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Research Article

An investigation of the attitudes of visually impaired middle school students toward the environment

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This study presents the results of a survey of eighty-seven visually impaired middle school students (including those who are blind and those who have low vision) concerning their attitudes toward the environment. The findings with respect to students' ecocentric, anthropocentric and antipathetic attitudes, as well as whether these attitudes differentiate according to gender, living environment, level of vision and family income, are reported. The students were found to be more likely to have an ecocentric attitude, and only the variable of family income had a significant impact on ecocentric attitudes. In line with these results, suggestions have been made for future research.

Keywords: Visually impaired student; Environmental attitude; Ecocentric attitude; Anthropocentric attitude; Antipathetic attitude

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1. Introduction

The environment is a phenomenon that has influenced and shaped the lives of mankind over the millennia that humans have existed. As such, it is obvious that human-based research cannot be conceived without consideration for the environment, and environment-based research cannot be conceived without factoring in human beings, because they are not only affected by the environment, but also have an impact on it (Kramer et al., 2018). As early as the 1970s, the world's leading politicians and academics began to recognize the growing environmental problems and the ensuing issues; in this sense, when it comes down to the basics of environmental problems, it is striking how nature is affected by human activities (Votteler & Martins, 2015). With this in mind, environmental education programs have been developed by some countries at a national level in the name of awareness-raising; these gained a new dimension with the United Nations Conference on the Human Environment held in Stockholm for the first time in 1972. Moreover, the "International Environmental Education Program" signed between UNESCO and UNEP in 1975 became a milestone for environmental education at the global level (Le Roux et al., 2000). Since then, environmental education centering on the conservation of nature and natural resources has taken its place in education programs of many different countries (Gökmen, 2021).

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Environmental education is a useful process that can bring people together, because different cultures, different environments, and societies with different value judgments actually face the same environmental problems and may have suggestions for effective actions or solutions to all of them on a local basis (North American Association for Environmental Education [NAAEE], 1999). One of the aims of environmental education is to develop environmental awareness and positive attitudes toward the environment, at the same time transforming these attitudes into pro-environmental behavior (Basile & White, 2000; Ürey & Güler, 2018). According to the United Nations Environment, Science and Culture Organization [UNESCO], the main objective of environmental education is to develop individuals' awareness of the environment and the environmental problems where they live, as well as to supply them with the knowledge, skills, attitudes, motivation and commitment to work individually and collectively to solve existing problems and to prevent new ones (Campbell et al., 2009). Such efforts result in environmentally conscious citizens who work to protect the environment and make an effort to prevent problems such as pollution.

In the educational process, learners of all types are considered to be valuable; this is particularly emphasized in the context of the inclusive approach with students with special needs (Belay & Yihun, 2020; Moriña, 2017). Thus, considering the principles of equality and participation in education, it is necessary to provide environmental education to individuals of all abilities, to raise their awareness of environmental issues, and to support them in gaining a positive attitude towards the environment. Doing so serves to protect natural resources and ensure social development,. In this sense, protecting the environment and its natural resources is directly related to positive attitudes towards the environment (Erhabor & Don, 2016; Erten, 2007). As such, it is important not only to examine the perspectives, attitudes and behaviors of individuals who do not have any disabilities, but also to identify and develop the perspectives, attitudes and behaviors of individuals with disabilities. In other words, it is as important to reveal the attitudes of the students with issues such as visual impairment towards the events and problems in their environment as those of the students who do not have such limitations (Ürey & Güler, 2018).

