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Evaluation of the Effect of Trampoline and Movement Education Programs on the Development of Attention and Visual Perception in Preschool Children

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Abstract: In this research, which was conducted to evaluate the effects of trampoline and movement training programs that support visual perception development on the attention and visual perception development of kindergarten children, an experimental model, including pre-post test and control group trial models, was used. The research population consisted of 49 (5-6 year old) students attending the kindergarten of the primary school in Istanbul. Students were divided into 3 groups by bias assignment. At the beginning of the research, Frostig Visual Perception and Frankfurter Attention Tests were administered to the students. The experimental groups participated in the trampoline and movement training program that supports visual perception development, while the control group participated in their own curriculum. Posttests were administered 8 weeks later. Whether there was a difference between the pre-test and post-test scores of the experimental and control groups after the studies was tested using paired sample t test, one of the parametric tests. ANCOVA was used to compare the Frankfurter Attention Test, Frosting Developmental Visual Perception Test and Subdimension Scores of the groups and post-hoc tests were applied to determine the direction of the difference between the groups. The results showed that there was an increase in the attention test scores of the trampoline training group compared to the movement training and control groups. It was observed that there was an increase in the Frostig developmental visual perception test sub-dimension scores of the trampoline and movement training groups, while there was no increase in any sub-dimension scores in the control group. In the comparison of the groups, it was seen that the movement training group was more successful in the Frosting visual perception test Perception of Position in Space dimension than the control group.

Keywords: *Motor skills, cognitive development, early childhood education, spatial awareness*

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INTRODUCTION

The first childhood period, which includes the pre-school years, is a period in which the child is actively oriented towards their environment, tries to explore the external world full of stimuli, and acquires the most basic skills of human life. Researchers call the preschool years the most important period in which the child naturally has a high tendency to satisfy her curiosity, research, examine and discover, and has a high learning potential. Children use their senses effectively to realize these tendencies (Kubesh et al., 2009; Gallahue et al., 2014; Ercan, 2011).

The interpretation of the data we collect from the environment with our senses in the human brain is called perception. In another definition, perception is the ability to capture, process and actively give meaning to the information received by our senses. Our sense organs are the cognitive process

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that enables us to understand our environment with the stimuli that reach us. This important cognitive ability is crucial for our daily lives and it is thanks to it that we are able to understand our environment. All information and experiences perceived through the sense organs contribute to the development of the child's mental functions. Visual, auditory and tactile perceptions are said to help the child perceive the environment (Senemoğlu, 2007). Learning does not develop in an environment devoid of visual stimuli. Visual perception is also defined as the ability to recognize, distinguish and interpret visual stimuli in relation to previous experiences (Akdemir, 2006; Frostig, 1966). Visual perception processes are the process of perceiving and processing visual information coming from sensory and mental processes. Visual perception skills develop rapidly in early childhood and approach the adult level around the age of eleven to twelve. In children, the perception of figure-ground discrimination develops rapidly between the ages of three and five and stabilizes between the ages of eight and ten, the perception of location in space completes its development between the ages of seven and nine, the ability to fix shape develops rapidly between the ages of six and seven and stabilizes between the ages of eight and nine, and the perception of more complex spatial relationships in children continues to develop throughout childhood and reaches the adult level at the age of ten (Sparto et al., 2006). Frostig examined visual perception by dividing it into five sub-areas: eye- motor coordination, Figure-ground discrimination, figure stability, perception of position in space and perception of spatial relations. The reason why Frostig divided visual perception into these five areas is that deficiencies were found in these sub-areas in clinical studies conducted with individuals with learning disabilities (Akdemir, 2006; Çağatay, 1986; Gallahue et al., 2014; Kephard, 1978).

It is observed that children with visual perception problems also lag behind in learning. Visual perception ability can be improved in children. It has been reported in studies that visual perception disorders play an inhibiting role in learning, especially in reading instruction. In successful reading learning, a child must have the visual perception skills necessary to distinguish letters and words written on paper. A child with poor spatial and locational perception cannot correctly see the relationship between objects and written symbols. Child is not skillful and confident in their movements. They have difficulties in understanding words that indicate spatial and locational relationships. Especially in their homework, it is noticeable that makes frequent mistakes because they see letters, words, sentences, numbers and pictures in a distorted way. For example, the letter b is perceived as d; the letter "p" is perceived as ç; the word house is perceived as and; the number 6 is perceived as 9; 24 is perceived as 42. Therefore, they will have many difficulties in reading, writing and calculating (Sağol, 1998; Erdoğan ,2013; Ercan et al., 2011).

