Creativity Dimensions	N	Min. Point	Max. Point	$\bar{X}$	ss
Fluency	83	9.00	42.00	20.03	5.25
Originality	83	3.00	30.00	14.31	4.13
Abstractedness of Titles	83	.00	20.00	8.01	3.69
Eloboration	83	6.00	23.00	10.81	2.69
Resistance to Premature Closure	83	.00	18.00	6.98	3.99
Creative Strengths	83	10.00	90.00	23.04	11.37
Creativity Index Total Score	83	34.00	188.00	83.18	22.87

As seen in the Table 2, the average scores obtained by the students are Fluency $\bar{X}$=20.03, Originality $\bar{X}$=14.31, Abstractedness of Titles $\bar{X}$=8.01, Elaboration $\bar{X}$=10.81, Early Resistance to Closure was found to be $\bar{X}$=6.98, Creative Strengths $\bar{X}$=23.04, and Creativity Index Total Score $\bar{X}$=83.18.

Comparison of Students' TTCT Scores by Age

Table 3. ANOVA results showing the differences in TTCT scores by age variable

Creativity Dimensions	Age	N	$\bar{X}$	Ss	sd	F	p	Cohen's f
Fluency	7 years	11	18.00	4.12				
	8 years	19	19.42	5.15				
	9 years	39	19.56	6.17	79	2.88	.04*	.33
	10 years	14	23.78	4.49				
Total		**83**	**20.03**	**5.64**				
Originality	7 years	11	11.18	2.63				
	8 years	19	12.63	2.92				
	9 years	39	15.56	3.55	79	8.23	.00*	.55
	10 years	14	15.57	2.47				
Total		**83**	**14.31**	**3.54**				
Abstractedness of Titles	7 years	11	6.54	3.41				
	8 years	19	7.68	4.66				
	9 years	39	8.43	3.21	79	.85	.46	
	10 years	14	8.42	3.73				
Total		**83**	**8.01**	**3.69**				
Elaboration	7 years	11	10.90	2.16				
	8 years	19	9.94	2.29				
	9 years	39	11.05	2.84	79	.96	.41	
	10 years	14	11.28	2.55				
Total		**83**	**10.81**	**2.59**				
Resistance to Premature Closure	7 years	11	7.72	5.04				
	8 years	19	5.47	3.56				
	9 years	39	7.89	3.99	79	2.12	.10	
	10 years	14	5.92	3.04				
Total		**83**	**6.98**	**3.99**				
Creative Strengths	7 years	11	14.81	2.92				
	8 years	19	15.89	4.93				
	9 years	39	27.33	8.35	79	17.95	.00*	.82
	10 years	14	26.00	6.59				
Total		**83**	**23.04**	**8.76**				

Creativity Index	7 years	11	69.18	12.69				
	8 years	19	71.05	17.60				
	9 years	39	89.84	20.38	79	7.16	.00*	.52
	10 years	14	91.00	19.07				
Total		**83**	**83.18**	**20.73**				

ANOVA test was conducted to examine the scores of the students in TTCT according to age. As a result of the analysis, no significant difference was found between the scores of the students in Elaboration, Resistance to Premature Closure and Abstractedness of Titles (p>.05). From Fluency (F79=2.85, p<.05), Originality (F79=8.23, p<.05) Creative Strengths (F79=18.55, p<.05) and Creativity Index Sum (F79=4.58, p<.05) It was seen that the scores they obtained differed significantly according to the age of the students. Post-Hoc Tukey test was used to determine which groups the differences were in favor of. According to the table, Cohen's f value is .55 in Originality; .82 in Creative Strengths size; Creativity Index Total Score was found to be .52. The values obtained show the wide effect level between age and these dimensions. Cohen's f value was found to be .33 in the Fluency dimension. This value indicates the medium effect level between age and Fluency dimension. When the scores obtained from the Fluency dimension are examined, there is a significant difference between the 7-year-old and 10-year-old students in favor of the 10-year-olds. When the scores obtained from the Originality, Creative Strengths and the Total of the Creativity Index are examined, there is a significant difference between students aged 7 and 8 and students aged 9 and 10 in favor of those aged 9 and 10 (p<.05).

