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Investigation of Adults' Levels of Devotion to Nature: An 8-Week Randomized Controlled Study

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Abstract

This study aimed to determine the level of devotion of the students who take the outdoor sports training to nature. It is a quantitative study, including a total of 220 students, 130 boys, and 90 girls, who took elective and compulsory outdoor sports training at Kırıkkale University in the 2021-2022 academic year. The scale used in the research was developed by Mayer and Frantz (2004) and adapted to Turkish by Bektaş et al. (2017). While collecting the data, pre-test and post-test data regarding the students' age, gender, and anthropometric characteristics (height, body weight, body fat) were taken. Analysis results found significant differences between male and female students and the control group in both dimensions of the scale; In general, it was observed that the students who took the training the outdoor sport training had higher levels of devotion to nature. The main finding of this research is that outdoor sports training is very effective in increasing the devotion to nature. Outdoor sports training should be given to increase adults' devotion to nature.
Keywords: Devotion to nature, Environment, Student, Outdoor sports

Yetişkinlerin Doğaya Bağlılık Düzeylerinin İncelenmesi: 8 Haftalık Randomize Kontrollü Araştırma

Öz

Çalışmanın amacı, Doğa Sporları dersi alan öğrencilerin doğaya bağlılık düzeylerini tespit etmektir. Çalışma, nicel bir araştırma olup 2021-2022 eğitim-öğretim yılında Kırıkkale Üniversitesi'nde öğrenim gören seçmeli ve zorunlu doğa sporları dersi alan 130 erkek ile 90 kız toplam 220 öğrenci katılmıştır. Araştırmada kullanılan ölçek, Mayer ve Frantz (2004) tarafından geliştirilmiş ve Türkçe 'ye Bektaş, Kural ve Orçan (2017) tarafından uyarlanmıştır. Veriler toplanırken öğrencilerin yaş, cinsiyet ve antropometrik özelliklerine (Boy uzunluğu, vücut ağırlığı, vücut yağ) ait ön test ve son test veriler alınmıştır. Analiz sonuçları, ölçeğin her iki boyutunda erkek ve kız öğrenciler ile kontrol grubu arasında anlamlı farklılıklar bulmuştur; genel olarak, doğa sporları dersine katılan öğrencilerin doğaya bağlılık düzeylerinin daha yüksek olduğu görülmüştür. Çalışma, öğrencilerin doğaya bağlılıklarını ortaya çıkarmak için istatistikleri kullanan bir çalışmadır. Bu araştırmanın ana bulgusu doğa sporları eğitimi doğaya bağlılığı artırmak için oldukça etkilidir. Yetişkinlerin doğaya bağlılıklarını artırmak için doğa sporları eğitimi verilmelidir.
Anahtar kelimeler: Doğaya bağlılık, Çevre, öğrenci, Doğa sporları

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INTRODUCTION

The developing world technologies and industrialization with people living in city centers have shaped their working and living spaces in this direction. Most people today have been away from the natural environment (Hartig et al., 2014). The natural areas that allow people to be directed to various activities such as walking and climbing, which include mental, emotional, and psychomotor experiences, are called nature (Türk et al., 2004; Wilson, 2007). Individuals need to have sufficient knowledge about ecological life in harmony with nature (Bond et al., 2022; Demir & Yalçın, 2014). The important effects of the principle of devotion to nature on the development of ecological behaviour are seen in individuals with sufficient knowledge and equipment (Mayer & Frantz, 2004). Identity in the environment in devotion to nature is associated with environmentalist attitudes and behaviours (Pereira & Forster, 2015). In particular, eco-psychologists have tried to express the extent to which individuals adopt the concept of devotion to nature in their cognitive world (Schultz et al., 2004). Devotion to nature is closely related to psychology and positively affects positive relationships with others, autonomy, self-acceptance, and personal development (Nisbet et al., 2011). Increasing the quality of life that exists in the devotion to nature and ensuring the development of mental health can be achieved with the desire of individuals to provide an experience (Tauber, 2012).

