



Atabey, N. (2021). Exploring middle school students' environmental attitudes through ecocentrism and anthropocentrism. *International Online Journal of Education and Teaching (IOJET)*, 8(3). 1580-1602.

Received : 11.01.2021  
Revised version received : 01.04.2021  
Accepted : 03.04.2021

## **EXPLORING MIDDLE SCHOOL STUDENTS' ENVIRONMENTAL ATTITUDES THROUGH ECOCENTRISM AND ANTHROPOCENTRISM**

*Research article*

Nejla Atabey 

[n.atabey@alparslan.edu.tr](mailto:n.atabey@alparslan.edu.tr)

Mus Alparslan University, Turkey

Dr. Atabey worked as a science teacher for 13 years in different state middle schools. She has been an Assistant Professor at Muş Alparslan University for 4 years now. Her research interests include environmental education, socioscientific issues and argumentation in science education.

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## **EXPLORING MIDDLE SCHOOL STUDENTS' ENVIRONMENTAL ATTITUDES THROUGH ECOCENTRISM AND ANTHROPOCENTRISM**

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### **Abstract**

Today, the decrease of bonds established with nature due to the use of technology, the increase in urbanization and the change of daily routines might affect people's attitudes and behaviours towards environment negatively. Considering that attitudes are one of the most important factors affecting behaviours, in the current study, it is aimed to reveal students' environmental behaviours and whether the attitudes that underlie these behaviours are ecocentric or anthropocentric. In the context of basic qualitative design, twelve questions related to environmental behaviours were asked to middle school students and in addition, students were required to explain the reasons of their behaviours. The findings revealed that middle school students had ecocentric and both ecocentric and anthropocentric attitudes for the questions related to sensitive behaviour and attentive behaviour. However it was seen that students showed anthropocentric attitudes for the questions related to energy/product saving and for the questions about sorting out the garbage, throwing the garbage into the recycling bin and using products having recyclable materials in their packaging. Therefore it is recommended to organize environmental education that supports students' environmental attitudes when the issue have an economic dimension and that encourage them for recycling applications.

*Keywords:* environmental attitudes, environmental behaviors, middle school students

### **1. Introduction**

"I like to play indoors better 'cause that's where all the electrical outlets are" reports a student training fourth grade (Louv, 2005, p. 10). Louv (2005), in his book named "Last Child in the Wood", emphasized that children's communication with nature has never been so much interrupted in history, and stated that the time spent by today's youth in nature is gradually decreasing and they are alienated from nature. Today, the use of technology such as TV and the internet, the increase in urbanization and the change of daily routines cause individuals to decrease their interactions with nature. Moving away from nature due to different reasons results in people's losing their ability to establish relationships and emotional bonds with other living things (Alföldi & Alföldi, 2019). The decrease in the bonds established with nature has the potential to affect our attitudes and behaviours towards the environment because it is known that experiences gained in nature positively affect people's attitudes and behaviours towards the environment (Rosa, 2019). Given that environmental problems like global warming, soil, air and water pollution are human-induced, it can be stated that people's attitudes and behaviours towards the environment are important. Having positive attitudes towards the environment also supports

the reduction of environmental problems by encouraging people to act environmentally friendly because it is a generally accepted that positive attitudes towards the environment lead to environmentally friendly behaviours (Severin, 2020).

The relationship between attitudes and behaviours is explained with the theory of planned behaviour, which is one of the most important theoretical frameworks about human behaviour. According to this theory, individuals exhibit behaviours not only by their own will, but also their behaviours are shaped by factors called attitudes, subjective norms and perceived behavioural control (Yılmaz & Doğan, 2016). How these factors affect behaviour is shown in Figure 1.

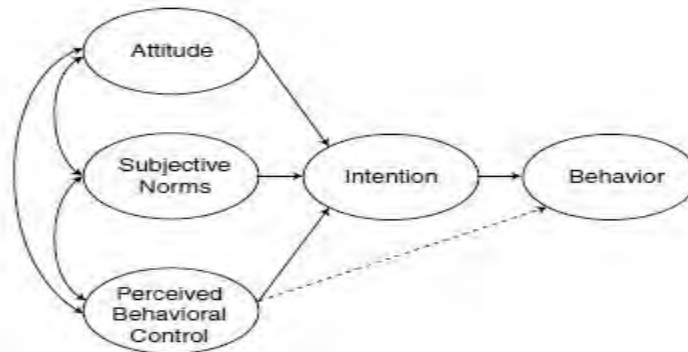


Figure 1. Theory of planned behaviour (Ajzen, 1991, p. 182)

As seen in Figure 1, the main factor of the planned behaviour theory is the intention of individuals to perform certain behaviour (Ajzen, 1991). According to this theory, intentions include motivational factors that affect behaviour, and are an indicator of how much people are willing to try and how much effort they plan to invest in order to perform the behaviour. Behavioural attitudes, subjective norms related to the behaviour (influence of close environment), and perceived behavioural controls greatly affect the prediction of behavioural intentions (Ajzen, 1991). Therefore, according to the planned behaviour theory, attitudes are powerful predictors of our intentions and our intentions are powerful predictors of our behaviours.

Not only it is theoretically explained that behaviours are affected by attitudes, but also many studies have also revealed results that confirm this theory. For example, in the study by Grob (1995), it was found that attitudinal elements explained 39% of the variance of environmental behaviour. Gadenne, Sharma, Kerr, and Smith (2011), in their study with consumers, also found that individuals who have a positive environmental attitude have environmentally friendly behaviours such as buying recycled products and participating in many environmentally friendly activities. Chan (1996) showed that secondary school students' attitudes towards the environment were a strong predictor of their desire to participate in environmentally friendly behaviours. The results of the study conducted by Rodríguez-Barreiro, Fernández-Manzanal, Serra, Carrasquer, Murillo, Morales, ... & del Valle (2013) with university graduates revealed that there is a significant correlation between two of the attitudinal factors (protection and intention to act) and environmentally friendly behaviours. In another study, Şahin and Doğu (2018) revealed that there is a positive and significant correlation between pre-service teachers' scores taken from the attitudes towards environmental problems and scores taken from the behaviours towards environmental problems. All these studies show that attitudes towards the environment are positively correlated with environmental behaviours.

