

## The Investigation of Teachers Biophilia Levels in Terms of Different Variables\*

*Öğretmenlerin Biyofili Düzeylerinin Farklı Değişkenler Açısından İncelenmesi*

### ABSTRACT

In this study, it is aimed to examine the biophilia levels of teachers working in different branches in terms of different variables. The research was conducted using the survey method, which is a quantitative research method. The sample of the study consists of 321 teachers working in different geographical regions of Turkey and in different branches in the 2022-2023 academic year. The "Biophilia Scale" developed by Sefalı and Özay Köse (2022) was used to obtain the data. The data obtained were analyzed with SPSS 22 package program according to teachers' biophilia levels, age, gender, professional seniority, branch and teaching level variables. As a result of the study, it was seen that Factor 1 had the highest mean while Factor 4 had the lowest mean, that is, the factor with the highest mean was level III while the factor with the lowest mean was level IV; while there was a significant difference between biophilia levels and gender and branch variables, there was no significant difference based on professional seniority, age and education level variables.

**Keywords:** Biophilia, Biophilia level, Teacher, Different variables

### ÖZET

Bu çalışmada, farklı branşlarda görev yapan öğretmenlerin biyofili düzeylerinin çeşitli değişkenler açısından incelenmesi amaçlanmıştır. Araştırma, nicel bir araştırma yöntemi olan anket yöntemi kullanılarak gerçekleştirilmiştir. Çalışmanın örneklemi, 2022-2023 öğretim yılında Türkiye'nin farklı coğrafi bölgelerinde ve çeşitli branşlarda görev yapan 321 öğretmenden oluşmaktadır. Verilerin elde edilmesinde Sefalı ve Özay Köse (2022) tarafından geliştirilen "Biyofili Ölçeği" kullanılmıştır. Elde edilen veriler, öğretmenlerin biyofili düzeyleri, yaş, cinsiyet, mesleki kıdem, branş ve öğretim kademesi değişkenlerine göre SPSS 22 paket programı ile analiz edilmiştir. Çalışma sonucunda, Faktör 1'in en yüksek ortalamaya sahip olduğu, Faktör 4'ün ise en düşük ortalamaya sahip olduğu, yani en yüksek ortalamaya sahip faktörün seviye III, en düşük ortalamaya sahip faktörün ise seviye IV olduğu görülmüştür; biyofili düzeyleri ile cinsiyet ve branş değişkenleri arasında anlamlı bir fark varken, mesleki kıdem, yaş ve eğitim düzeyi değişkenlerine göre anlamlı bir fark bulunmamıştır.

**Anahtar Kelimeler:** Biyofili, Biyofili düzeyi, Öğretmen, Farklı değişkenler

### INTRODUCTION

Nature presents children with many different faces: a newborn calf, a pet nearing the end of its life, an old path hidden among the trees, a castle overgrown with nettles, or a damp and mysterious corner of an empty lot. However children perceive nature, it presents them with a world that is different, larger, and older than their parents' world (Louv, 2019). For the new generation, nature has become an abstraction, contrary to reality. Day by day, nature is turning into something to be dressed up, consumed, watched, and even ignored. As the concept of nature conservation moves away from enjoyable outdoor experiences and increasingly becomes a mental construct, the question arises as to where the environmentalists of the future will be raised (Louv, 2019). Humans need spiritual and physical interaction with nature. This need is based on interest. This sense of belonging to nature and living things is an indication of humanity's closeness to nature. This closeness is referred to, in the broadest sense, as biophilia (Sefalı & Özay Köse, 2022). This term, originally a Latin word meaning 'love of life', was first used by Erich Fromm, who used it to mean psychological attachment to all living things (Orr, 1993, cited in Cho & Lee, 2018). Biophilia is our emotional connection to life. Biophilia is a combination of two Greek words: life (bio) and love (philia). Therefore, the literal meaning of biophilia can be expressed as "love of living things" or "love of life" (Sefalı & Özay Köse, 2022). Biophilia is not an instinctive but an innate condition. In this context, biophilia is a manifestation of a genomic structure that has passed through the filter of natural selection and can therefore be examined from an evolutionary (phylogenetic) perspective (Barbiero, 2021). It is undeniable that as people's level of biophilia increases, they become more aware of their environment and, consequently, nature. Because an increase in biophilia levels also positively improves people's attitudes towards nature and living things (Sefalı & Özay Köse, 2022). From this perspective, biophilia activities such as nature education, nature walks, or education in nature are very important in increasing individuals' levels of biophilia.

