

# **A study of the environmental risk perceptions and environmental awareness levels of high school students**

**Burcu ANILAN**

**Eskisehir Osmangazi University, Faculty of Education**

**Department of Elementary Education, Eskisehir, TURKEY**

**E-mail: [burcud@ogu.edu.tr](mailto:burcud@ogu.edu.tr)**

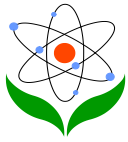
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## Abstract

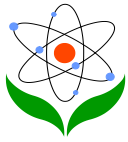
This descriptive research was conducted to determine the levels of environmental risk perceptions and environmental awareness of high school students in Eskisehir. High school students in the towns Tepebasi and Odunpazari in the 2010-2011 school years constitute the universe of the research. The sample of the research is composed of 413 high school students in Tepebasi and Odunpazari in the 2010-2011 school years. Research data have been collected via Environmental Risk Perception and Environmental Awareness Level surveys, which were developed by the researcher. Expert views have been consulted for the validity of both surveys, and alpha values have been analysed for the reliability. The alpha value of the Environmental Risk Perception Survey is .91, and that of the Environmental Awareness Levels Survey is .80. The results show that the risk perception and environmental awareness levels of high school students in Eskisehir regarding environmental factors are high. The students participating in the survey regard active and passive smoking, global warming, HIV, nuclear waste, and the use of alcohol and drugs as “very high-level” environmental risks. Students believe that environmental problems could be primarily resolved by changing people’s standards of judgement and attitudes towards nature, and they are aware that leading a healthy life in a naturally protected environment is of greater importance than having a high-quality life; these findings indicate that their environmental awareness levels are high.

**Keywords:** high school, environment, environmental risk perception, environmental awareness

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## Introduction

Since the moment they came into existence, human beings have needed a social life to continue their lives. Along with social life, the environment, the common area where human beings and other living creatures continue their relationship throughout their lives and interact with each other, has been formed (Türküm, 2006). In a broad sense, the environment is the accumulation of physical, chemical, biological or social factors at a specific time that may have direct or indirect effects on human activities and living creatures immediately or over time (Hamamcı &

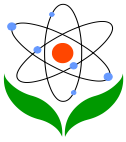


Keleş, 1998). Humans are social beings that are aware of their existence and interaction with the environment. They form artificial environments by changing the environmental conditions in accordance with their desires, using the opportunities that their intelligence and capabilities created (Özer 1993).

Today, rather than acquiring positive traits for the environment and humanity, changes in this artificial environment have taken on many negative aspects that may threaten the lives of all living creatures (Gündüz, 2004), and therefore, many environmental problems have occurred. With a history that dates back to early times, environmental problems have started to soar all around the world, particularly after the industrial revolution (Görmez, 1997). The largest factor in the occurrence of these problems is the changes in economies as a result of technological developments and the consequential increases in human needs (Bozkurt, 2008). Along with humans' excessive and senseless usage of natural resources and population growth, industrial products, the amount and variety of technical tools and social equipment, and excessive consumption have reached unimaginable levels (Hertsgaard 2001).

Today's world faces a wide variety of environmental problems. Air, soil, and water pollution, solid waste, nuclear waste, erosion, global warming, climate change, reduced biodiversity, radiation, and a decreasing number of plant and animal species are some of these problems. In 1992, the document "Warning to Humanity" (Öznacar, 2005) stressed that the opportunities people have will substantially disappear day by day and that people need to respect the environment they live in as much as they respect themselves. The concern that environmental problems will create bigger risks in the future is mentioned continuously (Beyhun et. al., 2007; Sam, Gürsakal & Sam, 2010; Szasz, 1994; Satterfield, Mertz & Slovic, 2004; Dunlap, Van Liere, Mertig & Jones, 2000).

