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A STUDY OF VISUAL MOTOR SKILLS OF CHILDREN WITH SPECIAL NEEDS

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Abstract:
The study goal is to analyze visual-motor skills of special education needs and variables that are considered to affect visual-motor skills, including age, gender, disability type, family kind, and number of children in the family. It was a descriptive model with 140 special education needs in Edirne territory Individual information form and Wide Range Assessment of Visual Motor Ability (WRAVMA) Test which was developed by Wayne Adams and David Sheslow in 1995 and adapted by Bektaş and Ercan (2021) were accustomed to collect facts. Study facts were analysed by means of a statistics pack program. Study results indicate that mean scores of children with special needs in WRAVMA are 11.21 in the drawing sub-test, 52.09 in the matching sub-test and 53.01 in pegboard sub-test. Study findings indicate that children's visual-motor skills are not correlated with their age, diagnosis ($p>0.05$), but they are correlated with age in the matching sub-test, family kind in drawing and matching sub-tests and number of children in the family in matching and pegboard sub-tests ($p<0.05$).

Keywords: special education, children with special needs, visual perception, visual-motor integration, motor coordination

1. Introduction

Individuals who constitute communities have many different features. Features that individuals have constitute inseparable parts of human development and life. As people have different features, they have different needs which also affect their lives. Regulations that aim to meet the needs of individuals are planned in a way that responds

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to these different needs and features. One and probably the most important of these fields is education (Pınar, Melekoğlu, Düzkantar, Cangi, Sönmez Kartal, Yıldız, Güçyeter, Erdem, Balıkçı, Tutuk, Demircan & Örenoğlu-Toraman, 2017).

The term SEN (Special Education Needs) represents a vast category of students who meet less or more learning challenges due to learning difficulties or other problems caused by various cultural and linguistic differences (Vassiliki, Maritab & Eleni, 2011; Law, 2019; Drabble, 2016). This term is often used to define remarkable separation from normal tendencies in human development (Rotkangmwa-Bodang & Agbo-Owobi, 2018). Visual perception is the organisation of actions that result in a conscious perception of visual stimuli coming from the environment (Newen & Vetter, 2014; Demirci, 2010; Wuang, Chiu, Chen, Chen, Wang, Huang, Wu & Ho, 2018). Visual perception is a complex and systematic neurophysiological process that depends on the development of the relevant area of the brain. Visual perception includes perception, encoding, analysis, identification and evaluation. Visual perception reports the ability to accurately recognize and successfully absorb visual stimuli. According to Gestalt theory, visual perception is not just recognizing objects; involves the interpretation and regulation of visual stimuli. It is linked to visual perception, visual-motor coordination, motor skills and cognitive development, and academic ability (Waal, Pienaar & Coetzee, 2018).

Visual-motor coordination is defined as the ability to coordinate visual perception and motor coordination (Hairol, Nordin, P'ng, Sharanjeet-Kaur, Narayanasamy, Mohd-Ali, Ahmad & Kadar, 2021; Memisevic ve Djordjevic, 2018; Ercan, Yılmaz, Taş ve Aral, 2016). Interactive coordination of both fine motor and visual perceptual skills creates visual-motor coordination. Since visual-motor coordination skills are violently associated with academic achievement and intellectual functioning, it is a very good measure of the child's general functionality flat (Memisevic & Djordjevic, 2018). Visual-motor coordination is also linked to cognitive performance and influences intelligence coefficients, math and writing skills, and overall academic achievement of primary school students (Waal, Pienaar & Coetzee, 2018). Visual-motor coordination is an important component of child development; it is associated with many functional skills and daily task involvement skills. Visual-motor coordination skills depend on powerful visual perception, fine motor coordination, development of motor skills and stable attention. Visual-motor coordination assessment forms an important part of each child's psycho-educational or neuropsychological evaluation for school or rehabilitation planning (Memisevic & Djordjevic, 2018).

It is reported that mental retardation might be related to perceptive disorders and stem from disorders in the systems that respond to stimuli. Moreover; differences might occur in the visual-motor skills of disabled individuals as their neurological functioning is different from normally developing individuals (Sparrow & Day, 2002). Visual perception and motor skills deficiencies or delays affect children unfavorably in getting academic skills, involving in school activities, building social relations and self-perception. In order to prevent delays in children's development and academic achievement; their visual motor integration skills must be assessed in early periods,

deficiencies must be identified and special education and support programs must be developed according to their development and needs (Demirler, 2018).

