Examination of the Relationship Between Children's Biophilia (Affinity Towards Nature) and Empathy Skills of 60-72 Months-Old Children

Suat Kol[1], Tuğçe Taşçı[2]

ARTICLE INFO

Article History:
Received 11.06.2023
Received in revised form 18.01.2024
Accepted Available online 25.01.2024

ABSTRACT

The aim of this study is to examine the relationship between biophilia levels and empathy skills of 60-72 months-old children. In this study, the "Biophilia Scale for Children" and "Empathy Scale for Children" were used as data collection tools. The research is a quantitative study in a relational survey model. The study group of the research consists of 150 children aged 60-72 months who attend the official kindergartens and primary school kindergartens affiliated to the Ministry of National Education in Adapazarı and Serdivan districts of Sakarya province. As a result of the analysis, it was found that there was a high level of positive correlation between the children's biophilia and their empathy skills. As a result of the examining the total scores of both scales according to the variables, it was concluded that children's biophilia levels differ significantly according to the frequency of being in nature, and empathy skills differ significantly according to the age of the father.

Keywords:
Affinity towards nature, children's biophilia, empathy, preschool

INTRODUCTION

Biophilia (closeness to nature) is the bond and love between the human self and other living systems (Wilson, 1984). According to another definition, it is a genetically based need and tendency to enable people to participate in life and vitality processes. It is also defined as an innate tendency to explore and discover the natural environment (Khan Jr, 1997). When the literature on the development of biophilia in children is examined, it is seen that there is no definite and clear general opinion about when and how biophilia develops. While some researchers argue that the instinctive survival efforts of individuals, aimed at ensuring the continuity of their species, have shaped the adaptation to nature, and therefore, they propose that biophilia is an innate tendency (Tilbury, 1995; Khan Jr, 1997; Kellert, 2005), other researchers have presented findings that indicate that biophilia can be developed or nurtured. This has emerged from the result that environmental and nature education given to children leads to the development of positive attitudes and behaviors towards nature in children (Erten, 2004; Ozaner, 2004). Furthermore, it is believed that spending time connected to nature has a positive impact on human psychology. It is also thought that being in nature contributes to the healing process of psychiatric disorders (Gullone, 2000). Wilson (1984) stated that as the biophilia level of the individual increases, the emotional bond developed towards all living or non-living systems in nature would increase. For example, someone who starts gardening and growing flowers for the first time gradually develops a greater love for flowers and increases the number of flowers they care for day by day. An example of this situation is a person who feeds cats and dogs on the street and adopts one of them over time. Sometimes, the individual may try to save another living needing help by jeopardizing their own life. This can be considered to demonstrate the relationship between biophilia and the concept of empathy.

Theodor Lipps, one of the first theorists to use the concept of empathy, said that empathy is an unconscious emotional experience in which observing someone's physical appearance leads to an intuitive understanding of the person's thoughts and feelings. George Mead was one of the first to suggest that empathy can be achieved through a deliberate, conscious, and cognitive process (Gladstein, 1984). Piaget (1975) believed that emotional contagion could lead to empathic behavior towards another person only through the ability to take others' perspectives. Goleman states that five competencies are essential for empathy to be realized. These are: Understanding individuals, fostering their development, being service-oriented, embracing diversity, and having political consciousness (Goleman, 2010).

When it comes to the development of empathy in children, one of the most notable characteristics of children in Piaget's preoperational stage is their egocentrism. In this case, the child sees themselves at the center of what is happening around them and looks at events and situations from their perspective (Yavuzer,

[1]Sakarya University,skol@sakarya.edu.tr, orcid.org/ 0000-0002-8291-7546
[2]Sakarya University,tugce.tasci@ogr.sakarya.edu.tr, orcid.org/0000-0001-8251-1493

2019). For this reason, Piaget suggested that especially preschool children are not ready for a cognitive effort to understand others and that the child must reach a certain mental level to show empathy (Piaget, 1948). Freud also states that in the phallic period, the age range of 3-6 years, the child competes with their same-sex parent, and their self-centered thinking continues. Therefore, he thinks that they still need to reach the competence to empathize (Baron-Cohen, 2006). Contrary to Piaget and Freud, many studies have shown that empathy can exist at an early age. The reactions of infants to other people's facial expressions have led to the view that children are biologically predisposed to empathy (Poole et al., 2005). For example, it is thought that when a baby hears another baby crying or starts crying when an angry facial expression is made towards him, it may be one of the first indicators of empathy. However, there is no consensus on whether these situations are empathy. Therefore, it is thought that increasing the levels of biophilia in children at an early age will contribute to the early development of empathy skills.

When the literature is examined, few studies examine children's biophilia levels. Yılmaz (2017) conducted a study to determine the biophilia levels of five-year-old children attending preschool education and their preferences for outdoor areas, as well as the biophilia levels of their mothers. The research revealed that the biophilia scores of children did not differ based on gender or type of school. Deretarla and Polat (2018) conducted a study to determine the biophilia levels of children attending preschool education and their mothers and concluded that the biophilia levels of children and their mothers were high, while there was no relationship between mother-child biophilia levels.

