

ARTICLE



# Investigation of environmental awareness and attitudes of children attending nature centred private kindergartens and public kindergartens

Kazım Biber<sup>1,\*</sup>, Hülya Cankorur<sup>2</sup>, Rabia Sultan Güler<sup>2</sup> and Ecenur Demir<sup>2</sup>

(Received 25 July 2021; revised 30 December 2021; accepted 11 January 2022; first published online 03 February 2022)

#### **Abstract**

The aim of the research is to examine the environmental awareness and attitudes towards the environment of 5-6-year-old children attending nature-centred private kindergartens and public kindergartens. The study group of the descriptive research that used a screening model consists of 48 children from nature-centred Private Maki Kindergartens and 48 children from public kindergartens in the province of Balikesir in the 2020–2021 academic year. A Personal Information Form and Environmental Awareness and Attitude Scale for Preschool Children, developed by Soydan and Samur (International Electronic Journal of Environmental Education, 7(1), 78-97, 2017) for 60-72 months old children, were used in the study. The scale consists of two sub-dimensions as Attitude Towards Environment (15 items) and Environmental Awareness (11 Items) and 26 pictures. The Cronbach  $\alpha$  coefficients of the Environmental Awareness (.74) and Attitude (.78) Scale for Preschool Children and the overall scale (.82) were calculated. The data were collected by the researcher through oneon-one meetings with each child. The mean, mode, median, skewness and kurtosis values of the variables in the study were calculated. To determine whether the environmental awareness and environmental attitudes of the study group differ according to the school they attend, independent samples t-test was conducted. According to the results of the research, a significant difference was found in environmental attitudes and environmental awareness of children in nature-centred kindergartens compared to children in public kindergartens. Children attending public schools are less exposed to the environment. Preparing the Pre-School Education Program in an environment-friendly manner to increase the environmental awareness of children attending public schools will be effective in terms of making a difference in their attitudes towards the environment.

Keywords: nature-centred kindergarten; attitude towards the environmental; environmental awareness; nature; preschool

Climate change, air and water pollution, ocean acidification, land degradation and loss of biodiversity are causing complex social-ecological challenges, and environmental problems are increasing at an alarming rate worldwide (Barnosky & Hadly, 2016). Scientists focusing on these adversely changing world conditions state that a healthy, resilient and functioning ecosystem is necessary for all living things (UN Environment, 2019).

Protecting and restoring the global environment requires larger-scale, collective actions and major changes in people's behaviour regarding production and consumption, as well as individual choices (Mastrángelo et al., 2019; UN Environment, 2019). One of the important tools in protecting the global environment is environmental education.

© The Author(s), 2022. Published by Cambridge University Press. This is an Open Access article, distributed under the terms of the Creative Commons Attribution-NonCommercial licence (https://creativecommons.org/licenses/by-nc/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is unaltered and is properly cited. The written permission of Cambridge University Press must be obtained for commercial re-use.

<sup>&</sup>lt;sup>1</sup>Department of Elementary Education, Preschool Education Division, Faculty of Education, Balıkesir University, Balıkesir, Turkey and <sup>2</sup>Rahmi Kula Anatolian High School, Balıkesir, Turkey

<sup>\*</sup>Corresponding author. E-mail: kbiber@balikesir.edu.tr

Environmental education refers to "an approach, a philosophy, a tool, and a profession" that aims to raise environmentally literate citizens and addresses the environment and sustainable resources (Monroe, Andrews & Biedenweg, 2008). Environmental education encourages the individual to increase and maintain human–nature interaction over time by developing attitudes, values, knowledge, tendencies and skills to be pro-environmental (Mastrángelo et al., 2019; Monroe, 2003; UNESCO, 1978). Environmental education is an education that lasts from infancy to old age, as scientific and social conditions related to environmental and sustainability issues are constantly changing. Environmental education requires constant critical thinking and decision making, not only individually but also as a society.

The ultimate goal of environmental education is to raise an environmentally literate citizen. Environmental literacy requires not only basic knowledge of the environment but also a "positive and caring attitude towards the environment" (Eagles & Demare, 1999). A study conducted by Eagles and Demare (1999) states that environmental education given to children aged 11–12 years attending the sixth grade is too late to make a difference in their attitudes towards the environment. From this point of view, it can be said that attitudes are formed in the early period of life; therefore, environmental education should start in early childhood to raise individuals who are highly aware and sensitive to the environment.

Environmental education in early childhood encompasses emotions, tendencies and skills as well as knowledge of the natural world. According to Ruth Wilson (1994), environmental education in early childhood includes the development of a sense of curiosity, an appreciation of the beauty and mystery of the natural world, opportunities to experience the joy of being close to nature and respect for other living things. At the same time, the development of problem-solving skills and interest and appreciation for the world around us is also within the scope of environmental education. The scope of environmental education states that learning is more than a cognitive process and that emotions play a particularly important role in environmental awareness (see Harlan & Rivkin, 2008). Therefore, opportunities should be provided in early childhood for children to experience peace, joy and fascination with nature because these feelings support their developing knowledge, skills and tendencies (Gardner, 1999). The children's relationship with themselves, others, the environment and the world is the basis of early childhood learning, but it is also necessary to support their growth and development. Developing the children's sense of curiosity about nature and enabling them to make discoveries in the real world is only possible with the children's exposure to nature.

