

A Longitudinal Study on the Development of Creativity in Children

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ABSTRACT This paper aims to examine the creativity of children from nursery school to 5th grade with the relational screening model. The research population was comprised of children attending 47 nursery schools during the 2011-2012 and 2012-2013 school years. The General Information Form and Torrance Creative Thinking Test (Figural Form A and B) were used as data collection tools in the study. The data was analyzed by SPSS 16, using *t*-test and paired *t*-test in uncorrelated measurements. The study results showed that the nursery class and 1st grade creative thinking scores of children differed only in the elaboration sub-domain, and that the difference was in favor of the 1st grade score ($p < .01$). The nursery class fluency scores, and the 1st grade fluency and elaboration scores, differed in favor of the girl children ($p < .01$).

INTRODUCTION

In education there has been increased interest in the role of creativity in keeping up with the information society of the 21st century. Through the last century there have been some changes in terms of the definition of creativity and its scope. According to one point of view, creativity is a synonym with intelligence (Butler-Kisber 2012: 9). Conversely, according to other point of the view, creativity is different from intelligence (Tegano et al. 1987, as cited in Kemple and Nissenberg 2000). Nowadays, every child having the potential for creativity is emphasized (Isenberg and Jalongo 2001).

Creativity is a skill that has an important role in the development of society and humanity; it exists in each individual and is available in each period of life; it is the totality of processes covering a wide range, spanning from daily life to scientific studies; it is a form of attitude and behavior that creates new, different things out of something that preexists; it is the ability to see close and distant environments; and it is an intense awareness and consciousness bonus (May

1991: 66). Creativity can be displayed through several products, such as painting, constructing a building, or composing a song. Or it can be demonstrated by having different and original ideas and expressing them (Akdal and Sahin 2014).

It is easier to observe creativity in children due to the fact that creative actions are not learned. Children have the will toward creative action without being aware of it.

Their imagination, feelings, and thoughts merge with spontaneous motivation and they express their thoughts freely (Ozden 1993). In general, preschool children's approach toward creativity is far more liberated and simple. In this period children are very creative and self-confident in the way they express themselves during creative activities due to the fact that their self-consciousness has not yet developed. Alternatively, during the primary school period, children are informed about certain things. They also learn that there is no final solution for each and every problem. Despite the fact that they are fully aware of the development of their self-consciousness, they doubt whether or not they can attain their goals in creative activities (San 1979). Certain studies suggest that a general decrease in creative skills is observed as children attend higher grade levels (as cited in Torrance 1962). Moran et al. (1983) found in a study that preschool children are more likely to give original reactions compared to higher age children.

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These findings indicate that children, who spend a great deal of time with formal school courses, are affected by limited restrictive programs that do not allow original thinking. Then again, preschool children have not yet encountered formal school courses determined by strict rules (Isenberg and Jalongo 2006).

Creative skills are observed more readily in little children. Nevertheless, creative thinking may fade away when it is not reinforced or obstructed by such interpretations as “do it right, and don’t be stupid,” or “how could you do it that way?” (Fyle 1985). Together with the introduction of standard procedures, children begin to face challenges. A tension emerges between natural creativity and standards, followed by children’s tendency to deviate from such procedures, and, in return, teacher’s interventions. A good example of this is the corrective action of teachers as early as the preschool years aiming to normalize the unusual color, shape, or subject selection of children. Therefore, teachers’ creativity would play an important role in preserving the natural creativity of children (Trnova and Trna 2014). Torrance (1965) argued that creativity could be learned. He underscored that creativity should not be left up to chance beginning from birth and that creative potential should be steered. To him, if this energy is not well steered and supported it may be channeled into a dangerous direction (as cited in Argun 2012). School systems should employ and mobilize resources for creativity that can be valued and developed. As a matter of fact, vast documentation throughout the world intending to be an assessment and/or reformation of the current education methodology underscore the importance of creativity (Chien and Hui 2010). As for rebuilding the classroom setting as a venue for improving the creativity of students, educators should consider the fact that individual and social factors need to be focused on to allow students to express and develop creativity (Beghetto and Kaufman 2014). Therefore, families and schools should assume an important role. In cases where children are steered without being restricted, creative individuals who are able to express themselves are raised.