Different methods can be followed in the process of evaluating attitudes towards the environment in the literature. When the extant research is reviewed, it is seen that attitudes have generally been tried to be determined through scales. For example, Fernández-Manzanal, Rodriguez-Barreiro, and Carrasquer (2007) measured the attitudes of university students by developing an environmental attitude scale. Levine and Strube (2012) evaluated the attitudes of college students with The New Ecological Paradigm Scale. In another study, Eagles and Demare (1999) measured 6<sup>th</sup> grade students' attitudes towards the environment using an attitude scale. It is seen that in the great majority of the studies conducted to investigate attitudes towards environment in Turkey, scales have been used. For example, environmental attitude scales were used by Gökçe, Kaya, Kaya, and Özden (2007) to measure the environmental attitudes of 8<sup>th</sup> grade students, by Kunt (2013) and Erten (2005) to measure the environmental attitudes of pre-service teachers, and by Özata-Yücel and Özkan (2014) to measure the environmental attitudes of middle school students. The studies by Atabey and Topçu (2020), Önal (2018) and Kahraman-Öztürk, Olgan and Tuncer (2012) are among the few studies that aimed to qualitatively identify students' attitudes towards the environment. While Önal (2018) worked on pre-service pre-school teachers, Kahraman-Öztürk et al. (2012) worked on pre-school children. For this reason, besides the lack of qualitative studies to measure the attitudes of middle school students, in studies conducted with scales, individuals have the possibility to respond in line with the expectations of the society instead of their own thoughts (Akin, 2010). Correspondingly, both the elimination of the possibility of responding the items in the scales under the influence of social desirability and the lack of qualitative analysis make the results of the current study valuable.

In the process of evaluating attitudes towards environment in the literature, it is seen that attitude approaches developed by Thomson and Barton (1994) are used in many studies (Bjerke & Kaltenborn, 1999; Erten, 2008; Ewert, Place, & Sibthorp, 2005; Kahraman-Ozturk et. al., 2012; Kopnina, 2017). According to this approach, attitudes towards the values given to nature itself are defined as ecocentric, and attitudes that value nature because of the material and physical benefits it provides to people are defined as anthropocentric (Thomson & Barton, 1994). In ecocentrism, nature deserves moral consideration because it has value itself (Kortenkamp & Moore, 2001). In anthropocentrism, nature deserves moral consideration, as how people treat against nature also affects people (Kortenkamp & Moore, 2001). In other words, while there is no concern about being beneficial for humans in the ecocentric approach, the interests of human beings are at the forefront in the anthropocentric approach (Bozdemir & Faiz, 2017). For example, two people who choose to turn off unnecessary lights may be doing the same but while the one who prefers to turn off to save money exhibits an anthropocentric approach, the other who prefers to turn off to contribute to the protection of nature exhibits an ecocentric attitude.

It seems that people who have an ecocentric attitude are more likely to exhibit behaviours aimed at protecting the environment (Kopnina, 2017). Therefore, it is of great importance to train individuals adopting an ecocentric attitude rather than an anthropocentric attitude through environmental education (Goldman, Assaraf, & Shaharaban, 2013) because today, human-induced environmental problems continue to increase. The fact that garbage left on the ground after a picnic, factory waste dumped into lakes, caretta caretta caught in the net and forests burned for touristic hotels are still on our agenda, pointing to the need for more emphasis on how to develop environmentally sensitive behaviours. Considering that attitudes are one of the most important factors affecting behaviours, in the current study, it is aimed to reveal whether the attitudes that underlie students' environmental behaviours are ecocentric or anthropocentric. It is believed that the findings from the study will provide important information to educators,

environmental organizations or relevant representatives such as the government regarding students' environmental behaviours and the attitudes underlying the behaviours. In this connection, the research questions guiding the current study are given below:

- 1- What are middle school students' behaviours towards the environment?
- 2- What are the attitudes underlying the students' behaviours towards the environment?

## **2. Method**

In the current study, it was aimed to explain middle school students' attitudes towards the environment in terms of sensitive behaviour, attentive behaviour and recycling behaviour. Basic qualitative methods were used to examine the students' attitudes in depth. Basic qualitative research is used when trying to explain an event or situation in detail instead of comparing the effect of any application (Fraenkel, Wallen, & Hyun, 2012). In qualitative studies, it is tried to determine how individuals make sense of events and the perspectives of the participants are revealed with their own words (Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz, & Demirel, 2018). For example, Fraenkel and Wallen (2012) stated that the study method should be basic qualitative for a study in which the sources of middle school students' self-efficacy in mathematics lesson were investigated. Kahraman et al. (2012) determined the study method as basic qualitative in the study in which they examined the attitudes of preschool students towards the environment in terms of ecocentrism and anthropocentrism. As the current study aims to reveal the attitudes underlying the behaviours of middle school students in a qualitative way, it seems to be necessary to use the basic qualitative method.

### **2.1. Participants**

The participants comprised of 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> grade students attending two state middle schools located in the western part of Turkey. Of the participating students, 21 are females and 9 are males. Moreover, 1 of the students is a 5<sup>th</sup> grader, 10 are 6<sup>th</sup> graders, 3 are 7<sup>th</sup> graders and 16 are 8<sup>th</sup> graders. The reason for the inequality of student distribution across the grade levels is that participation in the study on a volunteer basis.

The participants were determined using convenience sampling method. After obtaining the required ethical permissions, science teachers helped to reach volunteer students for the study. The teachers were informed about the data collection tool and the situations that should be considered during the implementation process were explained. After obtaining parental permissions for these students, data collection tools were delivered to the students through teachers. The forms filled out by the students were also collected by the teachers.

### **2.2. Data Collection Tools**

The data of the study were collected with a scale developed by Yeşil and Turan (2020) to measure middle school students' attitudes towards the environment. The scale consists of two main factors: environmental knowledge/feeling and behaviours towards environmental protection. Yeşil and Turan (2020) calculated the KMO (Kaiser-Mayer-Olkin parameter) value of the five factors obtained as a result of exploratory factor analysis as .845 and found that the scale factors explained 67.293% of the variance. In addition, they found the Cronbach's Alpha value of the scale as .845.

In the present study, a qualitative rather than quantitative process was followed in order to reveal the attitudes of students underlying their environmental behaviours in-depth, and thus, only the questions under the behavioural dimension of the scale were used. By adding "because"

to the end of each item in the behavioural dimension, the reasons for the students' behaviours were tried to be explained through ecocentric and anthropocentric attitudes. For example, by adding the word “because” to the end of the item “If there is an opportunity to plant trees, I take / do not take this opportunity.”, the students were first asked to indicate their preference (take / do not take) and then they were asked to complete the sentence starting with “because” so that the reasons for their preference could be elicited. About the appropriateness of using the scale in this way, the opinions of a measurement and evaluation expert and an instructor holding PhD degree were sought and thus the appropriateness of the scale was confirmed.