Comparison of Scores from TTCT by Gifted or Talented Department

Table 4. ANOVA results showing the differences of TTCT scores by gifted or talented department

Creativity Dimensions	Gifted Talented Department	N	$\bar{X}$	ss	sd	F	p	Cohen's f
Fluency	Gifted Students	45	19.35	5.49	78	1.11	.35	
	Art Students	24	21.79	5.77				
	Music Students	8	15.37	2.79				
	Gifted-Art Students	3	20.66	8.08				
	Gifted-Music Students	3	19.66	5.03				
	Total	**83**	**20.03**	**5.89**				
Originality	Gifted Students	45	14.04	3.37	78	3.85	.00*	.44
	Art Students	24	15.41	2.51				
	Music Students	8	11.37	2.19				
	Gifted-Art Students	3	17.66	.57				
	Gifted-Music Students	3	14.00	1.73				
	Total	**83**	**14.31**	**3.16**				
Abstractedness of Titles	Gifted Students	45	7.57	3.93	78	1.32	.30	
	Art Students	24	9.00	2.79				
	Music Students	8	6.50	2.39				
	Gifted-Art Students	3	10.33	8.08				
	Gifted-Music Students	3	8.33	2.38				
	Total	**83**	**8.01**	**3.69**				
Elaboration	Gifted Students	45	10.17	2.27	78	2.53	.04*	.36
	Art Students	24	12.08	2.41				
	Music Students	8	10.12	2.69				
	Gifted-Art Students	3	11.33	4.16				
	Gifted-Music Students	3	11.66	4.61				
	Total	**83**	**10.81**	**2.59**				
Resistance to Premature Closure	Gifted Students	45	5.46	3.39	78	6.53	.00*	.57
	Art Students	24	9.25	4.03				
	Music Students	8	6.37	2.97				
	Gifted-Art Students	3	12.66	1.15				
	Gifted-Music Students	3	7.66	4.04				
	Total	**83**	**6.98**	**3.99**				
Creative Strengths	Gifted Students	45	22.57	8.24	78	1.13	.34	

	Art Students	24	25.16	11.00				
	Music Students	8	19.62	6.80				
	Gifted-Art Students	3	27.66	5.85				
	Gifted-Music Students	3	17.66	5.50				
	Total	**83**	**23.04**	**8.96**				
Creativity Index Total Score	Gifted Students	45	78.08	20.29	78	2.77	.03*	.36
	Art Students	24	94.04	20.16				
	Music Students	8	77.12	18.93				
	Gifted-Art Students	3	87.66	1.15				
	Gifted-Music Students	3	79.33	20.79				
	Total	**83**	**83.18**	**20.73**				

*p<.05

ANOVA test was conducted to examine the scores of the students in the TTCT according to the gifted department. As a result of the analysis, no significant difference was found between the scores of the students in the dimensions of Fluency, Creative Strengths, Resistance to Premature Closure, and Abstractedness of Titles (p>.05). Students; It was observed that the scores they obtained from Originality ($F_{(78)}$=3.85), Elaboration ($F_{(78)}$=2.53), Resistance to Premature Closure ($F_{(78)}$=6.53) and Total Creativity Index ($F_{(78)}$=2.77) differed significantly according to the gifted department (p<.05). Post-Hoc Tukey test was used to determine which groups the differences were in favor of. According to the table, Cohen's f value is; .44 at Originality size; It was found to be .57 in the Resistance to Premature Closure dimension. The values obtained show the existence of a wide effect level between the Gifted Department and these dimensions. Cohen's f-value; .36 on the Elaboration dimension; The Creativity Index Total Score was found to be .36. These obtained values indicate the medium effect level between the Gifted Department and these dimensions. When the scores of the students in the Originality dimension were examined, it was found that between the Art Students and the Music Students, in favor of the Art Students; There is a significant difference between Gifted-Art Students and Music Students in favor of Gifted-Art Students. When the scores obtained from the Elaboration sub-dimension were examined, a significant difference was found between the art and Gifted Students in favor of the Art Students. When the scores obtained from the Resistance to Premature Closure sub-dimension were examined, a significant difference was found between the Gifted Students and the Art and Gifted-Art Students in favor of the Art Students and Gifted–Art Students Department. When the scores obtained from the total of the Creativity Index are examined, a significant difference is observed between the Art Students and Gifted Students in favor of the Art Students (p<.05).

