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## THE EFFECT OF THE WALDORF APPROACH APPLIED WITH THE COLLABORATIVE METHOD ON THE EARLY ASSESSMENT SKILLS OF 48-60 MONTHS-OLD CHILDREN

*Research article*

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# THE EFFECT OF THE WALDORF APPROACH APPLIED WITH THE COOPERATIVE METHOD ON THE EARLY NUMBER ASSESSMENT SKILLS OF 48-60 MONTHS-OLD CHILDREN

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## Abstract

The aim of this research is to determine the effect of activities in accordance with the Waldorf approach supported by the cooperative method on the early number assessment skills of 48–60-month-old children. The study, which was carried out in accordance with the quasi-experimental design with the control group, was planned as two activity hours two days a week and was applied for four weeks. The study group of the research consisted of 30 children (13 girls-17 boys) in two different kindergartens in the province of Sivas in the spring semester of 2021-2022. In the study, one of the kindergartens was randomly assigned to the experimental group and the other to the control group. Waldorf education materials and cooperative teaching method were used in the experimental group, while the current practice was continued without intervening in the process in the control group. The "Early Number Evaluation Scale for Children" developed by Yılmaz (2015) was used to obtain the data. The reliability of the scale was determined as 0.985 in the scale development study and as 0.939 in this study. Frequency and percentage analysis of participants' demographic information; In the data obtained from the scale, diagnostic statistics, dependent groups t-test, and independent groups t-test were used. According to the findings obtained in the research; It was determined that the scores of the experimental group increased statistically significantly in the pretest-posttest, posttest-permanence test findings of the research groups. Although there was a slight increase in the scores of the control group, it was concluded that this difference was not at a significant level. It was determined that there was a statistically significant difference in favor of the experimental group in the comparison of the scores of the research groups from the post-test and retention test.

*Keywords: Waldorf approach, early number skills, cooperative learning, preschool.*

## 1. Introduction

The importance of education given to all developmental areas of preschool children has been recognized all over the world. This period is the period when human brain development is the fastest and the connection paths between nerve cells in the brain are the most intense (Gilmore, Knickmeyer, & Gao, 2018). The foundation of knowledge, skills, behaviors, attitudes and habits that children will use throughout their lives is laid in this period. Everything that children learn between 0-6 years is settled in their minds more permanently than in the following periods (Rinaldi, 2021). However, the idea that educational approaches and methods in this period should have unique characteristics compared to other periods has also been discussed (Bildiren, 2018). It was emphasized that the foundations for these skills

should be laid for the future rather than one-to-one teaching of academic skills in the preschool period (Maričić & Stamatović, 2018). In this direction, with the studies carried out since the beginning of the 20th century, educational approaches have begun to be developed for this period. Among the developed approaches, Montessori, Reggio Emilio, Waldorf, Bank Street, Forest Schools, High/Scope approaches are the main ones that are accepted and implemented all over the world. The Waldorf approach, which has an important place among the approaches developed for the preschool period, was developed by Rudolf Steiner on the basis of children's mental conceptualization (Aljabreen, 2020; Avison & Rawson, 2016). Its first applications were carried out for the children of workers working in a factory in Germany in the 1920s. In the face of the negativities experienced after the First World War, trainings in accordance with the Waldorf approach were started in order to ensure the integrity of children's feelings and thoughts.

It is emphasized that among the most important goals of the Waldorf approach are educating children's minds, developing their creative qualities and building their characters. In addition, it is stated that all these characteristics should be brought to children as a whole (Avison & Rawson, 2016; Uhrmacher, 1995). It is aimed to enable preschool children to be aware of the level of knowledge they have, to develop this level of knowledge, to perceive their position in the world, and to create a universal kinship rather than a local and national belonging-identity idea (Uhrmacher, 1995). Although these schools were closed by the nazis during the second world war due to the emphasis on universality, they started to provide education again afterwards. In the following process, this school model has spread all over the world (Patterson & Bradley, 2011). Schools created in accordance with the Waldorf approach are among the strongest alternatives among the kindergarten models developed as an alternative to existing kindergartens (Aljabreen, 2020). However, although the basic spirit of Waldorf kindergartens is the same, there is no single and standard pattern that each kindergarten fits completely. In Waldorf kindergartens, children's gender, race, social class, religion, etc. It is aimed not to be discriminated against because of their characteristics and to provide equal education opportunities for each child (Bunar, 2008). It is stated that children who are brought up in accordance with these principles will have the knowledge, abilities, and skills to develop human civilization in a positive way (Stockmeyer, 2012). Of course, it is aimed to provide education that will enable children to develop themselves holistically, such as group work, problem-solving, communication, empathy, development of mathematical and linguistic skills, moral development, and having ethical values, as well as character building (Avison & Rawson, 2016).