Another factor that is as important as school and teacher in the education of children with special needs is the family. As people who are aware of the situation and needs of children with special needs, they seek services for their children. Especially at a young age, they become people who apply and maintain home education and rehabilitation for their children with special needs. These roles of families are addressed in various intervention programs. However, there are also practical resources for parents in home-based education programs. However, difficulties are encountered in the implementation of these programs and in achieving the desired success. Although it has been emphasized in various studies that it has a significant effect on perception, there are studies on the importance of investigating the visual-motor skills of special education needs from an early period, identifying problems or inadequacies, and providing supportive education. However, there are few studies examining family as a factor affecting visual-motor skills (Lo, Collin & Hokken, 2015; Anders, Sammons, Taggart, Sylva, Melhuish & Siraj, 2011; Duijff, Klaassen, Beemer, Swanenburg de Veye, Vorstman & Sinnema, 2012). It is important to inform the family in this area, to include them in support education programs, and to support them, especially in the home environment. The goal of this study is to inquire into some of the factors related to the family factor, which is thought to be effective on the visual-motor skills of special education needs.

2. Material and Methods

This study, which was conducted to determine the visual-motor skills of children with special needs according to age, gender, diagnosis, family kind and the number of children in the family, was carried out according to the screening model, which is one of the quantitative research methods. The aim of descriptive studies is to research and identify the current situation of a subject. Descriptive study model is a research method where features of the analysed individual or group are presented in descriptive statistical results (Büyüköztürk, 2005).

2.1 Participants

The study group, which was defined through purposive illustration, consists of 140 children aged 6-17 diagnosed with intellectual disability and an autism spectrum disorder. The study group involves children diagnosed with special needs and placed in special education by Edirne Counselling and Research Centre who have no difficulty in using their hands, holding pencils and following test instructions while doing WRAVMA. The University Social and Human Sciences Research Ethics Board permission was granted to carry out this research (Number: 2018.06.07 and Date: 22.06.2018) followed by relevant permissions from Edirne Governorship and Directorate of National Education. Demographic facts of children in the study are presented in Table 1.

Table 1: Demographic Facts of Special Education Needs

Student Variables	n	%	Total
Gender			
Boy	79	56.7	140
Girl	61	43.3	
Age			
6	6	4	140
7	10	7	
8	9	6.3	
9	13	9.1	
10	10	7	
11	6	4.2	
12	8	7	
13	15	11	
14	8	6	
15	13	8.4	
16	18	13	
17	24	17	
Disability Type			
Mental Disability	108	76.6	140
Autism Spectrum Disorder	32	23.4	
Family Kind			
Nuclear Family	120	85	140
Extended Family	9	7.3	
Broken Family	11	7.7	
Number of Children in the Family			
1	25	17.9	140
2	84	59.8	
3	31	22.3	

Table 1 shows that 43.3 % of 140 children in the study are girls and 56.7 % are boys while 4 % are at the age of 6, 7 % at the age of 7, 6.3 % at the age of 8, 9.1 % at the age of 9, 7 % at the age of 10, 4.2 % at the age of 11, 7 % at the age of 12, 11 % at the age of 13, 6 % at the age of 14, 8.4 % at the age of 15, 13 % at the age of 16 and 17 % at the age of 17. İnformation related to disability types of children shows that 76.6 % are diagnosed with Mental Disability and 23.5 % children with Autism Spectrum Disorder. Table 1 shows that 85 % of families are nuclear families, 7.3 % extended families and 7.7 % broken families. 17.9 % of families have single child, 59.8 % 2 children, 22.3 % 3 children.

2.2. Data Collection Tools

"Individual İnformation Form" and "Wide Range Assessment of Visual Motor Abilities (WRAVMA) Test" were used as data collection tools in the study. Detailed information about the data collection tools is given below.

2.2.1. Individual Information Form

Facts about children in the study group and their families were collected with school records and the “Individual İnformation Form” developed by the author. Individual

İnformation Form includes facts about children with special needs including their gender, diagnosis, socioeconomic status of the family, preschool education, and the number of children in the family.

