

EVALUATING THE DEVELOPMENT OF THE VISUAL PERCEPTION LEVELS OF 5-6 YEAR-OLD CHILDREN IN TERMS OF SCHOOL MATURITY AND “DRAW A PERSON” TECHNIQUE

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Abstract

In this study, the relationship between the visual perception levels of 5-6 year-old children and school maturity as well as their drawings of human picture is investigated. The participants of the study are 53 5-6 year-old children attending the Preschool Application Center at Marmara University. In order to collect data, the Frostig Visual Perception Test (FVPT), Goodenough-Harris Draw a Person Test and Marmara Primary School Readiness Test (MPRT) were used. The effect of the visual perception development level on the school maturity and the drawing of human pictures are analyzed by means of the simple linear regression analysis technique. Concerning the results, it was realized that the ability of visual perception is strongly explanatory of the school readiness and the developmental level assessed by the Goodenough-Harris Draw a Person Test. Also, it was found that the development of drawing a picture assessed by the Draw a Person Test significantly predicts school readiness. The predictive strength of the FVPT's sub dimension of “hand-eye coordination” was found to be significantly meaningful in predicting MPRT's “labyrinth” and “line” sub dimensions. The findings yielded in the study are compared to both national and international research findings and the predictive value of these instruments in predicting school readiness is discussed.

Keywords: *Visual perception, school maturity, children pictures, 5-6 year old children*

Introduction

School maturity means reaching a certain level of physical, mental, social and emotional development and being ready to successfully fulfill the

demands made at school (Oktay, 2004). All the healthy children at the age of six reach a cognitive developmental level allowing them to learn how to read and write. What is expected from a child who has recently started school is to acquire the ability to read and write. Acquiring this ability is almost considered to be equal to success at school (Snow, Burns & Griffin, 1998). However, not all the children can learn how to read and write at the same time due to certain individual differences. A child who has not been able to reach the school maturity level is likely to have problems in fulfilling what is expected of him. As a result, the child may develop negative attitudes towards the school and towards him/herself because of the disappointments they experience and the difficulties they encounter (Korkmazlar,1992; Blair,2002).

For the children to differentiate the words and letters written on the paper, they have to have the visual perception ability necessary for a successful reading instruction. Visual perception means the recognition of visual stimuli, discrimination and the ability to make interpretations in relation to previous experiences (Maslow, Frostig, Lefever & Whittlesey, 1964; Apak,1984). Visual perception in preschool education comes into prominence as far as pre-school children' daily routine activities, game activities, school and age-related developmental tasks are concerned (Brown et al., 2003). The visual perception ability accelerates between the years of 3 and 7. Pre-school years when children acquire most of the knowledge and skills providing the basis of children's academic skills are appropriate years for children to become aware of the problems regarding their visual ability and to take necessary precautions (Yüksel and Yurtsever, 2007). During this period, activities such as line, labyrinth, painting and drawing are frequently used, especially in pre-school institutions so as to speed up the transition process to reading and writing. Children's low performance in such activities can be determinative of problems students will encounter in the learning process at school. Conversely, Yost and Judi (2001) identified that the children with good handwriting has better visual perception skills than those with bad handwriting. In addition, it was found that children who have more developed visual and motor skills and hand-eye coordination write more neatly and draw more quickly in line with the task (Kaiser, Albaret, & Doudin, 2009). Many research studies have also revealed that writing more slowly during the school years might lead to the difficulty for these children to participate in the classroom activities, the lack of developed verbal skills (Tseng & Chow, 2000; Howe, Roston, Sheu & Hinojosa, 2013; Engel-Yeger, Hus & Rosenblum, 2012).