When applied in a timely and consistent manner, it has become one of the ongoing habits in human life (Nisbet et al., 2009). In this context, devotion to nature positively affects the orientation to living spaces in nature (Lindberg et al., 2019). Devotion to nature has been associated with the understanding of awareness, it has been stated that it is directly related to self-awareness, self-esteem, and resilience (Park et al., 2010; Sümbül et al., 2019; Yıldız et al., 2017; Yıldız, 2022; Yılgın, 2021). In addition, feeling connected to nature is proportional to subjective devotion, increased attention capacity, and positive emotions (Hutson et al., 2010; Zelenski & Nisbet, 2014). Many nature activities attended during childhood increase the devotion and interest towards nature and arouse the desire to participate in recreational terms as a motivating element in the future (Petersen et al., 2019; Rosa & Collado, 2019). It has been argued that it is related to many factors such as awareness of devotion to nature, gaining an environmental perspective, environmentalist attitudes, biospheric attitudes, and a sense of concern for nature (Mayer & Frantz, 2004). Individuals with this awareness increase their desire to exist in and explore natural environments (Lindberg et al., 2019). It has also been suggested that social well-being relates to devotion to nature (Howell et al., 2011). The love for nature and understanding of its importance is described as the responsibility to protect it (Perkins, 2010). In other words, devotion to nature has been accepted as a principle that individuals can experience in their relations with nature (Schultz, 2002). As long as individuals spend time in nature, they feel a sense of devotion, which means their sense of protection against nature and the environment develops more (Vining et al., 2008). Environmental problems have become widespread today, which is a serious issue (Portney, 2000). For this reason, issues such as increasing nature awareness by establishing empathy and how our identity will fit with the natural environment constitute the agenda (Stern, 2000). The importance of devotion to nature for ecologists and eco-psychologists in promoting some ecological behaviors is discussed (Mayer & Frantz, 2004).

Nature is the most important asset for our body that cannot be given up in the life cycle, as it renews our energy, increases our motivation, and contributes to our healthy life. Instead of being ungrateful to nature, it is essential to love nature, protect it, develop this awareness, and increase the level of devotion to nature. This study aimed to determine the level of devotion of the students who received outdoor sports training for eight weeks to nature.

METHOD

Research Model

Survey model, one of the quantitative research methods, was used in the research.

Research Group

A total of 220 people, 130 boys, and 90 girls, who studied at Kırıkkale University in the 2021-2022 academic year and took elective and compulsory outdoor sports training, were included in the research.

Data Collection

The data collection method consists of two parts. In the first part, a form consisting of gender, age, height, pre-test and post-test, body weight, body mass index (BMI), and Body Fat Percentage (Fat %) was filled in. In the second part, data were collected using the Nature Devotion Scale developed by Mayer & Frantz (2004) and adapted into Turkish by Bektaş et al., (2017). The scale consists of 2 sub-dimensions such as "Integration with Nature" (Questions 1 and 2) and "Part of Nature" (between the 5th and 11th Questions), 11 questions in total.

Analysis of Data

The mean and standard deviation statistics of the data obtained from the male and female participants included in the study were calculated. IBM SPSS 25.0 package program was used for statistical analysis. "Kolmogorov Smirnov test" was applied to see when the data showed a normal distribution (Yağin et al., 2021). To evaluate the data for various variables, the t-test was used and the significance was accepted as 0.005. In the study, pre-test and post-test measurements of anthropometric (body weight, BMI, and body fat ratios) values, percentage change values (%), and differences (Δ) were examined. The unrelated sample t-test was used to determine the differences between the experimental and control groups. The analysis results also calculated effect sizes (Cohen's d). Cohen's d values were considered trivial (<0.20), small (0.20–0.59), moderate (0.6–1.19), large (1.2–1.99), and very large (Hopkins et al., 2009). A value of $p< 0.05$ was considered statistically significant. Variables analyzed SPSS Statistical Software (SPSS, INC, an IBM Company, Chicago, Illinois). Since the data was normally distributed in binary, it met the prerequisites for parametric tests. For this reason, a t-test for independent groups and an ANOVA test for the comparison of three or more groups were applied in pairwise group comparisons. In addition, when there was a significant difference in the ANOVA results, the Tukey post hoc test, one of the multiple comparison tests, was applied to determine between which groups the difference was. American Psychological Association (APA) 6.0 style was used to report statistical differences (Yağın et al., 2021).