In social sciences, the concept of risk is defined by considering its different aspects. Beck (1992) uses the concepts of risk and danger with the same meaning and argues that risks caused by modernisation cause irreparable harm to the environment. According to Beck, risk society is shaped as a result of not foreseeing the conclusions of these threats and of unamenableness and impassivity. The risk society approach, which became widespread in the 1990s, also states that risk has started to take up an increasingly larger place in life, and the risk concept is related to the social restructuring that is composed of social, historical and cultural contents. Studies about risk perception (Walsh-Daneshmandi & MacLachlan, 2000;

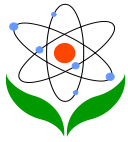


Riechard & Peterson,1998; Slimak & Dietz, 2006; Gürsoy, Çiçeklioğlu, Börekçi, Soyer & Öcek, 2008; Lazo,Kinnell & Fischer,2000; Lai, Brennan, Chan& Tao, 2003; Beyhun et. al., 2007, Altunoğlu & Atav, 2009, Sam et. al., 2010) are important in terms of guiding risk management and contributing to studies on reducing risks (Gürsoy et. al., 2008). Risk perception is an important step for increasing the awareness of a society in reducing environmental risks. People respond to environmental problems that threaten themselves on the level they perceive them. Individuals' ability to perceive environmental risks is proportional to how sensitive they are to environmental problems, and there is a primary need to increase individuals' level of awareness about environmental problems. Many studies regard nurturing conscious and sensitive individuals as the most effective way to resolve environmental problems, and they also note that environmental awareness can be constructed by providing the type of education that will teach them correct behaviours (Kızılaslan, 2005; Alım, 2006; Gökdere, 2005; Uzun & Sağlam, 2006; Şimşekli, 2004; Esa, 2010; Kahyaoğlu, 2011; Türküm, 2006; Çabuk & Karacaoğlu, 2003).

Although acquiring environmental awareness starts informally in the family and close social environments and continues throughout the lifetime, it lasts formally in pre-school, primary education, high school and university phases. Some studies indicate that the provided environment education is not enough to develop environmental awareness (Yılmaz, Morgil, Aktuğ & Göbekli, 2002; Kiziroğlu, 2000; Kaya, Akıllı & Sezek, 2009; Şimşekli, 2004; Özdemir, Yıldız, Ocaktan & Sarışen, 2004; Ünal & Dımişkı, 1999; Demirbaş & Pektaş, 2009). Based on these results, it can be stated that there is a need to make changes in the environmental education provided in our country. Raising individuals with environmental awareness and sensitivity is only possible with a good environmental education. Although the problems that environmental pollution create concern the future of every individual, understanding these problems and gaining awareness is primarily possible in the high school and university periods (Sülün, 2002). Considering that not all students will continue on to receive a university education, it is important to nurture students to have a high environmental awareness in high school.

### **Purpose of the research**

Environmental education provided in the high school period, in which personality starts to be shaped and awareness increases, provides more effective results. Thus, this research aims to determine the environmental risk perception and the level of



environmental awareness of high school students in Eskisehir. According to this main purpose, answers for the questions below have been researched.

1. What is the extent of the level of environmental risk perception of high school students in Eskisehir?
2. What is the extent of the level of environmental awareness of high school students in Eskisehir?
3. Do the environmental risk perception levels of high school students in Eskisehir differ according to individual characteristics?
4. Do the environmental awareness levels of high school students in Eskisehir differ according to individual characteristics?

## **Methodology**

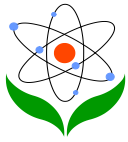
### **Research Model**

This research, which aims to determine the environmental risk perceptions and environmental awareness levels of high school students in Eskisehir, is a type of descriptive research. Although Karasar (2010) describes the survey method as a strategy that aims to reveal a past or present situation, Buyukozturk, Cakmak, Akgun, Karadeniz and Demirel (2009) define the method as a strategy that determines the views of participants concerning a situation or an event or specifies participants' characteristics, such as interests, skills, attitudes, etc.

### **Population and Sample**

High school students in the towns of Tepebasi and Odunpazari in Eskisehir in the 2010-2011 school years constitute the universe of the study.

The sample of the research is composed of 413 high school students in the towns of Tepebasi and Odunpazari in Eskisehir in the 2010-2011 school years. The samples have been chosen through a stratified sampling method. According to Baykul (1999), the stratified sampling method is commonly used in social sciences and is particularly appropriate for nonhomogeneous universes. Stratified sampling is often used when one or more of the subsets in the population has a low incidence relative to the other subsets. In addition, Balçı (2004) states that subsets in the universe are guaranteed to be represented sufficiently in this sampling method. Because the study aimed to collect the views of students from three different high schools, each



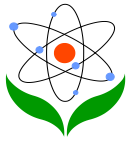
school type has been regarded as a stratum. Therefore, 201 students from Anatolian high schools, 87 from general high schools and 125 from high schools of science, were included in the study.