An overview of previous studies suggests that, despite the acceptance that creative thinking is an inherited skill, creativity is also a skill that can be learned and that individuals with such

skills can improve creativity provided appropriate programs are developed and appropriate environments are created (Karakus 2001). The preschool period and the first years of primary education are especially suitable periods for children with a certain creativity potential, where they can develop and use this potential (Bessis-Jaqui 1973). Knowing the creativity levels by the developmental periods of children may facilitate the development of appropriate programs. A literature review revealed that there were studies conducted on creativity by different age groups both in Turkey and abroad. For instance, the effect of creative drama on male adolescents’ conflict resolution skills based group guidance (Yavuzer 2012), and the inter-creative course model proposal: teaching-learning design in secondary schools of the Turkish Republic of Northern Cyprus (TRNC) (Ulas-Dagli et al. 2013). The following studies focused on children in secondary education: the creativity of children with different socio-economic backgrounds attending the last grade of secondary school (Aral 1992), the creativity level of children aged 12-14 by age and sex (Oncu 2003), creative thinking levels of 6th grade primary school students (Ersoy and Baser 2009), and the creativity of children from 3rd to 5th grades (Alacapinar 2013). Other relevant studies investigated the creativity and personality structure of children aged 7–11 years (Oncu 1989), the creativity level of preschool children aged 5-6 years by cognitive tempo (Ceylan 2008), the influence of common psychometric indicators of creativity (for example, openness, ideational fluency, ideational originality, and intelligence) on everyday creative activities and actual creative achievement (Jauk et al. 2014), and creative personality in women via a longitudinal study (Helson 1999). In a longitudinal study, beginning from 4th grade to 9th grade, to investigate students’ tendency of creativity development in terms of ages, there is a significant relationship between students’ diverging emotions and grade level with creativity. In a longitudinal study Russ et al. (1999) investigated if young children’ emotions and engagement in fantasy play is predictive of creativity. The result of the study revealed that pretend play is effective and significantly predictive of divergent thinking. It also found that although there is a slight increase in divergent thinking scores of the students’ in 4th and 9th grades, there is no significant increase

in students' score at 4th and 6th grade, and 6th and 9th grades.

There are no studies that focus on a longitudinal examination of creativity in children beginning from the preschool period. Accordingly, this study aims to monitor the development of creativity in children beginning from nursery school to 5th grade. Taken into consideration was that the findings of this longitudinal study might contribute in the development of activities and programs that comply with the developmental needs that enable improving and supporting the creativity of children.

METHOD

Research Model

The survey model, a descriptive method, was used in this study, which aimed to examine the creativity of children from nursery school to 5th grade. Surveys collect data at a particular point in time to describe the nature of existing conditions, or to identify standards against which existing conditions can be compared, or to determine relationships that exist between specific events (Cohen et al. 2005: 170). This study is longitudinal. This type of study involves repeated measurement of the same research variables over long periods. Replies to the below questions were sought in line with the aim of the study:

1. Do the nursery class and 1st grade creativity scores of the children enrolled in the study differ from each other?
2. Do the nursery class creativity scores of the children enrolled in the study differ by sex?
3. Do the 1st grade creativity scores of the children enrolled in the study differ by sex?

Research Population and Sample

The research population was comprised of 900 children attending 47 nursery schools in the primary schools during the 2011-2012 school year. The participants of the study consisted of 201 children selected randomly from these schools. Approximately 2 girls and 2 boys were selected in each school. The study population was comprised of 201 children randomly picked from the aforementioned nursery classes. However, when the children started 1st grade in the 2012-2013 school year a certain part of the population (n=201) could not be reached for various reasons (such as moving out of the city, unwill-

ingness to take part in the study, habitual absence, and death, etc.) and the population volume decreased to 160 participants in the 1st grade. Therefore, the analyses were performed on the data of 160 participants collected via data collection tools. The research was planned to examine the creativity of children from nursery class to 5th grade, and this study covers the first two-year period (2011-2012 and 2012-2013 school years) of the research. The follow-up data for the research will be collected in May during the 2013-2014 school year and the subsequent school years.

Data Collection Instrument and Procedure

The General Information Form and Torrance Creative Thinking Test (Figural Form A and Form B) were used as data collection tools in the study.

General Information Form

Developed by the researcher, the form was used to determine the demographic characteristics of children enrolled in the study.

Torrance Creative Thinking Scale Figural Form A and B

Developed by Torrance in 1966, the test is composed of two sections: verbal and figural. Each of the verbal and figural sections have two forms, A and B. The sub-tests included in the verbal and figural sections of the Torrance Test of Creative Thinking aim to bring out plenty of rare ideas that require creative power for problem solving in as many different areas as possible. Creativity in the figural test is evaluated by the following sub-dimensions: fluency, originality, abstractness of titles, elaboration, and resistance to premature closure. The Figural Form A has three subtests, including picture construction, picture completion, and parallel lines.

Picture Construction

Participants are asked to change a geometric shape to form a new shape, then to construct a story with regard to the shape and name it.