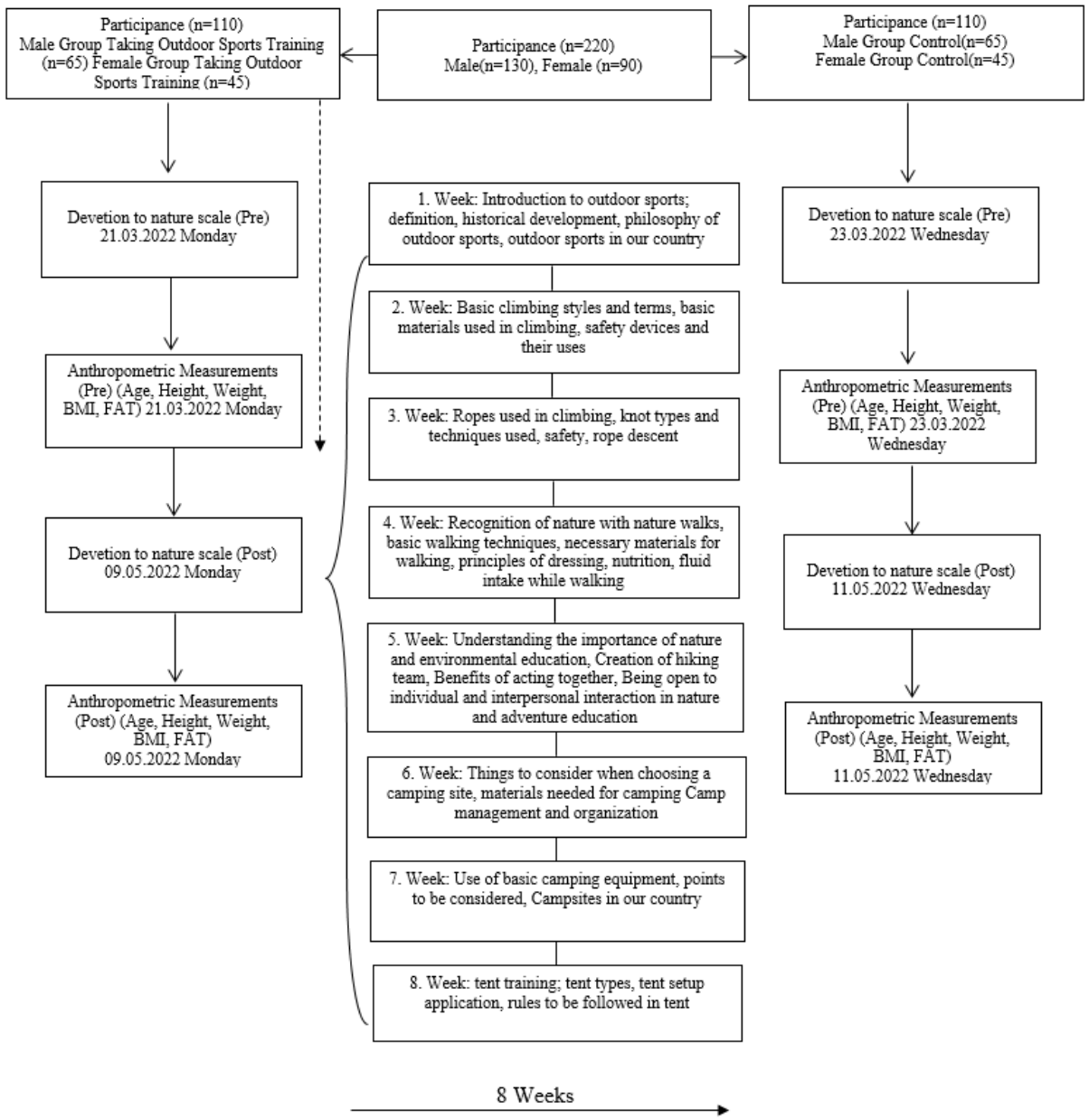

Figure 1. Flow diagram of study desing

RESULTS

The following statistics were made to determine the level of devotion of the students who took the Outdoor sports training to nature.