The behavioural dimension of the scale consists of four sub-dimensions: sensitive behaviour, attentive behaviour, energy/product saving and recycling. In the sensitive behaviour sub-dimension, there are 3 items; in the attentive behaviour sub-dimension, there are 3 items; in the energy/product saving sub-dimension, there are 2 items and in the recycling sub-dimension, there are 4 items. All these dimensions were found to explain 41.05% of the total variance in the scale. In the current study, the item "I take care not to make noise at a level that will disturb people" was not used on the grounds that it would not serve to reveal the students' ecocentric attitudes.

### **2.3. Data Analysis**

In the data analysis process, firstly, the environmental behaviours of the students were tried to be determined. In this connection, the answers given by the students for the options offered for each behaviour in the scale were determined and frequency calculations were made for these answers.

Then, the explanations of the students about their environmental behaviours were analysed in the context of the environmental attitude approaches proposed by Thomson and Barton (1994). In this context, while the answers considering the goodness of nature were encoded with the code of ecocentrism, the answers indicating that the nature is valued for the material or physical benefits it can provide for people were encoded with the code of anthropocentrism. During the analysis process, it was seen that some students gave answers that both value nature and consider the benefits it offers to people. These answers were encoded with the code of “anthropocentrism and ecocentrism”.

In the process of analysing the students' attitudes towards the environment, firstly, the statements of 15 students were coded separately by two different researchers. In the encoding of 5 statements, differences between the two coders were determined, and a consensus was reached as a result of the exchange of ideas. Coding of the statements belonging to the other students was performed by one researcher. After the coding was completed, frequency calculations of environmental attitudes were made for each scale item. Excerpts from students suitable for each coding are presented in the findings section.

## **3. Findings**

In the present study, students' attitudes towards the environment were classified into three categories: ecocentric, anthropocentric, and both ecocentric and anthropocentric. Below are presented the evaluations of the attitudes that underlie middle school students' environmental behaviours and sample excerpts appropriate for each category. While presenting the excerpts, numbers were used to stand for the names of students.

### **1.1. Findings Related to the Sub-dimension of Sensitive Behaviour**

In this section, the categorical evaluations of the answers given by the students to the items "I make effort to inform people about air pollution", "I take great care not to throw rubbish on the ground" and " If there is an opportunity to plant trees, I take this opportunity" are presented in Figure 2.

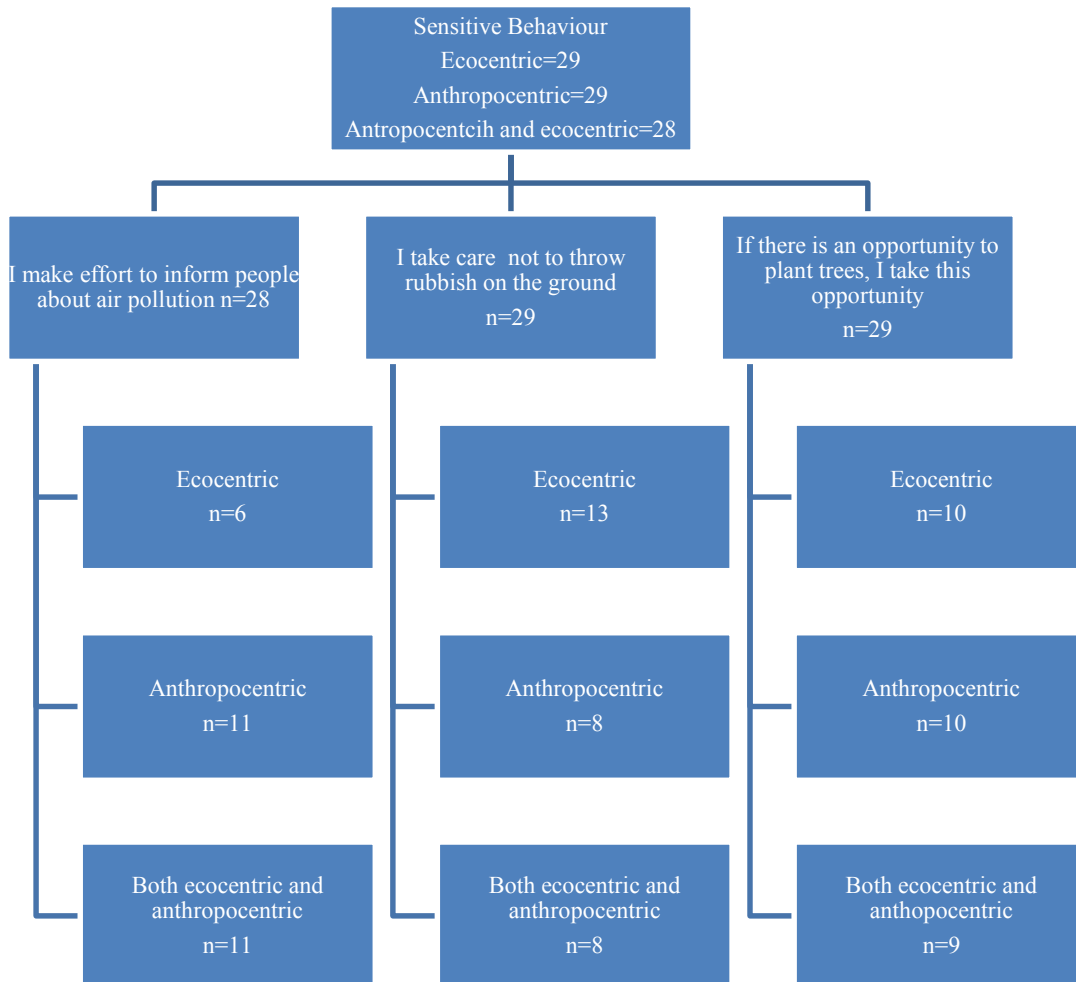


Figure 2. Students' behaviours and attitudes related to the sub-dimension of sensitive behaviour

As can be seen in Figure 2, in the sub-dimension of sensitive behaviour, 29 answers were obtained for ecocentric attitude, 29 answers were for anthropocentric attitude and 28 answers were for both ecocentric and anthropocentric attitudes. To the item "I make effort to inform people about air pollution", 28 of the 30 students responded as "I do". On the other hand, from the explanations made by the students about the reasons underlying their behaviours, it was understood that 6 students have ecocentric attitudes, 11 students have anthropocentric attitudes and 11 students have both types of attitudes. Some sample excerpts representing students' ecocentric attitudes are presented below.