The fact that children convey the mental reflections of the knowledge they visually acquire during their pre-school or early childhood years by means of drawing pictures to which they attach a great deal of importance is

remarkable when compared to other periods in their lives. In their pictures, children use their own interpretations regarding an object or experience, try to understand and internalize the external world and reflect this effort to the paper (Canel, 2011; Yavuzer, 2000). Therefore, from the drawings, it is possible to make predictions not only about their dream world but also about their developmental levels (Harris, 1963).

In all parts of the world, children's drawings at similar ages improve through similar developmental stages. Hence, taking their age as the criteria for the development of their drawing skills helps us understand their cognitive developmental levels (Chappel & Steitz, 1993). The line is used by the person as a tool to describe the objects so that the lines can be used in the symbolization of the objective world (Güngör, 2005). When the developmental stages of the ability to draw pictures are taken into consideration, it can be realized that children starting to scribble at the ages of 2-4 often draw human figures among their first meaningful pictures at around the age of 4. As the children's cognitive development progresses, the details in their drawings and their concepts of ratio, space and place become more visible. Therefore, when the person drawing of a child is carefully investigated, it is possible not only to make a prediction about the age of the child but also to assess the child about whether he/she exhibits appropriate behaviors for their age (Cansever, 1982; Cherney et al. 2006; Yavuzer, 2000; Claire et al. 2012).

The findings of some other research studies have also shown that activities aiming to develop pre-school children's fine motor skills facilitate their adaptation to academic skills in the primary school and give rise to their success in reading and numeric fields in their future academic life (Le, Nataraj-Kirby, Barney, Setodji & Gerswin, 2006; Chang, Singh, 2008; Grissmer, Grimm, Aiyer, Murrah & Steele, 2010). Without doubt, one of the most important activities to develop children's fine motor skills is drawing pictures and then painting them. Many studies have proved that pre-school children spend more time with such activities, and thus, both their hand-eye coordination and line drawing skills improve (McClelland, Morrison, & Holmes, 2000; Duncan et al., 2007). Besides, the hand-eye coordination, a factor affecting children's school readiness, also determines their conscious and voluntary movements on the paper. Mastering in the tasks entailing controlled and purposeful movements requiring attention to details (e.g., labyrinth) depending on their age can be regarded as a factor having an influence on their school readiness. In their study, Kindap and Sayıl (2005) asked 6-13 year-old children to draw a picture about two subjects. As a result of the study, they concluded that as children get older, a linear increase is observed in the use of paper and perspective along with the number of details used in the pictures, which means that there is a linear improvement in the representative size of the drawing. Hence, it would be fair to suggest that because of the fact that

children who do not attend a pre-school institution are not supported sufficiently for the development of their fine motor skills and visual perception, it is likely for them to have difficulty not only in their social relationship but also in their academic skills when they start primary school.

In order to make estimation about children's school maturity, the supervisors working in pre-school institutions should be supported using the correct method and they ought to be equipped with skills necessary to evaluate the children. By this means, the disruptions experienced in the early years of primary education can be diagnosed in advance and these deficiencies can be compensated. Therefore, it would be true to state that it is essential to comprehensively evaluate pre-school children's skills, to identify their weak skills that should be supported and thus, to prepare them for the school and the life in general by means of programs in line with their needs. Identifying children's visual perception levels, which are among factors that may have an influence on their school maturity, can be regarded as a variable that can predict to what extent they are ready for school. On the other hand, drawing a picture, which can be considered as one of the most obvious expressions of the visual perception level, can be considered as a variable indicating the level of efforts to grip the outside world. Therefore, it would be fair to state that the level of visual perception might have an impact on children's school maturity.

The objective of this study is to investigate the relationship between the visual perception levels of 5-6 year-old children and their school maturity as well as their person drawings. The sub-objectives of the study are as follows:

1. Can the hand-eye coordination skills of 5-6 year-old children explain their ability to draw labyrinth significantly?
2. Can the hand-eye co-ordination skills of 5-6 year-old children explain their level of school maturity significantly?
3. Can the visual perception skills of 5-6 year-old children explain their school maturity level significantly?
4. Can the visual perception skills of 5-6 year-old children explain the development of their drawings significantly?
5. Can the development of 5-6 year-old children's drawings explain their school readiness significantly?