Table 1. Demographic characteristics of the participants

	Variables	N	M±SD
Male and Female	Age (yrs)	220	21.5±1.6
	Height (cm)		172.9±1.6
	Body weight (kg)		66.5±8.6
	BMI (kg/m2)		22.2±1.6
	Fat (%)		15.8±4.6
Male	Age (yrs)	130	21.7±1.5
	Height (cm)		177.6±6.2
	Body weight (kg)		71.2±7.2
	BMI (kg/m2)		22.6±1.5
	Fat (%)		13.2±2.4
Female	Age (yrs)	90	21.4±1.7
	Height (cm)		166.2±6.1
	Body weight (kg)		59.8±5.4
	BMI (kg/m2)		21.6±1.5
	Fat (%)		19.6±4.3

The mean age of the students taking the outdoor sports training and the control group participants was 21.5±1.6 years; their average height was 172±1.6 cm. While their average body weight was 66.5±8.6 kg, their BMI was 22.2±1.6 kg/m2, and their body fat percentage was 15.8±4.6% (Table 1).

Table 2. Values of male and female participants doing outdoor sports

Variables	Male (n=130)	Female (n=90)
Always	61	33
Sometimes	55	36
whenever it's convenient	14	21

When the outdoor sports conditions of the male and female participants included in the study were examined, it was determined that always and occasionally were the responses for both genders (Table 2).

Table 3. Statistical information about the anthropometric measurements of the participants before and after the test

n=220	**Pre**	**Post**	**In-group**			**Out - group**		
Variables	M±SD	M±SD	p	Cohen's d	Descriptor	p	Cohen's d	Descriptor
Body Weight (Kg)								
MOSTG	75.9±7.6	68.8±8.2	**0.001***	0.898	Moderate	**0.001***	0.490	Small
MCG	73.9±8.2	73.7±7.4	0.156	0.026	Trivial			
BMI (Kg/m^2)								
MOSTG	24.1±1.8	21.8±1.7	**0.001***	1,313	Large	**0.001***	0,710	Moderate
MCG	23.5±2.0	23.4±1.7	0.066	0.053	Trivial			
Fat (%)								
MOSTG	15.0±3.2	12.3±2.4	**0.001***	0.954	Moderate	**0.001***	0.513	Small
MCG	14.1.±0.5	13.9±2.2	0.063	0.125	Trivial			
Body Weight (Kg)								
FOSTG	64.1±7.7	58.0±4.7	**0.001***	0.956	Moderate	**0.001***	0.557	Small
FCG	62.2±4.7	61.5±4.2	0.159	0.157	Trivial			
BMI (Kg/m^2)								
FOSTG	22.9±1.8	20.7±1.0	**0.001***	1,510	Large	**0.001***	0.798	Moderate
FCG	22.7±1.4	22.5±1.3	0.560	0.148	Trivial			
Fat (%)								
FOSTG	20.9±2.9	17.1±2.9	**0.001***	1.310	Large	**0.001***	0.466	Small
FCG	22.4±4.7	22.1±3.9	0.141	0.069	Trivial			

Pre: Pretraining. **Post**: Posttraining. **MOSTG**=Male Outdoor sports Traning Group; **MCG**=Male Control Group; **FOSTG**= Female Outdoor sports Traning Group **FCG**=Female Control Group; *p< 0.001

Cohen's d effect size of in-group anthropometric characteristics of male and female participants who took outdoor sports training: while the lowest effect scores were seen in body weight (kg) in both groups (p<0.005*, effect size 0.898-956), BMI (Kg/m2) had the highest effect scores (p<0.005*, effect size 1.313-1.510). When the effect sizes of the anthropometric characteristics between groups were examined, it was seen that the lowest score in Cohen's d effect size was body weight (kg) (p<0.005*, effect size 0.490). The highest score was found to be BMI (Kg/m2) (p<0.005*, effect size 0.710-0.798).