For children, in the first years of life, everything around them is play and entertainment is at the forefront. Therefore, all the skills and behaviors that are desired to be acquired by children should be gained in games or through game-based activities, ensuring that they enjoy themselves (Arslan & Dilci, 2018; Moore, 2017). However, these activities should be determined in accordance with the educational objectives or new activities should be designed. It is necessary to prepare the activities applied in the educational processes in preschool institutions in a way that the child will enjoy, and to use appropriate and natural materials (Curtis, 2002). The Waldorf approach has specialized materials in accordance with its own educational approach. The materials used in the Waldorf approach in the education of preschool children should be simple in structure and produced from natural wood materials (Frödén, 2019). In addition, these materials should reflect the elements in nature and should not be completely finished. Thanks to the incomplete completion, the child develops his/her creative skills by using these materials in different ways or by giving the final shape they want (Morrison, 2015). In addition to the specially prepared materials in the Waldorf approach, some simple tools and materials used at home, tree branches that can be obtained

from nature, pine cones, wooden blocks, leaves, seeds, seashells, stones, etc. numerous materials can be used (Oppenheimer, 2006). Children who are intertwined with natural materials during the education process develop their aesthetic feelings and creativity by discovering the beauty, simplicity, properties, and place of these materials in life (Turk & Sari, 2017). All the materials used in the Waldorf approach should contain as little detail as possible and even have some deficiencies and easily recognizable patterns. Children make up for these deficiencies and patterns by noticing them. In addition, these materials must be suitable for multidimensional use. For example, while wooden blocks form a building in one event, they can be a means of transportation in another event (Patterson & Bradley, 2011). Steiner (1995) states that everything that children learn through the materials used in the Waldorf approach enables them to understand the universal laws, forces, and substances that exist in them. In this way, children establish a physical and spiritual connection between people and the world. For this reason, seasonal transformations in nature, planets, solar system, states of matter, etc. in Waldorf activities. All cycles and actions related to nature can be seen (Dudek, 2007; Yüksel & Kartal, 2020). Naturally, the materials used in these activities should be designed in relation to these elements of nature. With the applied activities and materials, children develop their insights and comprehend the universe-human integration (Guttek, 2005).

Mathematics is the individual's abstract thinking about the universe and objects, understanding relationships in a logical framework, and making inferences (Geary, 1995). Steiner (2004) states that mathematics education is a guide through which children can meet their natural needs in their existence. He also emphasizes that mathematics enables children to get to know themselves, the universe, and nature holistically, and to discover the harmony between them. Appreciation skills develop in children who understand the harmony between systems and objects in the universe. His insight and enthusiasm increase and he develops a positive attitude towards mathematics (Avison & Rawson, 2016). The Waldorf approach provides a basis for children to internalize mathematical thinking. In this context, children gain a deep understanding that they will have throughout their lives (Starbaum, 1997). With mathematics education in the Waldorf approach, children; it is aimed that ~~they~~ comprehend mathematics, gain mathematical skills, learn to think mathematically, and ensure and maintain their enthusiasm and willingness in the learning process. Children cannot perceive numbers and concepts related to mathematics because they cannot embody them. However, they can learn simple operations such as recognizing numbers, counting and copying with appropriate materials (Schmitt-Stegmann, 1997). It is seen that many people have prejudices about mathematics and turn it into a phobia. It has been determined that the roots of mathematics phobia experienced by individuals go back to the pre-school period (Montague-Smith, Cotton, Hansen, & Price, 2017). Preschool teachers need to organize activities that will enable children to discover the fun side of mathematics and reveal their mathematical intelligence (Lee & Ginsburg, 2007). Mathematics is beyond the knowledge taught in schools in the classical sense and is not just about numbers and operations (Ginsburg, 1997). Mathematics is of great importance in children's efforts to understand and make sense of the world. Because they can comprehend the world with numbers and shapes, reconcile ideas and make logical inferences (Rinck, 1999). In order to strengthen preschool children's relationships with mathematics, they should be provided with new knowledge based on what they have learned in daily life (Greenes, Ginsburg, & Balfanz, 2004).