This study examines the relationship between biophilia levels and empathy skills of 60-72-month-old children. During the literature review, although there are many studies on empathy in children, no study was found to relate the concepts of empathy and biophilia. In addition, there are very few studies on biophilia in children. This research is thought to contribute to both the field of preschool education and biophilia studies in children. Furthermore, this research is unique as there is no other academic study that investigates the relationship between children's biophilia levels and empathy skills. It is necessary because it sheds light on children's attitudes towards nature and their empathy skills, helping to identify their interests and needs. Moreover, it serves a functional purpose by providing references for future academic studies related to children's biophilia levels and empathy skills.

METHOD

AIM AND METHODOLOGY OF THE RESEARCH

In the study, examining whether there is a significant relationship between the biophilia levels and empathy skills of 60-72-month-old preschool children, the relational survey model, one of the quantitative research designs, was used as the research model. This study tried to reveal the existence and degree of relationships between dependent and independent variables based on the relational survey model (Crano & Brewer, 2002).

STUDY GROUP

The study group of the research consists of 150 children aged 60-72 months attending preschool education in the 2022-2023 academic year. Schools where data are collected were selected from easily accessible and centrally located public schools using the convenience method. The children constituting the study group were determined by the criterion sampling method of purposive sampling. Purposive sampling is a method in which it is assumed that the participants are sufficient to participate in the research and the qualifications determined by the researcher (Patton, 2014). The children who participated in this study were selected from children with normal development and attended a public school. The parental consent form and general information form were sent to the parents, considering the principle of voluntariness. The general information form contains variables on the demographic data of the children and their parents. The results of the demographic characteristics of the children and parents who participated in the study can be found in below.

DATA COLLECTION TOOLS

The data of the study were obtained by using the general information form developed by the researcher, the "Child Biophilia Scale" developed by Rice and Torquati (2013) and adapted into Turkish by Yılmaz (2017), and the "Empathy Scale for Children (ÇEMÖ)" developed by Köksal Akyol and Aslan (2014). The Biophilia Scale consists of 22 items and is applied as a one-to-one interview. The scale includes 11 biophilic items and 11 non-biophilic items that express the opposite of biophilic things. This scale aims to measure children's biophilia level, in other words, to understand to what extent children are connected and close to

nature. This study used the items and pictures adapted to Turkish by Yılmaz (2017). There are 22 situation pictures corresponding to 22 items on the scale. While 11 of the photographs reflect biophilic attitudes, 11 of them reflect non-biophilic attitudes. The scale is scored with 1 point for biophilic items and 0 points for biophobic items. In addition, each item was illustrated with a male and female version to facilitate children's identification according to their gender and to obtain more reliable answers. The lowest score that can be obtained from the scale is 0, and the highest score is 11. The reliability coefficient of the scale created by Rice and Turqoati is .63. The reliability value of the scale for this study was calculated as .70. Depending on the alpha coefficient, scale reliability is interpreted in different ways. Accordingly, it is possible to say that the scale with alpha values between .60 and .80 is quite reliable (Kalaycı, 2010).

The "Empathy Scale for Children (ESC)" includes pictures in which four basic emotions (happiness, sadness, anger, and fear) are expressed and auxiliary pictures with facial expressions of these emotions for boys and girls. The scale is administered as a one-to-one interview with children. During the interview, children are first briefly interviewed about feelings. The auxiliary pictures with the faces of boys and girls with happy, sad, angry, and scared expressions are examined together with the child. The child was asked questions and chatted about the words in the pictures. Then, the images with the scale items for empathy situations are examined. The main character's facial expressions (for example, a girl whose doll was damaged in picture 2) were not drawn in the pictures with the scale items. The researcher says short sentences about the situation in the pictures and asks the child to guess which emotion the main character, whose face is not drawn in the picture, feels. If the child has difficulty answering, additional images can be shown, and "Which of these emotions could this child be feeling?" is asked. In the scoring phase of the scale, each correct answer of the child is recorded as a "1" point. The range of issues children can get from the scale is 0-12 points. The KR-20 alpha value of the scale was determined as .70. The test-retest correlation coefficient was found to be .89. This result means that the scale will be consistent if it is reapplied within a certain period (Köksal Akyol & Aslan, 2014). This study calculated the KR-20 value of the "Empathy Scale for Children" as .72.

DATA COLLECTION PROCESS

The study data started to be collected in October 2022, and the collection process lasted three weeks. The schools where the data collection tools would be applied were visited in advance, and the parental consent and general information forms were delivered to the parents. In addition, before the scale applications, in-class activities were attended, and time was spent with the children. The scales were applied to the children who signed the parental consent form and answered the general information form through one-to-one interviews. Care was taken to ensure that the place chosen for the application was bright and airy, away from noise and distracting stimuli. During the interview, the classroom tables and chairs were used, so the child could feel comfortable. Before the application, each child was briefly chatted with and relaxed. During the data collection process, more than two visits were made. At the end of the data collection process, data were collected from 156 participants.