Table 4. T-test results regarding the significant difference in the sub-dimensions of the devotion to nature scale (Male)

n=130	**n**	**Pre**	**Post**	**In-group**			**Out- group**		
Variables		M±SD	M±SD	p	Cohen's d	Descriptor	p	Cohen's d	Descriptor
Integration with Nature									
MOSTG	65	7.18±1.4	8.74±0.8	**0.001***	1.315	Large	**0.001***	0.456	Small
MCG	65	7.34±1.5	7.32±1.1	0.561	0.152	Trivial			
Part of Nature									
MOSTG	65	21.1±3.1	27.1±1.3	**0.001***	2.524	Very Large	**0.001***	0.983	Moderate
MCG	65	21.9±3.5	22.1±1.8	0.155	0.071	Trivial			
Full Scale									
MOSTG	65	28.3±4.1	35.9±1.7	**0.001***	2.421	Very Large	**0.001***	0.169	Trivial
MCG	65	29.3±4.6	29.4±2.4	0.202	0.027	Trivial			

Pre: Pretraining. **Post**: Posttraining. **MOSTG**=Male Outdoor sports Traning Grou; **MCG**=Male Control Group; *p< 0.001

For Cohen's d effect size in the sub-dimensions of the in-group devotion to nature scale of male participants, the lowest score was found to be in the integration with nature sub-dimension (p<0.005*, effect size 1.315), while the highest effect score was in the part of nature sub-dimension (p <0.005*, effect size 2.524). It was seen that the highest score of the effect size between groups was in the part of nature sub-dimension.

Table 5. T-test results regarding the significant difference in sub-dimensions of the devotion to nature scale (Female)

n=130	**n**	**Pre**	**Post**	**In-group**			**Out - group**		
Variables		M±SD	M±SD	p	Cohen's d	Descriptor	p	Cohen's d	Descriptor
Integration with Nature									
FOSTG	45	6.87±0.9	8.58±0.8	**0.001***	1.996	Large	**0.001***	0.868	Moderate
FCG	45	6.82±1.2	7.16±1.1	0.848	0.347	Small			
Part of Nature									
FOSTG	45	20.7±2.4	26.6±1.3	**0.001***	3.056	VeryLarge	**0.001***	1.345	Large
FCG	45	20.7±3.3	22.1±1.5	1.000	0.546	Small			
Full Scale									
FOSTG	45	28.0±2.8	35.4±1.6	**0.001***	3.245	VeryLarge	**0.001***	1.275	Large
FCG	45	28.3±4.0	29.4±2.1	0.995	0.344	Small			

Pre: Pretraining. **Post**: Posttraining **FOSTG**= Female Outdoor sports Traning Grou **FCG**=Female Control Group; ***p< 0.05**

When the effect sizes in the sub-dimensions of the in-group devotion to nature scale of the female participants who took outdoor sports training were examined, the lowest score of Cohen's d effect size was the sub-dimension of integration with nature ($p<0.005$*, effect size 1.996). The highest effect size score in the entire scale was determined as 3.245 for $p<0.005$*.

Table 6. Anova test results regarding the sub-dimension questions of participants' outdoor sportsand motivation to participate in nature