### **Data Collection Tool**

A questionnaire form that was prepared by the researcher has been used as the data collection tool. The survey includes three sections. Individual characteristics are gathered in the first section. In the second section is a five-point Likert-type scale with the answers “not at all”, “not much”, “neutral”, “somewhat” and “very” to assess the environmental risk perception level. The third section has been prepared as a five-point Likert-type scale that includes statements regarding the assessment of environmental awareness levels and includes answers of “strongly agree”, “agree”, “neither agree nor disagree”, “disagree” and “strongly disagree”. In the formation of the scale, literature has been reviewed, and similar studies have been consulted (Beyhun et.al.,2007; Fernandez-Manzanal, Rodriguez-Barreiro & Carrasquer, 2007; Altunoğlu & Atav, 2009; Aslan et.al., 2008; Uzun & Sağlam, 2006; Kaya, Akıllı & Sezek, 2009, La Trobe & Acott, 2000). Expert views have been used for the validity of the Environmental Risk Perception and Environmental Awareness Level surveys that were developed by the researcher. Cronbach’s Alpha (Tezbasaran, 1996) values have been checked for reliability. The Environmental Risk Perception and Environmental Awareness Survey have been submitted to two experts of Turkish for language validity and two experts of environmental education for scope validity. The alpha value of the Environmental Risk Perception survey is .91, and the alpha value of the Environmental Awareness Level survey is .80. It can thus be stated that the data collection tools are valid and reliable.

### **Analysis of Data**

The data of the research have been analysed quantitatively in the SPSS program. The frequency and percentages of the first and second sub-problems of the research have been obtained. Whether the data are distributed normally has been checked to decide which parametric or non-parametric tests will be used for the third and fourth sub-problems of the research. The Kolmogorov-Smirnov test has been applied for this purpose, and it has been observed that the data are not normally distributed ( $p < .05$ ). Thus, non-parametric tests have been used in the analysis of the data. Therefore, Mann-Whitney U Test has been used in bivariate comparisons, and

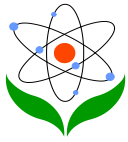


the Kruskal-Wallis Test has been applied in multivariate comparisons to analyse the data.

## Findings

**Table 1.** Descriptive statistics of the participants

Variables		f	%
Gender	Male	220	53.3
	Female	193	46.7
Type of high school	Anatolian	201	48.7
	General	87	21.1
	Science	125	30.3
Grade level	9	72	17.4
	10	246	59.6
	11	79	19.1
	12	16	3.9
Age	15	87	21.1
	16	224	54.2
	17	83	20.1
	18	19	4.6
Mother's education level	Elementary	105	25.4
	Secondary	44	10.7
	High	136	32.9
	University	120	29.1
	Graduate	8	1.9
Father's education level	Elementary	31	7.5
	Secondary	28	6.8
	High	146	35.4
	University	199	48.2
	Graduate	9	2.2
Do you eat healthily?	Yes	269	65.1
	No	144	34.9
Do you exercise regularly?	Yes	178	43.1
	No	235	56.9
Do you smoke?	Yes	30	7.3
	No	383	92.7
<b>Total</b>		<b>413</b>	<b>100</b>

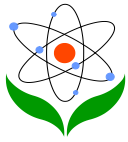


The frequency and percentage distributions of the individual characteristics of 413 high school students in the towns Tepebasi and Odunpazari in Eskisehir in the 2010-2011 academic years are shown in Table 1. With percentages of 53.3 % male and 46.7 % female students among 413 high school students, they can be said to be equal in terms of gender. It is observed that a large majority of the participants go to Anatolian high schools and are in 10th grade. The education levels of participants' parents are high school and above. Of the high school students, 65.1 % of the 413 declared they eat healthily, 56.9 % stated they do not exercise regularly, and 92.7 % stated they do not smoke. The ages of the participants were 15, 16 and 17, ages that could be defined as mid-adolescence for Turkish students. This period coincides with high school years and is largely occupied by growth and socialisation phases. Running away from home or school due to rage against authority, smoking and alcohol use, delinquency, psychosexual disorders and suicide attempts are the most commonly observed problems encountered in this period. However, it was a positive result that the participants do not smoke and regard alcohol and drugs as having high or very high levels of risk.

