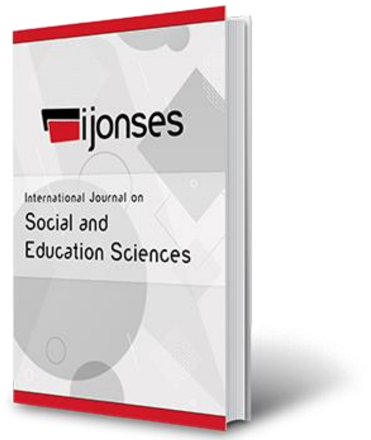

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Abstract

The aims of this study are investigating the attention ability and geometry skills of 60-72-month-old children according to the socio-economic status and determining whether the attention ability significantly predicts the geometry skill when the socio-economic status is controlled. The accessible population of the research in the relational screening model consisted of 60-72-month-old children studying in Afyonkarahisar kindergartens and nursery classes in the 2018-2019 academic year. The sample of the study was randomly selected 310 children among 60-72-month-old children attending high, medium and low socio-economic status schools, volunteering to participate in the study. The "General Information Form" was used to collect data on children and their families in the study while the " Attention Gathering Skills Test for Five-year Old Children FTF-K" developed by Raatz and Möhling in 1971 and adapted by Gözüm (2017) to determine the attention status of children, and the "Early Geometry Skill Test" developed by Sezer (2015) to measure children's geometry skills were used. Chi-Square, One-Way ANOVA and Hierarchical Regression tests were used to analyze the data obtained from the research. In the light of the findings, it was found out that children's attention skills and early geometry skills differed according to socio-economic status and when the socio-economic status was controlled, attention ability was a positive and significant predictor of early geometry skills of 60-72-month-old children.

Introduction

Most of the objects that children, living in a geometric world, relate to and see every day have a geometric shape and are related to geometry. In the early period, children interact with these objects, situations, and objects without direct instruction during the day and construct their intuitive and precise knowledge of geometric shapes (Charlesworth & Lind, 2012: 174). According to Copley (2000), geometry, which includes shapes, size, position, direction, and motion, defines, and classifies the physical world. Geometry, which helps to classify the world, affects the development of reasoning and justification skills by including geometric modeling and analyzing the subfields of mathematics such as shape, space, direction / position, and motion (Copley, 2000: 114) and the properties of geometric shapes, geometric relations (NCTM, 2000: 3). The geometry skill, which starts to develop from the sensory motor period, initiates with comprehending objects, distinguishing similar and different aspects, seeing and feeling, and towards the middle of the pre-operational stage children learn the names and properties of shapes (Charlesworth & Lind, 2012: 174). The geometry skill that develops in the preschool period also supports the increase of mathematics success (Clements, 1999: 72) by providing the understanding of spatial thinking, reasoning, and mathematics subjects (Copley, 2000: 106). For this reason, in order to evaluate and develop geometry skill in terms of different variables from the early period, children should be presented with geometric shapes in different positions (long, short, flattened, narrow, wide, etc.), explanations should be made on the properties of the shapes, and children should be experienced with these shapes (Charlesworth & Lind, 2012: 174). The development of children's geometry skills from an early period is also associated with the development of attention abilities (Anobile, Stievano, & Burr, 2013; Richard, Hodges, & Heinrich, 2018).

The child, who is exposed to many stimuli after birth, discovers his / her environment by paying attention to the stimuli that are relevant (Gözüm & Kandır, 2018: 58). Attention is defined as the individual's receiving stimuli from the environment through his / her sensory organs and directing his / her mental receptors to the stimuli formed in his / her phenomenal environment at the level of consciousness (Eysenck & Keane, 2000). Attention is one of the mechanisms that enable people with a limited information processing to use their cognitive resources in the most efficient way (Soysal, Yalçın, & Can, 2008: 35). Since, attention is effective on cognitive processes such as learning, remembering, communicating, problem solving and perception, decision-making (Sohlberg & Mateer, 1987), children's learning capacity increases with the development of attention ability and perception capacity improves by saving different stimuli from the environment into short-term memory (Armbruster & Anderson, 1988). A distress in attention can affect learning and cause a decrease in mathematics achievement. Problems with attention in the early childhood years while the foundations of mathematics, including geometry, were laid, may cause delay or inability to understand the skills to be acquired (Fuchs et al., 2006). Attention is a prerequisite for achieving mathematical success, as learning takes place more effectively as attention skills increase. Various studies have revealed that there is a significant relationship between mathematics and geometry skills and attention (LeFevre et al, 2013; Anobile, Stievano, & Burr, 2013; Richard, Hodges, Heinrich, 2018; Clark, Tullo, & Bertane, 2021). For this reason, it is extremely important to support children with attention problems by preparing early intervention opportunities in order to evaluate and develop attention-gathering ability in terms of different variables (Ettrich, 1998).

