



## **The Effect of Ecological Intelligence on Ecorecreative Attitude and The Mediating Role of Nature Attachment; An Example of Ornithology Activity**

**Glden KARAKAYA**

Ankara Hacı Bayram Veli niversitesi, Ankara

**zeyir KEMENT \***

Ordu niversitesi, Ordu

\* Corresponding Author: [uzeyirkement@odu.edu.tr](mailto:uzeyirkement@odu.edu.tr)

**Ali YAYLI**

Ankara Hacı Bayram Veli niversitesi, Ankara

### **Abstract**

The aim of this study is to explain the relationship between the ecological intelligence, nature relatedness, and ecorecreative attitudes of individuals participating in ornithology activities. The ecological intelligence scale was used in the study in three sub-dimensions, namely "holistic perspective", "social intelligence" and "economy". In this context, individuals participating in ornithology activities were selected as the population in the study and data were collected from the participants using a questionnaire form using the convenience sampling method. The research data were tested with the structural equation model in the Smart PLS statistical program. As a result of the analysis, it was determined that holistic and social intelligence affected natural relatedness, but economy did not. On the other hand, natural relatedness affected affective, cognitive, and behavioral attitudes. Holistic affected affective and cognitive attitudes but did not affect behavioral attitude. Similarly, social intelligence affected affective and behavioral attitudes, but did not affect cognitive attitudes. Economy, on the other hand, had a significant effect only on cognitive but did not affect affective and behavioral attitudes. Finally, natural relatedness has a mediating role between social intelligence and ecorecreative attitude scales. In addition, nature relatedness has a mediating role between holistic and affective/behavioral attitudes.

**Keywords:** Ecological intelligence, Ecorecreative attitude, Nature relatedness, Ornithology, Recreation

## **1. Introduction**

The environmental problems faced by humanity are not problems that basic sciences can solve alone. Since the majority of these problems are the result of human behavior, their solution also depends on people (Çakır et al., 2015). In order to solve the problems, people need to feel connected to nature. Individuals who feel connected to nature are expected to be more conscious in their behavior towards the environment (Değirmenci, 2020). In addition, studies have shown that people's disconnection from the natural environment can also cause these problems (Akçay et al., 2022; Tağrikulu et al., 2021; Yüksel & Bekar, 2017). According to Leopold's philosophy of environmental action, an individual's experiences with the environment create a sense of commitment and value towards the environment. For this reason, the individual has the motivation to protect the things he values. Therefore, the individual who creates a bond with the environment takes action to protect the environment (Goralnik & Nelson, 2011; Kılıç et al., 2017; Yüksel et al., 2020). Sustainable tourism and recreation practices have become more important than ever due to global environmental problems (Liu et al., 2022). Individuals who participate in natural area recreation activities learn about natural systems and spread them to their surroundings. They develop responsible behavior towards the environment. This makes an important contribution to environmental sustainability (Winter et al., 2019). It can be said that environmentally friendly recreational activities are becoming more important every day in this regard. One of these activities is bird watching. In short, bird watching can be expressed as the observation and identification of birds in their natural habitat (Şekercioğlu, 2002).

The growing bird-watching activity in Europe has significant potential for sustainable tourism (Stemmer et al., 2022). However, according to the 2022 World Bird Report, the number of bird species worldwide is decreasing by 49% and one in every eight birds is at risk of extinction. In Europe, 57% of birds living in agricultural areas between 1980-2020, 13% of insectivorous birds between 1990-2015, 14% of birds living in mountains between 2002-2014, and 3% of forest birds between 1980-2020 have decreased. In addition, 436 bird species have been at risk of extinction since 1988. The reasons for this are shown as deforestation, hunting, and ecosystem degradation (Doğa Derneği, 2024). It can be said that bird watching is an important natural area recreation activity in preventing this extinction. Because bird watchers increase local

awareness of birds in areas where bird diversity is high, this can be a key to bird protection (Şekercioğlu, 2002). Therefore, the study is considered important in terms of raising awareness about bird watching.

The reason why bird-watching (ornithology) is one of the environmentally friendly activities is that while angling etc. are among the consumable activities, bird-watching is among the non-consumable ecotourism activities. The people participating in this activity aim to see the birds, listen to their sounds, or take their photos (Çorba, 2019). The relationship of the person participating in bird-watching activities with the environment is strengthened and as bird watchers become more active in the environment, they play a role as an ecological gain in solving local and global environmental problems (Cordel & Herbert, 2002). The ecological intelligence of the individuals participating in bird-watching activities should be developed, they should be connected to nature and have an ecorecreative attitude. Because wrong practices in bird watching can cause birds to be disturbed rare or endangered species to disappear and natural habitat pollution (Şekercioğlu, 2002). For this reason, it can be said that bird-watching activities are closely related to ecological intelligence, commitment to nature, and ecorecreative attitude. Because a person with ecological intelligence is sensitive to environmental problems and raises people's awareness (Baş, 2011). It rejects the anthropocentric mechanistic view (Shumba, 2011). In addition, ecologists often mention the importance of attachment to nature. Attachment to nature is important in people's ecological behaviors (Bektaş et al., 2017). Similarly, bird watchers are expected to exhibit ecorecreative attitudes. Because people without environmental awareness can easily harm flora and fauna in recreational areas (Leung et al., 2008). For this reason, it is considered very important for individuals to have environmental education and recycling concepts in order to exhibit eco-recreational behaviors. Minds need to be developed ecologically (Sarı & Senel, 2018). As Leopald stated, experiencing the environment creates a bond with it and a protection instinct (Goralnik & Nelson, 2011). This study, it was aimed to investigate whether the ecological intelligence of individuals participating in bird watching, an environmentally friendly recreational activity, affects nature relatedness and ecorecreative attitudes. In order to solve environmental problems in general, people need to develop their ecological intelligence (Cordel & Herbert, 2002), increase their level of commitment to nature (Bektaş et al., 2017), and exhibit an ecorecreative attitude (Sezer et al., 2021). However, with modernization, people have become disconnected from nature (Tağrikulu et al., 2021).