Picture Completion

Children are asked to give a new shape to 10 half-drawn figures and to name them.

Parallel Lines

Tests different responses to the same kind of stimuli. The participants are asked to form new shapes out of 30 parallel lines and to name them.

Form B of the scale has three subtests, including picture construction, picture completion, and circles.

Picture Construction

Participants are asked to change a geometric shape to form a new shape, and then to construct a story with regard to the shape and to name it.

Picture Completion

Children are asked to give a new shape to 10 half-drawn figures and to name them.

Circles

Tests different responses to the same kind of stimuli. The participants are asked to form new shapes out of 42 circles and to name them.

Two measures, namely norm-referenced measures and criterion-referenced measures, are taken into consideration during the evaluation of the test. The norm-referenced measures are fluency, originality, abstractness of titles, elaboration, and resistance to premature closure. The fluency score is calculated as based on results obtained from the picture completion and parallel lines test; the originality score is based on picture construction, picture completion, and parallel lines tests; the abstractness of titles score is based on picture construction and picture completion tests; the elaboration score is based on picture construction, picture completion, and parallel lines tests; and the resistance to premature closure is based on the picture completion test. The criterion-referenced measures are examined in 13 domains. Each of the three tests are evaluated in the sub-domains of emotional expressiveness, storytelling articulateness, movement or action, expressiveness of titles, synthesis of incomplete figures, synthesis of lines, unusual visualization, internal visualization, extending or breaking boundaries, humor, richness of imagery, colorfulness of imagery, and fantasy.

As a result of the evaluation of the Torrance Test of Creative Thinking (Figural Form A or B),

a score for the Checklist of Creative Strengths is obtained considering the criteria therein along with the scores obtained from the fluency, originality, abstractness of titles, elaboration, and resistance to premature closure domains. The total creativity score is calculated by the addition of the total criterion-referenced scores from the Checklist of Creative Strengths to the mean score the child obtained in five domains (Aslan 2001).

The verbal and figural sections of the Torrance Test of Creative Thinking, as developed by Torrance in 1966, were adapted into Turkish by Aslan (2001) and the validity and reliability of the translation of the test, the adaptation of the test items to Turkish, and the Turkish version, were studied. The correlation between the English and Turkish versions of the test was found to be highly significant in terms of total figural creativity ($r=0.59$). The internal consistency analysis results were between $r= 0.38$ and $r=0.89$. According to the Cronbach alpha value, the lowest score for the preschool group was .50 and the highest internal consistency coefficient was .71. Within the scope of validity studies, internal validity and external validity studies were conducted. Under the title of criterion validity, the adjective list, Wechsler Adult Intelligence Test, and Wonderlic Personnel Test (General Ability Test) were used, and as a result of the analyses it was seen that the test was reliable for all age groups and score types (Aslan 2001). The test was studied again for reliability in the scope of this study. The confidence coefficient (Alpha) of the fluency sub-domain of the Torrance Creative Thinking Scale Form A was 0.727, and that of originality was 0.725, abstractness of titles was 0.826, elaboration was 0.826, and resistance to premature closure was 0.677. It can be asserted that the Torrance Creative Thinking Scale Form A is a reliable data collection tool.

Process and Administration

Necessary permission was obtained from the Provincial Directorate of National Education of Yozgat Provincial Governor's Office. The first phase of the administration was realized during the 2011-2012 school year at 23 primary schools under the Ministry of National Education located in Yozgat city center. Before the onset of the study the researcher provided general information to school administrators and teachers about the aim and conduct of the study. The General Information Form for the children included in the survey was filled in by the surveyor with the

assistance of the teacher. The Torrance Creative Thinking Test (Figural Form A) (*picture construction, picture completion, and parallel lines*) was applied individually to children at nursery school. The administration was realized in a calm environment out of the class, so that the children were not affected by noise or friends. When the children moved on to the 1st grade (2012-2013), the Torrance Creative Thinking Test (Figural Form B) (*picture construction, picture completion, and circles*) was administered in small groups, again in a calm environment out of the class. During the group administration, due care was shown to prevent the children from being influenced by the drawings of each other. The children were given ten minutes after the explanations for each application. (The activity for each subtest was limited to ten minutes, and the children completed the activities in ten minute durations). Because the children were not able to read or write (in nursery class), upon completion of the test the administrators helped them with writing down on the test page what they thought about their drawings and the names they gave them. Literate children did the same by themselves. Subsequently, the test materials were collected. Application of the test took approximately forty-five to fifty minutes, including the time allocated for explanatory remarks for each session.