DATA ANALYSIS

The forms collected were grouped by school name and morning/afternoon group. Among the data obtained, the data of 6 children were not evaluated because they were not suitable for evaluation. The remaining 150 data were used in the study. The data collected in the study were analyzed using the SPSS program. The data on biophilia level and empathy skill variables were analyzed regarding normality assumption. According to the results of the normality test conducted for the Biophilia Scale, the skewness value is -0.52 and the kurtosis value is -0.44. For the Children's Empathy Scale, the skewness value is -1.12 and the kurtosis value is 1.07. According to Tabachnick and Fidell (2013), if the skewness and kurtosis values are between -1.5 and +1.5, the distribution of the data is considered normal. Based on this criterion, the distribution of the data for the variables of biophilia level and empathy skills obtained from 150 children is normal. Therefore, parametric analyses were used in the study. The data obtained in the study were analyzed using Pearson correlation analysis, independent samples t-test, and ANOVA.

LIMITATIONS OF THE STUDY

The study has some limitations. The documents used in the research were selected from those that were accessible. The number of children participants in the data analysis process is limited to one hundred fifty. The children selected for the study were selected from accessible schools.

FINDINGS

According to the findings, 78 of the children participating in the study were girls, and 72 were boys. When the number of siblings of the children participating in the survey is analyzed, it is seen that 21 of them are only children, 80 have one sibling, 37 have two siblings, and 12 have three or more three siblings. When the birth order of the children participating in the study is analyzed, it is seen that 21 of them are the only child, 32 are the first child, 12 are the median child, and 85 are the last child. The inclusion of the variable birth order in the information form is based on Alfred Adler's theory of birth order. The theory claims that the order in which a child is born shapes their development and personality. When the distribution of the age of the mothers of the children participating in the study is analyzed, it is seen that 29 of the 150 mothers are 30 years old or younger, 57 of them are 31-35, 40 of them are 36-40, and 24 of them are 41-45 years old. When the distribution of the age of the fathers of the children participating in the study is analyzed, it is seen that 6 of them are between the age of 26-30, 48 of them are between the age of 31-35, 43 of them are 36-40, 41 of them are 41-45 years old and 12 of them are 45 years old and above. The reason why the age variables of mother and father were included in the information form is the relationship between the time children spend outside and whether or not their parents are young. It is believed that young parents are more likely to support their children in outdoor activities. Children who spend more time outdoors may have higher levels of biophilia. When the educational status of the mothers of the children participating in the study is examined, it is seen that 17 of them are primary school graduates, 23 are secondary school graduates, 50 are high school graduates, 30 are associate degree graduates, and 30 are undergraduate graduates. When the fathers' educational status of the children participating in the study is examined, it is seen that 22 of them graduated from secondary school, 71 from high school, 17 from associate degree, 28 from undergraduate degree, and 12 from graduate degree. The reason for including the educational status of the mother and father in the information form is that we want to understand whether the parents' ability to respond to the child's biophilic and empathic needs is related to their educational status. When the frequency of being in nature of the children participating in the study is analyzed, it is seen that 39 of them rarely, 47 of them once a week, 34 of them 1-3 times a week, 15 of them 4-6 times a week and 15 of them are in nature every day. When the place of residence of the children participating in the study is examined, it is seen that 98 of them live in the city center, and 52 of them live in the town.

Table 1. Simple Regression Analysis Results Between Children's Biophilia Levels and Empathy Skills

Variables	B	Sh	β	t	P
Empathy Skills	6,13	,588		10,43	,000
Biophilia Level	,370	,076	,423	5,67	,000

R= ,42 R2= ,17 F= 32,19

p = ,000** p< ,05

Simple regression analysis was used to investigate whether the level of biophilia affects child empathy skills. When Table 1 is analyzed, it explains whether the independent variable significantly affects the dependent variable. The fact that the significance value (p) in the table is less than 0.05 means that the level of biophilia has a statistically significant effect on empathy skills (p<.05). The B coefficient in Table 3 gives information about the direction in which the dependent variable is influential on the independent variable. According to the table, the B value is 370. This value explains that the biophilia level positively affects empathy skills. The R2 value in the table is the square of the correlation value. R2 value expresses how effective the independent variable is on the dependent variable. According to Table 3, it was observed that there was a significant relationship between the level of biophilia and empathy skills (R=0.42, R2=0.17). It is also possible to say that children's biophilia levels predict children's empathy skills (F=32.19 p< 0.05).

Table 2. Independent T-Test Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Gender

Scale	Gender	N	$\bar{x}$	SS	Sd	t	P
Biophilia Scale	Girl	78	7,63	2,08	148	1,30	,183
	Boy	72	7,14	2,52	137,97		
Empathy Scale	Girl	78	9,57	2,18	148	1,40	,149
	Boy	72	9,04	2,51	140,85		

When Table 2 is examined, as a result of the independent t-test, it is seen that there is no statistically significant difference (t148= 1,30 p>,05) in the biophilia scale scores of children according to gender variable. Accordingly, the biophilia levels of children did not differ according to being a girl or a boy. Independent t-test analysis was performed to understand whether the children's empathy scale scores differed in gender variable. As a result of the study, when Table 2 was examined, it was seen that the empathy scale scores of the children did not show a significant difference according to the gender variable (t148= 1,40 p>,05). Accordingly, children's empathy skills did not differ according to whether they were girls ($\bar{X}$=9,57) or boys ($\bar{X}$=9,04).