"Because air pollution affects nature badly, it is my responsibility to convey this to people."  
(S22)

“Because if we don't show, car exhausts and factory fumes will pollute the air.” (S23)

Some sample excerpts representing the anthropocentric attitudes exhibited by some students responding positively to the item “I make effort to inform people about air pollution” are given below.

“Because the air we breathe must be clean for a healthier life and to be a resilient individual.” (S7)

“Because this air is ours. If most people pollute the air, our lives will be difficult and our oxygen will be less. If the air gets polluted, the ozone layer becomes thinner and the harmful rays of the sun damage people's skin, so we have to convey what we know so that this would not happen.” (S17)

Some sample excerpts representing the ecocentric and anthropocentric attitudes exhibited by some students responding positively to the item “I make effort to inform people about air pollution” are given below.

“Because air pollution damages nature, can affect people's lives and damages the ozone layer.” (S10)

“Because air pollution causes respiratory diseases such as COPD and asthma. It harms the environment. And it causes visual pollution.” (S18)

As can be seen in Figure 2, 29 of the 30 students positively responded to the item “I take care not to throw rubbish on the ground”. On the other hand, from the explanations made by the students about the reasons underlying their behaviours, it was understood that 13 students have ecocentric attitudes, 8 students have anthropocentric attitudes and 8 students have both types of attitudes. Some sample excerpts representing students' ecocentric attitudes are presented below.

“I take great care. Because a plastic bottle that we throw unconsciously on the ground disappears in the nature in 1000 years; we throw chewing gum on the ground, birds think it is food and try to eat it. It clings to their beaks and they die there.” (S1)

“Because at first, garbage may seem harmless, but it continuously grows like this; it adversely affects the natural environment; objects that mix with the soil but do not disappear for years damage things such as plants that grow in that soil over time.” (S3)

Some sample excerpts representing students' anthropocentric attitudes towards the behaviour of “I take great care not to throw rubbish on the ground” are presented below.

“Because it would be best for people and us. If there is rubbish on the ground, it prevents us from being happy.” (S6)

“Because if everyone does the same behaviour, everywhere gets full of rubbish and we live in filth. We get sick”. (S7)

Some sample excerpts representing both types of attitudes towards the behaviour of “I take great care not to throw rubbish on the ground” are presented below.

“If rubbish is thrown on the ground, everywhere will be full of rubbish and various types of negative events will occur. Bad odours spread through our nature and streets. And we get disturbed. We get afraid of going out. There wouldn't be flowers and insects. The nature would disappear. If our nature disappeared, there would not be trees, flowers and animals. If there were



no trees, it would be difficult for us to breathe. We would have no oxygen. Nature would turn into a garbage dump.” (S5)

“Because the garbage thrown on the ground pollutes the land and sea and therefore, creatures living in the sea and soil will face extinction and since the soil yield decreases, the nutrients we consume will not be able to grow, and those which grow will not be very beneficial for our health.” (S14)

As can be seen in Figure 2, to the item “If there is an opportunity to plant trees, I take this opportunity”, 29 out of the 30 students responded positively. On the other hand, from the explanations made by the students about the reasons underlying their behaviours, it was understood that 10 students have ecocentric attitudes, 10 students have anthropocentric attitudes and 9 students have both types of attitudes. Some sample excerpts representing students’ ecocentric attitudes are presented below.

“Because trees clean the air. In this case, the air polluted by people is cleaned.” (S8)

“Because it prevents landslides, brings burning forest areas back to life and creates a living space for animals.” (S15)

Some sample excerpts representing students’ anthropocentric attitudes towards the behaviour of “If there is an opportunity to plant trees, I take this opportunity” are presented below.

“We need to have oxygen and get rid of carbon dioxide. Trees take carbon dioxide and turn it into oxygen. Oxygen plays an important role in the maintenance of people's lives.” (S11)

“Because we can get notebooks and books from our trees. They help us breathe and meet our food needs.” (S10)

Some sample excerpts representing both types of attitudes towards the behaviour of “If there is an opportunity to plant trees, I take this opportunity” are presented below.

“Planting trees reduces air pollution and gives us a greener environment. If air pollution and environmental pollution are reduced, it becomes better for living things. We have to plant trees for a better environment. We must be hope for future generations.” (S20)

“Because we can survive by breathing and we need trees to breathe healthily. In addition, trees protect the nature from harmful effects that may occur.” (S3)

## **1.2. Findings related to the sub-dimension of attentive behaviour**

The analyses of the students’ responses given to the items in the sub-dimension of attentive behaviour are presented below.

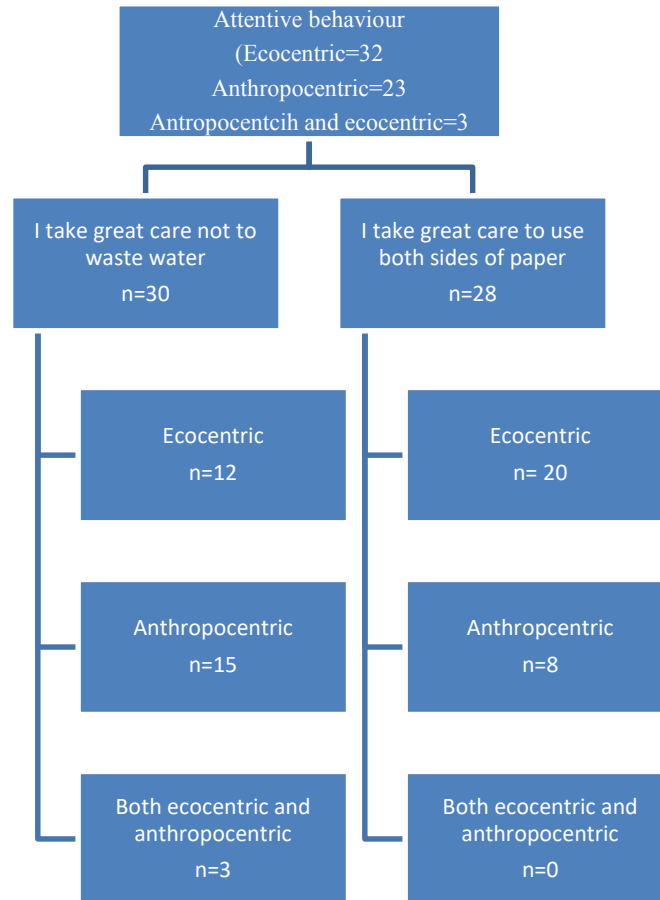


Figure 3. Students' behaviours and attitudes related to the sub-dimension of attentive behaviour

As can be seen in Figure 3, in the sub-dimension of attentive behaviour, 32 answers were obtained for ecocentric attitudes, 23 answers were for anthropocentric attitudes and 3 answers were for both ecocentric and anthropocentric attitudes. For the item "I take great care not to waste water", 30 students responded positively. Of these 30 students, 12 have ecocentric attitudes, 15 have anthropocentric attitudes and 3 have both types of attitudes. Some sample excerpts representing students' ecocentric attitudes are presented below.