Numerous studies conducted in the past two decades reveal that there is a negative relationship between children's exposure to nature and health problems (Kalinski, 2014; Driessnack, 2009; Louv, 2009). Today, children spend less time in nature; so, they remain ignorant of the environment, and this leads them to an unhealthy life (Coyle, 2005; Driessnack, 2009; Louv, 2008; Louv, 2009; Roberts, Foehr & Rideout, 2005). Despite the myriad potential health benefits of exposure to nature and green spaces, many children spend little to no time outside on a regular basis (Chaput et al., 2018; Aggio et al., 2017; Larouche, Garriguet & Tremblay, 2017; Moran, Plaut & Merom, 2017). Most of the studies linking the increase in children's health problems with decreased exposure to nature focus on nature for the solution of health problems. Kuo and Taylor (2004), in their study, found that young children showed a decrease in attention deficit and hyperactivity disorder symptoms while dealing with nature. Huh and Gordon (2008), on the other hand, draw attention to the relationship between the decrease in outdoor activities and the increase in vitamin D deficiency in childhood. Spending time in nature, recognizing nature and making discoveries to learn positively affect not only their individual health but also their environmental concerns when they reach adulthood and their participation in activities aimed at protecting the environment (Cagle, 2018; James, Bixler & Vadala, 2010; Rosa, Profice & Collado, 2018).

The importance of early childhood for the development of environmental awareness and interest throughout life has led to the emergence of various approaches and philosophical orientations regarding environmental education in early childhood (Ernst & Burcak, 2019).

Nature-centred early childhood education has gained significant momentum in the last few years (Larimore, 2016; Sobel, 2016; Wilson, 2018). Studies show that children who spend time outdoors frequently are significantly less stressed, have improved sensory perceptions, have fewer attention difficulties, have reduced rates of physical and emotional illness and obesity, have greater emotional regulation skills, are more likely to be a lifetime outdoor participant and have greater social skills (Kondo, Fluehr, McKeon & Branas, 2018; Müller et al., 2017; Twohig-Bennett & Jones, 2018; Tillmann, Tobin, Avison & Gilliland, 2018). The nature-centred kindergartens that are designed to include daily outdoor exploration to develop children's ability to work independently and collaboratively, to act responsibly towards their environment and others and to encourage the love of nature (Moore & Marcus, 2008) aim to make children gain their experiences with nature firsthand.

In nature-centred schools, administrators and teachers should have skills and experience in both early childhood education and environmental education (Vandermaas-Peeler & McClain, 2015). The nature-centred kindergarten program addresses both child development and environmental values and uses the natural world to support dual goals. This helps the development of the child's world and the development of an ecological identity or environmental ethics (Kiewra & Veselack, 2016).

In addition, these nature and environmental practices develop and shape children's ecological awareness, positive environmental attitude, environmental awareness and attitudes towards nature in early childhood (Corraliza & Collado, 2019; Evans, Otto & Kaiser, 2018; Phenice & Griffore, 2003). It also supports and encourages participation in research processes such as observation, experimentation, data collection, prediction and analysis (Torquati, Gabriel, Jones-Branch & Leeper, 2010).

For nature and environmental experiences, first, children need to go out from home, out of school, into nature, both through the school program with families. families. Research results indicate that traditional school and classroom education practices, lack of green space, parents' perception of "stranger danger," competition with television and video games and less than necessary unstructured play in nature negatively affect children's exposure to nature; therefore, it causes a lack of exposure of children to nature and deterioration of their interactions with nature (Louv, 2009).

In recent years, while the world's countries draw attention to environmental problems, the education ministries of the countries, non-governmental organizations and policy makers suggest that environmental literacy should be spread among the grassroots and environmental knowledge, awareness and attitudes should be developed as solutions.

When the literature is examined, very few studies have been found, especially in developed countries, on the impact of individual and school-related factors on environmental literacy and awareness (Lin & Shi, 2014; Hungerford & Volk, 1990; Kollmuss & Agyeman, 2002). Most of these studies draw attention to the early childhood period in gaining environmental awareness. Considering that since most attitudes are formed very early in life, young children should experience positive interactions with the natural environment; otherwise, it will be difficult to develop these attitudes towards nature in the later stages of life (Tilbury, 1993), the importance of researches that will shed light on developing environmental awareness and positive attitudes in early childhood and necessity is better understood. From this point of view, the aim of the study is to reveal the effect of nature-centred kindergartens and other kindergartens on gaining environmental awareness and attitudes towards the environment in early childhood.

## Method

## Research model

The research is a descriptive research with a screening model. The screening model aims to reflect the existing situation as it is (Karasar, 2000). The aim of this research is to compare the environmental awareness and attitudes of children attending nature-centred kindergartens and public kindergartens in Balıkesir province.

## Study group

The study group of the research consists of a total of 96 children aged 5–6 years who attend nature-centred kindergartens (48) and kindergartens (48) affiliated to the Ministry of National Education (MoNE) operating in the province of Balıkesir, Turkey, in the 2020–2021 academic year.

Nature-Centred Schools: Originating in Scandinavia and Germany, the nature-centred school initiative is widely used in England and Wales and has recently gained popularity in many countries around the world. Although these schools are known by different names such as nature-centred kindergarten, nature kindergarten, forest kindergarten, forest school and Waldkindergarten, the common theme of all these programs is to shape their philosophies and methodologies with nature (Bailie, 2010; Larimore, 2016; Natural Start Alliance, 2014).