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The biophilia hypothesis posits that there is an instinctive relationship between human nature and other living systems. This assumption was first proposed by Edward O. Wilson in his book *Biophilia*. This assumption actually explains why people keep animals in their homes, why they enjoy being surrounded by greenery and nature, why they grow plants, why they visit zoos, and why they sometimes risk their own lives to save an endangered creature. This love of nature keeps humans going (İncazlı, Özer & Yıldırım, 2016). In addition to people's connection with plants and animals, their attachment to nature is also important in terms of their level of biophilia. Attachment to nature is when the bond an individual forms with nature provides emotional relief (Schultz, 2001, cited in Sefalı & Özay Köse, 2022).

Recent studies have shown a direct link between the disconnect between younger generations and nature and the resulting mental, physical, and spiritual health issues. Many of these studies suggest that providing children with conscious and planned access to nature could be a powerful therapeutic method for attention deficit and other disorders (Louv, 2019). However, biophilia is the source of mental energies that connect individuals to nature. Therefore, it is necessary to return to its fundamental evolutionary adaptation, namely developing a healthy relationship with nature. The primary goal of education systems and governments should be to teach children their responsibilities as part of the natural world, rather than teaching them to use natural environments for economic gain (Klassen, 2010). The more educational programs that activate the biophilic instinct are recommended and developed, the more emotional ecology will help children, adolescents, and adults understand how necessary their close relationship with nature is for the harmonious development of their personalities (Barbiero, 2014). If the level of biophilia in individuals increases to the desired level, it will be possible to raise individuals who are interested in nature and the natural world, who protect the natural world, and who always have a desire to learn about nature (Perkins, 2010, cited in Kadirhanoğulları and Köse, 2022). In order to foster this sensitivity in individuals, there is a need for people who will set an example, starting with the family and continuing throughout their educational life, especially teachers who love, know, and are interested in nature, who are qualified and conscious. This is because in order for a teacher to teach and instill an appreciation for nature, they must first know, love, and internalize nature themselves. Subsequently, they must transfer these qualities to their students (Şimşekli, 2004, cited in Sefalı, 2019). The level of biophilia among teachers, who are the primary stakeholders in instilling biophilia awareness in students, is extremely important in instilling this awareness. In this context, this study aims to examine the biophilia levels of teachers working in different fields in terms of different variables. Within this general objective, answers to the following questions are sought:

1. What are teachers' levels of biophilia?
2. Do teachers' levels of biophilia show a significant difference according to;
  - a) The gender variable?
  - b) The age variable?
  - c) The branch variable?
  - d) The professional seniority variable?
  - e) The education level variable?

## **METHOD**

The research was conducted using a survey method. These studies are used to generalize findings from the sample to the population. It refers to cross-sectional and longitudinal studies that use questionnaires and structured interviews in the data collection process (Fowler, 2009, cited in Creswell, 2017).

## **Study Sample**

The sample of the study consists of 321 teachers working in different geographical regions and different branches in Turkey during the 2022-2023 academic year. The sample for the study was selected using convenience sampling. In this sampling method, individuals who are nearby and easily accessible are included in the sample, and the process continues by including individuals who are easy to reach until the required sample size is achieved (Güler, İlhan and Taşdelen-Teker, 2021). Researchers choose a situation that is easily accessible and economical in every sense. This method is used in survey studies where data is collected and shared in electronic environments today (Canbazoğlu Bilici, 2019). The demographic information of the teachers is given in Table 1:

**Table 1. Demographic characteristics of teachers**

Variables		f	%
Gender	Female	223	69
	Male	98	31
Age	20-30 years	30	9
	31-40 years	135	42
	41-50 years	109	34
	51 +	47	15
Professional Experience	1-5 years	29	9
	6-10 years	66	21
	11-15 years	72	22
	16-20 years	51	16
	20 +	103	32
Teaching Field	Primary School Teacher	106	33
	Preschool Teacher	57	18
	Subject Teacher	158	49
Education Level	Bachelor's Degree	252	79
	Graduate Degree	69	21
	<b>Total</b>	321	100

Table 1 shows that the vast majority of teachers are female and aged between 31 and 40; again, the vast majority have over 20 years of seniority and are subject teachers; finally, the vast majority of teachers have a bachelor's degree.