Table 3. ANOVA Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Number of Siblings

Scale	Source of Variance	Sum of Squares	Sd	Mean Squares	F	P
Biophilia Scale	Between Groups	11,24	3	3,75	,701	,553
	Within Group	780,55	146	5,35		
	Total	791,79	149			
Empathy Scale	Between Groups	6,48	3	2,16	,386	,763
	Within Group	816,16	146	5,59		
	Total	822,64	149			

A one-way ANOVA analysis was performed to understand whether the children's biophilia scale scores differed according to the number of siblings variable. As a result of the analysis, when Table 3 was examined, it was found that the biophilia scale scores of the children did not show a significant difference according to the number of siblings (F3,146 =,701 p>,05). A one-way ANOVA analysis was performed to understand whether the empathy scale scores of the children differed according to the number of siblings variable. As a result of the analysis, when Table 3 was examined, it was found that the empathy scale scores did not show a significant difference in the number of siblings (F3,146 = 3.86 p>.05).

Table 4. ANOVA Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Birth Order

Scale	Source of Variance	Sum of Squares	Sd	Mean Squares	F	P
Biophilia Scale	Between Groups	7,68	3	2,56	,476	,699
	Within Group	784,11	146	5,37		
	Total	791,79	149			
Empathy Scale	Between Groups	8,36	3	2,78	,500	,683
	Within Group	814,28	146	5,57		
	Total	822,64	149			

A one-way ANOVA analysis was performed to understand whether the children's biophilia scale scores differed according to the birth order variable. As a result of the analysis, when Table 4 was examined, it was found that the biophilia scale scores of the children did not show a significant difference in terms of birth order variable (F3,146 = ,476 p>,05). A one-way ANOVA analysis was performed to understand whether

the empathy scale scores of the children differed according to the birth order variable. As a result of the analysis, when Table 4 was examined, it was found that the empathy scale scores did not show a significant difference in terms of the birth order variable (F3,146 = ,500 p>,05).

Table 5. ANOVA Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Mother's Age

Scale	Source of Variance	Sum of Squares	Sd	Mean Squares	F	P
Biophilia Scale	Between Groups	22,63	3	5,66	1,07	,375
	Within Group	769,16	146	5,31		
	Total	791,79	149			
Empathy Scale	Between Groups	39,34	3	13,12	2,45	,066
	Within Group	783,30	146	5,37		
	Total	822,64	149			

A one-way ANOVA analysis was performed to understand whether the children's biophilia scale scores differed according to the mother's age. As a result of the analysis, when Table 5 was examined, it was found that the biophilia scale scores of the children did not show a significant difference in terms of the mother's age (F3,146 = 1.07 p>.05). A one-way ANOVA analysis was performed to understand whether the empathy scale scores of the children differed according to the mother's age. As a result of the analysis, when Table 5 was examined, it was found that the empathy scale scores of the children did not show a significant difference in terms of the mother's age (F3,146 = 2.45 p>.05).

Table 6. ANOVA Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Father's Age

Scale	Source of Variance	Sum of Squares	Sd	Mean Squares	F	P
Biophilia Scale	Between Groups	14,21	4	3,55	,662	,619
	Within Group	777,58	145	5,36		
	Total	791,79	149			
Empathy Scale	Between Groups	62,79	4	15,70	3	,021
	Within Group	759,85	145	5,24		
	Total	822,64	149			

A one-way ANOVA analysis was performed to understand whether the children's biophilia scale scores differed according to the father's age. As a result of the analysis, when Table 6 was examined, it was found that the biophilia scale scores of the children did not show a significant difference in terms of the father's age (F4,145 = ,662 p>,05). A one-way ANOVA analysis was performed to understand whether the empathy scale scores of the children differed according to the father's age. As a result of the analysis, when Table 6 is examined, it was found that the empathy scale scores of the children showed a significant difference in terms of the age of the father (F4,145 = 3 p<.05). Bonferroni Test was applied to determine the group showing significant difference. As a result of the test, it was seen that the significant difference was in the 41-45 age group.

Table 7. ANOVA Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Mother's Education Level

Scale	Source of Variance	Sum of Squares	Sd	Mean Squares	F	P
Biophilia Scale	Between Groups	3,48	4	,870	,160	,958
	Within Group	788,31	145	5,44		
	Total	791,79	149			
Empathy Scale	Between Groups	31,09	4	7,77	1,42	,229
	Within Group	791,55	145	5,46		
	Total	822,64	149			

A one-way ANOVA analysis was performed to understand whether the children's biophilia scale scores differed according to the mother's educational status. As a result of the analysis, when Table 7 was examined, it was determined that the biophilia scale scores of the children did not show a significant difference in terms of the mother's educational status (F4,145 = ,160 p>,05). A one-way ANOVA analysis was performed to understand whether the empathy scale scores of the children differed according to the mother's educational status. As a result of the analysis, when Table 7 was analyzed, it was found that the empathy scale scores of the children did not show a significant difference in terms of the mother's education level (F4,145 = 1.42 p>.05).