The mathematical experiences that children acquire during this period form the basis of the mathematical knowledge that they will learn in later education (Klibanoff, Levine, Huttenlocher, Vasilyeva, & Hedges, 2006). It is important to create effective teaching environments and use appropriate teaching methods for the retention of basic mathematical

knowledge in the preschool process (Elofsson, Englund-Bohm, Jeppsson, & Samuelsson, 2018). In this way, children develop a positive attitude towards mathematics and become more comfortable with mathematics in their future academic life (Geist, 2015). In the preschool period, children's worlds are built on concrete realities. Therefore, learning information and concepts related to mathematics should be carried out through activities organized using embodied educational materials (Han, Jo, Hyun, & So, 2015). It is of great importance that preschool children learn through activities they will do with their friends rather than their individual learning. In this sense, the activities implemented in preschool education on the basis of cooperative learning enable children to learn more easily and permanently (Akçay, 2016; Arslan & Kartal, 2022). Cooperative learning is a learning method in which children in heterogeneously formed small groups support each other's learning processes. The children in the groups do not only focus on their own learning, but also care about the learning of their friends in the group. Learning outcomes are evaluated on a group basis, not on an individual basis (Ozdilek, Okumuş, & Doymuş, 2018).

### 1.1. Purpose of the Research

It is accepted that pre-school education is the period in which the foundations of all the skills that children will need in their future academic, private and business lives are laid (Ihmeideh, 2009). It is the period when children gain skills in basic language, mathematics, and science, as well as perceiving and making sense of the world, their environment and objects. In addition, children begin to acquire socialization, communication, and empathy skills during this period. Preschool period has critical importance because of all these features. Appropriate methods and techniques should be chosen consciously in order for children in this period to gain basic skills related to mathematics and to love mathematics (Jordan & Levine, 2009). Studies on pre-school period have been examined in the literature, and no research has been found that examines the effects of the Waldorf approach supported by the cooperative method on the early number assessment skills of 48-60-month-old children. In this context, the researchers planned this study by accepting that this research, in which the cooperative method and Waldorf approach were applied together, would contribute to the relevant literature, and would be a source for the experts who prepare the pre-school education programs and the future researches. Purpose of the study; the aim of this study is to determine the effect of applying the cooperative method and Waldorf approach together on the early number assessment skills of preschool children. In this direction, answers to the following questions were sought:

- ✓ Is there a statistically significant difference between the pretest-post-test scores of the research groups from ENAS?
- ✓ Is there a significant difference between the post-test scores of the research groups from ENAS?
- ✓ Is there a significant difference between the permanence test scores of the research groups from ENAS?

## 2. Method

In this chapter; information on the model used in the study, the study group, the tools used in obtaining the data, the Waldorf approach materials used, how the application was carried out, the acquisition of data, and the analysis processes were presented.



## 2.1. Research Design

The research was carried out in accordance with the quasi-experimental design with the control group. Selective criterion sampling method was used in accordance with the purposive sampling model in determining the research groups in the study, which included an experimental and a control group. Research groups were randomly assigned as experiment and control.

## 2.2. Study Group

The study group of the research consists of 30 pre-school children (13 girls-17 boys) who continue their education in two branches of a kindergarten in Sivas province in the spring term of the 2021-2022 academic year. The experimental group (EG) in which the Waldorf approach supported by the cooperative method is applied consists of 15 children, and the control group (CG) in which the currently used learning method is used consists of 15 children. The criteria determined while forming the working group are as follows:

- ✓ Children must be between 48-60 months old
- ✓ Children should receive pre-school education for the first time
- ✓ Children should not have a health problem that will affect the process of conducting the research and affect the findings to be obtained.
- ✓ There should be no significant difference in the scale pre-test scores of the research groups.

The descriptive statistics of the research groups by gender are given in Table 1.