## Data Collection Tools

### Biophilia Scale

The "Biophilia Scale" developed by Sefalı and Özey Köse (2022) was used to obtain the data for the study. The scale consists of four sub-factors. Factor 1 represents Level III Biophilia; Factor 2 represents Level II Biophilia; Factor 3 represents Level I Biophilia; and Factor 4 represents Level IV Biophilia. The Cronbach Alpha values of the sub-factors were calculated as Factor 1 (.85), Factor 2 (.81), Factor 3 and Factor 4 (.64), respectively, and the Cronbach Alpha value for the scale as a whole was (.88).

Item analysis, AFA, and DFA studies were conducted as part of the scale's validity study. Accordingly, it was stated that the scale explained 50.41% of the total variance and had a four-factor structure consisting of 25 items (Sefalı & Özey Köse, 2022). After obtaining the necessary permissions, the data collection tool for the research was prepared using Google Forms and sent to teachers working in different regions and different branches in Turkey. A total of 271 teachers responded to the online data collection tool.

### Data Collection Processes

After obtaining the necessary permissions, the data collection tool for the research was prepared using Google Forms and sent to teachers working in different regions and different fields in Turkey. A total of 271 teachers responded to the online data collection tool.

### Data Analysis

The obtained data were analyzed using the SPSS program according to the variables of gender, age, branch, professional seniority, and education level. To express the normality distribution of the data, certain cut-off points were given in the literature regarding skewness and kurtosis coefficients. Based on this, if the data show a normal distribution, it is stated that the skewness and kurtosis coefficients can be between -2 and 2 (George & Mallery, 2001; Leech et al., 2005, cited in Uysal & Kılıç, 2021). The normality values of the data are given in Table 2:

**Table 2. Normality values of the data**

Variables	Skewness	Kurtosis
Biophilia Scale Total Score	,182	-,586
Gender	,850	-1,286
Age	,135	-,649
Professional Experience	-,225	-1,240
Teaching Field	-,324	-1,675
Education Level	1,394	-,056

According to Table 2, the skewness and kurtosis coefficients of the variables indicate that the data follow a normal distribution. As a result of the data following a normal distribution, the significance of the difference for two-category variables was tested using the t-test, and the significance of the difference for variables with more than two

categories was tested using the ANOVA test. Cohen's standardized effect size index,  $d$ , allows us to interpret how many standard deviations the compared means are apart (Büyüköztürk, 2018, p.44). Based on the calculations, the  $d$  value obtained is interpreted as follows: .20- small effect size; .50- medium; .80- large effect size (Cohen, 1988, cited in Özsoy and Özsoy, 2013).

## RESULTS

The findings were examined according to the sub-problems in order.

### Results related to the first sub-problem

**Table 3. Results related to teachers' levels of biophilia**

Factors	N	$\bar{X}$	sd
Factor 1	321	3,33	,773
Factor 2	321	3,24	,666
Factor 3	321	3,05	,814
Factor 4	321	2,13	,788
Total	321	3,07	,670

When examining the findings regarding the sub-dimensions and average scores of teachers' biophilia scale, it is observed that the average values are ranked as follows: Factor 1  $\bar{X}$ =3.33; Factor 2  $\bar{X}$ = 3.24; Factor 3  $\bar{X}$ =3.05 and Factor 4= 2.13. Accordingly, Factor 1 has the highest average, while Factor 4 has the lowest average. When the levels represented by the factors are examined, the factor with the highest average is Level III, while the factor with the lowest average is Level IV. In this context, it can be said that teachers' biophilic tendencies are high but not excessive.