According to Table 2, environmental risk factors that the students regard as having very high risk levels are smoking, passive smoking, global warming, HIV, nuclear waste, alcohol use and drugs. The starting age of smoking and passive smoking and using alcohol and drugs, which are very high-level risks, is in the high school years, and 92.7 % of the high school students in Eskisehir do not smoke; thus, the participants can be said to be conscious in terms of environmental risks.

Students perceive environmental factors such as sedentary lifestyle, traffic accidents, soil, air and water pollution, waste, contagion, and food additives as high-level risk factors. Although it is a gratifying result that the students who spend most of the day in front of a computer are aware of this danger, it is also an indicator that developing technology makes the life of an individual difficult while providing convenience. When Beyhun et al (2007) examined the risk perception levels of senior class students of a medical school, who concluded that air pollution, traffic accidents and passive smoking are regarded as very high-level risk factors.



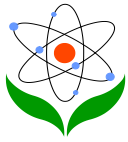


**Table 2.** Participants' levels of environmental risk perception

Environmental factors	Not at all		Not very		Neutral		Somewhat		Very	
	f	%	f	%	f	%	f	%	f	%
<b>Stress</b>	16	3.9	35	8.5	131	31.7	128	31	103	24.9
<b>Mobile phone</b>	34	8.2	85	20.6	136	32.9	93	22.5	65	15.7
<b>Smoking</b>	99	24	17	4.1	37	9	97	23.5	163	60.5
<b>Passive smoking</b>	45	10.9	60	14.5	71	17.2	114	27.6	123	29.8
<b>Global warming</b>	18	4.4	42	10.2	98	23.7	104	25.2	151	36.6
<b>HIV</b>	87	21.1	40	9.7	85	20.6	80	19.4	121	29.3
<b>Sedentary lifestyle</b>	52	12.6	52	12.6	102	24.7	112	27.1	95	23
<b>Nuclear wastes</b>	38	9.2	47	11.4	72	17.4	100	24.2	156	37.8
<b>Traffic accidents</b>	35	8.5	55	13.3	91	22	141	34.1	90	21.8
<b>Alcohol</b>	84	20.3	55	13.3	69	16.7	99	24	106	25.7
<b>Drugs</b>	94	22.8	23	5.6	45	10.9	77	18.6	174	42.1
<b>Battery and accumulator</b>	60	14.5	89	21.5	157	38	78	18.9	29	7
<b>Eating unhealthily</b>	27	6.5	89	21.5	139	33.7	106	25.7	52	12.6
<b>Soil pollution</b>	32	7.7	67	16.2	113	27.4	124	30	77	18.6
<b>Air pollution</b>	17	4.1	31	7.5	103	24.9	156	37.8	106	25.7
<b>Water pollution</b>	17	4.1	48	11.6	94	22.8	135	32.7	119	28.8
<b>Noise pollution</b>	22	5.3	73	17.7	129	31.2	114	27.6	75	18.2
<b>Waste</b>	25	6.1	58	14	127	30.8	135	32.7	68	16.5
<b>Cognitive diseases</b>	24	5.8	47	11.4	97	23.5	130	31.5	115	27.8
<b>Food additives</b>	24	5.8	49	11.9	83	20.1	135	32.7	122	29.5

(Sedentary lifestyle: lifestyle of people with no or irregular physical activity)

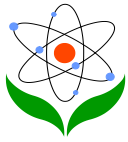
At the same time, stress, mobile phones, batteries and accumulators, unhealthy eating and noise pollution are perceived as medium-level risk factors. However, all the factors mentioned here threaten all people in the world today. Although it is better for the students to regard these factors as mid-level risk factors rather than thinking they are not risk factors, the city they live in has an effect on this situation.



Eskisehir, the population of which is approximately 700,000, is an agricultural and industrial city located near the middle of Turkey. Compared to other, bigger industrial cities such as Istanbul, Ankara and Izmir, Eskisehir have a smaller population, less noise and less industry and its negative effects.