It is a known fact that educational activities are important in bringing about lasting solutions for environmental problems. In this regard, educating individuals to be conscious of and sensitive to the environment appears to be the most effective way to solve such problems, whereas individuals with negative attitudes or antipathetic perspectives will be insensitive to environmental problems and even continue to create problems for the environment (Uzun & Sağlam, 2006). It can also be considered that there is a positive relationship between informing individuals about the environment and creating behavior change by encouraging positive attitudes. As such, one of the aims of environmental education is to raise awareness about the environment (Ho et al., 2021). The first step in achieving this is through teaching basic knowledge and concepts about the environment, but that is not enough; positive attitudes towards the environment must also be developed, and these attitudes should be reflected and transformed in their behavior (Heyl et al., 2013). In this context, Basile and White (2000) remarked on the importance of actions and attitudes by emphasizing the relationship between science and the social sciences. Namely, environmental education combines science knowledge and skills with social studies decision-making, as well as civic knowledge and skills, generally focusing on the application of content knowledge using higher-order thinking and making connections to the world beyond the classroom (Basile & White, 2000). In this regard, one way of transforming students' awareness, knowledge and attitudes towards the environment into positive behaviors is to integrate environmental literacy into daily life and to develop sustainable awareness towards society, economy and natural resources through an understanding of the relationship between the environment and society (Eroğlu & Yıldırım, 2020).

1.1. Environmental Attitudes

In order to understand the views of individuals towards the environment, it is essential to understand their environmental attitudes. According to Aiken (2000, as cited in Gürsoy et al., 2014), attitudes can be defined as positive or negative predispositions to a situation. Also referring to the environment, Dunlap and Van Liere (1978) mentioned ethical considerations as indications of an individual's attitudes. These ethical notions were discussed under two headings: ecocentric and anthropocentric. In this regard, individuals who have ecocentric values are more likely to appreciate nature without regard to any other interests, because nature is natural and good for them. Contrary to ecocentrics, individuals with an anthropocentric understanding support that human standards of life are a priority, and they argue that it is necessary to protect nature for the sake of human life (Thompson & Barton, 1994). From this point of view, it can be said that individuals with ecocentric and anthropocentric understandings may both tend to protect nature and natural resources, but the motivations that generate this tendency are different. For example, air pollution can lead to health problems in humans, such as the inability to breathe; the view that pollution should be avoided for that reason is an indication of an anthropocentric mindset. In this sense, it has been claimed that anthropocentrics are more pragmatic (Erten & Aydoğdu, 2011). On the other hand, while ecocentrics share the same idea with anthropocentrics concerning the conservation of nature; the difference between them is ecocentrics view nature as worth conserving even if there are no problems impacting humans (Thompson & Barton, 1994).

In addition to the two ethical approaches described by Dunlap and Van Liere (1978) and summarized above, Thompson and Barton (1994) referred to a third understanding of an antipathetic component. The concept of an antipathetic attitude is defined as unattracted, repulsed, and cold (Turkish Language Association [TLA], 2018); in terms of environmental perceptions, it denotes a person who feels distanced from environmental problems. According to Erten and Aydoğdu (2011), the intensity of the work carried out for the protection of the environment has caused and continues to cause the development of antipathetic attitudes towards the protection of nature.

1.2. Previous Research

Attempts to understand man's sense of environment are not new. However, investigations of students' perceptions towards the environment and environmental problems have become more popular with the increasing awareness of the importance of environmental education. In this regard, researchers have examined perceptions of students in a variety of contexts with varied sample groups. Some of the existing literature has focused on the values or attitudes of preschool children towards the environment (e.g., Broom, 2017; Lithoxoidou et al., 2017; Simsar, 2021). For instance, Simsar (2021) worked with pre-school children to investigate their environmental awareness regarding their ecological footprint, in addition to their environmental attitudes. Simsar concluded that many of the children had anthropocentric attitudes towards certain environmental phenomena, pointing out the importance of parents in raising individuals with environmentally friendly views. In another study conducted with a similar study group, Buldur and Ömeroğlu (2018) aimed to determine the attitudes and environmental awareness of pre-school children and found that although their awareness about environmental problems was moderate, the children's attitudes were high.