Table 1. *Distribution of research group students by gender*

Groups	Female		Male		Total
	n	%	n	%	n
EG	7	46.67	8	53.33	15
CG	6	40.00	9	60.00	15

When the information presented in Table 1 is examined; distribution of children by gender for the experimental group was 46.67% girls and 53.33% boys; for the control group, it is seen that it is 40.00% female and 60.00% male.

The children forming the experimental group of the research were divided into seven groups, taking into account their achievement, ability, and gender characteristics and balancing each other, by interviewing the practice teacher. There are two children in six groups and three in one group. Each group agreed with each other and determined a group name for themselves. Table 2 below shows the distribution of the students in the groups by gender and the group names.

Table 2. *Experimental group group names and distribution of students to groups*

Groups	Female (n)	Male (n)	Toplam (n)
Cats group	1	1	2
Candies group	1	1	2
Sheep group	1	1	2
Strawberry group	1	1	2
Penguins group	1	1	2
Forest group	1	1	2
Pilots group	1	2	3
Cats group	1	1	2

### 2.3. Data Collection Tools

The data of the study were obtained by using the "Early Number Rating Scale for Children". Permission to apply the scale was obtained from the researcher.

#### 2.3.1. Early Number Rating Scale for Children

The scale developed by Yılmaz (2015) consists of three sub-factors: Number Recognition-Circle Drawing (NRCD=20 items), Counting Objects-Number Writing (CONW=20 items), Counting Objects-Circling (OCC=21 items). It consists of 61 items. In the scale, the correct answers of the students were scored as "1" and incorrect answers as "0". The Cronbach's Alpha value of the scale was calculated as 0.955 in the scale development study, and as 0.939 in this study. When children give correct answers to all items in the scale, they get 61 points, and when they give wrong answers, they get "0" points. Sample images of the dimensions of the scale are given below.

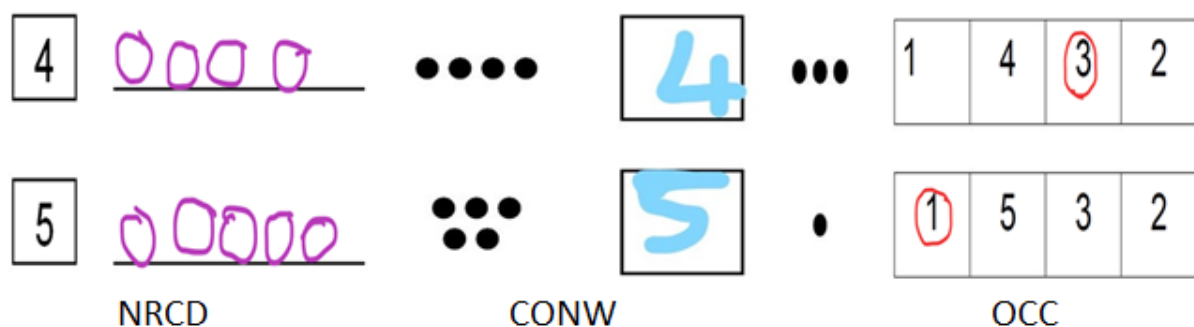


Table 3 shows the results of the unrelated groups' t-test, which was applied to determine whether the pretest scores of the experimental and control groups obtained from the scale show a statistically significant difference.

Table 3. ENAS pretest independent groups t-test results

	Groups	n	$\bar{x}$	sd	df	Levene test		t	p
						F	p		
NRDC	EG	15	14.20	3.40	28	1.319	.256	-1.159	.251
	CG	15	15.16	3.04					
CONW	EG	15	10.83	4.71	28	4.076	.048	-1.655	.103
	CG	15	12.63	3.64					
OCC	EG	15	15.53	4.51	28	.822	.368	-1.172	.246
	CG	15	16.76	3.57					
Total	EG	15	40.66	10.85	28	5.726	.020	-1.655	.104
	CG	15	44.56	6.98					

When Table 3 is examined; it was determined that the pretest mean scores of the research groups from the ENAS did not differ statistically in all factors and in the total score ( $p > .05$ ). This result reveals that the research groups had similar competencies in terms of early number assessment skills before the application.