Parents, defined as the first teachers of children, play a key role in the development of their cognitive abilities and math skills (Hindman, Skibbe, Miller, & Zimmerman, 2010; Lugo-Gil & Tamis-LeMonda, 2008). Socio-economic status is one of the most important familial factors affecting attention skills and geometry skills, which are among the basic skills to be acquired in preschool period. Socio-economic status is generally expressed by environmental factors such as parents' educational level, occupation, family income, the number of stimulating activities in the home environment, and the quality of adult-child interaction (Berk, 2013). In families that are disadvantaged in terms of these factors, this situation affects the amount of cognitive stimulation at home (Duncan & Magnuson, 2012; Mistry, Biesanz, Taylor, Burchinal, & Cox, 2004), but it can cause parents to have a negative mood and affect their children's development negatively by being reflected in communication with children (Conger, Rueter, & Elder, 1999). Bradley, Corwyn, McAdoo, García and Coll

(2001) and NICHD (2000) stated that, depending on the socio-economic status, especially disadvantaged children are less likely to participate in activities such as museum theater to support education, and that these children are read less books by their parents and have worse physical home characteristics meanwhile the quality of the communication of these children with their parents was lower. Duncan and Magnuson (2005), on the other hand, explained that the school readiness differences of children from lower and upper socio-economic status families reflect the differences in environmental support given to them, and that many factors such as financial limitations and low education levels are effective in supporting the readiness of children of low socio-economic status parents. Therefore, studies on the effect of socio-economic status on children's mathematics achievement, especially in geometry, are included in the literature (Anders et al., 2012 Aslan et al., 2012; Reid & Ready, 2013; Wang, Li, & Li, 2014). In the literature, there are also studies showing that the attention skills and cognitive development of children with low socio-economic status are lower than those with medium and high socio-economic status (Gözüm & Kandır, 2018; Ison, Greco, Korzeniowski, & Morelato, 2015; Wray, Stevens, Pakulak, Isbell, Bell, & Neville, 2017). Majority of the aforementioned studies reveal that the sample groups were comprised of children not residing in Turkey. At the same time, no research has been found in the literature to show whether the ability of attention predicts early geometry skills when the socio-economic status variable is controlled. For this reason, it is thought that this study will contribute and expand the literature in terms of its characteristics. Mainly the aims of this study are a) Investigating the attention skills and geometry skills of 60-72-month-old children according to the socio-economic status. b) Determining whether the attention ability significantly predicts the geometry skill when the socio-economic status is controlled.

Depending on this main purpose, the sub-problems of this research are as follows.

a) Do the attention skills of 60-72-month-old children differ according to the socio-economic status?

b) Do the geometry skills of 60-72-month-old children differ according to the socio-economic status?

c) How well does attention competence predict geometry skill when the socio-economic status is controlled?

Method

Research Model

As the research aims to investigate the attention ability and geometry skills of 60-72-month-old children according to the socio-economic status and to determine whether the attention ability significantly predicts the geometry skill when the socio-economic status is controlled; the type of the research is mainly a relational research. Relational screening models are research models that aim to determine the existence of co-change or the degree of change between two or more variables (Sönmez & Alacapınar, 2013).