Attention is one of the most important parts of cognitive functions in education and work life as well as in many daily activities. Attention can be defined as being aware of the stimulus. Most of the stimuli in the external world are captured by the sensory organs, but some are perceived selectively. Attention is generally defined as the process of selectively focusing on something to the exclusion of other things (Soysal et al., 2008).

The organism tends to focus on stimulus groups in different ways in each situation. The concept of figure-ground perception is also mentioned in focusing. The phenomenon of attention is guided by cognitive processes that have selective and eliminative functions (Aydın, 2001). In this period, attention control is fully achieved. While the child is engaged in any task, they can react to the audio-visual stimuli around him and engage in their work at the same time. Children can direct their attention to different situations and maintain it for a long time (Yurdakul et al., 2012).

Educational activities and daily life skills require a combination of attention, vision, visual perception and visual motor skills. It is very important to recognize the child's developing perceptual abilities and to understand the impact of perception on learning movement skills and correcting movement errors. Visual perception; (1) Visual acuity; being able to distinguish objects, (2) figure-ground perception; figure-ground perception is the separation of an object from its surroundings (3) Depth perception; depth perception, one of the most important aspects of visual perception allows us to see in three dimensions (4) Visual-Motor Coordination; Visual-motor coordination, the ability to track moving objects and make catch predictions, are developmentally important visual qualities and influence movement performance.

All voluntary movements include an element of perception and motor development in childhood is closely related to perceptual-motor functioning. Studies have shown that without movement, there is no visual perceptual adaptation and that the nervous system is closely related to perception in terms of muscle and motor aspects (Gallahue et al., 2014).

Movement is the result of sensory organs and cognitive processes working together with the neuromuscular system. The nature of the perceptual process and its influence on movement and cognition has been of interest to researchers and educators for many years. Perceptual motor behavior in childhood has a special emphasis on vision. Children learn to read, write, do arithmetic and other skills more easily with their skills in visual perception (Feldman, 2004). In visual perception, emphasis is placed on visual discrimination, matching, classification, figure- ground discrimination, spatial relationship between objects, visual memory and attention skills.

These skills are also the skills that increase attention and visual perception, which enable motor skills to be learned. For this reason, visual perception is important in teaching all skills. Developmental movement education programs have the potential to improve perceptual-motor functioning (Gallahue et al., 2014; Bringoux et al., 2000; Bhatia et al., 2015). In movement education programming, movement education concepts (body, spatial and temporal awareness and movement relationships) are used to develop basic movement skills. Body awareness is generally used in connection with body image and body schema and is considered as (1) becoming aware of body parts, (2) understanding how body parts work, and (3) reorganizing body parts for another motor activity (Abels & Bridges, 2010; Graham et al., 2012). Spatial awareness is one of the main components of perceptual motor development. Subjective positioning, objective positioning, private space, general space are the components of spatial awareness. In directional awareness, children can give dimension to objects in space. Temporal awareness, Harmony, frequency and rhythm are components of temporal awareness. Temporal awareness is somehow related to muscular systems and senses in coordinated interaction with each other (Abels & Bridges, 2010; Graham et al., 2012). Movement relations describe and emphasize the types of connections between and among "who" and "what" movement with body parts, object and individual, partner and group.

Trampoline is an equipment used for gymnastics branch and provides ease in learning gymnastic skills and develops all movement groups that develop strength, whole body balance and muscle coordination (Atilgan, 2013). Trampoline activities enable children to develop timing, rhythm, strength and coordination skills (Heitkamp, 2001). In the literature, there are researches on the use of mini-trampoline and trampoline activities in sports training in order to increase leg strength, vertical jump and balance development in children's sports (Aragao, 2011), and it is also said that trampoline activities contribute to the development of senses space awarenes, body awareness, time awareness) during the development of children's motor skills (Vuillerme et al., 2011; Giagazoglou et al., 2013).