In addition to research with pre-school children, other studies have aimed to reveal the attitudes, awareness and behaviors of elementary or secondary school students towards the environment or environmental problems (e.g., Ernst et al., 2017; Hamada et al., 2021; Staples et al., 2019; Liefländer & Bogner, 2018; Liu & Chen, 2020). One such study, by Soğukpınar and Karışan-Korucu (2020), examined the attitudes of elementary school students towards the environment. They discovered significant differences in the environmental attitudes of the students in terms of grade level and educational backgrounds of their parents.

Moreover, studies have also been conducted with pre-service teachers (Aydos & Yağcı, 2015; Tuncer et al., 2007; Vlaardingerbroek & Taylor, 2007) and in-service teachers (Larijani, 2010; Nagra, 2010) concerning their knowledge, awareness and attitudes towards the environment. For example, Nagra (2010) examined the environmental education awareness of 3,600 schoolteachers and concluded that they were well aware of environmental problems such as pollution, the greenhouse effect, and ozone layer depletion.

Furthermore, in terms of specific variables, previous studies have focused on demographic factors. Among these, the factor of gender has been most frequently studied in terms of behaviors (Lee et al., 2013; Xiao & Hong, 2010; Zelezny et al., 2000), attitudes (Sundström & McCright, 2014; Xiao & McCright, 2012), and living environment (Harris, 2004; Takayama et al., 2015). While the results of some of these studies indicated that gender is a significant variable in environmental attitudes and behaviors (Lee, 2009; Tikka et al., 2000), others have found no difference between the genders (Dalen & Halvorsen, 2011; Lee et al., 2013). Similar results can be seen in studies carried out with special needs individuals (Sengupta et al., 2009; Ziadat, 2010). Therefore, it has been argued that gender differences in environmental behaviors are inconsistent across various environmental studies. Similarly, inconsistencies between environmental attitudes and income have also been noted. In some instances, the demographic variable of income has been hypothesized to have a positive effect on environmentalism (Kelly, 2012), whereas other studies have found that income is not generally a predictive variable with respect to environmental attitudes or behaviors (Mertig & Dunlap 2001; Saphores et al., 2012).

The studies summarized above aimed to reveal the environmental knowledge, awareness, attitudes and behaviors of a wide range of participants, from preschool children to university students, in addition to teachers; it is widely recognized that in order to increase individuals' environmental knowledge, develop positive attitudes towards the environment, and transform these attitudes into pro-environmental behavior, their existing knowledge, attitudes and awareness should first be determined (Erten, 2007; Simsar, 2021). However, despite the large body of literature on environmental education, little is known regarding the attitudes of visually impaired students. In this regard, although there are studies on teaching science to students with visual impairment (e.g., Kizilaslan et al., 2021; McCarthy & Shevlin, 2017; Okcu & Sozbilir, 2019; Rosenblum et al., 2019; Yazıcı & Sözbilir, 2020), studies focused specifically on environmental education of students with visual impairment are quite limited (Maji, 2014; Ürey & Güler, 2018). The study by Ürey and Güler (2018), for instance, investigated the perceptions of visually impaired middle school students regarding environmental issues. The results showed that although the students were generally aware of environmental problems, they had difficulties in relating them to their immediate surroundings.

Considering that the need to understand the attitudes of students towards a phenomenon is a prerequisite for changing their perspectives, identifying the perceptions of visually impaired students is emerging as a new area for investigation. This study, which aims to address this gap in the research, aims to determine the attitudes of visually impaired middle school students towards the environment according to certain variables. The study will therefore address the following research questions:

RQ 1) What is the dominant attitude among visually impaired middle school students regarding the environment?

RQ 2) Do the attitudes of visually impaired middle school students change according to different variables (i.e., gender, living environment, level of vision (low vision or blind), family income level)?

2. Method

2.1. Research Design

A descriptive research design was adopted for this study, as it is considered one of the most suitable approaches for exploring, evaluating, and attempting to analyze, interpret and report on

the facts of a situation (Nachimias & Nachimias, 2003). This approach was considered appropriate for this study because it aimed to investigate the perception of visually impaired students towards the environment.