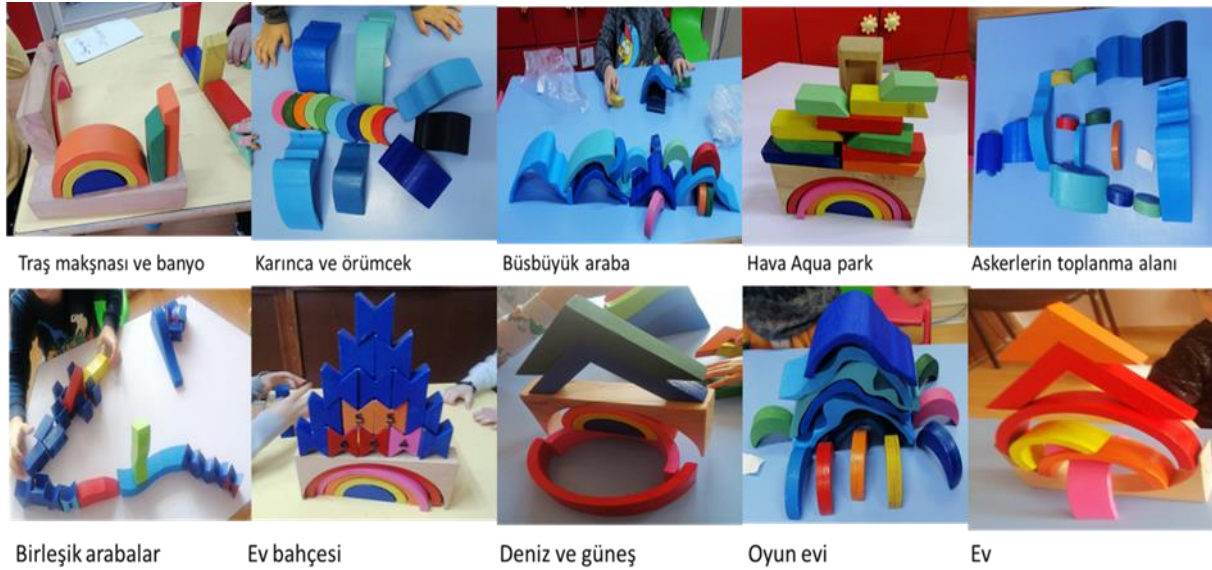
## 2.4. Materials Used

There are materials designed specifically for the Waldorf approach and used in Waldorf kindergartens around the world. Among these materials, the ones suitable for the purposes of the study and the age group were determined and seven of them were used in this study. In addition, a material was developed by the researchers. First of all, the opinions of pre-school education specialist, material development specialist and preschool teachers were taken about the suitability of the determined and developed materials for the purposes of the study. The consulted experts evaluated all the materials in terms of suitability for purpose, suitability for age group, intelligibility, ease of application, and suitability for group work. After receiving the opinion that the determined materials were appropriate, a pilot application was carried out in two different branches that were not included in the research groups. Since the applications went smoothly, two pieces of each material were produced. In line with the characteristics of the materials, they were paired crosswise in pairs. The matched materials were distributed to the students in the experimental group in a way that a different group would come each week. In this way, students in all groups had the chance to use all materials. It was ensured that the students in the group first got to know each material together. Afterwards, they were asked to produce different shapes by using two different materials together, to count the pieces of material, and to group them according to similar colors. Below are photos of the materials used.



Children used the Waldorf materials above in different ways and created shapes. Sample photographs of the shapes created by the children during the application process are given below. Below each photo are the names given by the children for the figure.





## 2.5. Application Process

The researchers first applied to the Provincial Directorate of National Education and received approval for the research. Afterwards, kindergarten classes between 48-60 months were determined and school administrators and pre-school teachers were contacted, and information was given on subjects such as the purpose, duration, and method of application of the study. Information was obtained in terms of children in schools and their distribution to branches, students' age, gender, and whether they received education for the first time or not. The teachers in the branches that are suitable for the purposes of the research and the participant criteria are met were interviewed again and the most suitable branches were determined among those who received positive answers. The teachers of the research branches were informed in detail about the purpose of the research, the application period and process, Waldorf materials, how to use these materials, the activities to be implemented through the materials, and the points to be considered in children, and possible problem situations. Demographic information of the children in the branches was obtained. An application consent form was sent to the parents of the children in the research groups, and positive responses were received from all of them. Parents were invited to the school to provide information about the study and their questions were answered. A short sample application was made by introducing the materials. It was also emphasized that they could follow the application whenever they wanted. Branches were randomly assigned to the experimental and control groups. ENAS was applied to the research groups as a pre-test. Each scale was administered to the children individually for approximately 15-20 minutes, their responses were not interfered with, and were completed in one-week period.