Table 8. ANOVA Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Father's Education Level

Scale	Source of Variance	Sum of Squares	Sd	Mean Squares	F	P
Biophilia Scale	Between Groups	11,35	4	2,84	,528	,716
	Within Group	780,44	145	5,34		
	Total	791,79	149			
Empathy Scale	Between Groups	10,65	4	2,66	,475	,754
	Within Group	812	145	5,60		
	Total	822,65	149			

One-way ANOVA analysis was performed to understand whether the children's biophilia scale scores differed according to the father's educational status. As a result of the analysis, when Table 8 was examined, it was found that the biophilia scale scores of the children did not show a significant difference in terms of the father's educational status (F4,145 = ,528 p>,05). A one-way ANOVA analysis was performed to understand whether the empathy scale scores of the children differed according to the father's education level. As a result of the analysis, when Table 8 was examined, it was found that the empathy scale scores of the children did not show a significant difference in terms of the father's education level (F4,145 = ,475 p>,05).

Table 9. ANOVA Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Children's Frequency of Being in Nature

Scale	Source of Variance	Sum of Squares	Sd	Mean Squares	F	P
Biophilia Scale	Between Groups	225,64	4	56,41	14,45	,000
	Within Group	566,15	145	3,91		
	Total	791,79	149			
Empathy Scale	Between Groups	46,75	4	11,69	2,18	,074
	Within Group	775,89	145	5,35		
	Total	822,640	149			

A one-way ANOVA analysis was performed to understand whether the biophilia scale scores of children differ according to the frequency of children's being in nature. As a result of the analysis, when Table 9 is examined, it was found that the biophilia scale scores showed a statistically highly significant difference (F4,145 = 14.45 p<.05) regarding children's frequency of being in nature. Bonferroni Test was applied to determine the group showing significant differences. As a result of the test, it was determined that the difference was found in children whose frequency of being in nature was 4-6 times a week. One-way ANOVA analysis was performed one-way ANOVA analysis was performed to understand whether the empathy scale scores of the children differed according to the frequency of children being in nature. As a result of the analysis, when Table 9 was examined, it was found that the empathy scale scores did not show a significant difference in the frequency of children's being in nature (F4,145 = 2.18 p>.05).

Table 10. T-Test Results of Biophilia Scale and Empathy Scale (ESES) Total Scores According to Where Children Live

Scale	Gender	N	$\bar{x}$	SS	Sd	t	P
Biophilia Scale	Girl	98	7,43	2,35	148	,256	,586
	Boy	52	7,33	2,25	137,97		
Empathy Scale	Girl	98	9,06	2,42	148	1,87	,149
	Boy	52	9,81	2,15	115,13		

Independent t-test analysis was performed to understand whether the biophilia scale scores of the children differed in terms of the place of residence variable. As a result of the study, when Table 10 was examined, it was seen that the biophilia scale scores of the children did not show a significant difference according to the place of residence variable (t148=,256 p>,05). Independent t-test analysis was performed to understand whether the empathy scale scores of the children differed in terms of the place of residence variable. As a result of the study, when Table 10 was examined, it was seen that the empathy scale scores of the children did not show a significant difference according to the place of residence variable (t148= 1,87 p>,05).

RESULTS, DISCUSSION, and SUGGESTIONS

This study examined the relationship between biophilia levels and empathy skills of 60-72-month-old preschool children and revealed the factors that may be effective in this relationship. For this purpose, 150 60-72-month-old children (78 girls and 72 boys) in preschool education institutions affiliated with the Ministry of National Education in Adapazarı and Serdivan districts of Sakarya province in the 2022-2023 academic year were included in the study. As a result of the research, it was revealed whether biophilia levels and empathy skills differed according to different variables. The findings obtained in the study were compared with those in the literature and interpreted in this context. As a result of the results obtained in the study, suggestions for future research were presented.

According to the results of the regression analysis, it is seen that the biophilia levels of the children and their empathy skills affect each other. Again, according to the results of the analysis, it was seen that children with high biophilia levels had better empathy skills. The fact that nature provides a natural learning environment for children supports children's developmental areas. Every bond the child establishes with other creatures in nature, including humans, increases the child's closeness to nature. This emotional connection established with nature gradually transforms into a positive attitude and behavior towards nature as a whole. These behaviors, which change over time, can bring along the skills of love, empathy, benevolence, and the ability to see from the perspective of others. No other study in the literature associates child biophilia level with child empathy skills. This increases the importance of the research results.

It was determined that the biophilia levels of 60-72-month-old preschool children did not significantly differ according to gender. Looking at the literature, Ahmetoğlu (2017), Yılmaz (2017), and Engin (2019) found that the level of biophilia showed a significant difference according to the gender variable in their studies on biophilia. However, there are also studies with a significant difference according to gender (Feshbach & Roe, 1968; Hoffman, 1987; Zahn-Waxler et al., 1992).