The relationship between perceptual-motor development and vision has a significant impact on children's mental dimensions. Problems in the visual field cause difficulties in listening and distraction; This is triggered by deficiencies in areas such as body perception, balance, coordination and behavioral planning. Due to these deficiencies, children face negative effects on their regular, academic success and reasoning ability in daily life, which causes their persistent, insecure and shy behavior. In addition, these children are often exposed to negative social labels by their families, species and other individuals, which causes them to feel worse due to the knowledge of their situation (Ercan et al., 2011). In this context, the evaluation of mental processes, the researches conducted and to be conducted on visual perception development education, the tests developed and the education and training programs gain importance (Ercan et al., 2011). It is thought that the child's visual perception development and attention can be increased with a movement education and trampoline education program prepared in accordance with the child's visual perception development.

Based on these considerations, the aim of the study was to evaluate the effect of trampoline education and movement education programs that support visual perception development on the attention and visual perception development of kindergarten children.

METHOD

In this study, which was conducted to evaluate the effect of trampoline and movement education programs that support the development of visual perception on the attention and visual perception development of kindergarten children, the experimental model including repeated measurements from the pretest, posttest and control group was used.

Population and Sample

The population of the study consisted of 49 students aged 5-6 years attending the kindergarten classes of a primary school with a kindergarten in the district of Beykoz in Istanbul. Sample selection power (power) analysis was performed; The type 1 error rate was calculated as $\alpha=0.05$ and the test power was calculated as $1-\beta=0.85$. Accordingly, it was determined that at least 15 people could be included in the research group. The students who participated in the study were divided into 3 groups as 16 Trampoline Education Group (TEG), 20 Movement Education Group (MEG) and 13 Control Group (CG). Children who had not previously received gymnastics, trampoline and movement education and who did not exercise regularly participated in the study voluntarily. Children who had no neurological diseases, vestibular visual disorders, lower extremity injuries or orthopaedic problems. Students who did not attend training regularly and students who did not attend classes due to long-term (10 days) injury or illness were excluded from the research group. At the beginning of the study, parents were informed about the purpose of the study and the study plan and a consent form was obtained. They gave their informed consent for the experimental procedure as required by the Helsinki declaration (1964).

Data Collection Tools

Frankfurter Attention Test developed by Raatz and Möhling (1971) and Frostig Visual Perception Test (Frostig 1968) was used in this study.

Frankfurter Attention Test (FAT)

The reliability coefficient of the Frankfurter Attention Test for Five Year Old Children developed by Raatz and Möhling (1971) is r= .85. Test-retest method was used in reliability studies (Kaymak, 2003). Frankfurter attention tests were administered by an expert with a certificate of application competence.

Frostig Visual Perception Test (FVPT)

Frostig Visual Perception Test was developed by Frostig (1961) to evaluate children's visual perception skills. The reliability study of the test for five-year-old children was conducted by Sökmen (1994) and it was found that the overall and sub-dimensional continuity coefficients of the test were significant at the 0.01 level. The Frostig Visual Perception Test (FVPT) consists of five sub-dimensions: Eye-Motor Coordination, Figure-ground Discrimination, Figure Stability, Perception of Position in Space and Perception of Spatial Relationships. Eye-Motor Coordination (EMC) is defined as the ability to coordinate vision with body movements or parts of the body. Figure-ground Discrimination (FGD) is defined as the ability to perceive the stimulus that is or should be selected among many stimuli and to think, focus and pay attention on it. Figure Stability (FS) involves the perception of an object in shape, posture, size, shading and position, and differentiating it from similar shapes. Perception of Position in Space (PPS); a mental process is required to recognize the positions of the parts of the shape relative to each other, and this process requires attention. Perception of Spatial Relationships (PSR) is defined as perceiving the relationships of two or more objects with themselves and with each other. There are standard scoring criteria for each sub-domain of the Frostig Visual Perception Test. The raw scores of the child in each sub-dimension are converted into standard scores. Standard scores are obtained from the percentage tables developed for the Frostig Visual Perception Test (Frostig, 1961; Sökmen, 1994). Frostig visual perception tests were administered and evaluated by an expert with a certificate of application competence for this age group of students.