2.2. Participants

The sample for the study consisted students who are studying in middle schools for the visually impaired of Ministry of National Education in different cities in Turkey in the 2015–2016 academic year. From these schools, eighty-seven visually impaired students were selected as the study sample by adopting a simple random sampling method. The characteristics of the participants are provided in Table 1.

Table 1
Characteristics of the participants

		f	*Total*
Gender	Male	54	87
	Female	33	
Level of Vision	Blind	45	
	Low vision	42	

While the number of males was higher than that of females, as seen in Table 1, the number of participants in the sample is close to each other with respect to the degree of blindness. A simple random sample selection was used in the selection of the sample. In the selection of a simple random sample, all units in the stage have an equal and independent chance to be chosen for the sample (Setia, 2016).

2.3. Data Collection and the Process

The Attitudes towards Environment Scale was used as a data collection tool to determine the perceptions of visually impaired students toward environmental problems. The questionnaire consists of two parts. In the first part, there are 4 questions relating to the demographic characteristics of the students. This section included questions about the genders of the students, their residential areas (village, district, province, and metropolis) where they have spent the majority of their lives, their degree of vision, and their family income. The second part included items that were designed to measure their perceptions toward the environment. The scale was originally developed in the United States by Thompson and Barton (1994) and later adapted to German by Siegrist (1996). The scale was further adapted to Turkish by Erten (2007) for use with students in Turkey, The Turkish scale was tested and proven to be valid and reliable. The reason for using this scale was that it is commonly used with the middle school age group, because the items on the scale are easy for younger students to understand. Moreover, it provides the opportunity to determine whether their thinking with regard to protecting the environment is human-centered, environmentally-centered or indifferent-repulsive.

The scale consists of a 3-factor structure that measures anthropocentric (human-centered), ecocentric (environment-centered) and antipathetic attitudes. There are a total of 27 items on the scale: 12 items for ecocentric, 8 items for anthropocentric, and 7 items for antipathetic attitudes (see the appendix for sample items). The scale items were re-arranged as a 5-point Likert-type scale, taking into account the sample group of the study, as the items in the original scale were developed for secondary and higher education participants and had a scoring range of 7. For the current study, the scale items were rated as *strongly disagree*, *disagree*, *neither agree nor disagree*, *agree* and *strongly agree*. In addition, some of the scale items were adapted to a level that middle school students would be able to understand without altering the root of the expression or creating a shift in meaning. After these changes were made, three lecturers specializing in science education were asked for their expert opinions of the questionnaire. As the next step, the questionnaire was administered with a total of 100 middle school students in order to establish the reliability and

validity of the scale. As a result of the reliability analysis, the Cronbach's alpha value was found to be 78. In terms of factors, alpha was found to be 0.70, 0.81 and 0.76 for the ecocentric, anthropocentric and antipathetic attitudes respectively. Based on this result, it was concluded that the survey was reliable (Bonnet & Wright, 2015). Furthermore, KMO and Bartlett's tests were applied to test the scale's validity. The KMO value was found to be 0.75, while the Bartlett's test value was 0.00. The KMO value indicated that the number of samples in the pilot study was sufficient, while the Bartlett's value ($p = 0.000 < 0.01$) indicated that the data were normally distributed (Field, 2009).

The application of the questionnaire was carried out in the classroom with the participation of the researcher after determining the days and hours at which the participants were at school. Volunteerism was taken into account in the implementation of the questionnaires. For students who were blind, the questionnaire was read by the researchers. For students with partial sight, the questionnaires were administered using large-scale polling printouts, as suggested in the literature, with 22-point size "Century Gothic" font (Reading Strategies for Students with Visual Impairments, 2010).