"Because when we don't save water, most of the water is wasted, in this case the lakes and seas dry up and animals die of thirst." (S8)

"Because water sources such as lakes, seas and streams are not unlimited. If we use our water unconsciously, we may end up with drought in our country soon." (S17)

Some sample excerpts representing students' anthropocentric attitudes towards the behaviour "I take great care not to waste water" are given below.

"The water we use is very important. We can live with it; without it, we will die. We drink water; we have a shower and wash our hands with it. In the current conditions, we need more water to clean ourselves because of Covid-19. We clean our dishes with it. So water is very important, we cannot live without it." (S4)

"If we run out of water, we cannot live; our water contributes a lot to us while washing our hands, cleaning ourselves and as a drink." (S5)

Some sample excerpts representing both types of attitudes towards the behaviour “I take great care not to waste water” are given below.

“We must save water in order to avoid water shortages in the future and to prevent lakes and seas from drying up.” (S26)

“Because the water in our dams can decrease. Saving water can have many positive effects in our future lives. For example, drought may appear, causing serious problems in the life of living things.” (S10)

For the item “I take great care to use both sides of paper”, 28 students out of 30 students responded positively. From the explanations of the students made to complete the because sentence, it was found that 20 students have ecocentric attitudes and 8 students have anthropocentric attitudes while none of the students have both types of attitudes together. Some student excerpts representing ecocentric attitudes are presented below.

“Because if we use less paper, we prevent many trees from being cut, but if we do not take care, many problems will arise.” (S3)

“Paper is made of trees ... Paper is valuable like trees. Without trees, polluted air will always remain.” (S25)

Some student excerpts representing anthropocentric attitudes are given below.

“Because paper is made of wood. If paper is used too much, more trees will be cut, which reduces oxygen production.” (S17)

“Because when those papers are made, we lose trees, that is, the oxygen we breathe, I take care to use it carefully.” (S1)

### **1.3. Findings related to the sub-dimension of energy/product saving**

The analyses of the students’ responses given to the items in the sub-dimension of energy/product saving are presented below.

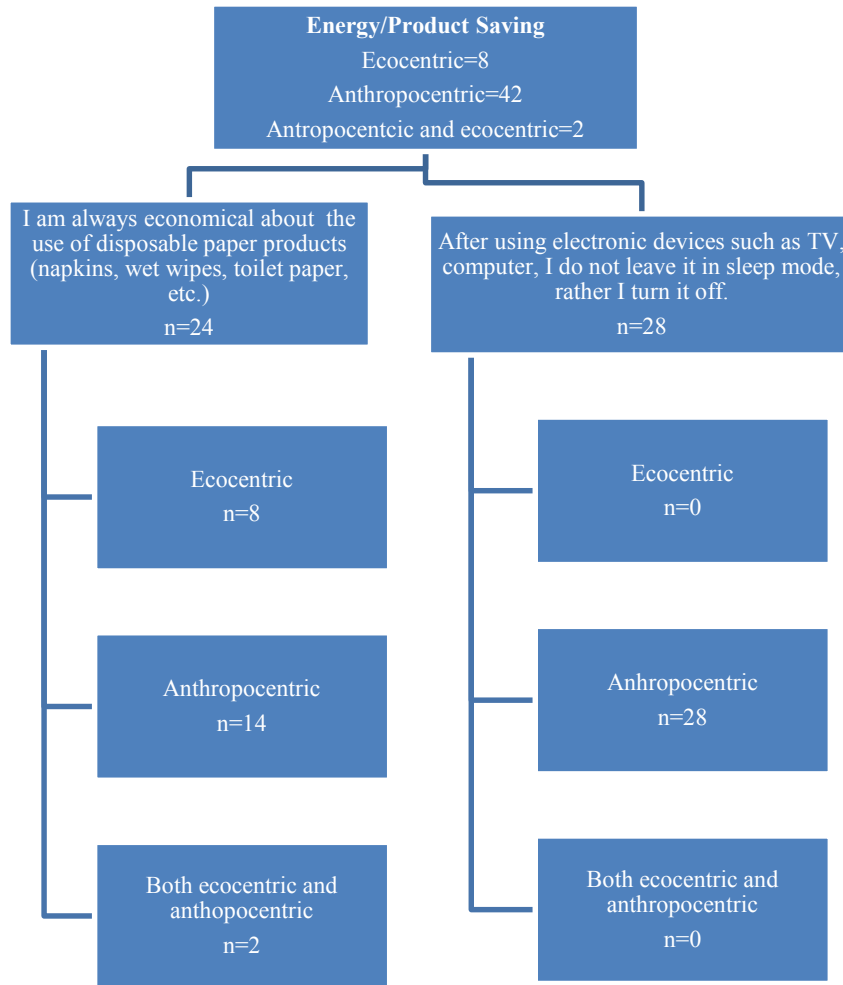


Figure 4. Students' behaviours and attitudes related to the sub-dimension of energy/product saving

As can be seen in Figure 4, in the sub-dimension of energy/product saving, 8 answers were obtained for ecocentric attitudes, 42 answers were for anthropocentric attitudes and 2 answers for both types of attitudes.

To the item "I am always economical about the use of disposable paper products (napkins, wet wipes, toilet paper, etc.), 24 students responded positively. Of these 24 students, 8 have ecocentric attitudes, 14 students have anthropocentric attitudes and 2 students have both types of attitudes. Some student excerpts representing ecocentric attitudes are given below.

"Because I would endanger our forests, trees." (S7)

"Because we will save paper and prevent trees from being cut down."(S12)

Some student excerpts representing anthropocentric attitudes towards the behaviour of "I am always economical about the use of disposable paper products (napkins, wet wipes, toilet paper, etc.)" are given below.