Method

In this part of the study, the research design, the sample of the study, population and sampling, data collection instruments and explanations about the data analysis are presented.

Research Design

In this research study, the correlational model was used among other general screening models. Relational screening model is a research model aiming to determine the presence or/and the degree of change among two or more variables. As the relationship between children's developmental level of visual perception and school maturity as well as drawing a person is examined, this study can be categorized as a predictive relationship research study (Balci, 2005; Karasar, 2005).

Sample:

The sample of the study is comprised of 53 5-6 year-old children attending the Preschool Application Center at Marmara University. Among these participants, 22 were female and 32 were male. In other words, no sampling method was used, and the entire universe in the context of the present study was reached. All research applications related to drawing a picture were conducted by the school counselor so as to facilitate children's self-expression of themselves.

Research Instruments

In the data collection process, three different tests were applied. These are Frostig Visual Perception Test, Goodenough-Harris Draw a Person Test and the Marmara Primary School Readiness Test.

Frostig Visual Perception Test: This test was developed by Marianne Frostig in 1963 in order to identify the visual perception levels of 4-6 year-old children. It assesses five perceptual skills, such as hand-eye coordination, figure-ground separation, shape constancy, perception of space and location in addition to location relationships (Wiederholt, 1971). The fact that the test was frequently conducted in studies carried out in different cultures lent wings to researchers about the validity of the test although the reliability and validity of it have not been studied in Turkey yet. Only Sökmen (1995) examined the reliability of the test for children at the age of 5. All the continuity coefficients of the general and sub-areas of the test were found to be significant at the level of .01. The standard scoring criteria for each sub-area of the test are available (Tuğrul et al. 2002). The raw scores children obtain from each sub-area has an equivalence as standard score (Maslow, Frostig, Lefever & Whittlesey, 1964).

Goodenough-Harris Draw a Person Test: Goodenough (1926, 1949) developed this test for the assessment of requirements, conflicts, personality-specific features, mental development and maturity of the children on the basis of their drawings. As a result, he prepared a detailed scoring method including the characteristics of the drawing. Having changed Goodenough's instructions, Harris (1963) asked a child to draw a man, a woman and a

picture of him/herself. Harris developed two scoring criteria so that he could evaluate the picture of the man and the woman separately. Then, Koppitz (1968) found that the test gave information both about the development of the child and about his/her emotional world. Considering their experience along with their scoring system, Goodenough and Harris identified features that should be available in pictures drawn by children at different ages (Cansever, 1982).

Marmara Primary School Readiness Test: In this study; Development and Implementation forms of “Marmara Scale for Primary School Readiness” that was developed by Unutkan in 2003 were used in order to collect data. Development form of the relevant scale comprised 4 sub-tests, namely intelligence and language (74 items), socio-emotional (40 items), physical development (23 items) and self-care skills (16 items) sub-tests with 153 items in total. The scale was filled out by parents or teachers. Test-retest reliability of the scale (continuity coefficient) $r=.99$ $p<0.01$ was found to be quite high. The internal reliability coefficient (Cronbach Alpha) was also high ($r=.98$, $p<0.01$). As validity study, factor structure was analysed with factor analysis. The sub-test for development form used in the study had a high internal consistency coefficient - Cronbach Alpha, such as intelligence and language ($r=.97$, $p<0.01$), socio-emotional ($r=.94$, $p<0.01$), physical development ($r=.89$, $p<0.01$), and self-care skills ($r=.80$, $p<0.01$).