2.4. Data Analysis

The SPSS 22 package program was used to analyze the data. Frequency and percentage values were determined to demonstrate the participants' demographic information and their perspectives on the environment. Levels and score ranges for each factor were established specifically for this study in order to identify the students' predominant attitudes toward the environment. The levels and range of points are presented in Table 2.

Table 2
Levels and score ranges used to determine the participants' perspectives

Level	*Score Range*					
	Ecocentric (x)		Anthropocentric (y)		Antipathetic (z)	
	Min.	Max.	Min.	Max.	Min.	Max.
	12	60	8	40	7	35
Weak	$12 \leq x \leq 27$		$8 \leq y \leq 18$		$7 \leq z \leq 16$	
Medium	$28 \leq x \leq 44$		$19 \leq y \leq 29$		$17 \leq z \leq 25$	
Strong	$45 \leq x \leq 60$		$30 \leq y \leq 40$		$26 \leq z \leq 35$	

According to Table 2, in terms of ecocentric attitudes, a 12-27 score range expresses a "weak" ecocentric level, while 28-44 is "medium" and 45-60 is "strong". In terms of an anthropocentric point of view, the range of 8-18 expresses a "weak" anthropocentric level, while 19-29 is "medium" and 30-40 is "strong". Finally, for antipathetic attitudes, the range of 7-16 scores expresses a "weak" level, and 26-35 points means that the participant has a "strong" antipathetic attitude.

Statistical analysis techniques were used to reveal the effects of each independent variable in the first part of the questionnaire on the anthropocentric, ecocentric and antipathetic viewpoints. An independent t-test and one-way analysis of variance (ANOVA) were used in this context since the assumptions of the tests were met. A significance level of 0.05 was considered in the analysis.

3. Results

Visually impaired middle school students' attitudes towards the environment were investigated within the frame of the first research question. The frequency and percentage distributions of the participants in terms of levels (weak, medium and strong) and their attitudes (anthropocentric, ecocentric, antipathetic) are presented in Table 3.

Table 3
Distribution of attitudes of participants according to variables

Variable	*Type of variable*	*N*	*Ecocentric (%)*			*Anthropocentric (%)*			*Antipathic (%)*		
			W	M	S	W	M	S	W	M	S
Gender	Male	33	0	24	76	3	36	61	52	48	0
	Female	54	0	22	78	0	41	59	48	50	2
Living environment	Village	7	0	43	57	14	43	43	14	86	0
	District	11	0	27	73	0	18	82	45	55	0
	Province	9	0	11	89	0	56	44	67	33	0
	Metropolis	60	0	22	78	0	42	58	58	40	2
Level of vision	Blind	45	0	13	87	0	36	64	56	44	0
	Low vision	42	0	33	67	2	43	55	53	45	2
Family income	Less than 1500 TL	33	0	30	70	3	42	55	39	61	0
	1501-2500	34	0	20	80	0	34	66	63	36	2
	2501-3500	18	0	13	87	0	50	50	87	13	0
	More than 3501 TL	2	0	0	100	0	50	50	50	50	0

Note. W: Weak; M: Medium; S: Strong; TL: Turkish Liras

When we consider the variable types in terms of gender, males (78%) were found to exhibit more ecocentric tendencies than the others. According to the other classifications, students living in a province (89%), those who were blind (87%) and those who had a family income of more than 3501 Turkish Liras (100%) had higher ecocentric tendencies. When examined in terms of anthropocentric attitudes, it was observed that students had a strongly anthropocentric point of view in all types of variables except for a few. In this regard, it was determined that visually impaired students living in villages (43%) and provinces (56%) exhibited moderate anthropocentric viewpoints. On the other hand, from the perspective of antipathetic attitudes, it was seen that all variants of the participants exhibited weak and partly moderate antipathetic views. Furthermore, it was found that male students who lived in villages and districts and those with family income levels below 1500 Turkish liras had a more antipathetic attitude than those expressed by other variables.

To address the second research question of the study, the results were examined statistically regarding the students' gender, living environment, level of vision and family income. The students' attitudes toward the environment in terms of the gender variable were compared using the independent t-test. The findings are presented in Table 4.