A short application was made by introducing the materials to the children in the experimental group, and the children's compatibility with working together, the ease of use of the materials, the comprehension of the children was observed and no problem was detected. The application was started with the experimental group, and it was applied as two activity hours two days a week (Monday-Wednesday). The purpose of performing two applications a week is to reduce the impact of possible absences, as the children are young, the effects of the pandemic process continue, and there may be reasons such as illness. The classroom environment is arranged in a way that allows children to interact in accordance with their cooperative work. In this direction, seven different application tables were created. The practice teacher first distributed the materials, which were prepared in pairs, to the children. Since there are eight materials in total, four groups of materials were formed. Each group was

given a different group of material each week. At the end of the four-week period, children in all groups had the opportunity to work with the materials. After each application, the children were asked questions about the color, number, shape, and size of the materials they used. They were asked to group the pieces of material in accordance with the questions. Feedback was given regarding the children's responses. During the whole application process, the necessary support was asked to the experimental group teacher, and his questions were answered in the process. After the four-week application period was over, ENAS was administered to the children in both branches as a post-test. A three-week break was taken and ENAS was applied to the research groups again as a retention test in order to determine the permanence of what the children learned.

## 2.6. Data Analysis

The data of the research was first transferred to digital media. SPSS program was used in the analysis of the data. Since the normality assumption of the data was  $n < 35$ , it was checked by applying Shapiro-Wilk (Demir, Saatçioğlu, & Imrol, 2016). It was determined that the normality assumption was not met ( $p < .05$ ). The skewness and kurtosis values of the data were checked, and it was determined that  $\pm 2.00$  ( $\pm$ Skewness =  $-.492/-1.174$ ; Kurtosis =  $-.113/.934$ ) met the acceptable value range (Field, 2013). Since it was accepted that the data met the normality assumption, the analyzes were made by applying parametric tests. For the data obtained from the scale, dependent groups t-test, independent groups t-test; frequency and content analysis was applied for demographic information. Obtained findings are presented in tables.

## 3. Findings

In this part of the research, the findings are given in line with the aims of the study. The findings are tabulated and the relevant explanation is given under each table.

Table 4 shows the results of the related groups t-test applied to determine whether the pretest-posttest scores of the experimental group from the scale differ statistically.

Table 4. *Experimental group ENAS pretest-posttest dependent groups t-test results*

	EG	n	$\bar{x}$	sd	df	t	p
NRDC	Pretest	15	14.20	3.40	14	-4.055	.000*
	Posttest	15	16.83	1.70			
CONW	Pretest	15	10.83	4.71	14	-5.926	.000*
	Posttest	15	16.16	2.36			
OCC	Pretest	15	15.53	4.51	14	-3.722	.001*
	Posttest	15	18.20	1.76			
Total	Pretest	15	40.66	10.85	14	-5.225	.000*
	Posttest	15	51.16	3.25			

\* $p < .05$

Looking at the data in Table 4; it is seen that there is a significant difference in favor of the posttest in the comparison of the pretest-posttest mean scores of the children in the experimental group regarding the ENAS test ( $p < .05$ ).

Table 5 shows the results of the related groups' t-test applied to determine whether the pretest-posttest scores of the control group from the scale differ statistically significantly.

Table 5. Control group ENAS pretest-posttest dependent groups t-test results

	CG	n	$\bar{x}$	sd	df	t	p
NRDC	Pretest	15	15.16	3.04	14	-1.099	.281
	Posttest	15	15.56	2.40			
CONW	Pretest	15	12.63	3.64	14	-1.578	.125
	Posttest	15	13.36	2.93			
OCC	Pretest	15	16.76	3.57	14	.528	.601
	Posttest	15	16.70	3.32			
Total	Pretest	15	44.56	6.98	14	-1.544	.133
	Posttest	15	45.53	5.60			

Looking at the data in Table 5; it is seen that there is no significant difference in the comparison of the ENAS pretest-posttest mean scores of the children in the control group ( $p > .05$ ).