The implementation form of the scale comprised 5 sub-tests, mathematics (47 items), science (14 items), words starting with the same sound and words with rhyme (8 items), drawing (3 items) and labyrinth (12 items) skills. The scale had 74 items in total. It was presented to the children individually by the researcher. The test-retest reliability of the scale (continuity coefficient) $r=.93$ $p<0.01$, was found to be quite high. The internal reliability coefficient (Cronbach Alpha) was also high ($r=.93$, $p<0.01$). As validity study, factor structure was analysed with factor analysis. The sub-test for implementation form used in the study had a high internal consistency coefficient - Cronbach Alpha, such as mathematic skills ($r=.96$, $p<0.01$), words starting with the same sound and words with rhyme ($r=.88$, $p<0.01$), science skills ($r=.86$, $p<0.01$), drawing skills ($r=.81$, $p<0.01$), and labyrinth skills ($r=.95$, $p<0.01$) (Polat,2003).

Data Analysis

The data obtained from the participants were entered into SPSS 16.0, a statistical package program. In this research study, the effect of the children’s developmental level of visual perception on school maturity and human drawings was investigated by means of the Simple Linear Regression Analysis technique. In the regression analysis, first of all, the F test was tested in order to assess the linearity of the relationship. The significance

level of the regression coefficient was tested by calculating the significance of the t value. The significance level was taken as $p < 0,05$ (Büyüköztürk, 2002).

Results

The findings are presented below in line with the sub-objectives of the study.

Table 1:

The Regression Analysis Table About The FVPT's "Hand-Eye Coordination" Sub-Test's Prediction of The MPSRT's "Labyrinth" Sub-Dimension

Model 1	R	R ²	ta	Be	t	p
Hand-Eye Coordination	,327	,107	,27	,3496	2,16	,0

a. Dependent Variable: Labyrinth

As can be realized from Table 1, the model was found to be statistically meaningful as a result of the regression analysis aiming to find to what extent the Frostig Visual Perception Test (FVPT)'s "Hand-Eye Coordination" sub-test can explain the Marmara Primary School Readiness Test's sub-dimension of "Labyrinth" ($F=6,232; p < ,05$). In this context, it would be true to state that the Frostig Visual Perception Test (FVPT)'s "Hand-Eye Coordination" sub-test can significantly predict the MPRT's sub-dimension of "Labyrinth" ($R^2 = ,107; p < ,05$). The results show that the hand-eye coordination skill explains around 11% of labyrinth drawing skills.

Table 2:

The Regression Analysis Table About the FVPT's "Hand-Eye Coordination" Sub-Test's Prediction of The MPSRT's "Line" Sub-Dimension

Model 1	R	R ²	ta	Be	t	p
Hand-Eye Coordination	,496	,246	,96	,4117	4,00	,0

a. Dependent Variable: Line

As one can see in Table 2, the model was found to be meaningful through the regression analysis intended to seek to what extent the Frostig Visual Perception Test (FVPT)'s "Hand-Eye Coordination" sub-test can explain the MPRT's sub-dimension of "Line" ($F=16,946$; $p<,01$). Therefore, it can be stated that the Frostig Visual Perception Test (FVPT)'s "Hand-Eye Coordination" sub-test can significantly predict the Marmara Primary School Readiness Test's sub-dimension of "Line" ($R^2=,246$; $p<.01$). The results reveal that the hand-eye coordination skill explains about 25% of line drawing skills.

Table 3:

The Regression Analysis Table About 5-6 Year-Old Children's Visual Perception Skills' Prediction of School Readiness

Model 1	R	R ²	ta	Be	t	p
Level of Visual Perception	,514	,264	,514	,5316	4,00	,0

a. Dependent Variable: School Readiness

As could be interpreted from Table 3, the model was found to be meaningful as a result of the regression analysis applied to reveal to what extent the visual perception skills of 5-6 year-old children can explain their school readiness ($F=18,626$; $p<,01$). Hence, it would be true to state that the predictive value of the visual perception skill assessed by the FVPT was found to be significant in predicting school readiness assessed by the MPRT ($R^2=,246$; $p<.01$). The results also show that the visual perception skills can explain 26% of school readiness.