Balıkesir Nature-Centred Maki Kindergartens: These institutions, located in Turkey, provide nature-based early childhood education, actualise learning in the context of nature, spend at least 30% of their day outdoors, include nature with all its aspects in the education program and provide education based on the interests of children. These institutions organise educational activities in the natural areas they define as Maki Village and Maki Campus. These areas are natural lands and consist of domestic animals, agricultural fields and fruit trees. In addition, nature is integrated into the interiors, and the playgrounds have an overall natural space appearance rather than structured play materials. Maki kindergartens are defined as nature-centred kindergartens with these features (Bailie, 2010; Green Hearts, 2014; Larimore, 2011; Moore, 2014).

Public kindergartens affiliated to the Ministry of National Education (MoNE): These schools implement MoNE 2013 Pre-School Education Program that is prepared according to the developmental levels of children and based on achievements and indicators. Children between 36 and 72 months can receive education in independent kindergartens, and children between 48 and 72 months can attend kindergartens within primary schools. The number of students in a class should not be less than ten and no more than twenty. Considering the social, cognitive, emotional and physical characteristics of children, public kindergartens aim to raise individuals who are openminded, participatory and self-confident. Education in these institutions is play-based. In the education plans, activities such as play and movement, music, art, science, mathematics, drama, Turkish and literacy preparation are included and performed in large groups and small groups.

Gülay and Ekici (2010) examined the Ministry of National Education's 2006 Pre-School Education Program in terms of environmental education and concluded that there were no objectives for environmental education in psychomotor and language areas. In their study, Özkan and Tuğluk (2020) examined the 2013 MoNE Preschool Education Program in general, and they determined that the objectives for environmental education were insufficient. No environmental objectives were found in the areas of motor development and language development, which are among the development areas in the program. In other areas of development, researchers found that the objectives are insufficient.

The descriptive statistics of children attending to the kindergartens affiliated with the Ministry of National Education and Maki kindergartens that constitute the study group are given in Table 1.

As seen in Table 1, 48 of the children forming the study group are 5 years old, 48 are 6 years old and 50% are females and 50% are males. Ninety percent of the mothers in Maki kindergarten and 80% of the mothers in the public kindergarten are college graduates. Fifty-four percent of fathers in Maki kindergarten and 56% of fathers in public kindergarten are officers serving for the state. Fifty-two percent of the children in the study group have only 1 sibling.

# Data collection tool

In the study, two data collection tools, namely Personal Information Form and Environmental Awareness and Attitude Scale for Preschool Children, were used.

Table 1. Demographic characteristics of the study group

		School type					
		Private nature- centred kindergarten		Public kindergar- ten affiliated with MoNE			
		f	%	f	%		
Age	5	24	50	24	50		
	6	24	50	24	50		
Gender	Female	22	45	26	55		
	Male	26	55	22	45		
Mother's education level	High school	5	10	10	20		
	College	43	90	38	80		
Father's education level	High school	11	23	13	27		
	College	37	77	35	73		
Mother's age	20–30	11	23	12	25		
	31–40	32	67	27	56		
	+41	5	10	9	19		
Father's age	20-30	7	15	6	12		
	31–40	29	60	31	65		
	+41	12	25	11	23		
Mother's occupation	Housewife	7	15	7	15		
	Officer	34	71	29	60		
	Worker	3	6	9	19		
	Self-employed	3	6	3	6		
Father's occupation	Officer	26	55	27	56		
	Worker	6	12	11	23		
	Self-employed	16	33	10	20		
Number of siblings	None	2	4	0	0		
	1 sibling	25	52	25	52		
	2 siblings	19	40	23	48		
	3 siblings	2	4	0	0		

Personal Information Form: In the form developed by the researchers, there are items related to demographic characteristics such as gender, age, education level of parents, etc.

Environmental Awareness and Attitude Scale for Preschool Children: The scale developed by Büyüktaşkapu Soydan and Öztürk Samur (2017) for children aged 60–72 months consists of two sub-dimensions as Attitude Towards Environment (15 items) and Environmental Awareness (11 Items) and 26 items.

The reliability coefficients of the Environmental Awareness and Attitude Scale for Preschool Children and its sub-dimensions used in the study were calculated (Table 2). It has been concluded that the  $\alpha$  coefficients of the scale validity are over .70, and the scores of questionnaires are reliable (Büyüköztürk, 2006).

1400010		
	α	values
	Factors	Overall scale
Environmental awareness	.74	.82
Attitude towards environment	.78	

**Table 2.** Environmental awareness and attitude scale for pre-school children and Cronbach  $\alpha$  coefficients of the scale's factors

# Application of the scale

At the beginning of the research, the Private Nature-Centred Maki Kindergarten operating in Balikesir and the public kindergartens in the same region were listed, and four schools were determined randomly. For conducting the research, Institutional Review Board (IRB) process for ethics was completed through Balikesir University and required permissions were received from the Balikesir Provincial Directorate of Nationa Education. Schools were visited after obtaining the necessary permission letters regarding the research. The study was conducted with the branches of the schools that agreed to participate in the study. Before the data collection process, the teachers were informed in detail about the purpose of the research and the measurement tools. Personal Information Forms were filled in with the help of teachers. The Environmental Awareness and Attitude Scale for Preschool Children was applied to each child individually by the researcher in the counselling room provided by the school administration.