2.2.2. Wide Range Assessment of Visual Motor Abilities (WRAVMA) Test

Adams and Sheslow (1995) determined that the test has three sub-test (drawing, matching and pegboard) and order to assess visual motor skills of 3-17 years old children. It is an individual test. The test consists of three sub-tests; Drawing (eye motor ccordination skills), Matching (visual spatial skills) and Pegboard (fine motor skills). Each test is applied in 5-10 minutes. The validity and reliability of WRAVMA was analysed with 202 children aged 5-6 who attended preschools affiliated with Edirne Provincial Directorate of National Education. Bektaş (2021) calculated Cronbach's alpha value as inner consistence of WRAVMA. In the adaptation study of the WRAVMA Test for Turkish children, the inner consistence coefficient was calculated as .84 for the drawing sub-test and .81 for the matching sub-test. The test was also applied to children in three-five-week interval and results were analysed. Test re-test reliability is .93 for drawing sub-test, .96 for matching sub-test and .90 for pegboard sub-test. For validity test, WRAVMA was applied to 5-6 year old school children with Beery-Buktenica Developmental Test of Visual-Motor coordination (VMI-5) (Ercan and Aral, 2011) to analyse the relationship between them. Thus, there is a positive and significant correlation between WRAVMA drawing sub-test and VMI visual-motor integration test ($r = .31$, $p<.05$), a positive and significant correlation between WRAVMA matching sub-test and VMI visual motor integration test ($r = .24$, $p<.05$) and a positive correlation between pegboard sub-test of WRAVMA and VMI motor integration sub-test ($r = .39$, $p<.05$). These results are as expected and indicate that WRAVMA have adequate criteria validity.

2.3. Data Analysis

Wide Range Assessment of Visual Motor Abilities (WRAVMA) Test was administered to children with special needs individually by the researcher. The tests were carried out individually by the practitioner in an environment that provides the necessary working conditions in terms of features such as heat and light, away from noise, in a way that does not disrupt education and training. The test was evaluated in accordance with the evaluation rules in the user manual and the drawing, matching and nail board score of each child was obtained.

Raw scores obtained as a result of WRAVMA were transformed into standard scores. These standard scores were analysed by means of a statistics pack program. Shapiro Wilk- Kolmogorov Smirnov tests were carried out for normality assumption of WRAVMA scores of children with special needs ($p<.05$). Parametric tests (t-test, one-way ANOVA) were carried out in cases where normality was satisfied and non-parametric tests (Mann-Whitney-U, Kruskal-Wallis) were used in cases where normality was not satisfied. In cases where extreme differences in variables were observed, non-parametric tests were applied regardless of normality.

Table 2: Lowest, Highest, Mean, Median, Standard Deviation, Skewness and Kurtosis Score Results of the WRAVMA Test

	Lowest	Highest	Mean	Median	Standard Deviation	Skewness	Kurtosis
Drawing Test	45	135	112.17	78	22.84	.18	-.83
Matching Test	45	92	52.09	45	11.10	1.49	1.34
Pegboard	45	91	53.01	45	11.21	1.50	1.74

According to Table 2, the lowest 45 and the highest 135 points from the drawing test of children with special needs; The lowest 45 and the highest 92 points were obtained from the matching test and the lowest 45 and highest 91 points were obtained from the pegboard.

The skewness values are .18 for the drawing test, 1.49 for the matching test, and 1.50 for the pegboard. The kurtosis values are -.83 for the drawing test, 1.34 for the matching test, and 1.74 for the pegboard. Skewness and kurtosis values; it is seen that it is in the range of -1.96 to +1.96 values, which is accepted as a normal distribution. Although many features show a normal giving out in the universe, there will be deviations from the normal distribution if the measurements of a feature of interest are obtained from a small group (n<30) (Büyüköztürk, Çokluk & Köklü, 2011).

3. Findings

Findings achieved as a result of statistical analysis of research facts are presented in this section in order of study problems.

Considering the mean rank values of special education needs in Table 3 in terms of their age, 14-year-old children have the highest mean rank value with 89.31 in the drawing sub-test and 15-year-old children have the lowest mean rank value with 46.62; 6-year-old children have the highest mean rank value with 130.50 in matching sub-test and 17-year-old children have the lowest mean rank value with 44.50 and 8-year-old children have the highest mean rank value with 90.28 in pegboard sub-test and 15-year-old children have the lowest with 43.46. On the other hand, Kruskal Wallis Test results of special education need in terms of their age are (x^2=9.843; p>0.05) in drawing, (x^2=54.024; p<0.05) in matching and (x^2=16.075; p>0.05) in pegboard. Thus, there is a statistically significant difference between matching sub-test scores of special education needs (x^2=54.024; p<0.05), and there is no statistically significant difference between the mean scores obtained from the drawing and pegboard sub-test.