Scale Sub-Dimensions		**M±SD**	**n**	**F**	**P**	**ANOVA**
Male and Female						
Integration with nature	Always(1)	8.35±1.1	94	11.309	**0.001***	3<2=1
	Occasionally(2)	7.78±1.3	91			
	Whenever Convenient(3)	7.40±0.9	35			
Part of nature	Always(1)	25.9±2.5	94	32.322	**0.001***	3<2<1
	Occasionally(2)	24.1±2.7	91			
	Whenever Convenient(3)	22.0±2.2	35			
Overall scale (Total)	Always(1)	34.3±3,2	94	30.541	**0.001***	3<2<1
	Occasionally(2)	31.9±3.6	91			
	Whenever Convenient(3)	29.5±2.7	35			
Male						
Integration with nature	Always(1)	8.41±1.0	61	7.803	**0.001***	3<2=1
	Occasionally(2)	7.80±1.2	55			
	Whenever Convenient(3)	7.29±0.9	14			
Part of nature	Always(1)	26.0±2.6	61	17.454	**0.001***	3<2<1
	Occasionally(2)	23.8±2.9	55			
	Whenever Convenient(3)	21.9±2.2	14			
Overall scale (Total)	Always(1)	34.4±3.3	61	17.284	**0.001***	2=3<1
	Occasionally(2)	31.6±3.7	55			
	Whenever Convenient(3)	29.2±2.9	14			
Female						
Integration with nature	Always(1)	8.24±1.1	33	3.242	**0.001***	3<2<1
	Occasionally(2)	7.75±1.3	36			
	Whenever Convenient(3)	7.48±0.9	21			
Part of nature	Always(1)	25.7±2.3	33	16.231	**0.001***	3<2<1
	Occasionally(2)	24.5±2.4	36			
	Whenever Convenient(3)	22.0±2.2	21			
Overall scale (Total)	Always(1)	34.2±3.0	33	14.026	**0.001***	3<2<1
	Occasionally(2)	32.4±3.3	36			
	Whenever Convenient(3)	29.7±2.7	21			

***p< 0.05**

A significant difference was found in the sub-dimensions of the participants' outdoor sports and participation in nature motivation for both genders ($p<0.001$) (Table 6).

DISCUSSION AND CONCLUSION

This study aimed to determine the level of devotion of adult individuals to nature and to evaluate their motivation sub-dimensions. The results of the research, the table sequence, and the problem sentence were arranged to form an index.

The mean age of the students taking the outdoor sports training and the control group participants were 21.5±1.6 years, their average height was 172±1.6 cm, their body weight was 66.5±8.6 kg, their BMI was 22.2±1.6 kg/m2, and their body fat percentage was 15.8±4.6%. (Table 1). Fat% values of women were higher than men when we evaluated them on the basis of gender. The reason for this is thought to be due to the fact that men are more active in social life and do more sports than female.

The percentage of men who responded always and occasionally to the questions about doing sports in the open air was over 60% while it was about 30% in female. Musitu-Ferrer et al. (2019) in his study, while the rate of men who always and occasionally answer questions about doing sports natures is over 50%, this rate is around 30% for female. This finding is in parallel with the findings of our study. Zhang et al., (2014) did not find a significant difference between gender and attachment to nature in a two-stage study they conducted with 1108 adult volunteers residing in the USA. Barton et al. (2016), in a study examining the relationship of nature excursions with 130 people and their relationship to nature, they revealed that attachment to nature does not have a direct effect on gender. Balci et al., (2021) similarly did not find a significant difference was found between gender and attachment to nature. Haluza et al., (2014) conducted a study with 1500 people and stated that female are more committed to nature than men. Karademir (2017), in his doctoral study in which he examined the level of devotion to nature and ethical attitudes of teacher candidates, found that female had higher levels of devotion to nature than men. The studies mentioned do not show parallelism with our findings. In two studies, it was stated that the level of devotion to nature of female was higher than that of men, while in the other three studies it was stated that there was no difference between the genders. This situation is thought to be due to the sample size and age groups. It will be healthier to evaluate the study in terms of gender by reaching a larger sample size and similar ages.

The lowest effect scores for Cohen's d effect size of the in-group anthropometric characteristics of male and female participants who took outdoor sports training were seen in body weight in both groups. While the lowest score in the size was found to be in body weight, the highest score of the effect size was found to be in BMI (Kg/m2). Cohen's d effect size of the anthropometric characteristics of men and female in the control group was found to be very small. When Table 3 shows a significant difference in favor of the students who took extreme sports training in all sub-dimensions of the scale within and between groups. According to the results of a previous study conducted on undergraduate students in Turkey, it has been stated that men's METs values are higher than female's and that men may be more likely to be active during the day because of this (Güler et al., 2021). Göger et al., (2019) also showed a significant

difference between activity and weight in the right lifestyle attitude and, as a result, between BMI values. Another similar study by Çınar and Duran, (2021) yielded high BMI values in the evaluation of devotion to nature in terms of health. The reduction in body weight shows that it has positive effects on BMI and physical performance. The studies carried out support this research.