In the Attitude Toward Environment sub-dimension, the child is shown pictures of two situations accompanied by a formal question, and the child's answer is received.

In the Environmental Awareness sub-dimension, pictures were shown to the children for each situation. The children were asked to give the green card if the conditions shown were correct, the red card if they were incorrect and the yellow card if children have no idea.



Image 1. Attitude Towards Environment.

"Sample Item 1 (Attitude Towards Environment sub-dimension): This child warns the people who litter. Whereas that child ignores the people who litter. Do you always ignore people who litter like that child? Do you sometimes warn and sometimes ignore? Or do you always warn the people who litter?" (Image 1) (Büyüktaşkapu Soydan and Öztürk Samur, 2017, p. 81).



Image 2. Attitude Towards Environment.

"Sample Item 2 (Attitude Towards Environment sub-dimension): This child likes playing in the garden. That child likes watching TV. Do you always watch TV like this child? (Image 2) Do you sometimes watch TV and sometimes play in the garden? Or do you always play in the garden?" (Büyüktaşkapu Soydan and Öztürk Samur, 2017, p. 81).



Image 3. Environmental Awareness.

"Sample Item 1 (Environmental Awareness sub-dimension): Instead of taking animals to the zoo, they should be released in the forest to live with their family." (Image 3) (Büyüktaşkapu Soydan and Öztürk Samur, 2017, p. 82).

"Sample Item 2 (Environmental Awareness sub-dimension): Measurements should be taken for factory and car smoke." (Image 4) (Büyüktaşkapu Soydan and Öztürk Samur, 2017, p. 82).

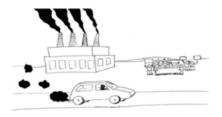


Image 4. Environmental Awareness.

	Mean	sd	Mode	Median	Z <sub>skewness</sub>	Z <sub>kurtosis</sub>
Environmental awareness	17.13	2.69	22	17.13	-1.79	.26
Attitude towards environment	24.95	4.60	27	25	-1.49	-1.74
Overall scale	42.09	6.76	49	44	-1.76	1.25

Table 3. Normality tests of research data

**Table 4.** The result of the independent samples *t*-test showing whether the environmental awareness and attitudes towards the environment of the study group differ according to the school they attend

							t-test		
	Groups	N	$\overline{X}$	sd	SE <sub>₹</sub>	t	df	р	Difference
Environmental awareness	Maki	48	20.92	1.32	0.19	14.169	60.400	<.001	M > P
	Public	48	13.35	3.45	0.50				
Attitude towards environment	Maki	48	27.04	1.35	0.20	11.974		<.001	M > P
	Public	48	22.88	2.00	0.29				
Overall scale	Maki	48	47.96	1.89	0.27	17.206		<.001	M > P
	Public	48	36.23	4.33	0.62				

# Scoring

Scoring in the attitude towards environment scale is carried out as 2 points if the children choose the positive behaviour in an item, 1 if they choose the sometimes option and 0 if they choose the negative behaviour. In the environmental awareness scale, 2 points are given for the correct answer, 1 point for the answer I do not know/I have no idea and 0 points for the wrong answer.

## Data analysis

The mean, mode, median, skewness and kurtosis values of the variables in the study were calculated. If the mean, mode and median values of a series are equal in the frequency distribution, we can say that the data are distributed symmetrically around the central tendency measures. In cases where these values are not equal to each other, it can be decided whether the series is normally distributed by looking at the Z scores of the skewness and kurtosis values. The fact that the Z scores of the skewness and kurtosis coefficients remain in the range of  $(\pm 1.96)$  indicates that the data exhibit a normal distribution (Field, 2000; Field, 2009). An independent samples t-test was used to show whether the environmental awareness and attitudes of the study group differ according to the school they attend. The normality tests of the research data are given in Table 3.

As seen in Table 3, the scores obtained from the measurements of environmental awareness (mean = 17.13, sd = 2.69), and attitude towards the environment (mean = 24.95, sd = 4.6) showed a normal distribution.

## **Findings**

In the study, the findings regarding whether the environmental awareness and attitudes of the children attending the Nature-Centered Maki kindergartens and public kindergartens affiliated to the Ministry of National Education differ according to the type of school are presented below.

When Table 4 is examined, in the environmental awareness sub-dimension, it is observed that the mean score of the children in Maki kindergarten is  $\overline{X} = 20.92$ , and the children in the public

Sub-dimensions		Attitude towards environment	Environmental awareness	Total
Attitude towards environment	r	1	.698**	.873**
	p	.000	.000	.000
Environmental awareness	r	.698**	1	.958**
	p	.000	.000	.000
Total	r	.873**	.958**	1
	р	.000	.000	.000

**Table 5.** Pearson correlation results showing whether there is a relationship between the sub-dimensions of the environmental awareness and attitude scale for preschool children

kindergarten are  $\overline{X}$  = 13.35. When the t value obtained as a result of these averages is examined, it is seen that there is a significant (p < .05) difference. This difference is in favour of Maki kindergartens.

Considering the sub-dimension of attitude towards the environment, it is seen that while the mean score of the children attending Maki kindergarten is  $\overline{X} = 27.04$ , the mean score of the children attending the public kindergarten is  $\overline{X} = 22.88$ . Considering the t value obtained based on these average results, there is a significant difference in the sub-dimension of attitude towards the environment (p < .05). This difference seems to be in favour of Maki kindergarten.