Table 3: Kruskal Wallis Test Results of Drawing Test, Matching Test and Pegboard Test in terms of The Age of With Special Education Needs

Tests	Age	n	$\bar{x}$	Sd	X^2	Mean Rank	p
Drawing Test	6.00	6	74.48	22.841	9.843	74.42	.545
	7.00	10				73.55	
	8.00	9				79.56	
	9.00	13				73.58	
	10.00	10				69.35	
	11.00	6				78.08	
	12.00	8				84.44	
	13.00	15				76.77	
	14.00	8				89.31	
	15.00	13				46.62	
	16.00	18				59.97	
	17.00	24				67.77	
Matching Test	6.00	6	52.09	11.106	54.024	130.50	.000*
	7.00	10				100.05	
	8.00	9				95.78	
	9.00	13				79.69	
	10.00	10				76.70	
	11.00	6				83.42	
	12.00	8				81.56	
	13.00	15				67.07	
	14.00	8				73.13	
	15.00	13				53.88	
	16.00	18				50.50	
	17.00	24				44.50	
Pegboard	6.00	6	53.01	11.217	16.075	80.58	.138
	7.00	10				62.80	
	8.00	9				90.28	
	9.00	13				82.54	
	10.00	10				65.85	
	11.00	6				65.33	
	12.00	8				81.63	
	13.00	15				70.27	
	14.00	8				90.13	
	15.00	13				43.46	
	16.00	18				75.36	
	17.00	24				61.38	

*p<0.05

According to Table 4, the mean score values of boys in the drawing sub-test of WRAVMA is ($\bar{x}$=74.11) and the mean score value of girls is ($\bar{x}$=74.95); the score of boys in the matching sub-test is ($\bar{x}$=51.22) and the score of girls is ($\bar{x}$=53.23) while the score of boys in pegboard sub-test is ($\bar{x}$=53.66) and the score of girls is ($\bar{x}$=52.16). According to the results of the t-test, which was conducted to determine whether the mean scores of the children in the study group from the WRAVMA test differ significantly according to the gender variable, there is no statistically significant difference between girls and boys (drawing subtest:

t(1.138)= .831; p>0.05, matching subtest: t(1.138)= .289; p>0.05, nailboard subtest: t(1.138)= .436; p>0.05).

Table 4: T-Test Results of Special Education Needs in Drawing Test, Matching Test and Pegboard Test in terms of Gender

Tests	Gender	n	$\bar{x}$	Sd	t	Df	p
Drawing Test	Boy	79	74.11	21.851	-.214	138	.831
	Girl	61	74.95	24.238			
Matching Test	Boy	79	51.22	10.128	-1.065	138	.289
	Girl	61	53.23	12.249			
Pegboard	Boy	79	53.66	11.360	.780	138	.436
	Girl	61	52.16	11.065			

p>0.05

Table 5: T-Test Results of Special Education Needs in Drawing Test, Matching Test and Pegboard Test in terms of Disability Type

Tests	Diagnosis	n	$\bar{x}$	sd	t	df	p
Drawing Test	Mental Disability	108	75.45	21.959	.928	138	.355
	Autism Spectrum Disorder	32	71.19	25.697			
Matching Test	Mental Disability	108	51.66	10.643	-.851	138	.396
	Autism Spectrum Disorder	32	53.56	12.616			
Pegboard	Mental Disability	108	53.20	11.442	.380	138	.705
	Autism Spectrum Disorder	32	52.34	10.567			

p>0.05

Considering the scores of mentally disabled children in WRAVMA according to Table 5, they scored ($\bar{x}$=75.45) in drawing sub-test, ($\bar{x}$=51.66) in matching sub-test and ($\bar{x}$=53.20) in pegboard sub-test. On the other hand, children with autism spectrum disorder scored ($\bar{x}$=71.19) in drawing sub-test, ($\bar{x}$=53.56) in matching sub-test and ($\bar{x}$=52.34) in pegboard sub-test. According to the results of t-test which was carried out to understand whether disability type correlated with scores of children in sub-tests of WRAVMA; there is not a statistically significant difference between drawing sub-test scores ($t_{(1.138)=}$ .928; p>0.05), matching sub-test scores ($t_{(1.138)=}$ -.851; p>0.05) and pegboard sub-test scores ($t_{(1.138)=}$ .380; p>0.05) of children who were diagnosed with autism spectrum disorder.