Applications

The Frostig Visual Perception and attention tests were explained to the students by an expert in the presence of their teachers, and then the tests were administered in a quiet classroom with one student each. The same tests were repeated after the end of the lessons. TEG and MEG students participated in a trampoline and movement education program with expert trainers in addition to their lessons at school for 2 days a week for 1 hour each for 8 weeks (Table 1). The control group (CG) students continued the course program in the their curriculum. Students who could not attend more than 3 classes due to disability or illness were excluded from the study group. The movement education and trampoline education program was given by an expert with a 3rd level coaching certificate in artistic and trampoline gymnastics trainer. The trampoline education (large-small trampoline and trampoline track) equipment are materials with International Gymnastics Federation (FIG) certificate with protection cushion and safety.

Table 1. Trampoline and Movement Education Curriculum

Content	Duration (min.)	Movement training program	Trampoline training program
Moderate tempo running	5	General warm-ups such as light jogging, walking, jumping	General warm-ups such as light jogging, walking, jumping
General warm-up movements	5	Stretching movements for the whole body	Stretching movements for the whole body
Special Warm-Up Movements	10	Special warm-ups and movements animal imitations	Special warm-ups and movements animal imitations
Main circuit	30	Implementation of movement training (displacement, balancing, object control movements) activities that support the development of visual perception and attention	Trampoline training (Mini-Trampoline, large trampoline and Trampoline track) that supports the development of visual perception and attention, implementation of jumping and gymnastic movements
Finishing phase	10	The Game	The Game

Data Analysis

The significance level of the study was taken as $p<0.05$. The averages, arithmetic averages, standard deviations, highest and lowest values of the scores obtained by the students from the Frankfurter Attention Test and Frostig Visual Perception tests were calculated separately for each group. First of all, it was investigated whether the distribution of the scores obtained from the Frankfurter Attention Test and Frostig Visual Perception tests of the Trampoline Education, Movement Education and control groups before the eight-week studies was in accordance with the normal distribution. According to the results of the normality test for the totals and sub-dimensions of the scales, kurtosis and skewness values were found between -2.00 and +2.00. The results between these values were found to be acceptable and met the normality assumption (Gliner & Morgan, 2015) (Table 2).

Table 2. Statistical Descriptive and Normality Test Information of the Scales of the Groups

Scale Totals	N	X	SS	Kurtosis	Skewness
Movement Training Pre-test Total	20	83,38	19,93	1,207	,149
Trampoline Pre-test Total	16	82,76	20,17	-,777	-,967
Control Group Pre-test Total	13	90,15	11,26	-1,276	1,478

Whether there was a difference between the pre-test and post-test scores of the Trampoline Education, Movement Education and control groups after eight weeks of studies was tested using paired sample t test from parametric tests. ANCOVA was used to compare the Frankfurter Attention Test, Frosting Visual Perception Test and subdimension Scores of Trampoline Education, Movement Education and Control groups and post-hoc tests were applied to determine the direction of the difference between the groups.

FINDINGS

Table 3 shows the comparison of the Frankfurter Attention Test pre-test and post-test score differences of the movement education, trampoline training and control groups.

Table 3. Comparison of the Groups' Frankfurter Attention Test Pre and Post Test Results

Groups		x	ss	sd	t	p
Trampoline Education Group (n=16)	Frankfurter Attention Test Pre-	34,63	6,742	15	-4,821	,000**
	Frankfurter Attention Test Post-	39,38	4,787			
Movement Training Group (n=20)	Frankfurter Attention Test Pre-	33,30	8,033	19	-1,884	,075
	Frankfurter Attention Test Post-	36,10	5,180			
Control Group (n=13)	Frankfurter Attention Test Pre-	31,08	6,813	12	-1,248	,236
	Frankfurter Attention Test Post-	34,23	7,282			

p<0,05* p<0,01**

A statistically significant difference was found between the Frankfurter Attention Test pretest and posttest scores of the students in the trampoline education group (t=-4,821; p<0,01). There was no statistically significant difference between the Frankfurter Attention Test pre-test and post-test scores of the students in the movement education group (t=-1,884; p>,05) and the students in the control group (t=-1,248; p>,05).

Table 4 shows the comparison of the differences between the pre-test and post-test scores of the trampoline education group in the Frosting Visual Perception Test.