The total mean score of the children attending Maki Kindergarten for the overall Environmental Awareness and Attitude Scale for Preschool Children is  $\overline{X} = 47.96$ . The total mean score of the children attending the public kindergarten was calculated as  $\overline{X} = 36.23$ . When the t value obtained for the total scores is examined, it is seen that the difference between the scores obtained from the overall scale is significant (p < .05) and in favour of Maki kindergartens.

The Pearson correlation results showing whether there is a relationship between the Environmental Awareness and Attitude Scale's Sub-Dimensions for Preschool Children are given in Table 5. The Pearson correlation coefficients were calculated for the multidirectional relationship between the scale items. As seen in the table, a high positive correlation (r = .87) was observed between the items of attitude towards the environment and environmental awareness sub-dimensions.

# Discussion, Conclusion and Suggestions

The present study used quantitative methods to compare children's attitudes towards the environment and environmental awareness between a traditional pre-school program and a nature-based pre-school program among children from the same population. The study was completed with the participation of 48 children attending a nature-centred kindergarten and 48 children attending a kindergarten affiliated with the Ministry of National Education. In line with the findings of the study, the following conclusions were reached.

Environmental awareness and attitudes towards the environment of 5–6-year-old children attending nature-centred kindergartens were found to be higher than children attending public kindergartens. The nature-centred kindergarten's program is based on both early childhood education (developmentally appropriate practices) and practices such as environmental education. Teaching staff should have skills and experience in both early childhood education and environmental education (Vandermaas-Peeler & McClain, 2015). The nature-centred kindergarten program addresses both child development and environmental values and uses the natural world to support dual goals. It helps the development of the children's world (in all areas such as

<sup>\*\*</sup>Correlation is significant at the .01 level (2-tailed).

cognitive, physical, social, emotional, aesthetic and spiritual) and an ecological identity or environmental ethics (Kiewra & Veselack, 2016). It has been determined that environmental education given in studies supporting the results of this research leads to an increase in the attitudes and awareness levels of young children towards the environment (Fetihi & Gülay, 2011; Gülay, Yılmaz, Turan Güllaç & Önder, 2010; Gülay Ogelman, 2012; Gülay Ogelman & Durkan, 2014; Özdemir and Uzun, 2006; Sungurtekin, 2001).

Private Maki Kindergarten in the study group is nature centred. Every day, the school takes its students to a natural land of 4000 square meters, which they call Maki Village, and this land enables children to interact with nature. Among the activities prepared to create this interaction, the properties of the seed, the structure of the trees, the soil and living things, my garden, the ones caught in my lens can be counted. It can be said that children's environmental awareness is higher thanks to these practices.

The ultimate goal of environmental education is to raise an environmentally literate citizen. Environmental literacy requires not only basic knowledge of the environment but also a positive and caring attitude towards the environment. Exposing children to nature and including practices that increase environmental awareness in early childhood programs can solve the increasing concerns of today's youth and facilitate the understanding of ecological concepts (Coyle, 2005; Driessnack, 2009; Louv, 2009). Supporting the results of this research, Inoue (2018) concluded in his study that children in nature-centered kindergartens are encouraged to explore the systems in nature, while the basic concepts of ecology are taught in other schools, they not only learn it in nature-centred schools but also associate it with life. In the present study, the low environmental awareness of children in kindergartens affiliated to the Ministry of National Education may be due to the attitude of the teacher and school management. In the study carried out by Buhan (2006), it is stated that the level of pre-school teachers' involvement in environmental education activities does not differ according to professional seniority. In the same study, teachers working in kindergartens affiliated to the Ministry of National Education give less place to environmental education activities than those working in private kindergartens. Teachers with bachelor's and master's degrees give more space to environmental education than teachers who have graduated from high school. In terms of age, it was determined that teachers in the 26-30 age group gave more space to environmental education activities than other age groups.

One of the reasons for the low environmental awareness of children in public kindergartens may be how much environmental awareness is included in the pre-school education program. In studies in which preschool education programs are examined in terms of environmental education (Erdoğan, Bahar, Özel, Erdaş & Uşak, 2012; Gülay & Ekici, 2010), it is stated that environmental education is insufficient and should be given more place in pre-school education programs. The results of the abroad study, in which the environmental education was studied, also show that environmental education in Turkey should be more intertwined with nature (Öztürk Aynal, 2013).

It is very important to include environmental education programs in the pre-school period and to introduce environmental education to young children for forming the basis of curious learning. With environmental programs, according to Wilson (1996), young children learn how they need healthy interaction with the environment, not only because of physical dependence on the environment but also because of psychological and emotional interaction with nature. The main purpose of early childhood environmental education is to promote the protection of the natural world and to help the healthy development of children (Wilson, 1996). Nature has many physical and mental health benefits. Some of these benefits have been briefly discussed before. According to Driessnack (2009), direct exposure to nature is important for children's physical and emotional health, development of cognitive processes and resilience to negative stress and depression.