It was found that the biophilia levels of children did not differ significantly according to the number of siblings. Engin (2019), on the other hand, concluded that children with no siblings have a higher tendency to connect with nature than children with two or more siblings. The fact that the sample numbers and sample groups of the studies are different may be a factor in the emergence of other results regarding the number of

siblings variable. It was found that the biophilia levels of children did not show a significant difference according to birth order and parental age. No other study in the literature examines the story of biophilia according to the birth order variable. It was found that the biophilia levels of children did not show a significant difference according to the educational status of the mother and father. In his study, Ahmetoğlu (2017) found that parents with high school and university graduates offered their children the opportunity to spend more time in nature than parents with primary school graduates; therefore, the biophilia levels of children showed a significant difference according to the educational status of the parents. Erdoğan (2022) conducted a study to examine the love for nature among teacher candidates. The research findings revealed that the love for nature among teacher candidates did not differ based on the educational background of their parents.

It was found that the biophilia levels of children showed a significant difference according to the frequency of being in nature. To identify which group the difference originated from, the Bonferroni test was applied. It was observed that the biophilia level of children differed in children whose frequency of being in nature was 3-4 times a week. Cheng and Monroe (2012), Rice and Torquati (2013) and Zhang et al. (2014) found that the level of biophilia differed according to the frequency of being in nature. It was found that the biophilia levels of their children did not vary significantly according to where they lived. Erdoğan (2022) found in their study conducted with teacher candidates that the love for nature did not differ based on the place of residence.

When the results related to children's empathy skills were analyzed, it was found that they did not differ significantly according to gender. Similar results were revealed in different studies (Kahraman, 2007; Akaydın & Akduman, 2016; Özer, 2016; Avcı, 2017; Koç, 2017; Özdemir, 2017; Koca, 2020; Malakcıoğlu, 2022).

It was found that children's empathy skills did not significantly differ according to the number of siblings and birth order. When the literature is examined, similar results are found (Küçükkaragöz et al., 2011; Özer, 2016; Akaydın & Akduman, 2016; Koç, 2017; Özdemir, 2017; Aka, 2019; Koca, 2020; Derman et al., 2020).

It was found that children's empathy skills showed a significant difference according to the father's age. Bonferroni test was applied to find out from which group the difference originated. According to the Bonferroni test results, it was observed that children's empathy skills differed in the group with fathers aged between 41-45 years. Similarly, Sayın (2010), Koç (2017) and Aslan (2018) found that empathy skills showed a significant difference according to the age of the father. It was found that children's empathy skills did not show a significant difference according to the educational status of the mother and father. Again, Özer (2016), Koç (2017) and Koca (2020) found that the empathy skills of their children did not differ significantly according to the educational status of the mother and father. It was found that children's empathy skills did not vary significantly according to the frequency of being in nature. No other study in the literature examines children's empathy skills according to the frequency of being in nature. It was found that children's empathy skills did not significantly differ according to the place where they lived. Küçükkaragöz et al. (2011) examined children's empathy skills according to different psycho-social variables and concluded that children's empathy skills did not differ significantly according to where they lived.

As a result of the analyses conducted in this study, more research is needed to clarify the relationships between the concepts of biophilia and empathy. The following suggestions can be given for further research to be conducted in this context:

- Research on children's biophilia levels and empathy skills can be conducted with large samples and involving different provinces and districts.
- In this study, data on children's biophilia levels and empathy skills were obtained through one-to-one interviews with children. In addition to this, studies that also include the opinions of parents and teachers can be conducted.
- In the current study, the focus was on children's biophilia levels and empathy skills. Children's biophilia levels and empathy skills can also be examined regarding different variables (parental attitudes, problem-solving skills, leadership characteristics, play skills) that may be related to children's biophilia levels and empathy skills.
- Studies and practices can be carried out to improve children's biophilia levels and empathy skills at all levels of education, starting from preschool. In this context, the current education program can include acquisitions, indicators and activities that support these skills.

Children should be encouraged to be in nature more often because children's biophilia levels, frequency of being in nature and empathy skills affect each other. Further research to be conducted to ensure that children's time spent in nature is effective and productive can guide parents and educators.

Declarations

Conflict of Interest

No potential conflicts of interest were disclosed by the author(s) with respect to the research, authorship, or publication of this article.

Ethics Approval

The formal ethics approval was granted by the Education Researches and Publication Ethics Committee of Sakarya University (No:E-61923333-050.99-79505).

No specific grant was given to this research by funding organizations in the public, commercial, or not-for-profit sectors.

Research and Publication Ethics Statement

Hereby, we as the authors consciously assure that for the manuscript "Examination of the Relationship Between Children's Biophilia (Affinity Towards Nature) and Empathy Skills of 60-72 Months-Old Children" the following is fulfilled:

- This material is the authors' own original work, which has not been previously published elsewhere.
- The paper reflects the authors' own research and analysis in a truthful and complete manner.
- The results are appropriately placed in the context of prior and existing research.
- All sources used are properly disclosed.

Contribution Rates of Authors to the Article

The authors provide equal contribution to this work.