Study Group

The accessible population of the research in the relational screening model consisted of 60-72-month-old children attending to kindergartens and nursery classes which were located in a provincial center and affiliated to the Turkish Ministry of National Education during the 2018-2019 academic year. According to the data obtained from the Provincial Directorate of National Education, the accessible population of the study consisted of approximately 4000 children aged 60-72 months studying in kindergartens and nursery classes. 310 children attending to 13 kindergartens and nursery classes were included in the sample of the study. In this study, 310 children were reached by using the appropriate sample sizes table for different deviation amounts. The confidence rate of the sample to represent the population is 95% (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2017). The sample of the study was chosen by random sampling method from the accessible population. The kindergartens and nursery classes included in the study were selected randomly from the list that was taken from the Provincial Directorate of National Education of a city in Turkey to represent the whole children in each of the lower, middle, and upper socio-economic status (Baştürk & Taştepe, 2013).

Data Collection Tools

In order to collect data on children and their families in the study, "General Information Form" prepared by the researchers, in order to assess children's attention ability "FTF-K Attention Gathering Skills Test for Five-year Old Children" developed by Raatz and Möhling in 1971 and adapted to Turkish by Gözüm (2017) and to determine the children's early geometry skills the "Early Geometry Skill Test" developed by Sezer (2015) were all used.

General Information Form

The form, developed by the researchers to collect personal information about children, includes questions about gender, socio-economic status, number of children, parents' education status, parents' age, and parents' profession. General information forms were filled in by the researchers for each child, with the consent of the parents, depending on the information in the personal development files of the children in the schools.

FTF-K Frankfurter Attention Gathering Skills Test

In order to determine 60-72 month-old children's attention ability, “FTF-K Attention Gathering Skills Test for Five-year Old Children” which was developed by Raatz and Möhling in 1971 and adapted to Turkish children by Gözüm (2017) was used. Children are asked to find and mark the pears within 90 seconds from the apples and pears given mixed in the scale. The marking time of the test is 90 seconds, while the instruction is explained to the children in eight minutes. There are 42 pear symbols that can be marked on the scale. In this scale, the pears marked by the child in 90 seconds after the instructions given to the children constitute the raw score. In order to eliminate the effect of gender and age variables, corrected scores were used instead of the raw scores received by the children. In order to calculate the corrected score of the child, the calendar age on the day of the test is found and the corresponding score from the corrected score table is added to the raw score and the test is evaluated. FTF-K Attention Gathering Skills Test is divided into 3 levels. Those who score between 0-22 are rated below average, those who score between 23-32 as average, and those who score between 33-43 as above average. Validity and reliability studies for the Turkish version has been carried out in Kars / Turkey by selecting 4 schools from each of the lower, medium, and upper socio-economic status with the help of Turkey

Statistical Institute (TSI) from the list of schools obtained from Kars Provincial Directorate of National Education. 173 children, 49.7% girls (n = 86), 50.3% boys (n = 87), who were selected using the random sampling method among 60-72-month-old children, constituted the study group for reliability procedures. Test-retest method was used for the reliability study of the FTF-K Attention Gathering Skills Test for Five-year Old Children (Frankfurter Test für Fünfjährige-Konzentration Test). In the test-retest reliability method used in the study in which the effect of the development of attentiveness program in preschool period on children's attention skills acquisition and reasoning skills were investigated, the level of the relationship between the first application and the second application was found to be .743 ($p < .001$). According to Guilford (1956), the lower limit of the reliability coefficient related to the test-retest application should be .70. The fact that the reliability coefficient was below this limit was interpreted as the use of the scale was not appropriate because the standard error in the detected scores was high (Kline, 1986). According to these results, it has been accepted that the Frankfurter Attention Gathering Skills Test for Five-year Old Children (FTF-K) is a reliable data collection tool for Turkish children aged 60-72 months (Gözüm, 2017).