According to the results of the research, the attitudes towards the environment and environmental awareness of the children attending nature-centred schools are high, revealing the necessity of giving more place to environmental education in public schools. For this reason, it can be

suggested to increase environmental activities in the pre-school education program, to provide training to teachers and school administrators on environmental awareness and to include families in activities to increase their awareness. The present study was conducted with preschool children aged 5–6 years. Within the scope of the same subject, research on school management, teacher and family attitudes can be carried out.

Acknowledgements. None.

Financial Support. This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

Conflicts of Interest, None.

## References

Aggio, D., Gardner, B., Roberts, J., Johnstone, J., Stubbs, B., Williams, G., & et al. (2017). Correlates of children's independent outdoor play: Cross-sectional analyses from the Millennium Cohort Study. *Preventive Medicine Reports*, 8(11), 10–14. DOI 10.1016/j.pmedr.2017.07.007.

Bailie, P.E. (2010). From the one-hour field trip to a nature preschool: Partnering with environmental organizations. Young Children, 65(4), 76–82.

Barnosky, A.D., & Hadly, E.A. (2016). Tipping point for planet earth: How close are we to the edge? New York, NY: Thomas Dunne Books.

Buhan, B. (2006). Okul öncesinde görev yapan öğretmenlerin çevre bilinci ve bu okullardaki çevre eğitiminin araştırılması (Yayımlanmamış Yüksek Lisans Tezi). İstanbul, Turkey: Marmara Üniversitesi.

Büyüköztürk, Ş (2006). Soysal bilimler için veri analizi el kitabı. Ankara: Pegem Yayınları.

**Büyüktaşkapu Soydan, S., & Öztürk Samur, A.** (2017). Validity and reliability study of environmental awareness and attitude scale for preschool children. *International Electronic Journal of Environmental Education*, 7(1), 78–97.

Cagle, N.L. (2018). Changes in experiences with nature through the lives of environmentally committed university faculty. Environmental Education Research, 24(6), 889–898. DOI 10.1080/13504622.2017.1342116.

Chaput, J.P., Tremblay, M.S., Katzmarzyk, P.T., Fogelholm, M., Mikkilä, V., Hu, G., & et al. (2018). Outdoor time and dietary patterns in children around the world. *Journal of Public Health*, 40(4), e493–e501. DOI 10.1093/pubmed/fdy071.

Corraliza, J.A., & Collado, S. (2019). Ecological awareness and children's environmental experience. *Psychologist Papers*, 40(3), 190–196. DOI 10.23923/pap.psicol2019.2896.

Coyle, K. (2005). Environmental literacy in America. Washington, DC: National Environmental Education & Training Foundation.

Driessnack, M. (2009). Children and nature-deficit disorder. Journal for Specialists in Pediatric Nursing, 14(1), 73-75.

Eagles, P., & Demare, R. (1999). Factors influencing children's environmental attitudes. *Journal of Environmental Education*, 30(4), 33–38.

Erdoğan, M., Bahar, M., Özel, R., Erdaş, E., & Uşak, M. (2012). Environmental education in 2002 and 2006 early childhood curriculum. Educational Sciences: Theory & Practice, 14, 3259–3272.

Ernst, J., & Burcak, F. (2019). Young children's contributions to sustainability: The influence of nature play on curiosity, executive function skills, creative thinking, and resilience. Sustainability. MDPI, Open Access Journal, 11(15), 1–22.

Evans, G.W., Otto, S., & Kaiser, F.G. (2018). Childhood origins of young adult environmental behavior. *Psychological Science*, 29(5), 679–687. DOI 10.1177/0956797617741894.

Fetihi, L., & Gülay, H. (2011). Deprem Bilinci Arttırma Programı'nın (DEBAP) 6 yaş çocukları üzerindeki etkisi. International Online Journal of Educational Sciences, 2(1), 1–17.

Field, A. (2000). Discovering statistics using SPSS for windows. London: SAGE.

Field, A. (2009). Discovering statistics using SPSS. London: SAGE.

Gardner, H. (1999). The disciplined mind: What all students should understand. New York, NY: Simon & Schuster.

Green Hearts (2014). Nature preschools. Retrieved October 18, 2020, from http://www.greenheartsinc.org/Nature\_ Preschools.html

Gülay, H., & Ekici, G. (2010). MEB Okul Öncesi Eğitim Programının çevre eğitimi açısından analizi. *Türk Fen Eğitimi Dergisi*, 7(1), 74–84.

Gülay, H., Yılmaz, Ş., Turan Güllaç, E., & Önder, A. (2010). The effect of soil education project on pre-school children. *Educational Research and Review*, 5(11), 703–711.

Gülay Ogelman, H. (2012). Teaching preschool children about nature: A project to provide soil education for children in Turkey. Early Childhood Education Journal, 40(3), 177–185.

Gülay Ogelman, H., & Durkan, N. (2014). Toprakla buluşan çocuklar: Küçük çocuklar için toprak eğitimi projesinin etkililiği. Uluslararası Sosyal Araştırmalar Dergisi, 7(31), 632–638.