Table 4
T-test results for students' attitudes according to gender variable

	Gender	*N*	*Mean*	*SD*	*t*	*df*	*p*
Ecocentric	Female	33	47.21	5.13	−.493	85	.623
	Male	54	47.74	4.67			
Anthropocentric	Female	33	29.61	4.73	−1.104	85	.273
	Male	54	30.63	3.83			
Antipathic	Female	33	16.73	4.33	−0.533	85	.595
	Male	54	17.24	4.38			

As can be seen in Table 4, no significant difference was found between the environmental attitudes of the female students and the males ($t_{(85)} = -0.493$; $p = 0.623$; $p > 0.05$). Similar findings were also determined for anthropocentric ($t_{(85)} = -1.104$; $p = 0.273$; $p > 0.05$) and antipathetic attitudes ($t_{(85)} = -0.533$; $p = 0.595$; $p > 0.05$).

The attitudes of the visually impaired middle school students towards the environment were also examined in terms of their living environment, and the data thus obtained were compared using one-way analysis of variance (ANOVA). The findings are presented in Table 5.

Table 5
ANOVA results for students' attitudes according to the living environment variable

	Source	*Sum of squares*	*df*	*Mean square*	*F*	*p*
Ecocentric	Between groups	60.577	3	20.192	.863	.464
	Within groups	1943.032	83	23.410		
	Total	2003.609	86			
Anthropocentric	Between groups	56.014	3	18.671	1.060	.371
	Within groups	1461.917	83	17.613		
	Total	1517.931	86			
Antipathic	Between groups	58.862	3	19.621	1.042	.378
	Within groups	1562.954	83	18.831		
	Total	1621.816	86			

Table 5 demonstrates that there was no significant difference between ecocentric ($F_{(3\text{-}83)} = 0.863;\ p = 0.464;\ p > 0.05$), anthropocentric ($F_{(3\text{-}83)}$=1.060; $p = 0.371;\ p > 0.05$) and antipathic ($F_{(3\text{-}83)} = 1.042; p = 0.378; p > 0.05$) points of view towards the environment.

As a further variable, the attitudes of the visually impaired students about the environment were investigated according to their level of vision. The results of the comparison using the independent t-test are presented in Table 6.

Table 6
T-test results for students' attitudes according to the type of visual impairment variable

	Level of Vision	*N*	*Mean*	*SD*	*t*	*df*	*p*
Ecocentric	Blind	45	48.33	4.42	1.601	85	.113
	Low vision	42	46.69	5.14			
Anthropocentric	Blind	45	30.60	3.59	0.823	85	.413
	Low vision	42	29.86	4.78			
Antipathic	Blind	45	16.62	4.21	0.941	85	.349
	Low vision	42	17.50	4.48			

The result of the t-test showed that no significant difference was found between the students with blind and low vision ($t_{(85)}$ =1.601; $p = 0.113;\ p > 0.05$). Similar findings were also revealed with respect to anthropocentric ($t_{(85)} = 0.823;\ p = 0.413;\ p > 0.05$) and antipathetic attitudes ($t_{(85)} = 0.941;\ p = 0.349;\ p > 0.05$), and no significant difference was found between students with different levels of vision.

Finally, the attitudes of visually impaired students towards the environment were analyzed according to the variable of family income, and the data thus obtained were compared using one way analysis of variance (ANOVA). The results are presented in Table 7.

Table 7
ANOVA results for students' attitudes according to family income variable

	Source	*Sum of squares*	*df*	*Mean square*	*F*	*p*
Ecocentric	Between groups	218.730	3	72.910	3.390	.022*
	Within groups	1784.879	83	21.505		
	Total	2003.609	86			
Anthropocentric	Between groups	57.245	3	19.082	1.084	.360
	Within groups	1460,686	83	17.599		
	Total	1517.931	86			
Antipathic	Between groups	139.028	3	46.343	2.594	.058
	Within groups	1482.788	83	17.865		
	Total	1621.816	86			

Note. *There is a significant difference at $p < 0.05$ level.