Table 6: Kruskal Wallis Test Results of Special Education Needs in Drawing Test, Matching Test and Pegboard Test in terms of Their Family Kind

Tests	Family	n	$\bar{x}$	Sd	X^2	p	Mean Rank
Drawing Test	Nuclear	120	74.48	22.841	9.694	.008*	69.48
	Extended	9					46.50
	Broken	11					101.27
Matching Test	Nuclear	120	52.09	11.106	6.403	.041*	71.29
	Extended	9					44.50
	Broken	11					83.14
Pegboard	Broken	120	53.01	11.217	.905	.636	69.38
	Extended	9					73.50
	Broken	11					80.32

*p<0.05

According to Table 6, the results of Kruskal Wallis Test carried out to understand whether family kind correlated with WRAVMA scores of special education needs show that there is a statistically significant difference in drawing sub-test (x^2=9.694; p<0.05) and matching sub-test (x^2=6.403; p<0.05). Conversely, there is not a significant difference in pegboard sub-test (x^2=.905; p>0.05). Children from broken families have the highest mean score while children from extended families have the lowest.

Table 7: Mann-Whitney U-Test Results of Special Education Needs in Drawing Test, Matching Test and Pegboard Test in terms of The Number of Children in Their Families

Tests	Number of Children	n	$\bar{x}$	Sd	U	p
Drawing Test	1	25	74.48	22.841	1.602	.375
	2	84				
	3	31				
Matching Test	1	25	52.09	11.106	1.722	.012*
	2	84				
	3	31				
Pegboard	1	25	53.01	11.217	2.152	.002*
	2	84				
	3	31				

*p<0.05

According to Table 7, the results of the Mann-Whitney U-Test carried out in order to understand whether the number of children in the families correlated with WRAVMA scores of special education needs show that there is not a significant difference between drawing sub-test scores of children of families with one, two and three children (U= 1.602, p >.05) while there is a significant difference between scores in matching sub-test (U=1.722; p <0.05) and pegboard sub-test (U=2.52; p <0.05). Children of families with two children scored higher in matching and pegboard sub-tests.

4. Discussion and Recommendations

The study aimed to analyse visual motor skills' special education needs and the variables considered to be influential on these skills. Study findings indicate that visual-motor skills of special education needs do not correlate with gender, or diagnosis but correlate with age, family kind and the number of children in the family. Age of special education needs correlates significantly with the matching sub-test of visual motor skills but there is not a significant correlation between age and drawing and pegboard sub-test. The visual motor skills of children often improve with age.

However, this study reveals that visual perception and motor skills of special education needs do not improve with age (Tal-Saban, Moshkovitz, Zaguri-Vittenberg & Aviva-Yochman, 2021; Van keer, Dhondt, Van der Putten & Maes, 2022; Sullivan, Thayer, Farnsworth & Susman-Stillman, 2019; Tso et al., 2022; Hansson, Gustafsson & Nielsen, 2018; Ayan, Boyalı, Ergin & Ulaş, 2019; Berigel, 2015; Haibach-Beach, Perreault, Foster & Lieberman, 2019; El-Hady, El-Azim & El-Talawy, 2018). It is thought that the differences in the improvement of children with special needs influence or limit their sensory

development and their perceptual development. For example, drawing skills include both visual perception and motor skills. The findings of the study are considered to show that the visual motor skills of children do not improve at all or improve to a very limited extent throughout the process. Drawing skills include both visual perception and motor skills. They are also prerequisite skills for academic education. A significant part of a school day in all grades of education involves activities that require these skills. Study findings reveal that the matching skills of six year old children are better than the matching skills of older children. WRAVMA includes test items and instructions that involve children's visual perception and motor skills and progress from simple to hard according to developmental steps. This result might have occurred due to the differences between the items and the extent of difficulty of items that six year old children and older children were responsible for. Children are asked to insert coloured pegs into the pegboard in pegboard sub-test of WRAVMA. This is an application process where children should both focus their attention on the activity and perform this task which requires hand-eye coordination. Eryiğit-Madzwamuse and Wolke (2015) concluded in their study that children with special needs have problems with their attention skills. This finding obtained from Table 3 reveals that children with special needs do not develop enough or show limited development in attention and hand-eye coordination skills. The limitations in cognitive skills and motor skill deficiencies of children with special needs may prevent their participation in peers and activities. Children attending pre-school classes learn many concepts and skills through desk activities, which are structured activities. If children have deficiencies in cognitive and motor skills, this may negatively affect their participation in activities and thus their learning. The duration of participation in desk activities, which increases the behavior of working on a task, also positively affects the development of children (Demir, 2016).