### Results related to the second sub-problem

**Table 4. Comparison of teachers' biophilia scale sub-dimensions and mean scores according to the gender variable**

Factors	Gender	N	X	S	sd	t	p
Factor 1	Female	223	3,40	,74	319	2,24	,017*
	Male	98	3,17	,83			
Factor 2	Female	223	3,30	,65	319	2,74	,006*
	Male	98	3,08	,68			
Factor 3	Female	223	3,16	,79	319	3,99	,000*
	Male	98	2,77	,81			
Factor 4	Female	223	2,24	,81	319	4,05	,000*
	Male	98	1,87	,66			
Average	Female	223	3,15	,65	319	3,33	,001*
	Male	98	2,88	,66			

\* $p < 0,05$

According to Table 4, the t-test results conducted to determine whether there was a significant difference between teachers' biophilia levels, scale sub-dimension scores, total score averages, and the gender variable showed that there was a significant difference between teachers' genders and biophilia levels ( $t(319)=3.33$ ,  $p < .05$ ). Looking at the mean scores, it was seen that female teachers' levels of biophilia ( $X = 3.15$ ) were higher than male teachers' ( $X = 2.88$ ). When examining the effect size,  $d=0.40$  was found to have a moderate effect. Again, the subscale scores of teachers' biophilia scale according to the gender variable showed significant differences for Factor 1 ( $t(319)=2.24$ ,  $p < .05$ ), Factor 2 ( $t(319)=2.74$ ,  $p < .05$ ), Factor 3 ( $t(319)=3.99$ ,  $p < .05$ ), and Factor 4 ( $t(319)=4.05$ ,  $p < .05$ ). When the mean values were examined, it was observed that the mean scores of female teachers were higher than those of male teachers in all factors. According to Factor 1, female teachers' biophilic tendencies are higher than male teachers' biophilic tendencies. According to Factor 2, female teachers' biophilic tendencies are higher than male teachers'. According to Factor 3, female teachers' suppressed biophilic tendencies are greater than those of male teachers. According to Factor 4, female teachers' exaggerated biophilic tendencies are greater than those of male teachers.

### Results related to the third sub-problem

**Table 5.** Comparison of teachers' sub-dimensions and average scores on the biophilia scale according to the age variable

Factors	Age	Sum of Squares	sd	Mean Square	F	p
Factor 1	Between Groups	34,464	35	,985	1,408	,070
	Within Groups	199,299	285	,699		
	Total	233,763	320			
Factor 2	Between Groups	13,265	25	,531	,710	,847
	Within Groups	220,498	295	,747		
	Total	233,763	320			
Factor 3	Between Groups	8,552	12	,713	,975	,473
	Within Groups	225,211	308	,731		
	Total	233,763	320			
Factor 4	Between Groups	13,497	14	,964	1,339	,183
	Within Groups	220,266	306	,720		
	Total	233,763	320			
Average	Between Groups	3,360	3	1,120	2,532	,057
	Within Groups	140,214	317	,442		
	Total	143,573	320			

According to Table 5, the results of the ANOVA test conducted to determine whether there was a significant difference between teachers' levels of biophilia and the age variable based on scale subscale scores and total mean scores showed that there was no significant difference between teachers' levels of biophilia and their ages  $F(3, 317) = 2.53, p > .05$ . Similarly, there was no significant difference between teachers' biophilia scale subscale scores and the age variable according to Factor 1  $F(35, 285) = 1.41, p > .05$ , Factor 2  $F(25, 295) = 0.71, p > .05$ , Factor 3  $F(12, 308) = 0.96, p > .05$ , and Factor 4  $F(14, 306) = 1.34, p > .05$ .

### Results related to the fourth sub-problem

**Table 6.** Comparison of teachers' sub-dimensions and average scores on the biophilia scale according to the branch variable

Factors	Subject	Sum of Squares	sd	Mean Square	F	p	Meaningful Difference
Factor 1	Between Groups	21,252	35	,607	,739	,860	
	Within Groups	234,324	285	,822			
	Total	255,576	320				
Factor 2	Between Groups	18,465	25	,739	,919	,579	
	Within Groups	237,112	295	,804			
	Total	255,576	320				
Factor 3	Between Groups	7,248	12	,604	,749	,703	
	Within Groups	248,328	308	,806			
	Total	255,576	320				
Factor 4	Between Groups	17,629	14	1,259	1,619	,073	
	Within Groups	237,947	306	,778			
	Total	255,576	320				
Average	Between Groups	5,663	2	2,832	6,549	,002*	PT-PST
	Within Groups	137,910	318	,434			PT-ST
	Total	143,573	320				