Early Geometry Skill Test

The "Early Geometry Skill Test" developed by Sezer (2015) was used to determine the early geometry skills of 60-72-month-old children. There are a total of 46 question items in the test. The children are asked to show geometric shapes such as triangle, rectangle, square, circle / circle, cylinder, rectangular prism, cube, cone among mixed shapes, draw geometric shapes, edges, corners in accordance with the instructions, find the shapes to come after the patterns, to find the same shapes given in the example, to create the same pictures on the cards shown from the blocks in the form of cubes and rectangular prisms, to find the surfaces of geometric shapes from the given options, to create a geometric shape using the given wooden sticks, to show the appropriate part to fill the space in the figures, and to find the geometric shape that is not used in the example. For the correct answers given, some questions are given 1, 2, 3, 4, 5, 6 and 7 points. In other questions, 1 point is given for correct answers. In some questions, for the wrong answers given, -1, -2, -3, -4, -5, -6 and -7 points are reduced from the points received. If the child gets a negative score in the questions, this score is written as "0". In other questions, 0 points are awarded for incorrect answers. The highest score that can be obtained from the test is 71. The content validity index of the Early Geometry Skill Test developed by Sezer (2015) was found to be .65, the total reliability coefficient Cronbach alpha value as .855 and the KR-20 coefficient as .853. The within-group correlation coefficient of the test was .124, the Pearson correlation coefficient between the two halves was .697, the Spearman-Brown coefficient was .821, and the Guttman Split-Half coefficient was .767. According to the Guttman Lambda (Li) method, the reliability coefficients vary between .760 and .883 values. Finally, for test-retest reliability of the test, the Pearson correlation coefficient was calculated as .898, the KendallTau_b coefficient as .738 and the Spearman rho coefficient as .885. As a result of these findings, a valid and reliable test, consisting of 42 items, was obtained (Sezer, 2015).

Data Collection

Data collection tools have been approved by the ethics committee of a university in Turkey before implementation and the necessary permits from the Provincial Directorate of National Education were taken. Permits for use of the tests were granted by the people who developed and adapted them. The research was carried out with 60-72-month-old children, attending the kindergartens and nursery classes of elementary schools, who volunteered to participate in the study from lower, middle, and upper socio-economic and cultural regions. In the spring semester of the 2018-2019 academic year, the school principal, teachers, and parents were interviewed at the schools included in the sample group, and information was given about the study, and it was conducted with the children of parents who agreed to participate in the study. The tests were administered in a quiet and comfortable environment in schools where the children attend, paying attention to the application rules of the tests. The data were collected by the researchers.

Data Analysis

The demographic data collected through the general information form were given as frequency and percentage values. Whether the scores of the children from the Frankfurter Attention Gathering Skills Test for Five-year Old Children (FTF-K) and the Early Geometry Skill Test showed normal distribution was analyzed with the Kolmogorov-Smirnov (K-S) normality test. As a result of the normality test, Chi-Square Test, ANOVA, and hierarchical regression analysis were used to investigate the difference between groups. The significance level was set at .05.

Findings

1. Does the attention ability of 60-72-month-old children show a significant difference according to socio-economic status?

According to Table 1, children's attention skills showed a significant difference in terms of socio-economic status ($p < .05$). It was found out that 38.6% of children with low attention skills had low socio-economic status, 37.9% had a medium socio-economic status and 23.5% had a high socio-economic status. It was seen that 28.7% of the children with high attention skills had low socio-economic status, 31.5% had a medium socio-economic status and 39.9% had a high socio-economic status. It was revealed that as the socio-economic status of the children increased, their attention abilities increased. It was observed that the children with low attention ability mostly had low and medium socio-economic status, and the children with high attention skills had more medium and high socio-economic status.

Table 1. Chi-Square Test Results of Attention Ability of 60-72-Month-Old Children Regarding the Socio-economic Status (SES) Variable

	Socio-economic Status							
	Low SES		Medium SES		High SES		Total	
	n	%	n	%	n	%	n	%
Low Attention Level	51	38.6	50	37.9	31	23.5	132	100
High Attention Level	51	28.7	56	31.5	71	39.9	178	100

$x^2=9.40$, sd=2, $p<.05$

2. Do the early geometry skills of 60-72-month-old children show a significant difference according to socio-economic status?

The results showing whether there was a significant difference in the early geometry skills of 60-72-month-old children in terms of socio-economic status are given in Tables 2a and 2b.