The results of the unrelated groups t-test applied to determine whether the post-test scores of the experimental and control groups applied after the application create a statistically significant difference are given in Table 6.

Table 6. ENAS test posttest independent groups t-test results

	Groups	n	$\bar{x}$	sd	df	Levene test		t	p
						F	p		
NRDC	EG	15	16.83	1.70	28	3.000	0.89	2.356	.022*
	CG	15	15.56	2.40					
CONW	EG	15	16.16	2.36	28	.256	.615	4.073	.000*
	CG	15	13.36	2.93					
OCC	EG	15	18.20	1.76	28	13.418	.001	2.182	.034*
	CG	15	16.70	3.32					
Total	EG	15	51.16	3.25	28	4.144	.046	4.762	.000*
	CG	15	45.53	5.60					

\* $p < .05$

Considering the findings in Table 6, it was determined that the mean scores of the experimental and control groups when the scale was applied as a post-test differed significantly ( $p < .05$ ). It was determined that the significant difference was in favor of the experimental group to which the application was made.

The results of the related groups t-test applied to determine whether there is a significant difference in the comparison of the posttest-permanence test scores of the experimental group are presented in Table 7.

Table 7. Experimental group ENAS posttest-persistence test dependent groups t-test results

	EG	n	$\bar{x}$	sd	df	t	p
NRDC	Posttest	15	16.83	1.70	14	-3.096	.004*
	Persistence	15	17.60	1.27			
CONW	Posttest	15	16.16	2.36	14	-2.605	.014*
	Persistence	15	17.23	1.50			
OCC	Posttest	15	18.20	1.76	14	-3.515	.001*
	Persistence	15	18.93	1.79			
Total	Posttest	15	51.16	3.25	14	-3.539	.001*
	Persistence	15	53.86	2.90			

**\* $p < .05$**

When the findings in Table 7 above are analyzed, it is determined that there is a significant difference in the post-test-permanence test comparison of the experimental group ( $p < .05$ ). It is seen that the significant difference occurs in favor of the permanence test.

The findings of the related groups' t-test applied to determine whether the posttest-permanence test scores of the control group from the scale show a significant difference are given in Table 8 below.

Table 8. Control group ENAS posttest-persistence test dependent groups t-test results

	CG	n	$\bar{x}$	sd	df	t	p
NRDC	Posttest	15	15.56	2.40	14	-1.439	.161
	Persistence	15	15.63	2.25			
CONW	Posttest	15	13.36	2.93	14	-.494	.625
	Persistence	15	13.43	2.81			
OCC	Posttest	15	16.70	3.32	14	-1.564	.129
	Persistence	15	16.93	2.99			
Total	Posttest	15	45.53	5.60	14	-1.581	.125
	Persistence	15	45.86	5.19			

Looking at Table 8 which includes the results of the post-test-permanence test comparison of the control group, it is seen that although there is a slight increase in scores between the measurements, this difference does not constitute statistical significance ( $p > .05$ ).

The results of the unrelated groups t-test applied to determine whether the mean scores obtained by the experimental and control groups as a result of the application of the scale as a permanence test differ statistically, are presented in Table 9 below.

Table 9. ENAS retention test independent groups t-test results

	Groups	n	$\bar{x}$	sd	df	Levene test		t	p
						F	p		
NRDC	EG	15	17.60	1.27	14	10.940	.002	4.163	.000*
	CG	15	15.63	2.25					
CONW	EG	15	17.23	1.50	14	2.247	.139	6.463	.000*
	CG	15	13.43	2.84					
OCC	EG	15	18.93	1.79	14	9.057	.004	3.137	.003*
	CG	15	16.93	2.99					
Total	EG	15	53.86	2.90	14	5.351	.024	7.286	.000*
	CG	15	45.86	5.26					

\* $p < .05$

According to the data in Table 9, where the findings regarding the retention test application are presented, a significant difference was found between the scores of the experimental and control groups in favor of the children in the experimental group ( $p < .05$ ).