Comparison of Students' TTCT Scores According to Pre-School Education

Table 5. Independent t-Test Results of TTCT Scores According to Preschool Education

Creativity Dimensions	Pre-school education	N	$\bar{X}$	ss	sd	T	p	Cohen's d
Fluency	Graduated	77	19.16	5.95	81	-.91	.36	
	Nongraduated	6	22.87	5.07				
Originality	Graduated	77	16.14	4.13	81	1.25	.21	
	Nongraduated	6	14.33	4.11				
Abstractedness of Titles	Graduated	77	11.50	1.97	81	2.47	.01*	1.04
	Nongraduated	6	7.74	3.66				
Elaboration	Graduated	77	10.54	2.50	81	-.87	.38	
	Nongraduated	6	11.50	3.39				
Resistance to Premature Closure	Graduated	77	7.09	4.04	81	.84	.40	
	Nongraduated	6	5.66	3.14				
Creative strengths	Graduated	77	26.75	12.13	81	1.07	.28	
	Nongraduated	6	22.83	8.70				
Creativity Index Total Score	Graduated	77	92.16	24.07	81	1.37	.17	
	Nongraduated	6	80.05	20.48				

*p<.05

The scores of the students in the sub-dimensions and all of the TTCT were compared according to the variable of getting pre-school education by using the Independent t-Test. A significant difference was found in terms of the Abstractness of Titles sub-dimension, and this difference is in favor of those with pre-school education ($p<.05$). No significant difference was found in other dimensions ($p>.05$). Cohen's d value was determined as Cohen's d 1.04 in the Abstractness of Titles dimension, and it is seen that this value has a great effect in favor of those who receive pre-school education.

Conclusion and Discussion

In this section, the results of the research, the comparison of the findings with the results of other research, and suggestions for other researches on the subject are given. The scores of the students in TTCT were compared according to the gender variable, and it was found that the difference between the averages was not significant. Accordingly, it was seen that there was no significant relationship between the creative thinking skills of gifted students and their gender. When we look at the studies on creativity, the finding that there is no significant relationship between gender and creativity supports the research findings (Gönen et al., 2011; Güneştekin, 2011; Sıdar, 2011; Baysal et al. 2013; Çeliköz, 2017).

A significant difference was found between the scores of the students in TTCT and the age variable. In the Fluency sub-dimension, 10-year-olds compared to 7-year-olds; In terms of Originality sub-dimension, Creative Strengths sub-dimension and Creativity Index Total score, 9- and 10-year-old children scored significantly higher than 7- and 8-year-olds. No significant difference was found in terms of Elaboration, Abstractedness of Titles, and Resistance to Premature Closure scores depending on age. According to the research findings, as the age level of the gifted primary school students increases, the average of the "Creativity Index Total Score" increases. It can be said that as the age level of the gifted students between the ages of 7-11 increases, the average total score of creativity also increases. Kontaş (2015) measured the creative thinking skills of students between the ages of 5-11 with the Shaped TTCT. As a result of the research, it was concluded that the average of creativity scores increased as the age level increased, which is in line with the research findings. This may also be an indication that Science and Art Center s support students' creativity. According to Güneştekin's (2011) research on primary school students, a significant difference was found between the Flexibility, Fluency, Elaboration and Originality dimensions of TTCT and the age variable. The observation that the mean scores of Fluency, Flexibility, Originality and Elaboration increase as the age level increases, supports the research findings. Işık, Uysal, Akosmanoğlu, and Bilir (2015) concluded that as the age levels of primary school students increase, their creative thinking mean scores also increase.

A significant difference was found between the scores of the students in TTCT and the variable of gifted field status. In the dimension of Originality, students in thedepartment of Art and Gifted-Art According to the students in the department of music; In the Elaboration dimension, Art Department Students According to the Gifted Department Students; In the dimension of Resistance to Premature Closure, Painting and Gifted Department Students According to Gifted Department Students; In the scores obtained from the Total of the Creativity Index, the Art Department Students achieved significantly higher scores than the Gifted Department Students. According to the Gifted Department; No significant difference was found in terms of scores obtained from Fluency, Abstractedness of Titles, Creative Strengths sub-dimensions. According to the results of the research, when the scores of gifted primary school students from TTCT are analyzed on a field basis, it is seen that Art Department Students come to the fore more. The reason for this situation may be that the creativity skills of the students were taken into consideration in the paintings they made during the selection of the Art Department Students. In addition, since the TTCT Figural A Test is mainly drawing, it may be in favor of Art Students. Findings can be compared by applying a verbal test to these student groups. Chan and Zhao (2010) investigated the relationship between students' drawing abilities and creativity with age groups. The sample of the study consisted of 223 students, including primary, secondary and university students in Hong Kong. According to the results of the research, the strong relationship between drawing abilities and creativity scores supports the research findings.