According to the results shown in Table 7, no significant difference was determined between the anthropocentric ($F_{(3\text{-}83)}$ = 1.084; $p = 0.360$; $p > 0.05$) and antipathetic attitudes ($F_{(3\text{-}83)}$ = 2.594; $p = 0.058$; $p > 0.05$) of students with respect to family income. However, from the ecocentric point of view, it was determined that there was a significant difference in attitudes ($F_{(3\text{-}83)}$ = 3.390; $p = 0.022$; $p < 0.05$). Tukey test was used to determine the source of significance, and the findings were significantly in favor of those with a family income between 2501-3500 Turkish liras.

4. Discussion and Conclusion

According to Thompson and Barton (1994), individuals with ecocentric attitudes had no reason for interest anxiety because it is natural to them; while anthropocentrics argue that the environment must be protected in the light of the fact that it is important for human beings and their standards of living. On the other hand, individuals with antipathetic attitudes are very disinterested in environmental issues. Considering that the aim of educational curricula is to develop positive attitudes towards the environment, it can be said that it is important to increase ecocentric attitudes toward the environment and decrease antipathetic attitudes. With respect to the first research question of the current study, it was found that the majority of the visually impaired students had a tendency towards ecocentric and anthropocentric attitudes. It was also observed that some visually impaired students exhibited moderate antipathetic tendencies, although they tended towards predominantly ecocentric and anthropocentric attitudes. Among the three attitudes, students exhibited primarily ecocentric views. Similarly, in their study conducted with middle school students, Onur, Sahin and Tekkaya (2012) reached the conclusion that most of the students had ecocentric attitudes towards the environment. One of the main reasons for this similarity can be interpreted in terms of attitudes towards of visually impaired students and individuals with no visual impairment. Moreover, similarities in environmental attitudes among middle schools may stem from the common curricula implemented for all individuals in the Turkish educational system. From this, is can be inferred that the curriculum was successful in supporting positive attitudes towards the environment and had no effect on individual differences. On the other hand, some Turkish studies carried out with different sample groups showed different results. For example, while the study conducted by Karakaya (2009) and Karakaya and Çobanoğlu (2009) revealed ecocentric tendencies in students in faculties of education, Özdemir's (2014) study, which was carried out with science faculty students, revealed that the anthropocentric beliefs of students were more dominant. In the context of this conclusion, it can be said that individuals with different learning experiences may exhibit different attitudes towards the environment.

It was also determined that visually impaired students did not display antipathetic attitudes towards the environment. In this case, it is noteworthy that although they exhibited no strong antipathetic attitudes, they did tend to evidence moderate antipathetic attitudes. As has been pointed out in previous studies (Amérigo et al., 2017; Özdemir, 2014), the turmoil and disturbances that are taking place in the actions of environmental organizations that are especially designed for solving environmental problems may affect students' tendencies in this regard.

When the environmental attitudes of visually impaired students were examined according to the gender variable, no statistically significant differences were found between female and male students with respect to their ecocentric, anthropocentric and antipathetic attitudes. Similar conclusions were made by Sengupta et al. (2009). On the contrary, in another study conducted with visually impaired students in a secondary school, it was found that female students showed more positive behaviors towards the environment (Maji, 2014; Olufemi et al., 2016). In this sense, while gender was found as a significant factor in some studies (Maji, 2014; Olufemi et al., 2016), other results found no difference between males and females' perspectives (Sengupta et al., 2009). In other words, there is a need for further studies to be carried out in this regard.