Table 4:

The Regression Analysis Table About 5-6 Year-Old Children's Visual Perception Skills' Prediction of Developmental Levels Depending On Their Drawings

Model 1	R	R ²	ta	Be	t	p
Level of Visual Perception	,495	,245	,495	,4106	4,00	,0

a. Dependent Variable: Children's Drawings

As presented in Table 4, the model was found to be meaningful considering the results of the regression analysis applied to show to what extent the visual perception levels of 5-6 year-old children can explain their developmental stages depending on their pictures ($F=16,860$; $p<,01$). In this context, it could be maintained that the visual perception level assessed by FVPT can significantly predict the developmental levels assessed by the Goodenough-Harris Draw a Picture Test ($R^2=,245$; $p<,01$). The results also reveal that the visual perception skill can explain 25% of their development depending on their drawings.

Table 5:

The Regression Analysis Table About 5-6 Year-Old Children's Drawing-Based Developmental Levels' Prediction of School Readiness

Model 1	R	R ²	Be	t	p
Drawing-based developmental levels	,495	,245	,495	4,106	,000

a. Dependent Variable: School Readiness

As can be realized from Table 5, the model was found to be meaningful when the regression analysis was conducted to reveal to what extent the developmental levels of the children at the ages of 5-6 depending on their drawings can explain their school readiness ($F=9,243$; $p<,01$). It was also found that the developmental stage assessed by the Goodenough-Harris Draw a Person Test on the basis of their drawings had a significant power in predicting their school readiness assessed by the MPRT ($R^2=,151$; $p<,01$). The results indicate that the developmental stages of 5-6 year-old children depending on their drawings can explain 15% of their school readiness.

Discussion and Conclusion

As a result of the statistical applications used in the study, it could be concluded that the hand-eye coordination skills of 5-6 year-old children significantly predicts their labyrinth and line drawing skills. While the hand-eye coordination skill predicts around 11% of the labyrinth drawing skills, it predicts about 25% of the line drawing skills. It would be fair to state that this result is quite significant.

The study revealed that as children's hand-eye coordination increases, they can draw lines more easily and deal with tasks requiring a great deal of attention (e.g., drawing a labyrinth) with less effort. Similarly, in the research study conducted by Kaiser, Albaret and Doudin (2009) with 75 8 year-old children, it was found that the visual motor skill and the hand-eye

coordination have predictive effects on the quality of their hand-writing. The increased hand-eye coordination helps children to reach the desired result in their drawing. Thus, research studies show that there is a linear relationship between the way of holding the pencil and their speed in writing (Temur, 2011). For instance, Dikowski (1994) conducted a study with children with impaired visual-motor skills. A visual-motor skill program was designed to promote children's mechanic skills. Thanks to the computer-assisted program aiming to teach skills like visual tracking, monitoring, spatial integration; the visual motor skills of eight out of ten children improved significantly. Moreover, as a result of the improvement in the visual skills of five children, their hand-eye coordination improved, which led to a significant change in their hand-writing. In the systematic interviews with children's families and parents, they indicated that the improvement of their children's hand-writing was significantly noticeable. In their study, Cherney et al., (2006) identified that children include more details in their drawing as their age increases and interpreted this finding as an indicator of keeping the object in mind and the development of the motor skills. On the other hand, Decker et al., (2011) explored the developmental and cognitive effects on the visual motor skills in their research study conducted on 856 children and came to the conclusion that the most important factors influencing the visual motor skills are formal reasoning and visual spatial intelligence.

In addition, the result of the study showed that the visual perception skills of 5-6 year-old children significantly explain their level of school readiness. The analysis of the data revealed that the visual perception skill explains about 26% of school readiness.