"More material and more money are spent on these if people don't care."(S6)

“Because if I do not act economically, the amount of garbage and our raw material need will increase, which will negatively affect our economy.” (S14)

Some student excerpts representing both types of attitudes towards the behaviour of “I am always economical about the use of disposable paper products (napkins, wet wipes, toilet paper, etc.)” are given below.

“It causes both material damage and environmental pollution.” (S15)

“Because the raw material of these products is again wood. Trees emit oxygen. If trees are cut, oxygen will be reduced, and the habitat of animals, that is, forests will disappear.” (S17)

To the item “After using electronic devices such as TV, computer, I do not leave it in sleep mode, rather I turn it off”, 28 students responded positively. All of these students have 28 anthropocentric attitudes. None of the students exhibited ecocentric or both ecocentric and anthropocentric attitudes towards this behaviour. Some sample excerpts representing anthropocentric attitudes are given below.

“Because I do not want to be exposed to radiation.” (S30).

“Because if I leave it on, the TV, phone, etc. will go on emitting radiation and will also cause harms on human health. (S14)

#### **1.4. Findings related to the sub-dimension of recycling**

The analyses of the students’ responses given to the items in the sub-dimension of recycling are presented below.

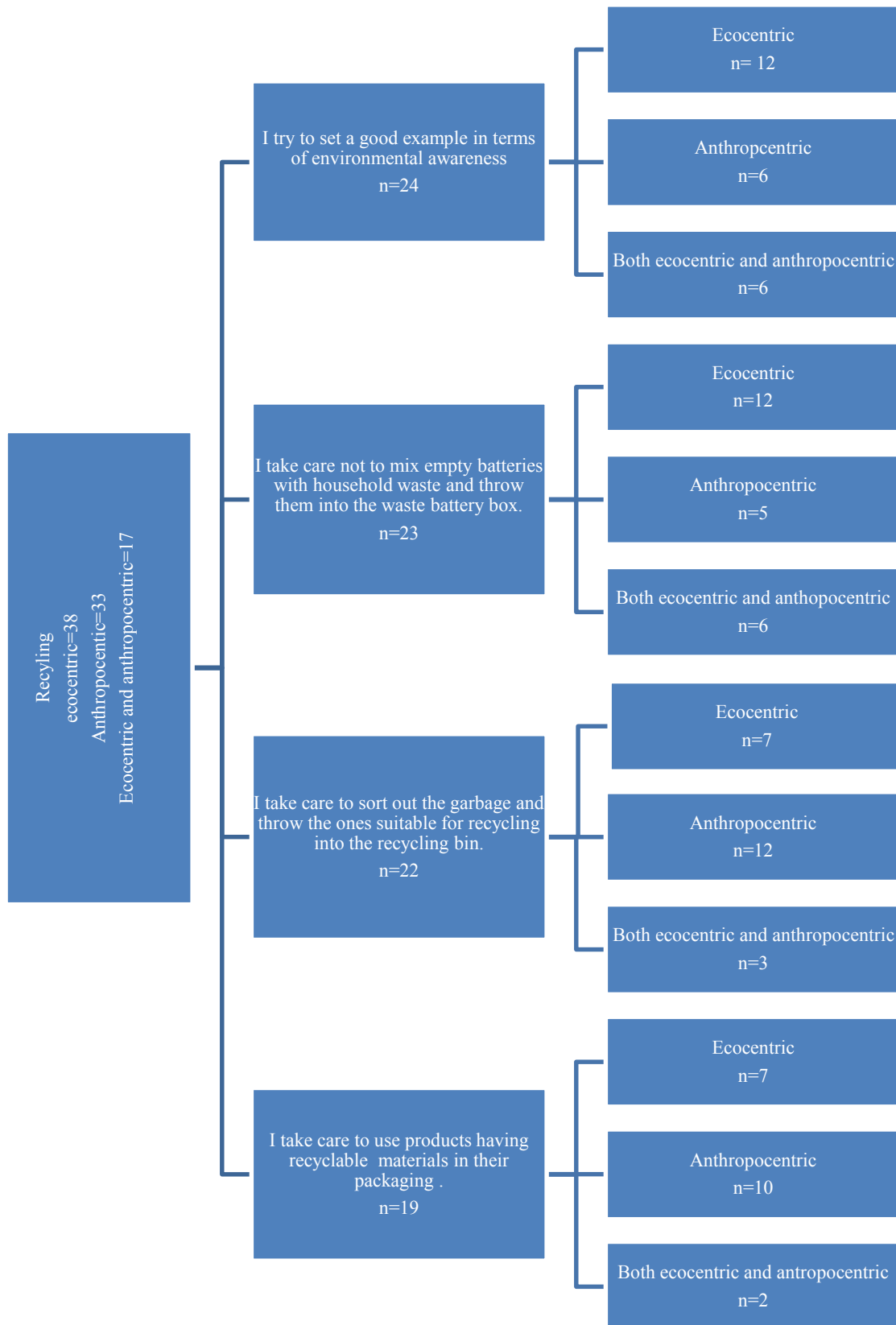


Figure 5. Students' behaviours and attitudes related to the sub-dimension of recycling

In the sub-dimension of recycling, 38 answers were obtained for ecocentric attitudes, 33 answers were for anthropocentric attitudes and 17 answers were for both types of attitudes together. To the item “I try to set a good example in terms of environmental awareness”, 24 students responded positively. Of these 24 students, 12 students were found to have ecocentric attitudes, 6 students were found to have anthropocentric attitudes and 6 students were found to have both types of attitudes together. Some student excerpts representing ecocentric attitudes are given below.

“Because if we do not protect our environment, we can harm living things and destroy the Earth.” (S10).

“If you can be a good example, people won’t throw garbage on the ground, won’t pollute the water, won’t cut trees, and will install filters in factory chimneys.” (S11)

Some student excerpts representing anthropocentric attitudes towards the behaviour of “I try to set a good example in terms of environmental awareness” are given below.

“To leave a clean world to future generations.” (S1)

“I try to set a good example. We need to be careful about throwing garbage on the ground and excessive cutting of trees. Because the tree is my breath, if trees are hurt I can’t exist.” (S2)

Some student excerpts representing both ecocentric and anthropocentric attitudes towards the behaviour of “I try to set a good example in terms of environmental awareness”.