Nature relatedness can be strengthened by natural area recreation activities during the individual's childhood (Çınar & Duran, 2021). Robert Micheal Pyle stated in his book 'The Last Child in Nature' "What does the extinction of crested vultures mean to a child who has never seen a wren?" (as cited in Çakır et al., 2015: 1373). For this reason, natural area recreation activities can be an important experience tool. Because nature-based recreation can produce positive results such as attitudes toward protecting nature and supporting local socio-economic development (Esen et al., 2020; Remacha et al., 2011). Therefore, the study is considered important in terms of raising awareness of the importance of participation in natural area recreation activities and concerning environmental problems because it concerns society. In addition, no study has been found in the literature about the ecological intelligence, attachment to nature, and ecorecreative attitude of bird watchers. The study can also be said to be important in terms of contributing to the literature. Another importance is the use of binoculars, telescopes, guidebooks nature-appropriate clothing, etc. for bird watching. (Doğa Derneği, 2024). For this reason, businesses can carry out marketing activities aimed at bird watchers. Because there has been a further revival in bird watching with COVID-19 (Corona). It is known that participation in global bird-watching activities was very high in May 2020 (Just, 2022). In 2020, Cağan Sekercioğlu observed 1849 of the 9,590 bird species observed all over the world and entered eBird (World Bird Watching Site). He became the person who saw the most bird species in the world in 2020 (Birdpx, 2024). It can be said that interest in bird watching is rapidly increasing in Türkiye. Türkiye has various wetlands and is on the migration routes of birds (Sert & Arslan, 2019). It is known that there are 184 important bird-watching areas and over 450 bird species in Türkiye. Therefore, Türkiye has an important potential in bird-watching activities (Çakıcı & Harman, 2006). The most well-known bird-watching spots in Türkiye are; in the Central Anatolia Region (Tuz, Akşehir, Eber, Kula, Seyfe, Sultansazlığı, and Palas Lakes), in the Marmara Region (İğneada Forests, İznik, Uluabat, Manyas Lakes, Meriç Basin), in the Aegean Region (Gediz and Büyük Menderes Deltas, Marmara and Bafa Lakes), in the Mediterranean Region (Göksu, Seyhan and Ceyhan Deltas, Bolkar, Amanos, Bey Mountains, Yumurtalık Lagoon and Tuzla Lake), in the Southeastern Anatolia Region (South Euphrates Valley and Birecik Steppes), and the Eastern Anatolia Region (Munzur Mountains, Erçek, Arın, Haçlı Lakes, Malazgirt and Bulanık Plain) (Aylan, 2020, p.51). No official statistics indicate the number of bird-watching people in Türkiye (Sert & Arslan, 2019). However, 6162 users are seen on the Türkiye e-Bird bird-watching page (ebird, 2024). In addition, it is known that bird watching is done individually. Since Türkiye is a potential

country for birdwatching, participation in bird-watching activities is expected. For this reason, a study was conducted on bird watching in Türkiye. In summary, the effect of ecological intelligence on nature relatedness and ecorecreative attitude was examined in the study. In addition, the effect of nature relatedness on ecorecreative attitude was investigated. Finally, the mediating role of nature relatedness was evaluated.

## **2. Literature Review**

### **2.1. Natural Area Recreation and Ornithology**

Outdoor recreation, which has a wide range of activities, can be classified as resource-based and user-oriented (Nielsen, 2021, p.1). While resource-based recreation activities are carried out in natural environments, they can be offered anywhere, such as in user-oriented parks (Harrison et al., 2022, p.3). Outdoor recreation can also be called a cultural ecosystem service. In other words, it is referred to as all non-material and normally non-consumption outputs that affect people's physical and mental conditions (Komossa et al., 2020, p.1). When it comes to outdoor activities in general, examples such as camping, caving, bird-watching, cycling, fishing, hunting, mountaineering, canoeing, rafting, sailing, skiing, horseback riding, etc. can be given (Nielsen, 2021). With the development of technology, people have begun to benefit from the convenience offered by technology. Technology has entered many areas of life such as home, work, agriculture, and industry. However, as people's physical, mental, and social work has decreased, physical and mental problems have also emerged in people. It is stated that these problems can be reduced with recreational activities (Gulam, 2016). When the studies are examined, it is possible to say that participation in nature-based recreation has increased since the 1990s (Cordel et al., 2008). Because natural area recreation offers a lot of variety. It provides social interaction to the individual and allows the individual to develop their learning skills (Lekies et al., 2015). According to the "Attention Restoration Theory" developed by Kaplan (1995) and the "Stress Reduction Theory" developed by Ulrich et al. (2023) being active in natural areas helps people focus their attention and reduce stress (Ozçifçi et al., 2021; Weng & Chiang, 2014). For this reason, human-nature interaction is gaining importance (Hayir-Kanat & Breuste, 2019). Nature is mentally restorative with its four basic features. These are; distance, admiration, scope, and harmony. In addition, nature itself is interesting and therefore does not require effort to attract attention (Lee, 2011). For example, being in a natural environment for someone living in a crowded city

creates a feeling of being away from chaos. Objects in nature easily evoke a sense of admiration in the individual. In a remote wilderness, scope comes easily and the individual feels like he/she is in a different world. In a natural area, the individual feels in harmony with nature as if there is a special resonance between him/her (Kaplan, 1995).

Nature-based recreation can have positive outcomes such as attitudes toward nature conservation and supporting local socioeconomic development (Remacha et al., 2011). There is an increasing awareness of the benefits of natural area recreation. Significant changes are being made to protect soils, rivers, and oceans and to improve resource management. Sustainable tourism and recreation practices have become more important than ever to increase resilience in natural systems, including human populations (Liu et al., 2022). Individuals who participate in natural area recreation activities learn about natural systems spread them to their surroundings and develop environmentally responsible behavior. Recreational activities have a unique potential to encourage deeper connections with outdoor spaces that result in conservation activities such as restoration, management, or volunteering. This makes a significant contribution to environmental sustainability (Winter et al., 2019). When nature-based recreation activities are examined, it is possible to categorize them under two headings "consumed" and "non-consumed". For example, while angling is among the consumable activities, bird watching is included in the non-consumable ecotourism activity. People participate in this activity to see birds, listen to their sounds, or take photos (Çorba, 2019). In short, bird watching refers to "the observation and identification of birds in their natural habitat" (Sekercioğlu, 2002, p.282). This non-consumable recreational activity, which is growing in Europe, has significant potential for sustainable tourism (Stemmer, 2022). With COVID-19, there has been a general increase in nature-related recreational activities. In this context, there has also been a revival in bird watching (Just, 2022).

The relationship between people and the environment is strengthened through bird-watching activities, and as bird watchers become more active in the environment, they play a role as an ecological gain in solving local and global environmental problems (Cordel & Herbert, 2002). It can be said that the individuals participating in bird-watching activities are educated, wealthy, and middle-aged and a significant portion of them are retirees. It is known that they have a heterogeneous structure. For example, some bird watchers attach importance to learning to scientifically classify birds. It is known that the most

important factor in choosing a bird-watching location is the bird, as well as accessibility, guidance, accommodation, transportation, price, and conservation participation (Stemmer, 2022). There may be many reasons that lead people to bird watching. It can be stated that enjoying nature, trying new things to learn, watching the color and diversity of birds, observing their behaviors, and meeting people with similar interests (Cordell & Herbert, 2002).