Yukay Yüksel and Yurtsever (2007) indicated that in the improvement of the visual perception skills of 4-6 year-old children in pre-school educational institutions, the "Frostig Visual Perception Training Program" applied as an extra-curricular program promotes children's visual perception levels. This finding is in line with the idea that the visual perception skill, which is effective especially in learning how to read and write, should be supported from a young age as it is influential in their acquisition of school maturity.

Focusing on the school readiness as a part of the children's perceptual development, Zyl (2008) found a significant relationship between school readiness and success at school. Paying attention to the motor skills of pre-school children, Bart, Hajami and Bar-Haim (2007) attempted to estimate their compliance with school. The researchers aimed to evaluate the relationship between their motor skills acquired in pre-school education and their social, emotional and school adaptation in primary school. For this reason, they assessed the basic motor functions of 71 pre-school children at the age of 5. A year later, their school adaptation was investigated when the children start primary school by means of surveys given to both students

themselves and their teachers. In addition to the predictive capability of the visual motor skills in terms of success at school, they found that the motor skills play a decisive role in their adaptation to school and in factors affecting their social and emotional adaptation to school. Furthermore, the researchers found that children with more developed motor skills display less disruptive behaviors in the process of adapting to school whereas children with fewer motor skills experience more malaise in the adaptation process. At the end of the study, the researchers drew attention to the relationship between the development of motor skills and the adaptation to school. Besides, the sub-dimensions of the visual motor skill test that are visual-spatial perception and motor sharpness explain 29% of the school adaptation variance. In an attempt to identify the cognitive skills related to school readiness, Sassu (2007) lists the following skills: visual and auditory perception, attention, reasoning, memory and language skills.

Another result of the current study is that the visual perception skill of 5-6 year-old children significantly explains their developmental levels on the basis of their picture drawings. More specifically, visual perception explain around 25% of their developmental levels depending on their picture drawings.

Cherney et al., (2006) asked 109 children between the ages of 5 and 13 to draw pictures of their families and schools. Their findings put forth the fact that especially in their drawing of families; they include many more details as their age increases. Another interesting finding showing the relationship between children's visual perception skills and their drawings is related to their drawing of their schools mostly in the form of an aerial view as their age increases. This situation in children's drawings shows that the visual perception changes with ages. In the conclusions drawn by the researchers, it was asserted that children draw more complicated pictures containing more details as their age increases. It was also emphasized that while children drew their families more symbolically in younger ages, they had the tendency to draw more realistically as they get older. One of the indicators of the improvement in the visual perception levels of the children is that they tend to draw more "stick man" in younger ages while they try to draw more realistic pictures as their age increases. Researchers attribute this situation to children's memory storing more details and to the development of their motor skills as their cognitive development progresses. Similarly, conducting a study with 430 5-11 year-old children, Ozer (2009) concluded that children include more details in their drawings as their age increases.

It was also found in this study that the development in drawing a picture assessed by the Draw a Picture Test significantly predicts the school readiness. The developments of the children aged 5-6 in drawing picture explain nearly 15% of school readiness.

In their study, Cherney et al., (2006) concluded that children's picture is an important tool to be able to assess children's development in spatial / development of three-dimensional perceptions as well as their family descriptions. Focusing on the question whether the Draw a Man Test is an indicator of school children's cognitive and socio-emotional adaptations, Laak et al. (2005) investigated 115 7-9 year-old mainstream and private students. The results of the study show that the Draw a Picture Test sufficiently assesses children's cognitive developmental stages. However, the same reliable results do not apply to the socio-emotional adaptation. The verification of the cognitive developments through the test means that it can yield positive results regarding children's school readiness. Thus, researchers using students' academic achievement scores found that the test can predict their academic achievement.

Developed by Tove Krogh (cited. Häidkindve et al., 2011), the Controlled Drawing Observation (CDO), which is a frequently used assessment technique in Denmark, Finland and Baltic countries, aims to identify children's developmental levels through their drawings. Longitudinal research studies focusing on this technique used to assess children's pictures show that the technique has a predictive value for their school readiness and for academic achievements, especially in mathematics and language skills.