Table 4 displays that the gender of special education needs is not correlated with visual motor skills. Motor development is conveyed as the organism's voluntarily getting mobility depending on physical growth and development of the central nervous system. Motor development includes movement skills as a result of physiological and biological changes, but also interacts with other areas of development (Demirci & Toptaş-Demirci, 2016). The development of motor movements requires that several parts of the individual's body work together and in harmony. The harmonious functioning of the parts of the individual's body comes to a sufficient level of development according to physical maturity and practice. Psycho-motor development continues throughout life and includes changes in physical structure, neuromuscular functions, acquisition and reduction of motor skills, and the process of achieving balance. In addition, it is possible to define motor skills as the classification of various movement categories such as speed, balance, coordination and strength. Psycho-motor development includes both physical development and cognitive processes (Ulutaş, Demir & Yayan, 2017). When the literature is inspected, although there are studies in which the visual-motor skills of children with special needs do not differ according to the gender variable (Emam & Kazem, 2014; Demiroğlu & Gülsoy, 2019; İnce, Akdemir & Yıldırım-Doğru, 2017), gender has an effect

on visual motor skills (Ayan, Boyalı, Ergin & Ulaş, 2019; Kara, Şahin, Köse, Tonak & Kara, 2020; Çalışkan & Süel, 2020; Kıvanç, 2020).

Table 5 shows that visual motor skills of special education needs are not significantly correlated with their disability type. The psychomotor skills of individuals with intellectual disability lag behind their peers. Academic and psychomotor learning of individuals with an intellectual disability is affected because there is an important relationship between intelligence level and motor skills. Even those with mild mental retardation lag behind their peers by a few years in terms of motor development (Durak, 2020). Children with Autism Spectrum Disorder fail to acquire many skills because they lack attention and motivation. In addition, these children experience limitations when compared to their peers (yaşıtları) in various areas such as sensory characteristics, academic skills, social and emotional characteristics, language development, communication skills, motor skills and daily life skills (Vatansever & Ahmetoğlu, 2019). Special education needs suffer challenges in setting visual motor integration due to different brain lesions. These challenges might affect the daily life activities of disabled children unfavourably. Mentally disabled children have difficulty in displaying visual motor skills. Visual perception problems have negative effects on not only daily activities but also academic abilities such as reading, writing and maths, minor muscle motor skills such as kneading, painting, cutting paper as well as visual discrimination, generalization, matching and imitating a model. Children and young individuals who meet problems in this field are left behind their peers in social and self-care skills and criticized by their environment (Bangir-Alpan & Özbalcı, 2015; Konuker, Pirpir, Çiçekler, Büyükbayraktar & Uslu, 2016; Tekok-Kılıç, Elmastaş-Dikeç & Can, 2010). Children diagnosed with autism display performance problems to different extents in various fields. Studies show that the mental deficiency of autistic children resembles the case of children who have mild mental retardation and autistic children have serious visual problems (Sahavil, 2016). In many studies in the literature, it is expressed that the visual-motor skills of both children with autism and children with mental disabilities are lower than children with normal development (İnce, Akdemir & Yıldırım-Doğru, 2017; Özer & Kaplan, 2000; Piek & Dyck, 2009; Vetrayan, Zin & Paulraj, 2015). Studies reveal that the intelligence levels of children are proportional to their motor skills (Bonifacci, 2004; Graf & Hinton, 1997; Pienaar, Barhorst & Twisk, 2014; İnce, Akdemir & Yıldırım-Doğru, 2017).

Table 6 shows that there is a significant correlation between family kind of special educational needs and children's visual motor skills in drawing and matching sub-tests but there is not a significant correlation in pegboard sub-test. Contrary to expectations, although children from broken families are thought to be in disadvantaged situations, they received high scores in this study. Families that have been torn apart due to various reasons (divorce, death, work, school, etc.) may be more closely interlocked and interested in each other in order not to be affected by this situation more. Especially in order not to experience the negative effects of the disintegration, the parent who stays with the child tries to establish an order as soon as possible and tries to minimize the effects of the situations that may be against the child. On the other hand, in families with broken children, not only parents but also grandparents and other family members try to

help the family. When it comes to a child with special needs, both parents and other family members usually direct their attention to the child. It is thought that these factors are effective in children's drawing and matching skills.