\* $p < 0,05$

According to Table 6, ANOVA results were conducted to determine whether there were significant differences between teachers' levels of biophilia across different disciplines, as measured by scale subscale scores and total mean scores, and the age variable. The results revealed a significant difference between teachers' levels of biophilia and their teaching disciplines.  $(2, 315) = 6.53, p < .05$ . When examining the effect size,  $\eta^2 = .039$ , it is seen to have a moderate effect. Eta-square ( $\eta^2$ ), which does not require the assumption of linearity between variables, shows the degree to which the independent variable affects the dependent variable. Eta-square ( $\eta^2$ ) shows how much of the total variance in the dependent variable is explained by the independent variable or factor and ranges from 0.00 to

1.00.  $\eta^2$  values of 0.01, 0.06, and 0.14 are interpreted as small, medium, and large effect sizes, respectively (Büyüköztürk, 2018, p. 44). Again, teachers' biofilia scale subscale scores according to the branch variable were Factor 1  $F(35, 285) = 0.74, p > .05$ , Factor 2  $F(25, 295) = 0.92, p > .05$ , Factor 3  $F(12, 308) = 0.75, p > .05$ , and Factor 4  $F(14, 306) = 1.62, p > .05$ .

**Table 7.** Comparison of Tukey test values for teachers' average biophilia scale scores according to subject variable

Teaching Field	N	X	SS
Primary School Teacher	106	3,03	,665
Preschool Teacher	57	3,35	,572
Subject Teacher	158	3,00	,682
Total	321	3,07	,669

According to the results of the Tukey test conducted to determine between which branches the difference observed in Table 7 exists; it was concluded that preschool teachers' (PT) levels of biophilia ( $X = 3.35$ ) were higher than those of classroom teachers ( $X = 3.03$ ) and subject teachers (ST) ( $X = 3.00$ ).

### Results related to the fifth sub-problem

**Table 8.** Comparison of teachers' sub-dimensions and average scores on the biophilia scale according to the professional seniority variable

Factors	Professional Experience	Sum of Squares	sd	Mean Square	F	p
Factor 1	Between Groups	66,929	35	1,912	1,042	,409
	Within Groups	522,965	285	1,835		
	Total	589,894	320			
Factor 2	Between Groups	41,287	25	1,651	,888	,623
	Within Groups	548,607	295	1,860		
	Total	589,894	320			
Factor 3	Between Groups	41,287	12	1,463	,787	,664
	Within Groups	548,607	308	1,858		
	Total	589,894	320			
Factor 4	Between Groups	37,105	14	2,650	1,467	,122
	Within Groups	552,789	306	1,807		
	Total	589,894	320			
Average	Between Groups	2,006	4	,501	1,119	0,347
	Within Groups	141,568	316	,448		
	Total	143,573	320			

\* $p < 0,05$

According to Table 8, ANOVA results were conducted to determine whether there were significant differences between the biofilia levels of teachers working in different branches, their scale sub-dimension scores and total score averages, and the age variable. The results showed that there was no significant difference between teachers' biofilia levels and their professional seniority  $F(4, 316) = 1.11, p > .05$ . Similarly, there was no significant difference in teachers' biofilia scale subscale scores according to the professional seniority variable: Factor 1  $F(35, 285) = 1.04, p > .05$ , Factor 2  $F(25, 295) = 0.89, p > .05$ , Factor 3  $F(12, 308) = 0.79, p > .05$ , and Factor 4  $F(14, 306) = 1.47, p > .05$ .

### Results related to the sixth sub-problem

**Table 9.** Comparison of teachers' sub-dimensions and average scores on the biophilia scale according to the learning level variable

Factors	Education Level	N	X	S	sd	t	p
Factor 1	Bachelor's Degree	252	3,36	,77	319	1,48	,138
	Graduate Degree	69	3,21	,78			
Factor 2	Bachelor's Degree	252	3,25	,66	319	1,11	,265
	Graduate Degree	69	3,15	,67			
Factor 3	Bachelor's Degree	252	3,07	,78	319	1,03	,300
	Graduate Degree	69	2,95	,89			
Factor 4	Bachelor's Degree	252	2,13	,78	319	,39	,691
	Graduate Degree	69	2,09	,81			
Average	Bachelor's Degree	252	3,09	,66	319	1,27	,973
	Graduate Degree	69	2,98	,68			