“Environmental pollution is one of the biggest problems in the world right now. And it can cause all kinds of diseases. Animals living in a polluted environment may lose their genetic characteristics or their genetic characteristics may change due to waste. In addition this can cause various problems in humans. (S20)

“Because our environment is everything to us; without our environment, there would be no such thing as us, no humans, no animals; therefore, I try to set an example in terms of environmental awareness in order to protect our animals and us.” (S13)

To the item “I take care not to mix empty batteries with household waste and throw them into the waste battery box”, 23 students responded positively. Of these 23 students, 12 students were found to have ecocentric attitudes, 5 students were found to have anthropocentric attitudes and 6 students were found to have both types of attitudes. Some sample student excerpts representing ecocentric attitudes are given below.

“I take care not to mix empty batteries with household waste and throw them into the waste battery box. Because it harms the soil.” (S28)

“Batteries are harmful to nature. Although people are not affected much, stray animals can change a lot or die of the damage of batteries. Household waste is often thrown into garbage bins and stray animals can be affected by contact with garbage cans.” (S20)

Some sample student excerpts representing ecocentric attitudes towards the behaviour of “I take care not to mix empty batteries with household waste and throw them into the waste battery box” are given below.

“Because recycling happens and we get more profit thanks to recycling.” (S6)

“Because, when waste batteries get into the soil, the land loses its value, resulting in a food problem.” (S18)

Some sample student excerpts representing both types of attitudes towards the behaviour of “I take care not to mix empty batteries with household waste and throw them into the waste battery box” are given below.

“Because like plastics, batteries disappear in many years, and when mixed with the soil, the materials in it cause the soil to become dirty. In other words, consider things such as vegetables and fruits we plant in the soil. They come in our mouths again later.” (S1)

“Because these batteries go into the soil after a few years, they penetrate into the soil, but since animals need to be fed, different diseases, different wounds can occur in different parts of our bodies.” (S13)

To the item “I take care to sort out the garbage and throw the ones suitable for recycling into the recycling bin.”, 22 of the students responded positively. From the explanations of the students, it was understood that 7 students have ecocentric attitudes, 12 students have anthropocentric attitudes and 3 students have both types of attitudes. Some sample student excerpts representing ecocentric attitudes are given below.

“I sort the garbage into groups such as paper, glass, plastic and when these are full they go to recycling. They are reused after recycling. .... If they are recycled, no more trees are cut because paper is made of wood.” (S25)

“It takes billions of years for a battery to degrade in nature.” (S26)

Some sample student excerpts representing anthropocentric attitudes towards the behaviour of “I take care to sort out the garbage and throw the ones suitable for recycling into the recycling bin” are given below.

“Some rubbish changes some people's lives. For example, raising money to buy wheelchairs for people who need them by collecting plastic bottle caps.” (S29)

“Because if we recycle, raw material is not needed. This leads to a great financial saving.” (S18)

Some sample student excerpts representing both types of attitudes towards the behaviour of “I take care to sort out the garbage and throw the ones suitable for recycling into the recycling bin” are given below.

“Because I can contribute to the development of the country and protection of nature.” (S7)

“Because recycling is important for our future as it does not contaminate the soil. It also helps the country's economy.” (S12)

To the item “I take care to use products having recyclable materials in their packaging”, 19 students responded positively. Of these 19 students, 7 students have ecocentric attitudes, 10 students have anthropocentric attitudes and 2 students have both types of attitudes. Some sample student excerpts representing ecocentric attitudes are given below.

“Because I use these materials to avoid further pollution.” (S7)

“Because then we can recycle the products and in this case fewer trees would be cut down.” (S8)

Some sample student excerpts representing anthropocentric attitudes towards the behaviour of “I take care to use products having recyclable materials in their packaging” are given below.



“Because when those packages become useless, we turn them into a useful material.” (S6)

“Because we want to recycle them and use them to produce things that will work for us again.” (S1)

Some sample student excerpts representing both types of attitudes towards the behaviour of “I take care to use products having recyclable materials in their packaging” are given below.

“Because recycling is important for our future. Apart from our future, it is also important in terms of not harming nature. (S19)

“Recycling of these packages should be done with correct methods in accordance with the legislation and they should be brought back to the economy. In this way, the most efficient use of natural resources and their protection for future generations will be ensured, and environmental pollution will be prevented and added value will be created.” (S20)

#### **4. Discussion**

One of the findings obtained in the present study investigating middle school students' behaviours towards the environment and the attitudes underlying these behaviours is that almost all of the students perform the correct behaviours for the three items (I make effort to inform people about air pollution, I take great care not to throw rubbish on the ground and If there is an opportunity to plant trees, I take this opportunity) under the sub-dimension of sensitive behaviour. This finding can be interpreted as middle school students exhibiting positive behaviours towards the environment. In addition, it was found that ecocentric (n = 29), anthropocentric (n = 29), ecocentric and anthropocentric (n = 28) attitudes towards the items in the sub-dimension of sensitive behaviour were exhibited at rates very close to each other. Thomson and Barton (1994) stated that the attitudes of the individuals exhibiting both types of attitudes together can be considered to be positive towards the environment (Özen-Uyar & Yılmaz-Genç, 2016). Thus, it can be argued that the attitudes of the students towards the items “I make effort to inform people about air pollution”, “I take great care not to throw rubbish on the ground” and “If there is an opportunity to plant trees, I take this opportunity” in the sub-dimension of sensitive behaviour are at the desired direction. This can be attributed to the students' having sufficient knowledge on these issues. In this connection, the students' explanations such as “If most people pollute the air, our lives will be difficult and our oxygen will be less. If the air gets polluted, the ozone layer becomes thinner and the harmful rays of the sun damage people's skin, so we have to convey what we know so that they this would not happen.” (S17) and “Because we can survive by breathing and we need trees to breathe healthily. In addition, trees protect the nature from harmful effects that may occur.” (S3) show that students are knowledgeable about the consequences of their behaviours for both humans and nature. This may have caused students to exhibit ecocentric and anthropocentric attitudes together. In fact, different studies have revealed that there is a relationship between environmental knowledge and attitudes towards the environment (Atasoy & Ertürk, 2008; Bradley, Waliczek & Zajicek, 1999; Gao, 2018).