It was determined that Cohen's d effect size in the sub-dimensions of the in-group devotion to nature scale of male participants who took outdoor sports training was the lowest in the integration with nature sub-dimension, while the highest effect score was in the part of nature sub-dimension. It was seen that the highest score of the effect size between groups was in the part of nature sub-dimension. When the effect sizes in the sub-dimensions of the devotion to nature scale of the men in the control group were examined, very small values were found in Cohen's d effect sizes. A significant difference was found in favor of the students who took outdoor sports training in all sub-dimensions of the scale within and between groups (Table 4). Koç and Karatekin (2013) evaluated pre-service teachers according to the frequency of their participation in environmental activities and found significant differences in favor of those who participated in environmental activities more frequently. This finding showed parallelism with the findings of our study. Contrary to our research. Tagrikulu et al., (2021) found that male teachers' sub-dimensions of devotion to nature and integration with nature were lower than expected. Balci et al., (2021) in their study with candidates participating in physical activity, when all dimensions of the attachment to nature scale were evaluated according to gender, no significant difference was found in the scores they got from the scale. Özgün and Özgün (2018) found that the scores they got from the overall scale differed significantly in favor of female when they were evaluated according to gender in their study conducted with prospective classroom teachers. In this context, it is thought that the lower than expected level of devotion to nature in all dimensions of the scale is due to the trainings, preferred places, insufficient time and sample group.

For the effect sizes of female participants who take outdoor sports training in the sub-dimensions of the in-group devotion to nature scale, Cohen's d effect size was the lowest score in the integration with nature sub-dimension. When the effect size of the female participants who took outdoor sports training was examined, it was determined that the highest score was in the part of nature sub-dimension, and the lowest score was in the scores of integration with nature. The effect sizes of female in the control group in the sub-dimensions of the devotion to nature scale were found to be very small in Cohen's d effect sizes. Table 5 shows a significant difference in favor of the students who took extreme sports training in all sub-dimensions of the scale within and between groups Karademir (2017) and Tagrikulu et al., (2021) stated that female teachers' sub-dimensions of devotion to nature and integration with nature and part of nature scores were higher than male teachers, which does not match with our results. Bruni et al., (2008) and Mayer and Frantz, (2004) found that gender did not make a difference in terms of devotion to nature. According to gender, it can be said that the dependence of the participants on nature increases. The fact that women's attachment to nature is higher than men on average is thought to be due to the sample size. It will be healthier to evaluate the study in terms of gender by reaching a larger sample size.

A significant difference was found in the sub-dimensions of the participants' outdoor sportsactivities and their motivation to participate in nature in terms of both genders (Table 6).

According to an experimental study conducted during the pandemic period, undergraduate students walking by taking at least 10,000 steps a day in nature significantly reduced the BMI values of students and also reduced waist and hip ratios (Yanar & Güler, 2021). Çınar and Duran, (2021) determined that the sub-dimensions of integration with nature and being a part of nature make a significant difference in terms of social motivation, which is similar to our findings. Considering the positive relationship between the attention capacity of individuals and their devotion to nature, it reveals its relative importance (Mayer et al., 2009). The fact that women's attachment to nature is higher than men on average is thought to be due to the sample size. It will be healthier to evaluate the study in terms of gender by reaching a larger sample size.

As a result, when we examined the adults' levels of devotion to nature, the scores in BMI values in terms of pre-test and post-test improved in both genders. The study showed that the values of devotion to nature indicate an increase among men and female who take outdoor sports training, with better scores for men as they seem to have higher motivation. In summary, it has been observed that when suitable environments are created for the students who take outdoor sports training, their devotion to nature increases after receiving education about nature. In Tootect our healthy natural habitats, it is necessary to educate individuals about nature consciousness from an early age. In this sense, it is recommended to create awareness, increase nature-related activities, and create the necessary appropriate conditions.

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Information on Ethics Committee Permission

Committe: This study was carried out with the permission of Kırıkkale University Social and Human Sciences Research Ethics Committe

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