In terms of living environment, no significant differences were found between the environments where the visually impaired students lived and ecocentric, anthropocentric and

antipathetic attitudes. This may be due to students having to learn about certain environmental issues, such as traffic or earthquakes, directly from their teachers or textbooks in their schools rather than experiencing them personally. Similar results can be seen in well-attended studies carried out by Bogner and Wiseman (1997) with the participation of about 2400 non-impaired German pupils from rural and urban areas. Their results revealed no differences in their attitudes towards the environment. Other studies conducted with non-impaired students also reveal that there is no significant difference in rural-urban distinction (Arcury & Christianson, 1993; Yalmancı & Gözüm, 2011). This result implies that living environments may not affect the environmental attitudes of visually impaired students as with those who are non-impaired.

With respect to level of vision of the participants, no significant differences were found between the blind students and those with low vision. This result may be due to the fact that the students with low vision have inadequate individual social experiences, as with their blind peers, because their eyesight is very limited. In a more general framework, whether the sense of sight has an effect on environmental attitudes and behaviors is a controversial issue. A study conducted by Sengupta et al. (2009) found no statistically significant difference between visually impaired students and non-impaired students in terms of environmental awareness and behavior. The results of the current study support the idea of sight not having an effect on environmentalism. In other words, it can be argued that visual impairment is not an obstacle to the development of environmental awareness and the adoption of environmentally positive behaviors, and that the education given to visually impaired students on environmental problems is beneficial (Olufemi et al., 2016). Therefore, it can be assumed that the educational policies in the context of special education are carried out to a certain extent.

The results concerning whether environmental attitudes varied according to family income levels revealed no statistically significant difference with respect to anthropocentric and antipathetic attitudes. In other words, the family income levels of the students were not influential in terms of anthropocentric and antipathetic environmental attitudes. This may be due to the fact that the participants in the study did not have great disparities in family income. Some of the previous studies that have examined the effect of family income on attitudes toward the environment likewise found no difference in this regard (Karahan, 2009; Sadık & Sarı, 2010; Sağlam, 2012). For instance, Karahan (2009) found no relation between family income and ecocentric, anthropocentric or antipathetic attitudes toward the environment.

Moreover, when the ecocentric perspective was examined, a significant difference was fond in favor of those with family income levels between 2501-3500 Turkish liras. This result obtained from the current study is contrary to other studies. In this regard, it can be inferred that children from high-income families exhibit more nature-centered attitudes than children from low- or middle-income families. Numerous studies in the literature have indicated that environmental awareness is directly proportional to family income (Bozoglu et al., 2016; Fernández-Manzanal et al., 2007). The current study supports the existing literature (e.g., Ozkan, 2013) that has concluded that economic development plays an important role in the growth of positive environmental attitudes.

5. Limitations and Future Research

This study examined visually impaired students' perspectives in terms of ecocentric, anthropocentric and antipathetic attitudes toward the environment, as well as whether their attitudes differentiated according to certain variables. Although the study addressed a relevant research question, there were limitations associated with the methodology employed in this investigation. The first limitation was the sample size. Although the sample size allowed inferential analysis, higher numbers of visually impaired students would increase the statistical power and the generalizability of the results of this study. Second, in terms of the survey method, the researcher had not actually observed the behavior of the students nor read their minds with respect to their attitudes, but rather used their responses to the scale items. Qualitative studies

could provide a more robust understanding in this regard. Finally, it is recommended that learning settings and materials be designed to support visually impaired students in developing ecocentric attitudes and behaviors towards environmental problems. As a final remark, since the study was conducted in 2016 and due to inflation in the Turkish lira, family income level given in Table 3 may be insufficient to reflect current income levels. Researchers should consider this situation in future research.

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Appendix. Sample items in the scale

Ecocentric
Nature is valuable for its own sake.
One of the most important reasons to conserve is to preserve wild areas.
Anthropocentric
The most important reason for conservation is human survival.
Nature is important because of what it can contribute to the pleasure and welfare of humans.
Antipathic
I don't care about environmental problems.
I do not think the problem of depletion of natural resources is as bad as many people make it out to be.