- Harlan, J., & Rivkin, M. (2008). Science experiences for the early childhood years: An integrated affective approach (9th ed.). Upper Saddle River, NJ: Pearson/Merrill Prentice Hall.
- Huh, S.Y., & Gordon, C.M. (2008). Vitamin D deficiency in children and adolescents: Epidemiology, impact and treatment. Reviews in Endocrine and Metabolic Disorders, 9(2), 161–170.
- Hungerford, H.R., & Volk, T.L. (1990). Changing learner behavior through environmental education. The Journal of Environmental Education, 21(3), 8–21.
- Inoue, M. (2018). Fostering an ecological worldview in children: Rethinking children and nature in early childhood education from a Japanese perspective. In A. Cutter-Mackenzie, K. Malone & E. Barratt Hacking (Eds.), Research handbook on child-hoodnature. London: Springer (Online). DOI 10.1007/978-3-319-51949-4\_55-1.
- James, J.J., Bixler, R.D., & Vadala, C.E. (2010). From play in nature, to recreation then vocation: A developmental model for natural history-oriented environmental professionals. Children, Youth, and Environments, 20(1), 231–256.
- Kalinski, B. (2014). Nature center preschools- A teaching tool for early childhood environmental education(Unpublished master's thesis). University of Nebraska Lincoln.
- Karasar, N. (2000). Bilimsel araştırma yöntemi (10. Basım). Ankara: Nobel Yayın Dağıtım.
- Kiewra, C., & Veselack, E. (2016). Playing with nature: Supporting preschoolers' creativity in natural outdoor classrooms. International Journal of Early Childhood Environmental Education, 4, 71–96.
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to proenvironmental behavior? *Environmental Education Research*, 8(3), 239–260.
- Kondo, M., Fluehr, J., McKeon, T., & Branas, C. (2018). Urban green space and its impact on human health. *International Journal of Environmental Research and Public Health*, 15(3), 445. DOI 10.3390/ijerph15030445.
- Kuo, F.E., & Taylor, A.F. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. American Journal of Public Health, 94(9), 1580–1586.
- Larimore, R.A. (2011). Establishing a nature-based preschool. Fort Collins, CO: National Association for Interpretation.
- Larimore, R.A. (2016). Defining nature-based preschools. International Journal of Early Childhood Environmental Education, 4(1), 32–36.
- Larouche, R., Garriguet, D., & Tremblay, M.S. (2017). Outdoor time, physical activity and sedentary time among young children: The 2012-2013 Canadian Health Measures Survey. Canadian Journal of Public Health, 107(6), 500-506. DOI 10. 17269/CJPH.107.5700.
- Lin, E., & Shi, Q. (2014). Exploring individual and school-related factors and environmental literacy: Comparing U.S. and Canada using PISA 2006. *International Journal of Science and Mathematics Education*, 12(1), 73–97. DOI 10.1007/s10763-012-9396-2.
- Louv, R. (2008). Last child in the woods: Saving our children from nature-deficit disorder. Chapel Hill, NC: Algonquin Books. Louv, R. (2009). Do our kids have nature-deficit disorder. Educational Leadership, 67(4), 24–30.
- Mastrángelo, M.E., Pérez-Harguindeguy, N., Enrico, L., Bennett, E., Lavorel, S., Cumming, G.S., & et al. (2019). Key knowledge gaps to achieve global sustainability goals. *Nature Sustainability*, 1–7. DOI 10.1038/s41893-019-0412-1.
- Monroe, M.C. (2003). Two avenues for encouraging conservation behaviors. Human Ecology Review, 10(2), 113-125.
- Monroe, M.C., Andrews, E., & Biedenweg, K. (2008). A framework for environmental education strategies. Applied Environmental Education & Communication, 6(3-4), 205–846 216. DOI 10.1080/15330150801944416.
- Moore, R.C. (2014). Nature play & learning places: Creating and managing places where children engage with nature. Natural Learning Initiative and National Widlife Federation. Retrieved from http://natureplayandlearningplaces.org/wp-content/uploads/2014/09/Nature-Play-LearningPlaces\_v1.2\_Sept22.pdf
- Moore, R.C., & Marcus, C.C. (2008). Healthy planet, healthy children: Designing nature into the daily spaces for childhood. In S.R. Kellert, J. Heerwagen & M. Mador (Eds.), Biophilic design: the theory, science, and practice of bringing buildings to life (pp. 153–203). Hoboken, NJ: Wiley.
- Moran, M.R., Plaut, P., & Merom, D. (2017). Is the grass always greener in suburban neighborhoods? Outdoors play in suburban and inner-city neighborhoods. *International Journal of Environmental Research and Public Health*, 14(7), 759. DOI 10.3390/ijerph14070759.
- Müller, U., Temple, V.A., Smith, B., Kerns, K., Eycke, K.T., Crane, J., & Sheehan, J. (2017). Effects of nature kindergarten attendance on children's functioning. *Children, Youth and Environments*, 27(2), 47–69. DOI 10.7721/chilyoutenvi.27.2.0047.
- Natural Start Alliance (2014). What is a nature preschool? Retrieved from http://naturalstart.org/naturepreschool/what-is-a-nature-preschool
- Özdemir, O., & Uzun, N. (2006). Yeşil sınıf modeline göre yürütülen fen ve doğa etkinliklerinin ana sınıfı öğrencilerinin çevre algılarına etkisi. Çocuk Gelişimi ve Eğitim Dergisi, 1(2), 12–20.
- Özkan, B., & Tuğluk, M.N. (2020). 2013 Okul Öncesi Eğitim Programının Çevre Eğitimi Analizi. Turkish Studies-Educational *Sciences*, 15(3), 1991–1996. DOI 10.29228/TurkishStudies.41743.
- Öztürk Aynal, Ş. (2013). Haydi çocuklar doğaya ve bahçelere açılıyoruz: Mekan dışı eğitim İsveç'ten örnekler. *International Journal of Social Science*, 6(1), 371–384.
- Phenice, L.A., & Griffore, R.J. (2003). Young children and the natural world. Contemporary Issues in Early Childhood, 4(2), 167–171. DOI 10.2304/ciec.2003.4.2.6.