\* $p < 0,05$

According to Table 9, the t-test results conducted to determine whether there was a significant difference between the biofilia levels of teachers working in different branches, their scale sub-dimension scores and total score averages, and the education level variable showed that there was no significant difference between teachers' biofilia levels and their education levels ( $t(319) = 1.27, p > .05$ ). When examining the mean scores, the biofilia levels of teachers with a bachelor's degree ( $X = 3.09$ ) are higher than those of teachers with a graduate degree ( $X = 2.98$ ). Again, teachers' biofilia scale sub-dimension scores according to the education level variable were not significantly

different for Factor 1 ( $t(319)=1.48, p>05$ ), Factor 2 ( $t(319)=1.11, p>05$ ), Factor 3 ( $t(319)=1.03, p>05$ ), and Factor 4 ( $t(319)=0.39, p>05$ ).

## DISCUSSION AND CONCLUSION

In order for humans to understand the planet, their immediate surroundings, and nature, they must engage in direct, conscious, and planned interaction with nature. There is a need for people who will serve as role models in the formation of nature awareness and love, starting from the family and continuing throughout education and training, especially qualified teachers who know and love nature. This is because teachers who will teach children about nature and make them love it must first be in close contact with nature themselves (Şimşekli, 2004, cited in Sefalı, 2019). In this study, which examined teachers' levels of biophilia in terms of different variables, teachers' levels of biophilia were examined in terms of gender, branch, age, professional seniority, and education status variables. In this section, the results obtained based on the data are summarized, and the research findings are presented by discussing them with the findings of other studies in the literature. A review of the literature regarding the obtained results yielded the following conclusions:

When examining the findings related to the scale sub-dimensions and average scores regarding teachers' levels of biophilia in the study, it was found that the average values were ranked as Factor 1, Factor 2, Factor 3, and Factor 4. Accordingly, Factor 1 had the highest average score, while Factor 4 had the lowest average score. Looking at the levels represented by the factors, Factor 1 had the highest average with Level III biophilia, while Factor 4 had the lowest average with Level IV biophilia. Parallel to the findings obtained regarding teachers' biophilia levels, Gedik (2024)'s study, which examined the relationship between preschool students' biophilia levels and parents' and teachers' biophilia levels, found that preschool teachers working in kindergarten during the preschool period had high biophilia levels. Similarly, Karademir (2017), in his study examining teacher candidates' biophilia levels and ethical attitudes, concluded that teacher candidates' levels of attachment to nature were above average.

The study found that there was a significant difference between the mean total scale scores and the gender variable in terms of teachers' levels of biophilia. When the participants' Biophilia Scale subscale total mean scores were evaluated according to the gender variable, a significant difference was observed between the Factor 1, Factor 2, Factor 3, and Factor 4 scores and the gender variable. This difference was in favor of female teachers. This result can be interpreted as female teachers having a greater level of attachment to nature than male teachers. This situation is thought to be due to women having a more attentive, sensitive, and emotional personality than men. This result is consistent with sociological findings that women have greater cognitive and affective competence than men due to their emotional tendencies and human structures, and that they also have a more positive attitude than men (Sönmez and Yerlikaya, 2017). In parallel with the findings obtained regarding the gender variable, Kadirhanogulları and Özay Köse (2022) conducted a study to determine the biophilia levels of students attending vocational schools and found that there was a significant difference between students' biophilia levels and the gender variable. Again, Aydın (2023) examined secondary school students' closeness to nature (biophilia) and environmentally friendly behaviors. In his study, he found that students' levels of biophilia differed significantly according to gender, with male students scoring higher. Karademir (2017) stated that female teacher candidates had higher levels of attachment to nature than male teacher candidates. In contrast to these findings, Yılmaz and Olğan (2017), Erdoğan (2022), Engin and Demiriz (2022), Köse, Gül, and Sefalı (2023), Taşçı (2023), and Zhang, Goodale, and Chen (2014) stated that there was no significant difference between biophilia levels and the gender variable in their studies examining biophilia levels.