## **2.2. Ecological Intelligence**

For a sustainable world, it is necessary to combat various interrelated and complex problems (Akkuzu-Güven & Uyulgan, 2021a). Many examples of these problems can be given as global warming, depletion of the ozone layer, extinction of flora and fauna, floods and erosion due to the excessive cutting of forests, unemployment, soil pollution, energy problems, poor air and water conditions, and decreased quality of life. These problems have occurred as a result of human behavior directly or indirectly affecting the environment (Putra et al., 2019; Suwandi, 2018). For this reason, people need a number of basic skills. It is stated that to achieve a radical transformation in the solution of environmental problems, people who are aware of their ecological intelligence and who develop this intelligence are needed (Akkuzu-Güven & Uyulgan, 2021b). Goleman (2009) defines ecological intelligence as the ability of people to adapt to the ecological niche. The use of the word ecology in this definition should not be interpreted as only including natural science. Ecological intelligence expresses eco-philosophy, systemic thinking, and holistic perspective (Okur-Berberoğlu, 2020). Therefore, the ecological view is essentially the idea of relational connection. At the same time, it expresses more than that. Because it offers the promise of healing the fragmented, it is ethical, valued, and expresses humanity. Ecological intelligence emerges as a response to the limitations of the modernist worldview. In other words, it rejects the anthropocentric mechanistic view (explanation of organic and living concepts with mechanical laws) (Shumba, 2011).

Ecological intelligence has a complex structure and therefore has sub-dimensions. These are; Social intelligence, economy, and holistic perspective (Okur-Berberoğlu, 2020). According to the holistic perspective, every person should know that their behavior affects not only themselves but also the environment they live in (Bahrudin, 2018). Therefore, a person with ecological intelligence should contribute to the sustainability of the environment by exhibiting environmentally protective behavior (Bouley, 2012). A person with social intelligence should be able to think about whether there is human

exploitation when producing any product. In the economic sub-dimension, products should have a sustainable understanding instead of environmental and human exploitation when producing them. These sub-dimensions are interrelated (Okur-Berberoğlu, 2020).

### **2.3. Nature Relatedness**

Since the existence of humanity, humans, and nature have been a whole in interaction. However, this organic worldview lasted until the 16th and 17th centuries. During this period, with the influence of Bacon and Descartes, nature began to be seen as a mechanical structure that needed to be dominated (Yaylı, 2015). With this understanding, nature was commodified. As people developed a sense of ownership, they began to constantly take from nature and see themselves as superior to plants and animals (Byrne, 2011). With the influence of the Industrial Revolution, people began to migrate from villages to cities (Gül, 2013). For this reason, it is known that more than half of the world's population lives in cities and this number is increasing every day (Noe & Stolte, 2023). In addition, developing countries have begun to rapidly consume scarce resources in nature (Ertan-Akkoyunlu, 2015). Natural destruction has increased. This has brought with it global environmental problems such as climate change (Gül, 2013). In addition, people have had fewer opportunities to interact with nature. It is also a fact that the decrease or disappearance of experiencing nature has negative effects on human health (Dean et al., 2018). For these reasons, attention has been focused on the relationship between nature and humans as environmental problems have increased (Nisbet & Zelenski, 2013). Studies covering the relationship between humans and the ecosystem have begun to be conducted since the end of the 19th century (Seymour, 2016). Especially concerned intellectual researchers such as Leopold have conducted studies indicating their environmental concerns (Lin, 2015). According to Leopold's philosophy of environmental action, an individual's experiences with the environment create a sense of commitment and value towards the environment. For this reason, the individual develops a motivation to protect the things he values, and therefore the individual, who forms a bond with the environment, takes action to protect the environment (Goralnik & Nelson, 2011). The environmental problems faced by humanity are not problems that basic sciences can solve alone. Since the majority of these problems are the result of human behavior, their solution also depends on humans (Çakır et al., 2015). To solve these problems, people need to feel connected to nature. They need to be more conscious in their behavior towards the environment (Değirmenci, 2020). In addition, studies have shown



that people's disconnection from the natural environment can also cause these problems (Tağrikulu et al., 2021). When environmental literature is examined, it is seen that the concept of connectedness has a rich history. Philosophers defend the importance of the belief that 'I am a part of nature' (Schultz et al., 2004). In short, connectedness to nature refers to the degree to which a person perceives nature in their cognition (Schultz, 2002). Ecologists and ecopsychologists have frequently mentioned the importance of connectedness to nature in their studies. It is also stated that connectedness to nature is an important component in exhibiting ecological behaviors (Bektaş et al., 2017). Various studies have shown that intentionally establishing direct contact with nature in an aesthetic environment increases the connection between humans and nature, as it involves the use of various senses (Rosa & Collado, 2019).

#### **2.4. Ecorecreative attitude**

Ecology and environmental protection issues have been an important source of motivation for designers and architects when designing recreation areas (Rybka & Szpytma, 2012). Natural area recreation is seen as a solution for a sustainable environment (Zhang et al., 2021). Because outdoor recreation provides a more sustainable environment for people in cities by protecting the environment (Kement, 2014). Eco-labels are an important solution to solving environmental problems (Wedding, 2010). The concept of eco simply means using ecology in a way that future generations can use (Erdoğan, 2014, p.7). Ernest Haeckel used the concept of ecology in 1869. Ecology is derived from the Greek word 'oikos'. Accordingly, it can be defined as the home life of living things. Thus, the word 'ecology' was used to examine the environmental conditions of existence (Thom, 2019). When considered at the recreation scale, eco-recreation is the protection and development of the ecological balance in all resource-based or user-focused recreation activities carried out in open areas and the creation of a reminiscent association of this in people (Karaküçük & Akgül, 2016). Behaviors in recreation areas can harm flora and fauna. For example, pedestrian traffic can easily damage the vegetation. When the vegetation is damaged, the soil is exposed to erosion as a result of water and wind compression. Chemicals in recreation areas are carried to streams, lakes, and rivers, decreasing water quality and endangering human health. In addition, people visiting the recreation area can also displace animals. Displaced animals are at a disadvantage against predation. They cannot easily find natural food. They eat food offered by visitors. This can cause intestinal problems (Leung et al., 2008). For this reason, it is considered very important for individuals to have environmental education and

recycling in order to exhibit eco-recreational behavior. Minds need to be developed from an ecological perspective (Sarı & Şenel, 2018). Because, according to the theory of planned behavior, behaviors are created by intentions. Subjective norms, perceived behavioral control, and attitudes are effective on intentions (Ajzen, 2011).

In general, environmental attitudes are behavioral intentions such as being aware of environmental activities and exhibiting protective behaviors towards the ecological environment (Schmiedebach et al., 2022). A person with an ecorecreative attitude is also expected to exhibit ecorecreative behavior. Ecorecreative attitude can be briefly expressed as participation in recreational activities that focus on protecting the environment and supporting sustainability in natural area recreation activities (Kement et al., 2021). Individuals' positive attitudes towards the environment affect the display of ecorecreative behaviors. As a result, environmental threats in the environment and human relationships can be minimized. Areas used for tourism and recreation purposes are protected and developed. Individuals participating in open area recreation activities develop awareness about environmental sensitivity (Sezer et al., 2021). In addition, ecology has the principle of the integrity, limitation, and self-control of nature, the principle that the increasing population increases environmental problems, the principle of the diversity of nature, the principle that nature finds the best solution, the principle that nothing disappears in nature, the principle of nature's rebound, and the principle of going together with nature (Kement et al., 2021).