Doğru, Turcan, Arslan and Doğru (2006) investigating pictures of 66 8-14 year-old children living in Turkey and 58 Turkish children in Germany found that students with high school achievement obtain higher score in the Goodenough-Harris Draw a Person Test.

However, there have been studies revealing that children's pictures cannot predict IQ scores (Reisman and Yamokoski, 1973; Willcock et al. 2011). Working on the question whether children's pictures can predict school readiness in terms of their emotional and developmental readiness, Szasz et al., (1980) used Koppitz's developmental and emotional planning system for 141 children between the ages of 5 and 6. It was concluded that children's pictures cannot predict school readiness. On the other hand, Currie et al., (1974) studied personal tendencies in the early years of childhood and came to the conclusion that the emotional indicators in Koppitz's human drawing have predictive value.

As a result of the statistical analysis applied in this study, it was found that the visual perception skill of 5-6 year-old children can significantly predict their school readiness and their developmental level in line with their pictures assessed by the Goodenough-Harris Draw a Person Test. From this finding, it could be concluded that these instruments have a predictive value in predicting children's school readiness. It would be fair to think that such instruments can be used by specialists dealing with pre-school children in

order to assess the extent to which children are ready for school; however, considering the predictive values of all these instruments as a whole would be a better way of approaching the issue. Thus, Sayıl (2004) concluded that other objective source of information apart from the picture drawn by the child should certainly be taken into account so as to arrive at a more sound decision. In other words, it was emphasized that the information obtained from the children's pictures alone could be limited.

Considering children's academic skills, it would be fair to state that in many lessons like geography, mathematics, geometry, physics and art, their visual perception skills are related to eye-hand coordination, figure-ground separation, detection stability, perception of space and location as well as the perception of spatial relations (Frostig, 1964). Besides, it must be born in mind those computer skills, which are one of the most important skills expected from the primary school students today, are closely connected to graphic skills. Children's visualization of the relevant data will lead to success in these subjects. Therefore, it could be recommended that programs aiming to improve such skills should be carefully incorporated into pre-school education and should be supported during primary education.

In line with the results of the current study, it can be concluded that the scores obtained from different assessment tools to assess pictures drawn by children or to assess their school readiness should be taken as criteria by specialists and parents in predicting to what extent children are ready for school in the transition phase to the 4+4+4 system in Turkey.

Parents favoring the idea of voluntarily sending their children who are under 72 months old to the primary school ignore the fact that children's fine motor skills mature depending on their age, or they are not aware of the importance of the issue. It is very likely for the younger children sharing the same class with their older peers in the 4+4+4 school system to make an effort to be able to keep up with their older peers academically and to have the feeling of failure because of poor fine motor skills that develop in parallel with age. Additionally, children may take a dislike to the school and even have the school phobia. Therefore, it is recommended that both by informing parents through media and by evaluating pre-school children comprehensively, the possible negative consequences of this system should be highlighted. Taking necessary precautions by doing so is vital in the future education lives of these children.

The findings of the present study can guide educators, especially the ones dealing with preschool children and preparing them for the primary school. However, the evaluation of the visual perception ability only based on the sub-dimension of the hand-eye coordination is without doubt not sufficient alone to predict children's readiness for the primary school. In

addition to this, positive results were found in the experimental studies in which educational programs based on holistic approach including activities aiming to support the skills of figure-ground perception, perception of the location of space and location relationships were implemented so that children's reading and mathematics skills were supported (Yukay Yüksel & Yurtsever, 2007; Yüksel, Küçükoğlu, Ünsal, Şallı, 2014). Additionally, preparatory programs preparing children for the primary school should include educational programs focusing on their auditory perception, memory and attention processes along with their visual perception so that outcomes that are more efficient can be reached.

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