REFERENCES

Ahmetoğlu, E. (2017). The contributions of familial and environmental factors to children's connection with nature and outdoor activities. *Early Child Development and Care*, *189*(2), 233-243. https://doi.org/10.1080/03004430.2017.1314273

Aka, M. (2019). *İlkokul öğrencilerinin özgüveni ve empatik eğilimi arasındaki ilişkinin incelenmesi (Analyzing the relationship between primary school students' self-confidence and emphatic tendency).* [Doctoral dissertation, Çukurova Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,600670,-MELTEM%20AKA

Akaydın, D., & Gültekin Akduman, G. (2016). 6 yaş grubu çocukların duygusal zeka düzeyleri ile empatik becerileri arasındaki ilişkinin incelenmesi (The investigation of the relations between empathy skills level and emotional intelligence of 6 age group children). *Uluslararası Sosyal Araştırmalar Dergisi, 9*(43), 1353-1360. https://www.sosyalarastirmalar.com/articles/the-investigation-of-the-relations-between-empathy-skills-level-and-emotionalintelligence-of-6-age-group-children.pdf

Aslan, N. (2018). *60-72 aylık çocukların empati becerilerinin anne çocuk ilişkisi açısından incelenmesi*. [Master thesis, Marmara Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,524529,-NURC%C4%B0HAN%20ASLAN

Avcı, E. (2017). *Anne-babaların tutumları ile ilkokul kademesindeki çocukların empati ve saldırganlık düzeyleri arasındaki ilişkinin incelenmesi (An analysis of the relationship between parents' attitudes and the level of empathy and aggressiveness of children in primary school).* [Master thesis, Van Yüzüncü Yıl Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,480156,-ERCAN%20AVCI

Baron-Cohen, S. (2006). Empathy. *Psychologist*, 19(9), 536-537. https://www.academia.edu/download/51821672/BC2006Empathy_freudian_origins_ThePsych.pdf

Cheng, J., & Monroe, M. (2012). Connection to nature: Children's affective attitude toward nature. *Environment and Behavior*, 44(1), 31-49. https://journals.sagepub.com/doi/full/10.1177/0013916510385082?journalCode=eab

Crano, W., & Brewer, M. (2002). *Principles and methods of social research*. Lawrence Erlbaum Associates.

Deretarla, E. & Polat, P. (2018, May). *Anasınıfına devam eden çocuklar ve annelerinin doğaya yakınlık (biyofili) seviyelerinin incelenmesi (Examining the levels of closeness to nature (biophilia) of children attending kindergarten and their mothers)*. 2. Uluslararası Multidisipliner Çalışmaları Kongresi, Adana, Turkiye.

Derman, M. T., Türen, Ş., & Buntürk, T. (2020). Okul öncesi çocukların empati bölümleri ile annelerinin ebeveyn tutumları arasındaki ilişkinin incelenmesi (The examination of the relationship between the empathy sections of the preschool children and the parental attitudes of their mothers). *Erken Çocukluk Çalışmaları Dergisi*, *4*(3), 336-368. https://doi.org/10.24130/eccd-jecs.1967202042188

Doğanay-Koç, E. (2017*). Okul öncesi eğitime devam eden 60 ay ve üzeri çocukların anne bağlanma stillerinin; empatik, duygusal ve sosyal beceri düzeylerine etkisinin incelenmesi (The analysis of the influence of mother attachment styles of children 60 months old and over who continue pre-school education on their level of emphatic, emotional and social skills)*. [Master thesis, Gazi Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,461539,-ESRA%20DO%C4%9EANAY%20KO%C3%87

Engin, K. (2019). *60-72 aylık çocuklar için doğayla bağlantı kurmaya eğilim ölçeği'nin geliştirilmesi ve bazı değişkenlere göre incelenmesi (Development of disposition to connect with nature scale for 60-72 Months Children and Investigation on Some Variables)*. [Master thesis, Gazi Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,599654,-K%C3%9CBRA%20ENG%C4%B0N

Erten, S. (2004). Çevre eğitimi ve çevre bilinci nedir, çevre eğitimi nasıl olmalıdır? *Çevre ve İnsan 1 Dergisi* (65/66). https://yunus.hacettepe.edu.tr/~serten/makaleler/cevre.pdf

Feshbach, N., & Roe, K. (1968). Empathy in six-and seven-year-olds. *Child development*, *39*(1), 133-145.

Gladstein, G. A. (1984). The historical roots of contemporary empathy research. *Journal of the History of the Behavioral Sciences* (20), 38-59.

Goleman, D. (2010). *İşbaşında duygusal zeka (Working with emotional intelligence)*. (H. Balkara, Trans.) Varlık.

Gullone, E. (2000). The biophilia hypothesis and life in the 21st century: Increasing mental health or increasing pathology? *Journal of Happiness Studies, 1*(1), 293-321.

Hoffman, M. (1990). Empathy and justice motivation. *Motivation and Emotion, 14*(2), 151-172. https://doi.org/10.1007/BF00991641

Kahraman, H. (2007). *Empatik beceri eğitiminin okul öncesi dönemdeki çocukların empatik becerilerine ve sorun davranışlarına etkisi (The influence of empathy education on the empathic skills and conduct problems of preschooler children)*. [Master thesis, Mersin Üniversitesi], YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,241000,-HUR%C4%B0YE%20KAHRAMAN

Kalaycı, Ş. (2010). *SPSS uygulamalı çok değişkenli istatistik teknikleri*. Asil.

Kellert, S. (2005). Building for life: Designing and understanding the human-nature connection. *Nature and Childhood Development, 1*(1), 63-89.