### **3. Hypothesis Development**

#### **3.1. The Relationship Between Ecological Intelligence and Nature Relatedness**

When the literature was examined, Suwandi et al. (2018) found that Indonesian language textbooks based on ecological intelligence had a significant impact on students' environmentally friendly behaviors. Özden and Yapıcı (2021) examined the relationship between individuals' ecological intelligence and organic food consumption. As a result of the study, it was revealed that ecological intelligence had an impact on organic food consumption. In addition, it was among the results that Generation Z consumed less organic food. Aswita and Suryadarma (2018) examined the sustainability of the natural tourism area in Aceh, a region in Indonesia. They concluded that ecological, social, and religious intelligence formed through local knowledge ensured the sustainability of this area. Ilela et al. (2021) examined the relationship between ecological intelligence and environmental behavior of secondary school students. As a result of the study,

a relationship was found between ecological intelligence and environmental behavior. As a result of the concept review and literature review, it can be said that human behavior directly or indirectly disrupting nature plays an important role in bringing ecological intelligence and commitment to nature to the agenda. In both concepts, it is emphasized that human behavior is important for a sustainable environment. Therefore, as a result of the research, it is expected that there will be a relationship between the natural devotion of individuals with developed ecological intelligence. Therefore, the following hypotheses are being answered:

*H<sub>1a</sub>: Holistic perspective has a positive effect on nature relatedness.*

*H<sub>1b</sub>: Social intelligence has a positive effect on nature relatedness.*

*H<sub>1c</sub>: Economy has a positive effect on nature relatedness.*

### **3.2. The Relationship Between Nature Relatedness And Ecorecreative Attitude**

When the literature is examined, Cheung and Fok (2014) examined the environmental attitudes and motivations of individuals participating in nature-based recreation activities in Hong Kong. Accordingly, a relationship was found between the attitudes and motivations of visitors. It was concluded that individuals with high environmental concerns visited for innovation purposes, while those with low environmental concerns visited for escape purposes. In this study, it can be said that attitudes toward the environment direct environmental behavior. Cinar and Duran (2021) examined the effect of attachment to nature on nature walk motivation. As a result of the research, it was found that attachment to nature was effective in the sub-dimensions of nature walk motivation. Sulphery and Faisal (2021) found in a study they conducted in Saudi Arabia that attachment to nature and environmental concern was a precursor to ensuring environmental sustainability. Schmiedebach et al. (2022) examined the environmental behaviors of students with socio-demographic factors. Accordingly, it was concluded that education level, gender, and age were effective on environmental behaviors. Davis et al., (2011) examined the relationships of individuals with the natural environment and their environmental behaviors. As a result, they concluded that attachment to nature affects ecological behavior and willingness to make sacrifices for the environment. Bradley et al. (2010) conducted a study to measure the environmental knowledge and attitudes of high school students. The students were given a 10-day environmental science course. As a

result of the study, it was concluded that the students' environmental knowledge increased by 22% and their attitudes towards the environment changed positively. As a result of the concept review and literature research, the following hypotheses were developed in the study;

*H<sub>2a</sub>: Nature relatedness has a positive effect on affective attitude.*

*H<sub>2b</sub>: Nature relatedness has a positive effect on cognitive attitude.*

*H<sub>2c</sub>: Nature relatedness has a positive effect on behavioral attitude.*

### **3.3. The Relationship Between Ecological Intelligence And Ecorecreative Attitude**

An individual with developed ecological intelligence is expected to have an ecorecreative attitude. The feature that distinguishes the ecorecreative attitude from other environmental attitudes is that the individual exhibits attitudes specific to the field of activity. For example, while an individual participating in a recreational activity in water pays attention to the cleanliness of the water, a person participating in a recreational activity on land may focus on soil pollution (Kement et al., 2021, p.36). Okur-Berberoğlu and Uygun (2012) examined the relationship between students' perceived environmental awareness and environmental attitude. As a result of the research, it was found that environmental awareness and environmental attitude were effective. Tükel et al., (2022) examined the relationship of individuals walking in nature with nature and their attitudes towards eco-recreation. As a result of the research, it was observed that as the relationship of individuals participating in nature walks with nature increased, their attitudes towards eco-recreation also increased. Kement and Bükey (2020) examined the behaviors of individuals visiting Bolu Yedigöller National Park as an eco-recreation activity within the scope of green purchasing behavior theory. Accordingly, environmental values affect individuals' ecological worldview. The ecological worldview affects the awareness of the consequences, awareness imposes responsibility on the individual, responsibilities affect personal norm, and personal norm affects green purchasing behavior. As a result of all these evaluations, the following hypotheses are sought in the research;

*H<sub>3a</sub>: Holistic perspective has a positive effect on affective attitude.*

*H<sub>3b</sub>: Holistic perspective has a positive effect on cognitive attitude.*

*H<sub>3c</sub>: Holistic perspective has a positive effect on behavioral attitude.*

Thorndike (1920) defined social intelligence as understanding other individuals and behaving more wisely in human relations. He/she is knowledgeable and sensitive about social issues (Walker & Foley, 1973). For this reason, individuals with developed social intelligence are expected to exhibit ecocrecreative attitudes that support sustainability. Erdem (2017) examined the relationship between multiple intelligence areas of high school students and sustainable environmental attitudes. As a result of the study, a relationship was found between logical-mathematical intelligence and sustainable environmental attitude. Hossain et al. (2022) examined the relationship between the emotional intelligence of tourists and their environmentally responsible behaviors. As a result of the research, a relationship was found between the sub-dimensions of emotional intelligence and environmentally responsible behavior. In line with this information, the following hypotheses were formed in the research;

*H<sub>4a</sub>: Social intelligence has a positive effect on affective attitude.*

*H<sub>4b</sub>: Social intelligence has a positive effect on cognitive attitude.*

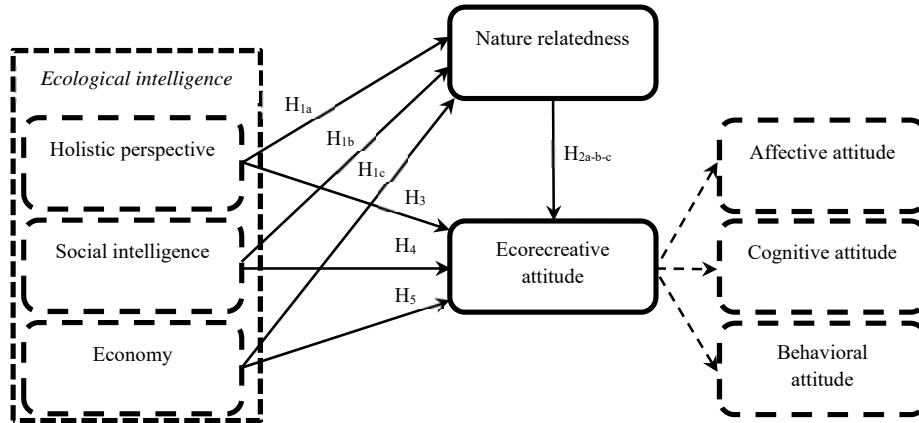
*H<sub>4c</sub>: Social intelligence has a positive effect on behavioral attitude.*