Table 4. Comparison of Frostig Visual Perception Test Pre and Post Test Results of Trampoline Education Group

Trampoline Education group (n=16)		**x**	**ss**	**sd**	**t**	**p**
Eye-Motor Coordination (EMC)	Pre-Test	97,06	5,994	15	-1,764	,098
	Final Test	99,56	1,031			
Figure-Ground Discrimination (FGD)	Pre-Test	57,06	30,041	15	-3,133	,007*
	Final Test	70,38	21,269			
Figure stability (FS)	Pre-Test	61,06	23,946	15	-1,732	,104
	Final Test	72,06	23,539			
Percepsion of position in space (PPS)	Pre-Test	79,56	24,894	15	-2,169	,047*
	Final Test	90,31	12,070			
Percepsion of spatial relationship	Pre-Test	79,94	0,306	15	-,466	,648
	Final Test	81,31	21,347			
Total Frostig Visual Perception Test (FVPT)	Pre-Test	83,87	18,694	15	-3,269	,005*
	Final Test	96,63	4,064			

p<0,05*

There was no statistically significant difference in favor of the post-test between the pre and post-test scores of the students in the trampoline training group in the EMC sub-dimension (t=-1,764 ; p>,05), the pre and post-test scores of the FS sub-dimension (t=-1,732 ; p>,05) and the PSR sub-dimension (t=-,466 ; p>,05) of the Frostig visual perception test.

There was a statistically significant difference in favor of the post-test between the pre and post-test scores of the students in the trampoline training group in the Frostig visual perception test; the pre and post-test scores of the FGD sub-dimension (t=-3,133 ; p<,05), the pre and post-test scores of the PPS sub-dimension (t=-2,169 ; p<,05), and the total Frostig visual perception test pre and post-test averages (t=-3,269 ; p<,05).

In Table 5, the comparison of the differences between the pre-test and post-test scores of the Frosting Visual Perception Test pre-test and post-test of the movement education group is presented.

Table 4. Comparison of Frostig Visual Perception Test Pre and Post Test Results of Movement Education Group

Movement Education Group (n=16)		x	ss	sd	t	p
Eye-Motor Coordination (EMC)	Pre-Test	95,00	20,264	19	-1,020	,320
	Final Test	99,65	1,348			
Figure-Ground Discrimination (FGD)	Pre-Test	64,80	23,035	19	-1,889	,074
	Final Test	72,95	22,943			
Figure stability (FS)	Pre-Test	63,60	26,217	19	-2,307	,032*
	Final Test	74,80	23,777			
Percepsion of position in space (PPS)	Pre-Test	63,65	33,875	19	-2,171	,043*
	Final Test	78,60	24,678			
Percepsion of spatial relationship (PSR)	Pre-Test	74,80	23,478	19	2,111	,048*
	Final Test	83,50	18,600			
Total Frostig Visual Perception Test (FVSR)	Pre-Test	84,15	18,737	19	-2,945	,008*
	Final Test	94,15	10,985			

p<0,05*

There was no statistically significant difference between the pre- and post-test mean scores of the students in the movement education group in the EMC sub-dimension (t=-1,020 ; p>,05) and the FGD sub-dimension of the Frostig visual perception test in favor of the post-test (t=-1,889; p>,05).

There was a statistically significant difference in favor of the post-test between the pre and post-test mean scores of the students in the movement education group in the Frostig visual perception test; FS sub-dimension (t=-2,307 ; p<,05), PPS sub-dimension (t=-2,171 ; p<,05), PSR sub-dimension (t=-2,111; p<,05) and total Frostig visual perception test (t=-2,945; p<,05).

Table 6 presents the comparison of the control groups Frostig visual perception test pre and post-test score differences.