It was concluded that there was no significant difference between the mean total scale scores of teachers' biophilia levels and the age variable. When the mean total scores of the subdimensions of the Biophilia Scale were evaluated according to the age variable, no significant difference was found between the scores of Factor 1, Factor 2, Factor 3, and Factor 4 and the age variable. This situation may be due to the fact that the ages of the teachers participating in the study were predominantly in the 31-40 and 41-50 age ranges. In contrast to the findings obtained regarding the age variable, Rice and Torquati (2013) found a significant difference between the ages of students and their closeness to nature in their study evaluating the connection between the biophilia levels of preschool children and their experiences in outdoor environments.

It was found that there was a significant difference between the average total scale scores and the branch variable in terms of teachers' levels of biophilia. This result can be interpreted as meaning that the levels of biophilia among teachers working in different branches also differ from one another. The significance of the difference was seen to be specific to the branch of preschool teaching. It can be stated that this result, which is in favor of preschool teachers, is very important as preschool teachers take on the responsibility of instilling a love of nature in individuals and welcome them at the first stage of their education and teaching life. Thus, it is thought that preschool teachers can build a solid foundation of love for nature in these individuals during early childhood. When the mean total scores of participants' subscale scores on the Biophilia Scale were evaluated according to the field variable, no significant difference was found between the scores on Factor 1, Factor 2, Factor 3, and Factor 4 and the field variable. In line

with the findings obtained from the analyses of the scale total score averages related to the branch variable, Karademir (2017) stated that the levels of attachment to nature of teacher candidates showed a significant difference according to the department they were continuing in, as a result of his study on the biophilia levels and ethical attitudes of teacher candidates. Similarly, Tağrikulu, Gül, and Çobanoğlu (2021), in their study determining the level of attachment to nature among teacher candidates, concluded that the level of attachment to nature among teacher candidates showed a significant difference according to the departments they were enrolled in. In contrast to this finding, Erdoğan (2022), in his study examining pre-service teachers' levels of biophilia and biophobia towards living things, stated that there was no significant difference between pre-service teachers' departments and their levels of biophilia.

It was concluded that there was no significant difference between the average total scale scores of teachers' biophilia levels and the professional seniority variable. When the participants' Biofilia Scale sub-dimension total score averages were evaluated according to the professional seniority variable, no significant difference was found between Factor 1, Factor 2, Factor 3, and Factor 4 scores and the professional seniority variable.

It was concluded that there was no significant difference between teachers' biophilia levels and the education level variable in terms of scale total score averages. When the participants' subscale total mean scores on the Biophilia Scale were evaluated according to the education level variable, no significant difference was found between the scores for Factor 1, Factor 2, Factor 3, and Factor 4 and the education level variable. This situation can be interpreted as meaning that professional seniority and educational level variables do not create a significant difference in teachers' levels of attachment to nature. No other study examining the level of biophilia in relation to professional seniority and educational level variables has been found in the domestic and foreign literature.

The findings of the research revealed that teachers' levels of biophilia differed according to gender and subject area variables, while no differences were observed according to age, professional seniority, and education level variables. Biophilia activities (such as nature-based education, nature walks, and visits to national parks) increase individuals' levels of biophilia, thereby leading to the development of individuals who can recognize and interpret their natural surroundings and environment (Sefali, 2019). Teachers who plan and carry out biophilia activities that will develop students' love of nature must feel competent in this area. It is believed that the higher the teachers' levels of biophilia, the higher their students' levels of biophilia will be. This is because it will be easier for teachers to convey a value they believe in and embrace to their students, which will yield effective results.

## RECOMMENDATIONS

Based on the data obtained from the research, the following recommendations are presented:

Given that individuals with high levels of biophilia are more sensitive to environmental issues, teachers' levels of biophilia can be determined and activities can be organized to increase this level. In this context, teachers actively working in the profession should be provided with practical in-service training on biophilia, regardless of age, gender, or subject area.

Teachers should be encouraged to use out-of-school learning environments that enable students to connect with nature.

Parents and school administrators should be made aware of the need to support teachers in activities they plan in close connection with nature.

Teacher candidates, regardless of their field, should take courses in environmental and nature studies during their undergraduate education, and/or the content of existing courses should be reorganized and enriched.

The research can be repeated with a different perspective, involving teacher candidates studying in various fields and adding other variables.

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