With the development of the Industrial Revolution, nature was seen as an endless resource. There was a perception that human needs were unlimited. For this reason, a wide variety of goods and services were produced. This production process caused excessive pressure on nature and living things. For this reason, the economic system must also be sustainable (Özdemir, 2022). For this reason, individuals with a sustainable economic understanding are expected to exhibit an ecocrecreative attitude. In line with this information, the following hypotheses were formed in the research;

*H<sub>5a</sub>: Economy has a positive effect on affective attitude.*

*H<sub>5b</sub>: Economy has a positive effect on cognitive attitude.*

*H<sub>5c</sub>: Economy has a positive effect on behavioral attitude.*



**Figure 1.** Research Model

#### **4. Methods**

##### **4.1. Population and Sampling**

The population of the study consisted of individuals participating in ornithology activities in Türkiye. However, since it was not possible to reach the entire population due to time and cost, sampling was resorted to. There are no statistics on the number of people participating in bird-watching in Türkiye. Therefore, G\*Power was preferred to determine the sample size. 5% effect size, 5% alpha level, and 95% power were selected for the sample calculation (Faul et al., 2009). Accordingly, reaching at least 262 participants was found sufficient. Since there was no category or group to be classified during the collection process of the research data, the simple random sampling method was used. The research data were reached online via Google Forms to a total of 387 people between January and June 2024.

##### **4.2. Data Collection**

The survey technique, one of the quantitative research methods, was used in the research. The first part of the survey form included questions aimed at determining demographic characteristics. The second part included items belonging to the ecological intelligence (Okur-Berberoğlu, 2020) scale. Ecological intelligence was used in the research as three sub-dimensions “holistic”, “social intelligent”, and “economy”. The ecorecreative attitude (Kement et al., 2021) scale was used as three sub-dimensions “affective”, “behavioral”, and “cognitive”. The nature relatedness scale (Çakır et al., 2015) was used as a

single dimension without being separated into sub-dimensions. Scale items were directed to the participants on a five-point Likert-type scale, with "1" strongly disagree and "5" strongly agree. Scale items were asked of the participants in Turkish. Before the survey form was distributed, content and face validity conditions were met. Five experts were interviewed for face validity. For content validity, a pilot test was conducted on a group of 50 people and it was decided that the items were valid and reliable.

#### **4.3. Data Analyses**

For data analysis, coding was performed in the SPSS statistics program, and analyses were performed in the Smart PLS statistics program. First, measurement and structural model analyses were performed. Then, the structural equation model was used for hypothesis testing. Before proceeding to data analysis, it was determined that the scales had kurtosis-skewness values between -2 and +2 and showed normal distribution (George & Mallery, 2013). In addition, evaluation was made through the Harman single-factor test to determine whether there was a common method bias (Kock, 2015). As a result of the factor analysis, it was concluded that the total variance was below 50% and there was no common method bias (Fuller et al., 2016).

### **5. Results**

#### **5.1. Demographic Results**

The demographic characteristics of the participants in the study are detailed in Table 1. Accordingly, 35.1% of the participants are female and 64.9% are male. 32% of the participants are 25-36, 22.5% are 37-45, 21.2% are 46-55, 17.3% are 18-24, 5.7% are 56-65 and 1.3% are 65 years of age or older. 61.5% of the participants have a bachelor's degree, 26.1% have a master's degree, 9.3% have a college degree, 2.3% are in secondary school and 0.8% are in primary school level. When the frequency of past participation of the participants in the event is examined, 63.3% have attended the event 6 or more times, 20.9% have attended the event for the first time, 9% have attended the event 2-3 times and 6.7% have attended the event 4-5 times.

**Table 1.** Demographic Characteristics of Participants

		N	%
<b>Gender</b>	Female	136	35.1
	Male	251	64.9
<b>Age</b>	18-24	67	17.3
	25-36	124	32.0
	37-45	87	22.5
	46-55	82	21.2
	56-65	22	5.7
	66 and more	5	1.3
<b>Education</b>	Primary school	3	.8
	Secondary school	9	2.3
	College	36	9.3
	Bachelor's degree	238	61.5
	Master	101	26.1
<b>Past behavior frequency</b>	1 time	81	20.9
	2-3 times	35	9.0
	4-5 times	26	6.7
	6 and more	245	63.3

## 5.2. Measurement Model Assessment

The construct/convergent validity and reliability results of the scales used in the study are given in detail in Table 2. In order to ensure the construct validity of the scales, outer loadings were examined and items numbered "1", "2" and "4" from the holistic sub-dimension, items numbered "1" and "2" from the nature relatedness' experience sub-dimension scale, items numbered "1", "2", "4", "5" and "7" from the nature relatedness scale, item numbered "5" from the cognitive attitude sub-dimension and items numbered "1" and "7" from the behavioral attitude sub-dimension were removed because they gave results below 0.50 (Kaiser, 1974). For composite reliability (CR), rho\_a (Dijkstra & Henseler, 2015) and rho\_c (Bagozzi & Yi, 1988) values were calculated. Rho\_a values were accepted because they gave results above 0.70 and rho\_c values were accepted because they gave results above 0.60. In addition, Cronbach's Alpha ( $\alpha$ ) values were accepted because they were above 0.70 (Hair et al., 2017). For convergent validity, the average variance explained (AVE) was calculated. AVE values of behavioral attitude (AVE= 0.440), natural relatedness (AVE=0.465), and social intelligence (AVE= 0.480) scales were below 0.50. However, since they were above 0.40 and CR values were above 0.60, they were considered acceptable (Fornell & Larcker, 1981; Huang et al., 2013; Lam, 2012) and the research was continued in its current form.



**Table 2.** Reliability and Validity Scores

<b>Construct</b>	$\lambda$	<i>OutlerVIF</i>	$\alpha$	<i>rho_a</i>	<i>rho_c</i>	<i>AVE</i>
<b>Nature relatedness (NatureR)</b>						
NatureR3	.594	1.450	.882	.892	.904	.465
NatureR5	.637	1.647				
NatureR6	.558	1.562				
NatureR8	.571	1.366				
NatureR9	.808	2.426				
NatureR10	.634	1.466				
NatureR11	.606	1.514				
NatureR12	.780	2.047				
NatureR13	.694	1.730				
NatureR14	.811	2.581				
NatureR15	.745	1.904				
<b>Ecological Intelligent</b>						
<b>Economy</b>						
Economy1	.871	1.773	.766	.784	.865	.682
Economy2	.846	1.846				
Economy3	.756	1.356				
<b>Holistic</b>						
Holistic3	.788	1.239	.611	.658	.833	.715
Holistic5	.899	1.239				
<b>Social intelligence (Social)</b>						
Social1	.753	1.210	.643	.655	.786	.480
Social2	.653	1.194				
Social3	.688	1.278				
Social4	.673	1.227				
<b>Ecorecreative attitude</b>						
<b>Affective attitude (affective)</b>						
Affective1	.912	4.644	.918	.926	.941	.765
Affective2	.937	7.467				
Affective3	.940	6.886				
Affective4	.906	3.770				
Affective5	.640	1.357				
<b>Cognitive attitude (Cognitive)</b>						
Cognitive1	.648	1.575	.810	.849	.862	.515
Cognitive2	.581	1.510				
Cognitive3	.809	2.015				
Cognitive4	.759	1.757				
Cognitive6	.647	1.414				
Cognitive7	.826	1.811				
<b>Behavioral attitude (Behavior)</b>						
Behavior2	.628	1.361	.815	.825	.861	.439
Behavior3	.559	1.284				
Behavior4	.573	1.335				
Behavior5	.695	1.818				
Behavior6	.769	2.137				
Behavior8	.727	1.626				
Behavior9	.725	1.617				
Behavior10	.592	1.303				

Note:  $\alpha$  = Cronbach Alpha;  $\lambda$  = Outer loadings; *OutlerVIF* = Outer variance inflation factor; *rho\_a* and *rho\_c* = Composite reliability; *AVE* = Averaged variance extracted.