Table 6. Comparison of Control Group Frostig Visual Perception Test Pre and Post Test Results

Control Group (n=13)		x	ss	sd	t	p
Eye-Motor Coordination (EMC)	Pre-Test	97,38	6,71	12	-1,404	,186
	Final Test	100,00	,000			
Figure-Ground Discrimination (FGD)	Pre-Test	67,23	19,88	12	-1,008	,333
	Final Test	72,69	22,38			
Figure stability (FS)	Pre-Test	63,00	19,09	12	-1,107	,290
	Final Test	70,92	25,58			
Percepsion of position in space (PPS)	Pre-Test	83,46	22,25	12	-1,652	,124
	Final Test	73,15	31,81			
Percepsion of spatial relationship (PSR)	Pre-Test	66,62	26,53	12	-2,385	,124
	Final Test	79,38	26,45			
Total Frostig Visual Perception Test (FVSR)	Pre-Test	66,62	26,53	12	-,847	,414
	Final Test	79,38	26,45			

p<0,05*

There was no statistically significant difference between the pre- and post-test mean scores of the students in the control group in the EMC sub-dimension (t=-1,404 ; p>,05), ; FGD sub-dimension (t=-1,404; p>0,05), FS sub-dimension (t=-1,107 ; p>,05), PPS sub-dimension (t=-1,652 ; p>,05), PSR sub-dimension (t=-2,385; p>,05) and total Frostig visual perception test (t=-,847; p>,05). The total and sub-dimension scores of attention, frosting visual perception test of movement education, trampoline education and control groups were compared by using Analysis of Covariance (ANCOVA), age and gender were given as covariates. Post-Hoc tests were applied to determine the direction of the difference between the groups.

There was no statistically significant difference (p>.05) in the comparison of the total score of the Frankfurter Attention Test Frosting Visual Perception Test, EMC, FGD, FS, PPS sub-dimensions of the groups, except for the PSR sub-dimension of the frosting visual perception test. Therefore, it was not shown as a table.

In Table 7, the results of ANCOVA test post- hoc analysis for the Frostig Visual Perception Test Perception of Position in Space Subdimension of the students in the trampoline training, movement education and control groups are presented.

Table 7. ANCOVA Post-Hoc Results According to Frostig Visual Perception Perception of Position in Space Subdimension

Dependent Variables	Groups	Groups	Mean Differences	Std. Error	p
Perception of Position in Space Subdimension (PPS)	Trampoline Education	Movement Education	-11,39	9,22	,672
		Control Group	17,23	9,42	,224
	Movement Education	Trampoline Training	11,39	9,23	,672
		Control Group	28,62*	9,38	,012*
	Control	Trampoline Training	-17,23	9,42	,224
		Movement Education	-28,62*	9,38	,012*

p<0,05* p<0,01**

The difference between the trampoline education, movement education and control groups was found to be statistically significant (p<.05) in the PPS sub-dimension of the Frostig Visual Perception Test.

DISCUSSION

The aim of this study was to evaluate the effects of trampoline and movement education programs that support visual perception development on attention and visual perception development of kindergarten children. According to the findings of the study, it was seen that trampoline education programs supportingvisual perception development showed statistically significant differences for the attention test in kindergarten children, but did not show statistically significant differences for movement education and control groups supporting visual perception development. According to these results, it can be said that trampoline activities are sufficient to increase attention development, but movement education activities are not sufficient to increase attention level.

In the literature, it is said that physical activity is beneficial not only for physical health but also for cognitive functions, especially executive functions closely related to learning success can be improved with regular physical activity (Adsız, 2010). Kubesch (2009), Yurdakul et al. (2012) movement education, Asan (2011) table tennis, Tunç (2013) golf training, Kartal et al., (2016) fencing training, found significant differences between the pre-test and post-test values of their own group and the post-test and pre-test in their study. The findings of these studies partially support our research. Because in our study, no significant difference was found in the control and movement education groups, but it was observed that trampoline education had a positive effect on attention development. Wen et al. (2018) investigated the effect of mini trampoline education on the development of brain executive functions (EF) in Chinese preschool children and found no statistically significant difference between the groups. The results of this study are similar to our study. It can be said that the fact that trampoline training has never been used in such studies in our country, the fact that kindergarten students are meeting this device for the first time and participating in the studies by paying attention to them can be said to be effective on these results. According to the findings of the study, trampoline education, which provides visual perception development in kindergarten children (EMC, FS, PSR sub-dimensions), was not statistically significant, while (FGD, PPS sub-dimensions and total FVSR) was found to be statistically significant. While it was observed that the sub-dimensions in the movement education group (EMC, FGD) were not statistically significant, FS, PPS, PSR subscales and total FVPT score statistically significant and control group (all sub-dimensions) and total FVPT were not statistically significant. The education group was statistically more successful than the control group in the visual perception dimension. Many studies by Atasoy et al., (2018), Ercan et al., (2011) say that physical activities that support children's visual perception development are effective. The results of these studies partially support our study. We think that the reason why the sub-dimensions of visual-motor coordination, figure-ground discrimination, figure stability, perception of position in space, which are among the sub-dimensions of the frostig visual perception test of the students who received trampoline education that supports perceptual motor development, could not develop sufficiently was due to the fact that trampoline exercises were performed on a plane and on a fixed equipment. The fact that the total scores of the Frosting visual perception test figure-ground discrimination, perception of position in space and the total scores of the frostig visual perception test are significant, we can conclude that the nature of the trampoline exercises, which involves a lot of jumps, improves the students' ability to perceive the stimulus that is selected or should be selected among many stimuli and to think about it, focus and pay attention. According to the total scores of the frosting visual perception test, it is seen that trampoline exercises support the development of visual perception due to the nature of the movements and the branch.