Table 2a. Descriptive Statistics of Early Geometry Skills Scores of 60-72-Month-Old Children According to Socio-economic Status (SES)

Groups	**n**	$\bar{x}$	**sd**
1.Low SES	102	21.51	7.40
2.Medium SES	106	29.95	8.70
3.High SES	102	34.15	9.06

The arithmetic mean of the high group was ($\bar{x}$=34.15); of the middle group was($\bar{x}$=29.95) and the low SES group was ($\bar{x}$= 21.51).

Table 2b. One-Way ANOVA Test Results Related to Socio-economic Status (SES) and Early Geometry Skills Scores of 60-72-Month-Old Children

	Sum of squares	sd	Mean of Squares	f	p	Difference among groups
Between Groups	8456.62	2	4228.31	59.557	.000	1-2
Within groups	21795.71	307	70.99			1-3
Total	30252.33	309				2-3

p<.05 1.low status, 2.medium status, 3.high status

According to table 2a and 2b, the socio-economic status variable caused a significant difference in terms of early geometry skills of 60-72-month-old children ($F(2, 307) = 59.56$, $p < .05$). There was a significant difference at $p < .05$ status between the arithmetic means of the high-medium-low SES group. According to the Scheffe test, which was conducted to determine which groups the difference stems from, it was seen that as the socio-economic status of the children increased in the early geometry skills scores, the total scores obtained from the scale increased significantly. Accordingly, it can be said that children in the group with a high socio-economic status had more early geometry skills than the children in the middle and low SES groups, and the children in the middle SES group than the children in the low SES group.

3. How well does children's attention ability predict geometry when socio-economic status is controlled?

Hierarchical regression analysis was conducted to determine whether the attention ability significantly predicted early geometry skills when the socio-economic status of 60-72-month-old children were controlled. Since the early geometry skills of children differed significantly according to the socio-economic status, the socio-economic status was first included in Model 1. According to the results of the hierarchical regression analysis shown in Table 3, it was seen in the first model that socio-economic status explained 26% of the variance as a significant predictor of geometry skill (ΔR^2=.26, ΔF=113.47; p<.05). As the socio-economic status of the children increased, there was an increase in their geometry skills scores ($\beta = .51$, $p < .05$).

Table 3. Hierarchical Regression Results Related to the Prediction of Socio-economic Status (SES) and Attention Ability to Early Geometry Skills

Model	Predictor	*B*	*SH*	β	*t*	*Partial r²*	*ΔR²*	*ΔF*
1	Socio-economic Status	6.31	.59	.51*	10.65*	.51	.26*	113.47*
	Constant	15.92	1.28		12.43*			
2	Attention Ability	4.85	.81	.28*	5.99*	.32	.07*	35.93*
	Constant	4.75	2.22		2.14*			

*p<.05

At the last stage, attention skill added to model 2 explained 7% of the variance when socio-economic status was controlled. Attention was found to be a positive and significant predictor of early geometry skills of 60-72-month-old children when the socio-economic status was controlled (ΔR^2 =.07, ΔF=35.93; p<.05). As the attention skills of children increased, their early geometry skills scores also increased (=.28, p<.5). As a result, when the socio-economic status of 60-72-month-old children participating in the study were controlled, the more activities with children were done to develop attention skills, the more early geometry skills increased.

Discussion

As a result of the study, it was found out that 60-72-month-old children's attention skills and early geometry skills differed according to socio-economic status, and when the socio-economic status was controlled, attention ability was a positive and significant predictor of early geometry skills of 60-72-month-old children. It was determined that 38.6% of children with low attention skills had low socio-economic status, 37.9% had a medium socio-economic status and 23.5% had a high socio-economic status. It was concluded that 28.7% of the children with high attention ability had low socio-economic status, 31.5% had a medium socio-economic status and 39.9% had a high socio-economic status. It was seen that as the socio-economic status of the children increased, their attention abilities increased. It was observed that children with low attention skills had low or medium socio-economic status, and children with high attention skills had more middle or high socio-economic status.