The model goodness of fit of the scales was calculated. Standardized root mean square residual (SRMR) gave a result lower than 0.80 (SRMR= 0.70) (Hu & Bentler, 1999). The normed fit index (NFI) was evaluated as acceptable because it gave a result close to 1.00 (NFI= 0.751) (Hair et al., 2013).  $\chi^2$  was calculated as 1889.348. In addition, d\_ULS (3.854) and d\_G (0.891) fit criteria were calculated and were found to be higher than the original value (0.05) (Dijkstra & Henseler, 2015). Finally, goodness of fit (GoF) was calculated and gave a result higher than 0.36 (0.45) (Tenenhaus et al., 2005). As a result of all these evaluations, it was concluded that the model had a goodness of fit.

**Table 3.** Heterotrait Monotrait Ratio

No	Construct	1	2	3	4	5	6
1	Affective attitude						
2	Behavioral attitude	.508					
3	Cognitive attitude	.596	.590				
4	Economy	.149	.409	.378			
5	Holistic perspective	.382	.329	.380	.308		
6	Nature relatedness	.477	.566	.377	.299	.321	
7	Social Intelligence	.412	.886	.375	.653	.404	.634

For discriminant validity, Heterotrait Monotrait Ratio (HTMT) (see Table 3) and Fornell Larcker Criterion (see Table 4) were calculated. HTMT values of all scales were below 1.00 (Vorhees et al., 2016) and Fornell Larcker Criterion values were higher than correlation loadings (Fornell & Larcker, 1981). Accordingly, the scales have discriminant validity.

**Table 4.** Fornell Larcker Criterion

No	Construct	1	2	3	4	5	6	7
1	Affective attitude	<b>.875</b>						
2	Behavioral attitude	.433	<b>.663</b>					
3	Cognitive attitude	.524	.479	<b>.718</b>				
4	Economy	.127	.338	.304	<b>.826</b>			
5	Holistic perspective	.298	.238	.289	.209	<b>.846</b>		
6	Nature relatedness	.429	.492	.338	.249	.242	<b>.682</b>	
7	Social Intelligence	.331	.654	.291	.457	.259	.508	<b>.693</b>

Note: Numbers in bold represent the square root of AVE.

### 5.3. Structural Model Assessment

In order to understand whether there is a multicollinearity problem in the research model, InnerVIF values were examined and it was found to be below 5.00 (Becker et al., 2015) (see Table 5). Secondly, the coefficient of determination (R<sup>2</sup>) was calculated. Affective attitude was found to be 0.24, cognitive attitude was found

to be 0.20, behavioral attitude was found to be 0.47, and nature relatedness was found to be 0.27. Thirdly, the effect size ( $f^2$ ) of the hypotheses was calculated. The obtained results are shown in Table 5. Accordingly, the highest effect size was found in the effect of social intelligence on behavioral attitude (0.31). This rate was followed by the effect of social intelligence on nature relatedness (0.23).

#### 5.4. Path Analysis Results

Hypotheses were tested and presented in Table 5. Holistic perspective ( $\beta_{\text{Holistic}} \gg \text{NatureR} = .116, t = 2.682, p = .007$ ) and social intelligence ( $\beta_{\text{Social}} \gg \text{NatureR} = .474, t = 8.130, p = .000$ ) have a significant effect on nature relatedness, but economy ( $\beta_{\text{Holistic}} \gg \text{NatureR} = .006, t = .125, p = .900$ ) does not have a significant effect on nature relatedness. So, while hypotheses H1a and H1b are supported, H1c is not supported. Nature relatedness has a significant effect on affective attitude ( $\beta_{\text{NatureR}} \gg \text{Affective} = .326, t = 5.544, p = .000$ ), cognitive attitude ( $\beta_{\text{NatureR}} \gg \text{Cognitive} = .227, t = 3.462, p = .001$ ), and behavioral attitude ( $\beta_{\text{NatureR}} \gg \text{Behavioral} = .206, t = 4.052, p = .000$ ). Hence, H2a, H2b, and H2c are supported. Holistic perspective has a significant effect on affective attitude ( $\beta_{\text{Holistic}} \gg \text{Affective} = .196, t = 3.326, p = .001$ ) and cognitive attitude ( $\beta_{\text{Holistic}} \gg \text{Cognitive} = .186, t = 2.622, p = .009$ ), but has no significant effect on behavioral attitude ( $\beta_{\text{Holistic}} \gg \text{Behavioral} = .043, t = .956, p = .339$ ). Therefore, while hypotheses H3a and H3b are supported, H3c is not supported. Social intelligence has a significant effect on affective attitude ( $\beta_{\text{Social}} \gg \text{Affective} = .141, t = 2.177, p = .030$ ) and behavioral attitude ( $\beta_{\text{Social}} \gg \text{Behavioral} = .521, t = 10.562, p = .000$ ), but has no significant effect on cognitive attitude ( $\beta_{\text{Social}} \gg \text{Cognitive} = .038, t = .574, p = .566$ ). Therefore, while hypotheses H4a and H4c are supported, H4b is not supported.

**Table 5.** Hypotheses Testing Results

Hypothesis	$\beta$	$\bar{x}$	S.D.	t-Statistic	p-Value	ImmerVIF	$f^2$	Results
H1a Holistic -> NatureR	.116	.120	.043	2.682	.007**	1.084	.018	Supported
H1b Social -> NatureR	.474	.475	.058	8.130	.000***	1.311	.234	Supported
H1c Economy -> NatureR	.006	.009	.052	.125	.900	1.279	.000	Not supported
H2a NatureR -> Affective	.326	.326	.059	5.544	.000***	1.371	.101	Supported
H2b NatureR -> Cognitive	.227	.229	.066	3.462	.001***	1.371	.046	Supported
H2c NatureR -> Behavioral	.206	.205	.051	4.052	.000***	1.371	.059	Supported
H3a Holistic -> Affective	.196	.197	.059	3.326	.001***	1.103	.045	Supported
H3b Holistic -> Cognitive	.186	.190	.071	2.622	.009**	1.103	.038	Supported
H3c Holistic -> Behavioral	.043	.043	.046	.956	.339	1.103	.003	Not supported
H4a Social -> Affective	.141	.142	.065	2.177	.030**	1.618	.016	Supported
H4c Social -> Cognitive	.038	.041	.067	.574	.566	1.618	.312	Not supported
H4b Social -> Behavioral	.521	.526	.049	10.562	.000***	1.618	.001	Supported