We think that the reason for the insufficient development of the sub-dimensions of the frosting visual perception test related to eye-motor coordination, figure-ground discrimination of the students who received a movement education program supporting perceptual motor development is that the studies on coordinating vision with the movements of the body or parts of the body, perceiving and thinking about the stimulus selected or to be selected among many stimuli, focusing and paying attention could not be done sufficiently or the students had never received gymnastics/movement education before. The development of the same group's frostig developmental visual perception test figure stability, perception of position in space, perception of spatial relationship sub-dimensions and total frostig visual perceptions show that the developmental movement education program with movement concepts was successful. The concepts of movement at the core of movement education programs that support perceptual development contribute to the development of visual perception. These concepts increase the awareness of children's bodies, space, timing and movement relationships, appealing to all sensory organs and ensuring easy and accurate learning of skills. In his research, Tepeli (2013) found that object control studies based on movement training It was found that it increased visual perception development in kindergarten children. In our study, the Frostig Visual Perception Test subscale of the movement training group was perception of body position in space (PPS) it was found to be significant when compared to the trampoline and control groups. Spatial awareness studies of movement education programs (subjective positioning, objective positioning, private-public space) Application with different materials may have had an impact on these results. Memiş et al., (2012) concluded that the visual perception levels of students were at an average level and that there was a significant relationship between visual perception and academic achievement. Lee et al., (2022) in their reseach found a significant relationships between four subcomponents (eye-hand coordination, copying, figure-ground, and spatial relations) of visual perception and word legibility. Garje et al., (2015) In their research, they conducted perceptual-motor development studies on primary school students with learning disabilities and said that these studies were effective in increasing the academic achievement of children. From this point of view, we think that movement education and sports programs that support perceptual development will contribute to children's academic achievement by increasing their visual perception.

Erdoğan et al., (2013) conducted individual interviews with 24 kindergarten teachers and according to the results of their study in which they examined children's activities for literacy preparation, they concluded that teachers included a lot of activities to develop writing skills within the scope of literacy preparation, but they did not include a limited number and variety of activities to develop phonemic awareness, visual perception, vocabulary, listening and speaking skills. From this point of view, it can be said that children cannot learn effectively and have difficulty in transferring the information they have learned. Ercan et al., (2011) conducted a study on the preparation of visual perception training programs for six-year-old children attending kindergarten, which affect reading-writing preparation skills and reading-writing processes, and to determine whether this program is effective on children's visual-motor coordination development. The training program prepared to develop matching, classification, figure-ground discrimination, figure stability, perception of position in space, perceptional of spatial relationships, visual memory, visual-motor coordination and attention skills supports children's visual-motor coordination, visual perception and motor coordination skills. Visual- motor coordination skills are very important for children to acquire academic skills (Ercan et al., 2011).

Based on the findings of our research, kindergarten teachers should not only implement programs designed to develop fine motor skills to prepare children for primary school, but also include sports programs that support large muscle groups during class hours, Researchers are advised to develop sports programs that involve the active use of large and small muscles and include vigorous activities to improve attention and perception, and to plan studies that test the effects of these programs on children's attention and visual perception.

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