#### 4. Discussion, Conclusion and Recommendations

The results obtained in this part of the research will be discussed together with similar studies in the literature.

It is seen that the scores of the children in the experimental group in the pretest-posttest and posttest permanence test comparisons related to the ENAS test make a significant difference. The results show that cooperative Waldorf activities affect children's early number assessment skills positively. In addition, it has been determined by the permanence test that the competencies gained by the children through the application continue to develop after the application is over. It can be said that the fact that children's awareness has started to develop and the effect of the application continues. It was determined that although the scores of the children in the control group in the pretest-posttest and posttest retention test comparisons related to the ENAS test increased slightly, this increase did not make a significant difference. The results obtained show that the current teaching method applied improves children's early mathematics assessment skills, but this is not at a level to make a significant difference. The findings suggest that the program in practice is not sufficient to develop early number assessment skills of 48-60 month old children. Since the findings were obtained as a result of an experimental research and a research conducted with a certain number of children, they cannot be generalized but also cannot be ignored. When the posttest and retention tests of the research groups were compared, it was concluded that there was a significant difference in favor of the students in the experimental group in both the posttest and retention tests. Accordingly, it can be interpreted that the activities based on the cooperative Waldorf approach applied in developing preschool children's early number assessment skills are effective.

Korkmaz and Oztürk-Samur (2022) investigated the effect of Waldorf approach on creativity and cognitive skills of preschool children. In the experimental study, in accordance with this study, it was found that the Waldorf approach was significantly more effective than the method in current practice. Steiner (1996), emphasizing that one of the main purposes of the Waldorf approach is to ensure the multi-faceted development of children, and states that



in this context, preschool children can be used effectively for many different developmental areas. Each child has different characteristics, and the development of these characteristics should be developed from the pre-school period (Hutchingson & Hutchingson, 1993). Ekici (2015) states that the Waldorf approach affects children's creativity positively. Kotaman (2009) states that visuality and aesthetics are important in activities implemented in the Waldorf approach, and that children go through a natural education process in the field of art as well as expressing their feelings and thoughts.

It is stated that pre-school children will begin to discover mathematical connections in life and in the universe with the development of early number evaluation skills. In addition, it is stated that they can easily establish cause-effect relationships that they had not noticed before, by looking at the world, objects and relations between objects with a more curious gaze (Charlesworth, 2005). Although nearly a century has passed since the emergence of the Waldorf approach, it is seen that studies on the effectiveness of this approach in Turkey are quite limited. In the studies conducted, the views of teachers and parents on the Waldorf approach were generally sought (Coşgun, Özer, & Aydın, 2021; Koca & Ünal, 2018; Yüksel & Kartal, 2020). Yüksel and Kartal (2020) found that teachers think that the use of Waldorf materials positively affects the cognitive, affective, linguistic, psycho-motor, and emotional development areas of preschool children. However, teachers stated that they would prefer to use Waldorf materials mainly for the cognitive development of children in educational environments. Teachers said that Waldorf materials can be used in the cognitive field, especially in teaching science and mathematics, concepts, scientific process skills, sequencing, classification, reading and writing skills.

The Waldorf approach has a long history in terms of the emergence of preschool approaches. However, according to the results obtained in the literature review, it is seen that this approach is not used functionally enough in Turkey. Here, the development of pre-school education compared to other education levels can be shown as a reason. In a changing and globalizing world, it is important to lay the foundations of children's education, starting from the earliest ages. The number of pre-schools where Waldorf kindergartens or other alternative kindergarten approaches are implemented needs to increase. Of course, it is important that teachers have sufficient skills to apply these approaches. For this, it is necessary to give practical training to teachers rather than theory in pre-service and in-service trainings for the application of approaches designed for pre-school. Increasing the number of practical studies will contribute to the literature on the positive-negative effects of this approach. In this study, it was studied with children aged 48-60 months. New studies can be done with different age groups and for different skills. Technology-supported applications can be made for the development of different skills today, where technology enters every field (Ozkan, 2021). Waldorf materials and tablet applications can be combined with activities for linguistic skills such as mathematics and listening speaking. In this study, the teaching process was designed in accordance with the cooperative learning method. Different learning methods and techniques can be applied. Quantitative and qualitative data can be evaluated together using the mixed method.

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