<b>H5a</b>	Economy -> Affective	-.060	-.057	.055	1.089	.276	1.279	.004	<i>Not supported</i>
<b>H5c</b>	Economy -> Cognitive	.189	.190	.059	3.212	.001***	1.279	.035	<i>Supported</i>
<b>H5b</b>	Economy -> Behavioral	.039	.041	.046	.861	.389	1.279	.002	<i>Not supported</i>

*Note: P = <.001\*\*\*, p = <.05\*\*; NatureR= Nature relatedness*

Economy has not a significant effect on affective attitude ( $\beta_{\text{Economy}} \gg \text{Affective} = -.060$ ,  $t = 1.089$ ,  $p = .276$ ) and behavioral attitude ( $\beta_{\text{Economy}} \gg \text{Behavioral} = .039$ ,  $t = .861$ ,  $p = .389$ ), but has a significant effect on cognitive attitude ( $\beta_{\text{Economy}} \gg \text{Cognitive} = .189$ ,  $t = 3.212$ ,  $p = .001$ ). Therefore, while hypotheses H5a and H5c are not supported, H5b is supported.

**Table 6.** Mediation Effect Results

<b>Hypotheses</b>	$\beta$	$\bar{x}$	<i>S.D.</i>	<i>t-Statistic</i>	<i>p-Value</i>
Holistic -> NatureR -> Cognitive	.026	.028	.014	1,897	.058
Social -> NatureR -> Affective	.154	.155	.036	4,282	.000***
Social -> NatureR -> Behavioral	.098	.097	.026	3,817	.000***
Social -> NatureR -> Cognitive	.107	.108	.031	3,491	.000***
Economy -> NatureR -> Affective	.002	.002	.017	.123	.902
Economy -> NatureR -> Behavioral	.001	.002	.011	.122	.903
Holistic -> NatureR -> Affective	.038	.039	.016	2,432	.015**
Economy -> NatureR -> Cognitive	.001	.002	.012	.118	.906
Holistic -> NatureR -> Behavioral	.024	.024	.011	2,242	.025**

*Note: P = <.001\*\*\*, p = <.05\*\*; NatureR= Nature relatedness*

The research also examined the mediating effect of nature relatedness presented in Table 6. Accordingly, there is a mediating effect of nature relatedness between social intelligence and affective, cognitive, and behavioral attitude. There is also a mediating effect of nature relatedness between holistic perspective and affective and behavioral attitude. In other hypotheses, there is no mediating effect of nature relatedness.

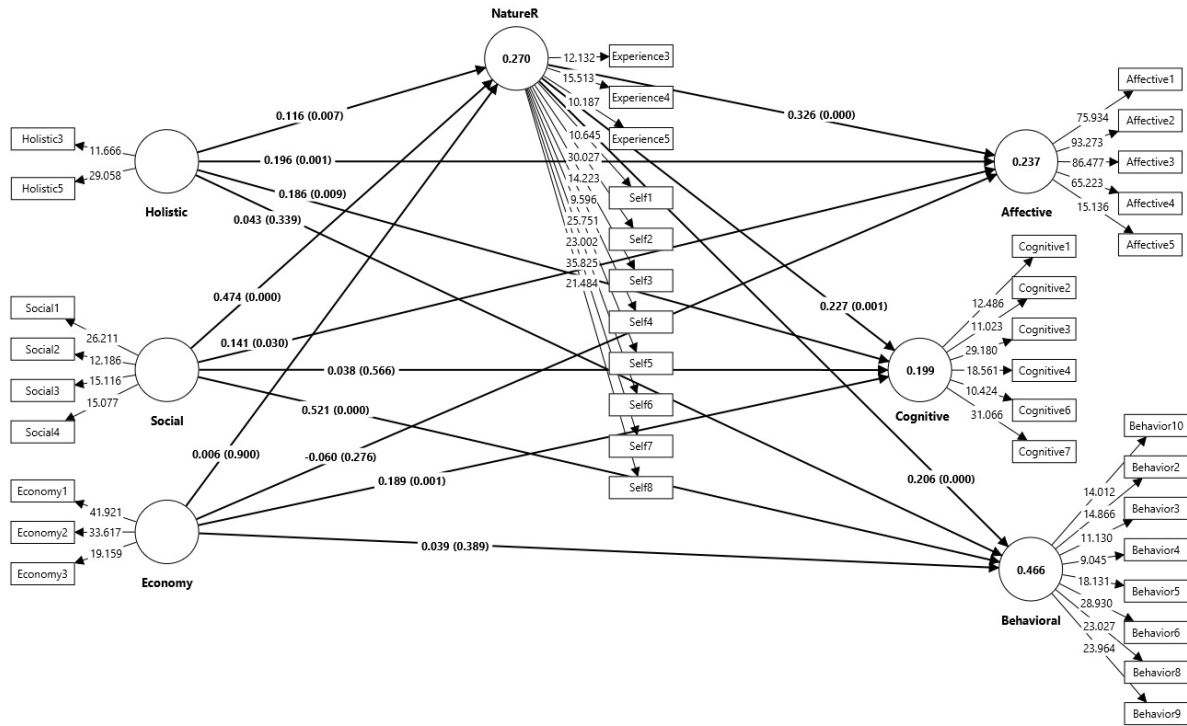


Figure 2. SEM Results

## 6. Conclusion and Discussion

In this study, the effects of ecological intelligence and nature relatedness of individuals participating in ornithology activities on ecorecreative attitudes were examined. When the effect of ecological intelligence on nature relatedness was examined, a positive significant effect of holistic perspective on nature relatedness was found. A positive significant effect of social intelligence on nature relatedness was found. No positive significant effect of economy on nature relatedness was found. When the effect of nature relatedness on ecorecreative attitude was examined, a positive significant effect was found on affective attitude. A positive significant effect of nature relatedness on cognitive attitude was found. It was determined that nature relatedness had a positive significant effect on behavioral attitude. When similar studies in the literature were examined, Sargin (2024) found that ecological intelligence, nature relatedness, and nature passion had a positive significant effect on environmental sensitivity. When the effect of ecological intelligence on ecorecreative attitude was examined, a positive significant effect of holistic on affective attitude was found. A positive significant effect of holistic on cognitive attitude was found. No

positive significant effect of nature integration on behavioral attitude was found. A positive significant effect of social intelligence on affective attitude was reached. A positive significant effect of social intelligence on cognitive attitude was not reached. A positive significant effect of social intelligence on behavioral attitude was reached. A positive significant effect of economy on affective attitude was not reached. A positive significant effect of economy on cognitive attitude was reached. A positive significant effect of economy on behavioral attitude was not reached. Yapraklı and Mutlu (2021) found a positive significant effect of ecological literacy and subjective norms on consumption behavior that supports environmental sustainability. However, they did not find any effect of attitude towards the environment on environmental consumption behavior. In particular, it can be said that the development of ecological literacy in the individual also improves his/her ecological intelligence. Therefore, findings supporting the result of the study were reached. In the study, the mediating role of nature relatedness in the effect of social intelligence on ecorecreative attitude (cognitive, affective, behavioral) was also reached.