Another finding obtained in the present study is that almost all of the students perform the correct behaviours in the sub-dimension of attentive behaviour and their attitudes towards this sub-dimension are largely ecocentric. In this sub-dimension, there are two items (I take great care not to waste water, I take great care to use both sides of paper ), the presence of more ecocentric attitudes in this dimension seems to be because of the item regarding the use of two sides of paper because more anthropocentric attitudes were found to be exhibited towards the item related

to not wasting water. The large number of anthropocentric attitudes towards water consumption can be attributed to the realization of the importance of water for human life. In this regard, students' explanations such as "The water we use is very important. We can live with it; without it, we will die. We drink water; we have a shower and wash our hands with it. In the current conditions, we need more water to clean ourselves because of Covid-19. We clean our dishes with it. So water is very important, we cannot live without it." (S4) and "If we run out of water, we cannot live; our water contributes a lot to us while washing our hands, cleaning ourselves and as a drink." (S5) show that students have realized the importance of water for humans and are conscious about the issue. Perception of water as indispensable to their own lives may have supported the emergence of anthropocentric attitudes. This finding is consistent with the results of the study conducted by Onukogu, Ugwuanyi, and Adiaha (2018) on senior secondary school students. In their study, 95.3% of the students stated that water plays an important role in the daily activities and survival of people, while 75% agreed that water is very important for the existence or survival of all living things. These rates supports why anthropocentric attitudes are more exhibited in the current study. In addition, the findings of the present study are supported by the results of the study conducted by Aydođdu and akır (2016), which found that secondary school students had sufficient knowledge about the importance of water awareness and that they gained awareness about the protection of water for future generations. The emphasis on the protection of water for future generations indicates another anthropocentric attitude. On the other hand, in the current study, it was found that more ecocentric attitudes were exhibited towards the item "I take great care to use both sides of paper." Here, students stated that trees are used especially in paper making, that they do not want more trees to be cut and that trees are necessary for clean air. Therefore, it can be argued that students' knowledge of paper making affected their attitudes. In fact, Atasoy and Ertürk (2008), Bradley et al. (1999) and Gao (2018) and Sönmez and Yerlikaya (2017) also found a relationship between middle school students' knowledge and attitudes towards the environment. On the other hand, this finding is not consistent with the study by Kahraman et al. (2012) reporting that preschool children exhibited more anthropocentric attitudes towards using both sides of paper. This difference may be due to the fact that students from higher grade levels participated in the current study. It has been revealed that with increasing grade level, students tend to exhibit more ecocentric attitudes (Aydos & Yağcı, 2015; Bozdemir & Faiz, 2017; Eryiđit, 2010). Increasing cognitive development as we get older, increasing interactions with nature, being subjected to more ecological education and developing conceptual understanding may support the increase in the ecocentric attitudes of students as their grade level increases.

Another finding obtained in the current study is that in the sub-dimension of energy / product saving, most of the students stated desired behaviours for using of disposable paper products (napkins, wet wipes, toilet paper, etc.) and turning off electronic devices. Moreover, it was observed that most of the students would exhibit correct behaviours with anthropocentric attitudes. In the study conducted by Kahraman et al. (2012) on younger children, it was found that most of the students expressed anthropocentric attitudes rather than ecocentric attitudes towards the item related to turning the lights off while leaving the room and this finding concurs with the finding of the current study. Special emphasis was put on being economically thrifty in the responses of the students given to the items "I am always economical about the use of disposable paper products (napkins, wet wipes, toilet paper, etc.) and "After using electronic devices such as TV, computer, I do not leave it in sleep mode, rather I turn it off." in the sub-dimension of energy/product saving. This finding can be explained by the low cost-high cost

theory expressed by Diekmann and Preisendörfer (2003). According to this theory, people prefer behaviours that save time and effort and provide economic convenience for them. Behaviours such as turning off the switches of electrical equipment are defined as "Low-cost" behaviours (Erten, 2007). For this reason, it can be stated that the students have largely anthropocentric attitudes towards the items in this sub-dimension to save money.

The last finding obtained in the current study is that the students tend to exhibit fewer correct behaviours towards the sub-dimension of recycling compared to the other sub-dimensions. This might be because of the lack of adequate application settings for recycling in Turkey and students' lack of opportunity to take part in recycling-related activities in their daily lives. Another finding is that from among the students tended to exhibit correct behaviours towards the four items in the sub-dimension of recycling, 38 answers were obtained for ecocentric attitudes, 33 answers were for anthropocentric attitudes and 17 answers were for both types of attitudes together. In this connection, in the study conducted by Develi, Gürsoy, Özçelik, Emik, Yavuz and Kara (2017), most of the middle school students stated their reasons for using recycling as not polluting the environment, and this finding supports the ecocentric attitudes towards recycling identified in the present study. However, while more ecocentric attitudes were expressed towards the items "I try to set a good example in terms of environmental awareness" and "I take care not to mix empty batteries with household waste and throw them into the waste battery box", more anthropocentric attitudes were expressed towards the items, "I take care to sort out the garbage and throw the ones suitable for recycling into the recycling bin" and "I take care to use products having recyclable materials in their packaging". As sorting out rubbish is classified as low-cost behaviour (Erten, 2007), anthropocentric attitude may have been adopted. At the same time, as recycling boxes are not a widespread practice in Turkey, it might be difficult to understand the importance of the issue. In the study conducted by Erten (2003), which supports the findings of the present study, the rate of students who found sorting out garbage reasonable was found to be 80%, while the rate of students who answered "yes, always" to the question "Do you sort out your garbage at home?" was found to be 23.3%. Therefore, although students find sorting out garbage logical, their failure to do so may be attributed to their inability to find the opportunity to practice the behaviour. The same reason can be used to explain the reason for the larger number of anthropocentric attitudes expressed towards the item "I take care to use products having recyclable materials in their packaging" in the current study because the use of recyclable packaging in Turkey is not yet a widespread practice. Lack of experience of students on this subject may have supported their adopting anthropocentric attitudes. In fact, there are researchers who argue that life experiences are more effective than specific programs to form environmental attitudes (Newhouse, 1990).

## **Recommendations**

The findings obtained in the current study show that the students' environmental attitudes are generally ecocentric. However, it was determined that almost all of the students have anthropocentric attitudes towards the items in the sub-dimension of energy / product saving due to financial concerns. For this reason, it is recommended to organize environmental education so that students do not only consider financial interests, but also care about environmental consequences of their behaviours. Another finding of the study is that more anthropocentric attitudes are exhibited towards the items related to sorting out garbage and using products having recyclable materials in their packaging. This might be because of the students's lack of

experience about recycling and inadequate recycling infrastructure in Turkey. For this reason, it is suggested that recycling practices should be made more widespread and that more efforts should be invested to encourage the use of products having recyclable materials in their packaging. In addition, although the knowledge level of the students was not measured in the present study, considering the answers they gave it can be stated that their knowledge has an impact on their behaviours. Therefore, it is thought that environmental education, which will be organized in a way to inform students about the consequences of their behaviours in terms of both human and environment, will support their ecocentric attitudes as well as their anthropocentric attitudes.

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