In the literature, there are different studies evaluating the attention abilities of children in different age groups according to their socio-economic status. In the reliability study of the Frankfurter Attention Gathering Skills Test for Five-year Old Children (Frankfurter Test für Funjahrıge Konzentratıon-FTF-K) conducted by Gözüm and Kandır (2018), as a result of the first and second applications, according to the mean scores of the children in the attention test, it was found out that the children at the upper and middle socio-economic status scored lower than the children at the upper and middle socio-economic status. In a study conducted by Ison, Greco, Korzeniowski, and Morelato (2015) with 141 Argentinian children between the ages of 10-13, they found that children with parents with a high socio-economic status had higher attention performance than their peers. Wray, Stevens, Pakulak, Isbell, Bell, and Neville (2017) reported that 5-year-old children with lower socio-economic status had weaker selective attention skills than 4-year-old upper socio-economic status children in their study with 58 children of normally developing preschool period. Werchan, Lynn, Kirkham, and Amso (2019) determined that the socio-economic status of the family predicted featured-based attention in infants aged 3-5 months and object-based attention in babies aged 9-12 months. D'Angiulli, Herdman, Stapells, and Hertzman (2008) found out that children at upper socio-economic status had better auditory selective attention. Assari, Boyce, and Bazargan (2020), in their study with 4188 adolescents in general, found that generally high socio-economic status was associated with children's attention status. Lupien, King, Meaney and McEwen (2001) stated that the attention skills of children with low socio-economic status were more at risk. Mezzacappa (2004), in a study in which 249 school-age children aged 6-7 years were evaluated, stated that the ability of children with lower socio-economic status to filter distracting information and manage response conflict were lower compared to their higher SES peers. Stevens, Lauinger, and Neville (2009), in their study evaluating the selective attention of 32 children aged 3-8 years, reported that children with lower socio-economic status had deficiencies in selective attention and control of attention, and especially in filtering distracting stimuli. It can be said that the findings obtained as a result of the literature review are in line with the results of this study and that the socio-economic status is one of the important factors affecting children's attention ability.

It was determined that the socio-economic level variable caused a significant difference in the early geometry skills of 60-72-month-old children. In early geometry skill scores, it was seen that as the socio-economic level of children increased, the total scores obtained from the scale increased significantly. The arithmetic mean of the high level SES group was (= 34.15), of the medium level SES group was (= 29.95) and the low SES group was ($\bar{x}$ = 21.51). Accordingly, it can be said that children in the group with a high socio-economic status had more early geometry skills than the children in the medium and low SES groups, and the children in the medium SES group had more early geometry skills than the children in the low SES group. Although it was observed that there are very few studies in the literature that have examined children's geometry skills according to their socio-economic level, it has been found that geometry skills are mainly investigated in studies in which the geometry skill is often dealt with with other mathematical skills. Aslan et al. (2012) examined the effect of socio-economic level on children's classification of shapes. In the task of classifying the circle, rectangle, and square shapes, it was observed that there was a statistically significant difference between the scores of the children according to the socio-economic status. For all three figures, it was determined that there were significant differences between the group with low socio-economic level and the groups with medium and high socioeconomic level. In addition, significant differences were found between the groups with medium socio-economic status and those with high socio-economic status in classifying the square and circle shapes. Considering that the educational levels of the mother and father affect the socio-economic level of the family, Kesicioğlu (2011), Köse (2005), Nunes et al. (2009) claimed that the education levels of the parents had a positive effect on the spatial and geometric skills of the children while Thirumurthy (2003) suggested that only mothers' education levels affected those skills. In his study, Avcı (2015) investigated the mathematics skills of 288 children of 48-66 months and determined that as the socio-economic level of families increased, the mathematics scores of children tended to increase. Tok and Ünal (2020), in their study examining the mathematics skills of 372 children aged 60-72 months, found that the mathematics skill scores of children from high-income families were significantly higher. Lopez et al. (2007) conducted a longitudinal study with 73 low-income Latin families and their children while Jordan et al. (2009) conducted a longitudinal study with 378 children attending kindergarten and the mathematics achievement of children of low SES families was found to be lower than the medium SES children. Downer and Pianta (2006), Polat Unutkan (2007), Sektnan, McClelland, Acock, & Morrison (2010) explained that there was a significant difference in mathematics achievement in the mathematics performance of low and high SES children. Similarly, Crook and Evans (2014), Nesbitt, Baker-Ward, and Willoughby (2013), Blums, Belsky, Grimm, and Chen (2017) found out that the environment offered to the child had a mediating role in executive functions on the problem-solving skill. Reid and Ready (2013) found that there were positive relationships between children's socio-economic status and mathematics learning. Denton and West (2002) found that children from low-income and middle-income backgrounds had a large gap, compared to their high SES peers, between reading and mathematical knowledge, and this was increasingly widespread throughout their academic process. Wang, Li and Li (2014) reported that Chinese students' SES revealed significant difference on their mathematics achievements. In the light of the relevant literature and based on the results of this research, it can be said that high-income families are more successful in mathematics-related skills because of the more diverse academic and social opportunities they offer to their children and the easier access of children to three-dimensional and digital materials related to mathematics (Aslanargun, Bozkurt, & Sarıoğlu, 2016).