When the effect of nature relatedness on ecorecreative attitude was examined, a positive significant effect was found on affective, cognitive, and behavioral attitudes. A person who spends time in nature may love nature. Therefore, a person may have a protective attitude towards the things he loves. Davis et al. (2011) concluded in a study that people who are attached to nature have a sense of protection. Bradley et al. (2010) gave a 10-day environmental information course to high school students in their study. As a result, the students' environmental knowledge increased by 22% and their attitudes towards nature became positive. When the effect of ecological intelligence on nature attachment was examined, a positive significant effect of integration with nature was found on nature attachment. An individual with developed ecological intelligence looks at the ecological system as a whole. He may be more aware that all living things have a function within the system. This may cause him to have a more connected and protective attitude towards nature. Suwandi et al. (2018) found a positive significant effect of ecological intelligence on environmentally friendly behavior. Social intelligence was found to have a positive significant effect on nature relatedness. A person with social intelligence is sensitive to environmental and social problems and can develop attitudes and behaviors in this direction. No positive significant effect of the economy on attachment to nature has been found. The economic dimension may not directly affect nature relatedness. Because the economic dimension is a more general concept, while nature relatedness is more specific.

When the effect of ecological intelligence on ecorecreative attitude was examined, a positive significant effect of the dimension of holistic on affective and cognitive attitudes was found, while no effect was found on behavioral attitudes. It may be difficult for a person who does not spend time in nature to have a holistic perspective on nature. A person who sees himself as a part of nature may love nature and have a greater instinct to protect it than other people. In a study conducted by Tükel et al. (2022), it was concluded that as the relationship of individuals who go hiking with nature increases, their attitudes towards eco-recreation also increase. Okur-Berberoğlu and Uygun (2012) found a relationship between perceived environmental awareness and environmental attitude. The fact that the dimension of holistic ecological intelligence does not have an effect on the behavioral dimension of ecorecreative attitude may not have been sufficient motivation for the attitude to turn into behavior. Or there may be other mediating variables. In addition, people may not be able to turn attitude into behavior for different reasons. Scale items may not be measuring this dimension sufficiently. The scale can be tested on another sample group.

When the effect of the social intelligence dimension of ecological intelligence on ecorecreative attitude was examined, a positive significant effect was found on the affective and behavioral dimensions, while no significant effect was found on the cognitive dimension. A person with social intelligence may have environmental awareness but may not have sufficient knowledge of ecorecreative activities. Ecorecreative attitude varies according to the field of activity. For example, an individual participating in a recreational activity in water may pay attention to the cleanliness of the water, while a person participating in a recreational activity on land may focus on soil pollution (Kement et al., 2021, p.36). While the economic dimension of ecological intelligence has a positive significant effect on the cognitive attitude, a positive significant effect was not found on the affective and behavioral dimensions. The economic dimension is a more general concept. The economic dimension may not directly affect the ecorecreative attitude. There may be different mediating variables and these variables can be investigated.

### **6.1. Theoretical Implications**

As a result of the study, it was found that ecological intelligence and nature relatedness have an effect on ecorecreative attitude, and ecological intelligence has an effect on nature relatedness. The study was conducted on individuals who participated in ornithology activities as a non-consumable recreational activity that supports sustainability. In addition, it can be called an original study because it examines the

concepts of 'ecological intelligence', 'nature relatedness' and 'ecorecreative attitude' together. The study is considered important because it creates awareness about the solution of climate change and environmental problems with non-consumable environmentally friendly recreational activities. This study added originality to the relevant scale in terms of using the eco-creative attitude scale developed by Kement et al. (2021) with different theoretical structures. In addition, the efficiency of the ecorecreative attitude scale has been proven in an ecorecreative activity such as ornithology. On the other hand, the evaluation area of the scale has been expanded by using the ecological intelligence scale (Okur-Berberoğlu, 2020) in an original activity such as ornithology.

## **6.2. Practical Implication**

Environmental problems such as environmental sustainability, carbon footprint, and climate change have become important problems of the 21st century (Gül, 2013). Since the cause of these problems is human-induced, the solution point is also human. In order to cope with environmental and global problems, the whole society needs to be conscious. Therefore, the development of people's ecological intelligence, their increased commitment to nature, and their eco-creative attitudes play an important role. Because an individual with a developed ecological intelligence develops critical thinking. They are aware of how their behaviors towards the environment will affect nature. They investigate whether the products they consume cause any harm to the environment or society during the production phase. Parents, schools, and administrators have important duties in order to raise a society with a developed ecological intelligence. The ecosystem cycle can be explained in a more educational way, especially in schools. Students can be made to think critically and understand what consequences their behavior towards the environment can have. It is not enough to explain theoretically for this idea to emerge. The individual must love nature. Because a person may tend to protect something they love. For this reason, it is important for the individual to be in natural areas. Activities such as growing plants in pots can be carried out in schools to raise students' awareness about plants. In addition, trips to natural areas can be organized in cooperation with families. Students can be directed to non-consumable recreational activities such as bird watching and nature photography. A bond can be formed between them by getting to know and loving the plants and animals in nature. A person with a developed ecological intelligence and an increased commitment to nature exhibits an attitude and behavior that protects the environment. This can generally be seen as an



important step in combating global environmental problems. In addition, local governments should provide social justice by increasing the quality and quantity of green areas and allowing the entire society to access these areas. In order to minimize the damage and mechanical pressure in natural areas, visits to natural areas should be controlled. Awareness about environmental problems can be created by carrying out projects that will make the society aware of the sustainability of natural areas.

Businesses can prioritize environmental sustainability when creating a marketing strategy. An individual with a developed ecological intelligence investigates whether there is any exploitation of labor or any application that harms the environment in the process from the procurement of raw materials for the product they consume to the production stage. Therefore, when creating a marketing strategy for this audience, environmentally friendly processes regarding production stages can be presented in more detail. Tools such as telescopes, binoculars, cameras, bird-watching guidebooks, costumes that will not disturb birds, voice recorders, and GPS devices are required for bird-watching. Environmentally friendly products can be offered to individuals participating in bird-watching activities, and the environmentally friendly features of the products can be highlighted.

### **6.3. Limitation and Future Studies**

This study was limited to individuals participating in ornithological activities. In addition, only nature relatedness and ecological intelligence scales were used to measure ecorecreative attitudes in the study. In future studies, environmental values, environmental sensitivity, etc. scales that may affect environmental attitudes can also be used. In addition, the behavior-attitude process can be explained with the help of theories such as Theory of Green Purchase Behavior (Han, 2020). In future studies, a study can be conducted by comparing individuals who participate or do not participate in natural area recreation activities. In addition, the relationship between ecological intelligence, nature relatedness, and ecorecreative attitudes and climate change concerns can be examined.

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