Data Analysis

The data was analyzed by SPSS 16, using *t*-test and paired *t*-test in uncorrelated measurements (Buyukozturk 2007).

FINDINGS

The data and analysis results pertaining to the data collected in the first two-year period covering the 2011-2012 and 2012-2103 school years are provided below in the scope of the study, which aimed to examine whether the creativity of children differed by grade levels and sex, from nursery class to 5th grade.

A review of Table 1 indicates that the nursery class and 1st grade creative thinking scores of children differed only in the elaboration sub-domain ($t_{(159)} = -4.883, p < .05$), and that the difference was in favor of the 1st grade score ($p < .05$). No significant difference was observed in the fluency ($t_{(159)} = .654, p > .05$), originality ($t_{(159)} = 1.111, p > .05$), abstractness of titles ($t_{(159)} = .463, p > .05$), and resistance to premature closure ($t_{(159)} = .879, p > .05$) sub-domain scores and in the total creativity score ($t_{(159)} = 1.268, p > .01$). However, the mean nursery class-fluency ($\bar{X} = 20.28$), originality ($\bar{X} = 16.22$), abstractness of titles ($\bar{X} = 1.18$), resistance to premature closure ($\bar{X} = 9.38$), and total creativity ($\bar{X} = 16.10$) scores were higher than the mean 1st grade fluency ($\bar{X} = 19.76$), originality ($\bar{X} = 15.32$), abstractness of titles ($\bar{X} = 1.09$), and resistance to premature closure ($\bar{X} = 9.00$) scores and mean total creativity ($\bar{X} = 15.42$) score.

The nursery class fluency scores of children ($t_{(158)} = 2.613, p < .05$) differed by sex in favor of girls. No significant difference was found in the originality ($t_{(158)} = .977, p > .05$), abstractness of titles ($t_{(158)} = -.756, p > .05$), elaboration ($t_{(158)} = 1.729, p > .05$), and resistance to premature closure ($t_{(158)} = .221, p > .05$) sub-domain scores of creativity and

Table 1: t-test results of children enrolled in the study by nursery class and 1st grade creativity scores

Creativity	Grade	n	x	SS	Sd	T	p
Fluency	Nursery class	160	20.28	10.05	159	.654	.514
	1st Grade	160	19.76	7.25			
Originality	Nursery class	160	16.22	9.54	159	1.111	.268
	1st Grade	160	15.32	7.62			
Abstractness of Titles	Nursery class	160	1.18	1.91	159	.463	.644
	1st Grade	160	1.09	1.96			
Elaboration	Nursery class	160	6.95	2.94	159	-4.883	.000*
	1st Grade	160	8.34	2.98			
Resistance to Premature Closure	Nursery class	160	9.38	4.47	159	.879	.381
	1st Grade	160	9.00	3.82			
Total	Nursery class	160	16.10	6.71	159	1.268	.207
	1st Grade	160	15.42	5.49			

* p<.001

in the total creativity score ($t_{(158)} = 1.212, p > .05$) (Table 2).

The 1st grade fluency ($t_{(158)} = 2.613, p < .05$) and elaboration ($t_{(158)} = 2.020, p < .05$) scores of children enrolled in the study differed by sex in favor of girls. No significant difference was observed in the originality ($t_{(158)} = 1.124, p > .05$), abstractness of titles ($t_{(158)} = .337, p > .05$), and resistance to premature closure ($t_{(158)} = .744, p > .05$) sub-domain scores of creativity and in the total creativity score ($t_{(158)} = 1.493, p > .05$) (Table 3).

DISCUSSION

Nursery class and 1st grade creative thinking scores of children differed only in the elaboration sub-domain, and that difference was in favor of the 1st grade score. No significant difference was found in the fluency, originality, abstractness of titles, and resistance to premature closure sub-domain scores of creativity or in the

total creativity score. However, the mean nursery class fluency, originality, abstractness of titles, resistance to premature closure, and total creativity scores of children were higher than the mean 1st grade fluency, originality, abstractness of titles, and resistance to premature closure scores and mean total creativity score. Similar results were obtained in another study. Claxton et al. (2005: 332) observed in their study that the elaboration score gradually increased in 4th, 6th, and 9th grades. Alacapinar (2013) found a significant difference in the mean fluency, flexibility, originality, and elaboration scores and the total creativity score by grade level. The fluency, flexibility, originality, and elaboration scores and the total creativity score of the 5th graders were highest compared to the other grades. However, the 6th grade students had the lowest scores. Also, the fluency, flexibility, originality, and elaboration scores and the total creativity scores increased from 3th grade to 5th grade (Alacapinar

Table 2: t-test results of nursery class creativity scores of children enrolled in the study by sex