Khan Jr, P. (1997). Developmental psychology and the biophilia hypothesis: Children's affiliation with nature. Developmental Review, 17(1), 218 - 224. doi: 10.1006/drev.1996.0430

Koca, A. (2020). *60-72 aylık okul öncesi çocukların duygu düzenleme becerileri ile empati becerileri arasındaki ilişkinin incelenmesi (Investigation of the relationship between emotion regulation and empathy skills of 60-72 months preschool children).* [Master thesis, Gazi Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,630439,-AY%C5%9EENUR%20KOCA

Köksal Akyol, A., & Aslan, D. (2014). The development of empathy scale for children (ESC). M. Yaşar, Ö. Özgün, J. Galbraith (Ed) *Contemporary Perspectives and Research on Early Childhood Education*, (s. 113-123). Cambridge Scholar.

Küçükkaragöz, H., Akay, Y., & Canbulat, T. (2011). Bir grup ilköğretim öğrencisinin bazı psiko-sosyal değişkenlere göre empatik beceri düzeyleri (The Level of Emphatic Skills of a Group of Elemantary School Students According to Some Psycho-Social Variables). *Uşak Üniversitesi Sosyal Bilimler Dergisi, 4*(2), 88-100. https://dergipark.org.tr/tr/download/article-file/202375

Malakcıoglu C. (2022). *Beş yaşındaki çocukların, ebeveynlerinin ve öğretmenlerinin empati düzeyleri ile çocukların duygulanımları arasındaki ilişkiler (Relationships among five-year-old children's, their parents' and teachers' empathy levels and affectivity of children)*. [Doctoral dissertation, Marmara Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,740710,-CEM%20MALAKCIO%C4%9ELU

Ozaner, F. (2004). *Türkiye'de okul dışı çevre eğitimi ne durumda ve neler yapılmalı?* V. Ulusal Ekoloji ve Çevre Kongresi (s. 67-98). Bolu: Abant İzzet Baysal Üniversitesi ve İzmir Biyologlar Derneği.

Özdemir, A. N. (2017). *Okul öncesi dönem çocuklarının akran şiddetine maruz kalma düzeyi, mizaç tarzı ve empatik becerilerinin incelenmesi (Investigation of pre-school children's exposure level to peer violence, temperament style and empathic abilities).* [Master thesis, Gazi Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,461533,-AY%C5%9EE%20NUR%20%C3%96ZDEM%C4%B0R

Özer, G. (2016). *Empati eğitim programının anaokulu çocuklarının empatik ve prososyal becerilerine etkisinin incelenmesi (Investigation of pre-school children's exposure level to peer violence, temperament style and empathic abilities).* [Doctoral dissertation, Hacettepe Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,461533,-AY%C5%9EE%20NUR%20%C3%96ZDEM%C4%B0R

Patton, M. (2014). *Nitel araştırma ve değerlendirme yöntemleri (Qualitative Research and Evaluation Methods).* (M. Bütün, & S. Demir, Trans.) Pegem Akademi.

Piaget, J. (1948). *The moral judgment of the child*. Free Press.

Piaget, J. (1975). *The child's conception of the world*. Routledge & Kegan Paul Ltd. https://ia800501.us.archive.org/30/items/childsconception01piag/childsconception01piag.pdf.

Poole, C., Miller, S., & Church, E. (2005). How empathy develops: effective responses to children help set the foundation for empathy 0 to 2 why is she crying? *Early Childhood Today, 20*(2), 21-25.

Rice, C., & Torquati, J. (2013). Assessing connections between young children's affinity for nature and their experiences in natural outdoor settings in preschools. *Children, Youth and Environments, 23*(2), 78-102.

Sayın, K. B. (2010). *İlköğretim birinci kademe öğrencilerinin empati becerileri ile anne-baba tutumları arasındaki ilişki (Correlation of empathy skills and parenting attiude in primary school students).* [Master thesis, Maltepe Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,278769,-KAM%C4%B0LE%20BEYZA%20SAYIN

Strayer, J., & Roberts, W. (2004). Empathy and observed anger and aggression in five-year old. *Social Development, 13*(1), 1-13.

Tabachnik, B., & Fidell, L. (2013). *Using multivariate statistics* (6. Press). Pearson.

Tilbury, D. (1995). Environmental education for sustainability: Defining the new focus of environmental education in the 1990s. *Environmental Education Research, 1*(2), 195-212.

Wilson, O. (1984). Biophilia. Harvard University.

Yavuzer, H. (2019). *Çocuk psikolojisi*. Remzi.

Yılmaz, S. (2017). *Investigation of 5-year-old preschool children's biophilia and children's and their mothers' outdoor setting preferences.* [Doctoral dissertation, Orta Doğu Teknik Üniversitesi]. YÖK Tez Merkezi. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp#:~:text=1-,481531,-S%C4%B0MGE%20YILMAZ

Zahn-Waxler, C., Radke-Yarrow, M., Wagner, E., & Chapman, M. (1992). Development of concern for others. *Developmental Psychology, 28*(1), 126–136.

Zhang, W., Goodale, E., & Chen, J. (2014). How contact with nature affects children's biophilia, biophobia and conservation attitude in China. *Biological Conservation* (117), 109-116.