- Roberts, D.F., Foehr, U.G., & Rideout, V.J. (2005). Generation M: Media in the lives of 8-18 year-olds. San Francisco, CA: Henry J. Kaiser Family Foundation.
- Rosa, C.D., Profice, C.C., & Collado, S. (2018). Nature experiences and adults' self-reported pro-environmental behaviors: The role of connectedness to nature and childhood nature experiences. Frontiers in Psychology, 9, 1055. DOI 10.3389/fpsyg. 2018.01055.
- Sobel, D. (2016). Nature preschools and forest kindergartens: The handbook for outdoor learning. St. Paul, MN: Redleaf Press. Sungurtekin, Ş. (2001). Uygulamalı Çevre Eğitimi Projesi, kapsamında ana ve ilköğretim okullarında Müzik Yoluyla Çevre Eğitimi. Uludağ Üniversitesi, Eğitim Fakültesi Dergisi, 14(1), 167–178.
- Tilbury, D. (1993). Environmental education: Developing a model for initial teacher education(Doctoral dissertation).

  University of Cambridge United Kingdom. Retrieved from https://search.proquest.com/docview/2005421168?

  accountid=16701
- Tillmann, S., Tobin, D., Avison, W., & Gilliland, J. (2018). Mental health benefits of interactions with nature in children and teenagers: A systematic review. *Journal of Epidemiology and Community Health*, 72(10), 958–966. DOI 10.1136/jech-2018-210436
- Torquati, J.C., Gabriel, M., Jones-Branch, J., & Leeper, J. (2010). Environmental education: A natural way to nurture children's development and learning. *Young Children*, 65(6), 98–104.
- Twohig-Bennett, C., & Jones, A. (2018). The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes. *Environmental Research*, 166, 628–637. DOI 10.1016/j.envres.
- UN Environment (2019). Global environment outlook—GEO-6: Healthy planet, healthy people. Cambridge, UK: Cambridge University Press.
- UNESCO. (1978). Intergovernmental Conference on Environmental Education: Final report. Paris, France: UNESCO.
- Vandermaas-Peeler, M., & McClain, C. (2015). The green bean has to be longer than your thumb: An observational study of preschoolers' math and science experiences in a garden. *International Journal of Early Childhood Environmental Education*, 3, 8–27.
- Wilson, R.A. (1994). Environmental education at the early childhood level. Day Care and Early Education, 23-25.
- Wilson, R.A. (1996). Environmental education programs for preschool children. *Journal of Environmental Education*, 27(4), 28–33. DOI 10.1080/00958964.1996.9941473.
- Wilson, R.A. (2018). Nature and young children: Encouraging creative play and learning in natural environments (3rd ed.). New York, NY: Routledge.
- **Assoc. Dr. Kazım Biber:** He completed her undergraduate degree in Elementary Teaching in 1992. He completed his master's degree in Balıkesir University Social Sciences Institute and his doctorate in Preschool Education at Marmara University (2012). He is working as the head of Balıkesir University Necatibey Education Faculty Preschool Education Department currently. He conducts researches in fields of Art Education, Family Education and Participation courses.
- Hülya Cankorur: He was born in Balıkesir. He graduated from Uludag University (NEF) Chemistry Teaching Department in 1988. He started to work in the Ministry's In-Service Training. He attended Bilkent and DEU English Language Education certificates and received English Chemistry Science and received the title of Technical Teacher. He taught Scientific Principles of Technology at his school. In 2007, he received TÜBİTAK-BİDEB Project Consultancy. He worked as a Chief Technician in MAY Workshops. He prepared scientific projects as a consultant teacher. Participated in the particle physics training. ATLAS, CMS, ALICE, LEIR and CAST trainings that participated in the Turkish Language Teaching Program at CERN in 2014.

Rabia Sultan Güler: She was born in Balıkesir. While continuing her education at Rahmi Kula Anatolian High School, she made a presentation as a speaker at the International Scientific Research Congress (IBAD). In the same year, the article "How Pre-School Teachers and Teacher Candidates Cope with Stress" was published in the Journal of Educational Researches of Uşak University. She attended the 2nd International Geography Education Congress (UCEK). She made it to the finals in the 18th Science Research Projects Competition of Private Ege High School with her project in the field of health in 2021. She continues to study at Rahmi Kula Anatolian High School.

**Ecenur Demir:** She was born in Balıkesir. After successfully completing her education at Balıkesir Mehmetçik Primary School and Balıkesir Racing Secondary School, she continued her education at Balıkesir Rahmi Kula Anatolian High School and made it to the finals in the 18th Science Research Projects Competition of Private Ege High School in 2021 with her health project. She continues to study at Rahmi Kula Anatolian High School.

Cite this article: Biber, K., Cankorur, H., Güler, R.S., & Demir, E. (2023). Investigation of environmental awareness and attitudes of children attending nature centred private kindergartens and public kindergartens. *Australian Journal of Environmental Education* 39, 4–16. https://doi.org/10.1017/aee.2022.1