<i>Creativity</i>	<i>Cinsiyet</i>	<i>n</i>	<i>x</i>	<i>SS</i>	<i>Sd</i>	<i>T</i>	<i>p</i>
<i>Fluency</i>	Girls	78	22.37	10.15	158	2.613	.010
	Boys	82	18.29	9.60			
<i>Originality</i>	Girls	78	16.97	9.41	158	.977	.330
	Boys	82	15.50	9.66			
<i>Abstractness of Titles</i>	Girls	78	1.06	2.04	158	-.756	.451
	Boys	82	1.29	1.78			
<i>Elaboration</i>	Girls	78	7.36	3.07	158	1.729	.086
	Boys	82	6.56	2.77			
<i>Resistance to Premature Closure</i>	Girls	78	9.46	4.45	158	.221	.825
	Boys	82	9.30	4.51			
<i>Total</i>	Girls	78	16.75	6.58	158	1.212	.227
	Boys	82	15.47	6.81			

* $p < .01$

Table 3: t-test results of 1st grade creativity scores of children enrolled in the study by sex

<i>Creativity</i>	<i>Sex</i>	<i>n</i>	<i>x</i>	<i>SS</i>	<i>Sd</i>	<i>T</i>	<i>p</i>
<i>Fluency</i>	Girls	78	21.35	7.99	158	2.752	.007
	Boys	82	18.26	6.14			
<i>Originality</i>	Girls	78	16.01	8.37	158	1.124	.263
	Boys	82	14.66	6.82			
<i>Abstractness of Titles</i>	Girls	78	1.14	1.99	158	.337	.737
	Boys	82	1.06	1.94			
<i>Elaboration</i>	Girls	78	8.82	3.19	158	2.020	.045
	Boys	82	7.88	2.70			
<i>Resistance to Premature Closure</i>	Girls	78	9.23	3.87	158	.744	.458
	Boys	82	8.78	3.79			
<i>Total</i>	Girls	78	16.09	6.08	158	1.493	.138
	Boys	82	14.79	4.82			

* $p < .01$

2013). Ceylan's (2008) study of the creativity level of preschool children (aged 5-6 years) by cognitive tempo found that the age of children led to a statistically significant difference in elaboration scores, and that the fluency scores of children aged 6 years were significantly higher than that of the children aged 5 years. Atay (2009) observed that there was a significant relation between the age and elaboration scores of children, and that the fluency scores of children aged 6 years were significantly higher than that of children aged 5 years. As age increases with grade level, these results can be interpreted that elaboration improves with rising grade levels.

The nursery class fluency scores of children differed by sex, and the difference was in favor of girls. No significant difference was found in the originality, abstractness of titles, elaboration, and resistance to premature closure sub-domain scores of creativity or in the total creativity scores obtained in the nursery class. Both the 1st grade fluency and elaboration scores of children enrolled in the study differed by sex in favor of girls. Atay (2009) observed in a study that there was a significant relationship between the sex and the fluency and elaboration scores of children, and that the fluency and elaboration scores of girls were higher than that of boys (Atay 2009). Another longitudinal study found that the creativity scores significantly increased from 4th to the 6th grades, and that this increase was in favor of girls in terms of flexibility and fluency scores (Lau and Cheung 2010). Mullineaux and Dilalla (2009) found in their study that the elaboration score of girls aged 10-15 years were higher than that of boys, and that their drawings were better and more innovative.

CONCLUSION

The recommendations in line with the results pertaining to the data collected in the first two-year period covering the 2011-2012 and 2012-2103 school years are provided below in the scope of the study, which aimed to examine whether the creativity of children differed by grade levels and sex, from nursery class to 5th grade.

Beginning from the preschool period, rich, stimulating environments have a positive effect on the creativity of children. Accordingly, attention should be paid to enrich the environment in upper grades as with the nursery classes. For the purpose thereof, children can be provided

with the opportunity to benefit from and live in certain places (such as the library, a workshop, laboratory, etc.), where they can build backgrounds and gain satisfaction in all aspects. Children's activities should be supported and positive models should be demonstrated via providing assistance so the children can reveal their own thoughts, rather than simply steering, guiding, and providing previously made examples.

RECOMMENDATIONS

Recommendations can be made for further studies. Further studies may focus on examining the creativity of parents and teachers along with the children, and compare the creativity of parents vs. children and teachers vs. children. Experimental studies, in which different methods and techniques are used with an aim to develop the creativity of children, may be planned. Data collection tools aimed to assess the creativity of children by different age groups can be developed.

LIMITATIONS

A limitation of the study is that the sample was selected from the city center.

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