The scores of the students in TTCT were compared according to the variable of getting pre-school education. A significant difference was found in terms of the Abstractness of Titles sub-dimension, and this difference is in favor of pre-school areas. No significant difference was found in other sub-dimensions. According to the result of Dilek's (2013) study investigating the effect of sociocultural characteristics on creative thinking, it was concluded that preschool education does not affect creativity. According to some studies, a significant difference was found in favor of children receiving preschool education in creative thinking skills (Yıldız, 2003; Agear & Aral, 2010). Contradictory

results were found between the research results and the literature on this subject. The reason for this may be that the number of students in the sample who did not receive pre-school education (6 out of 83) remained statistically very low. More extensive research is needed on this subject.

The scores of the students in TTCT were compared according to the education level of their parents and no significant difference was found. Yıldız, Özkal, and Çetingöz (2003) examined the creativity skills of children aged 7-8 who received and did not receive pre-school education. In the study conducted, the fact that there was no significant difference between the father's education and the Fluency, Flexibility and Originality scores of the students shows parallelism with the research finding. Atay (2009) investigated the creativity skills of 5-6 year old students who received pre-school education. According to the study, there was a significant correlation between parental education level and Elaboration and Fluency scores; No significant difference was found in terms of Originality and Flexibility. Güneştekin (2011) attends primary school 1-5. examined the creative thinking skills of 5th grade students according to some variables. According to the research, a significant difference was found between the Fluency, Flexibility, Originality and Elaboration dimensions of TTCT and the parental education level. According to the research, as the education level of the parents increased, the TTCT scores of the students also increased. The results of the research on this subject and the literature are generally contradictory. The reason for this situation may be the lack of sample. Because 75% of the parents in the sample were undergraduate and graduate graduates, the educational status variable may have become dysfunctional. It seems that more comprehensive research is needed.

The TTCT scores of the students were compared according to the family income level and no significant difference was found. It can be said that family income level is not related to the creative thinking skills of gifted primary school students. Sezgin (2004) examined the creativity skills of 5-6 year old children in terms of some factors. According to the results of the study, the conclusion that the family income level does not affect the creative thinking is in line with the research findings. Bapoğlu (2010) examined the critical and creative thinking skills of gifted and normal-minded students. According to the results of the research, it was concluded that students with middle socioeconomic level achieved higher scores than students with lower and upper socioeconomic levels.

The TTCT scores of the students were compared according to the school type variable and no significant difference was found. According to the research, it can be said that the creative thinking skills of gifted primary school students are not related to the school type variable. According to the research conducted by Sıdar (2011) on gifted 4th and 5th graders, there are significant differences between creativity scores and school type. The difference is in favor of private school students. Private school students find themselves more creative than public school students. The number of samples in this study may have been insufficient. Because only 10% of the students in the sample go to private school. More comprehensive research can be conducted on this subject in which the number of samples is balanced.

The TTCT scores of the students were compared according to the variable of parental age, and no significant difference was found. According to the research, it can be said that the creative thinking skills of gifted primary school students are not related to the mother/father age variable. The fact that 71.1% of the mothers and 80.7% of the fathers in the sample were in the 35-44 age range indicates that the families of the students are generally middle-aged.

The TTCT scores of the students were compared according to the number of siblings and no significant difference was found. In some studies, no significant difference was found between the number of siblings and creativity (Erkan, 2005; Güneştekin, 2011; Ceylan & Ömeroğlu, 2012; Kılıç & Tezel, 2012; Karakuş Aktan,2013; Dilek, 2013). These findings are consistent with the research results.

The TTCT scores of the students were compared according to the birth order variable and no significant difference was found. However, when we look at the studies (Gürsoy, 2001), there are different results between birth order and creative thinking skills. It seems that more comprehensive research is needed on this subject.

Recommendations

In line with these results, some suggestions for future scientific studies are presented below:

- By including different provinces in the same study and increasing the number of samples, a more comprehensive sociocultural and demographic research can be conducted.
- The effect of Science and Art Center on the development of creative thinking can be investigated.
- Visual and verbal creativity scores of Science and Art Center students can be compared with TTCT.
- The formal and verbal creativity scores of gifted and normal students can be compared.
- The same research can be done with different creativity scales and the results can be compared.

- The research can be done on a larger scale by collecting data from 7 socio-economic regions throughout Turkey.
- Different creativity tests can be applied to gifted students and the results can be compared.

Limitations

This study was conducted in Ordu city in Turkey, in 2019-2020 educational term and is limited to 83 gifted or talented students.

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