Since there are no studies investigating the impact of the family kind on visual perception skills in the literature, indirect results have been focused on in order to investigate the impact of family kind on children's development. In recent years, there has been a change in the structure and design of family life, including the upbringing of children and adolescents. Given the high rates of divorce and separation, the number of children and adolescents temporarily living with only one parent is increasing, but in most cases, they are living in a stepfamily. Many international studies have examined how parental separation and subsequent family re-establishment can affect children's well-being. It has been concluded that children from broken families often have disadvantages in terms of their well-being. However, these disadvantages are generally weak and heterogeneous. Various factors such as the economic status, the severity of the parental conflict, parenting behavior, and parental cooperation problems in parenting affect the coping of broken families with the separation process and may partially explain the disadvantages that children may experience in this separation process (Entleitner-Phleps & Walper, 2020).

Table 7 shows that the number of children in families of special education needs is significantly correlated with matching and pegboard sub-dimensions of visual motor skills but not correlated with drawing sub-dimension. Many families that have a disabled child worry about their children’s future. They plan to have a second or third child who could look after the disabled child after their death. Children growing up in these families are sometimes deliberately or unintentionally directed by their parents to activities and responsibilities related to their disabled sibling. Especially if the disabled child is younger than the child with normal development, the older sibling can display more instructive behaviors. In addition, the efforts of peers or older children to teach can be more effective than the teaching of an adult for individuals who are developmentally at pre-school level. Having a disabled sibling develops positive emotions in healthy children such as maturity, confidence, and affection. It also creates a positive communication atmosphere in the family (Özen Çınar, Kartal & Korkmaz-Aslan, 2017). Helping older siblings to help their mother and younger siblings in their spare time develops a sense of being useful, valuable, and carrying responsibility (Bıyıklı, 1983). On the positive aspects of having a disabled sibling, Üstdağ and Bumin (2014) examined the effect of group activities practical to disabled children and their siblings on the social involvement of children and sibling relationships. As a result of the study, a difference was found in the first and last measurements of the disabled children and their siblings who have applied to the program. The implemented program was effective on children with disabilities and their siblings.

5. Conclusion

As a result, in this study, it was found that the visual motor skills of children with special needs did not vary according to gender and diagnostic, in the matching sub-dimension according to age, in the drawing and matching sub-dimensions according to the family kind, and in the matching and pegboard sub-dimensions according to the number of children in the family. Based on these results, the following recommendations can be made:

Since problems in visual-motor skills negatively influence the child's perception, movement, and coordination, many fields of the child's life (independent living skills such as eating, dressing, personal care, cleaning, using tools used in simple daily life, etc.), perceiving and exhibiting social skills, participating in games, maintaining, etc. skills, adapting to school life, fulfilling academic skills, etc.) create limitations. These limitations bring responsibilities to children's families, close environment, teachers and peers. For this reason, seminars and applied training where field experts can come together with families and educators should be organized to increase their knowledge and awareness. It is important to implement and maintain intervention programs by relevant field experts in line with the wants of the child, families and teachers. There may be a continuous improvement in visual motor skills with parallel and supportive studies to be carried out by families at home and teachers at school. The effects of this improvement will be reflected in the child's daily living skills, social skills and academic skills.

Similarly, providing the necessary support to teachers, families and normally developing peers in both special education schools and schools where mainstreaming/integration practices are carried out will contribute to children with special needs gaining more from education. Imitation skills play a major role in visual-motor skills. It is important to present their peers as role models in teaching visual motor skills to children with special needs and reinforcing these skills. It is important to provide social learning experiences for children with special needs and normal development. As a matter of fact, it is an important indicator that the visual-motor skills of children with special needs who have siblings differ from those of children with special needs who are only children.

Visual motor skills consist of sensory perception motor components. It is of interest to experts in different disciplines. Interdisciplinary studies will not only make significant contributions to the literature, but also contribute to the education and rehabilitation of individuals with special needs.

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Conflict of Interest Statement
The authors have no conflicts of interest to declare.

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