Hierarchical regression analysis results showed that when socioeconomic status was controlled, attention ability became a positive predictor of early geometry skills. Although there is no direct study in the literature that attention ability is a predictor of early geometry skills, there are studies on the relationship between different sub-skills of mathematics and general mathematics skills and attention. Zippert, Clayback, and Rittle-Johnson (2019) examined the relationship between pattern-forming skills of 66 preschool children and their general cognitive abilities, including fluid reasoning, working memory, and spatial skills. Accordingly, they concluded that children's pattern-forming skills were significantly correlated with their performance in general cognitive ability measures. Giofre, Mammarella, Cornoldi (2014) found that working memory was strongly associated with geometric achievement, regardless of their intelligence, in their research with 176 children attending 4th and 5th grades. Peng, Namkung, Barnes, and Sun (2016) conducted a meta-analysis of 110 studies with 829 effect sizes in order to determine the relationship between mathematics and working memory and found a moderate significant relationship between mathematics and working memory. LeFevre et al. (2013) stated that executive attention was a predictor of mathematics knowledge in a study with 157 children attending 2nd and 3rd grade. Anobile, Stievano, and Burr (2013) stated that attention predicted math scores in a study they conducted with 68 children between the ages of 8 and 11 in the school period. Richard, Hodges, and Heinrich (2018) predicted the mathematics performance scores of visual attention children in a study evaluating 24 children between the ages of 8 and 18 in adolescence. Stipek and Valentino (2015) stated that, with the longitudinal data obtained from the National Longitudinal Survey of Youth (NLSY), the relationship between working memory and attention and academic outcomes was strong and positive in early childhood, but insignificant or small and negative in later years. Cragg and Gilmore (2014) suggested that executive function predicted children's mathematics proficiency while Clark, Tullo, and Bertane (2021) explained that there was a relationship between attention and math proficiency. Fuchs et al. (2006) concluded that there was a direct relationship between attention and mathematics skills and that the strongest determinant for mathematical performance was attention. In their study, it was seen that the levels of inattention had a significant relationship with mathematics. The research results in the literature support the prediction of attention on early geometry skills, which is a sub-field of mathematics skills.

Conclusions and Suggestions

As a result of the study, it was found out that 60-72-month-old children's attention ability and early geometry skills differed according to socio-economic status, and when the socio-economic level was controlled, attention ability was a positive and significant predictor of early geometry skills of 60-72-month-old children. The absence of different variables such as parents' education, profession, number of siblings, parental attitudes, teachers, and school environment, which may affect attention ability and early geometry skills, can be listed as a limitation of the study. In this sense, it may be suggested to conduct studies that investigate different variables related to peers, school, teacher and family that can affect the attention and early geometry skills of 60-72-month-old children. In addition, the research can be enriched by evaluating the children's attention and early geometry skills using different data collection methods together with standard tests in future studies. The predictive power of attention on early geometry skills can be determined by keeping the socio-economic status constant by conducting longitudinal studies on the subject or by including different age groups in the sampling. Projects can be organized so that children, especially from families with low socio-economic status, can receive education for more than one year with an education program that will support the attention skills and later the effects of this education on early geometry skills can be evaluated. Seminars, conferences, etc. can be held on the importance of the activities to support the attention and early geometry skills of children from low and middle socio-economic families.

Notes

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