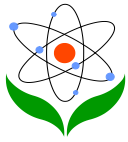
The frequency and percentages of participants' answers to the statements related to the assessment of environmental awareness levels are presented in Table 3. When analysing the environmental awareness levels of high school students, it is observed that they believe that environmental education will help solve environmental problems, and there is a need to include environmental education and applied activities about environmental education in curricula. As a result of their study, Tokat and Mutlu (2004) concluded that high school students think lectures and applications about the environment should be increased. Topics and subjects about the environment take place in biology and geography classes in Turkey. It is observed that there are no classes about environmental education in the current high school curriculum. With the aim of having students acquire effective environmental awareness, there is a need to add a class about the environment to high school curricula. It is observed that the participants do not read additional books beyond textbooks to obtain knowledge and information about the environment. They share their knowledge about the environment with their friends, watch related programs on television and follow relevant broadcasts from the radio, and they want to voluntarily participate in environmental activities and be a member of institutions that carry out these activities. Tokat and Mutlu (2004) also concluded in their research that high school students feel that they and their civic and governmental institutions are responsible in addressing the challenges of environmental problems. Altunoglu and Atav (2009) obtained similar results in their study, noting that focusing more on environmental problems in written and visual media and extending Internet usage can contribute to environmental awareness shifts.

Participants stated that they were ambivalent in the item that said that the government and regulations have recently worked to get environmental pollution under control. The reason for this response might that students do not closely follow government policies about the topic or they are hesitant to support the environmental policies of the government.



**Table 3.** Participants' levels of environmental awareness

Item	Strongly disagree		Disagree		Neither agree nor disagree		Agree		Strongly agree	
	f	%	f	%	f	%	f	%	f	%
1	62	15	142	34.4	104	25.2	78	18.9	27	6.5
2	41	9.9	66	16	86	20.8	135	32.7	85	20.6
3	45	10.9	56	13.6	102	24.7	151	36.6	59	14.3
4	104	25.2	148	35.8	79	19.1	45	10.9	37	9
5	40	9.7	90	21.8	136	32.9	111	26.9	36	8.7
6	25	6.1	56	13.6	120	29.1	153	37	59	14.3
7	124	30	193	46.7	51	12.3	28	6.8	17	4.1
8	74	17.9	101	24.5	132	32	78	18.9	28	6.8
9	97	23.5	142	34.4	82	19.9	61	14.8	31	7.5
10	114	27.6	138	33.4	70	16.9	58	14	33	8
11	136	32.9	148	35.8	72	17.4	39	9.4	18	4.4
12	121	29.3	151	36.6	58	14	48	11.6	35	8.5
13	23	5.6	39	9.4	72	17.4	167	40.4	111	26.9
14	22	5.3	28	6.8	48	11.6	150	36.3	165	40
15	76	18.4	67	16.2	103	24.9	95	23	72	17.4
16	31	7.5	47	11.4	125	30.3	139	33.7	71	17.2
17	25	6.1	24	5.8	34	8.2	165	40	164	39.7
18	28	6.8	21	5.1	41	9.9	118	28.6	205	49.6
19	52	12.6	122	29.5	107	25.9	88	21.3	43	10.4
20	28	6.8	22	5.3	61	14.8	140	33.9	162	39.2
21	31	7.5	85	20.6	144	34.9	114	27.6	39	9.4
22	46	11.1	80	19.4	114	27.6	139	33.7	34	8.2
23	50	12.1	88	21.3	106	25.7	130	31.5	39	9.4
24	102	24.7	110	26.6	103	24.9	67	16.2	31	7.5
25	31	7.5	75	18.2	111	26.9	136	32.9	60	14.5
26	155	37.5	144	34.9	46	11.1	41	9.9	27	6.5
27	33	8	20	4.8	36	8.7	86	20.8	238	57.6
28	80	19.4	77	18.6	118	28.6	91	22	47	11.4
29	114	27.6	150	36.3	96	23.2	8.2	8.2	19	4.6
30	31	7.5	29	7	109	26.4	140	33.9	104	25.2



Although students declared that they would be happy if people recycled used bottles, tin cans and paper and that they would prefer environmentally friendly products even if they were expensive, they were ambivalent on the item regarding being careful about buying a product that can be recycled, and they did not agree on the item regarding going door to door to teach people about recycling. These answers are self-contradictory. These two different views can be interpreted as the fact that students regard recycling as an important issue for protecting the environment, but they do not personally do something for recycling. This result is also significant in the sense that knowing or being aware of something does not necessarily mean that it should be practised.

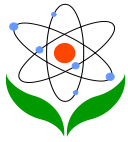
Participants specified that people should adapt to nature instead of changing it in the way that suits them, and in this way, the balance of nature will not be spoilt. Solving environmental problems is primarily possible by changing the values and attitudes of people; people today have moral tasks and responsibilities they owe to people in the future, and it is more important to have a healthy life in a naturally protected environment than to lead a high-quality life. The fact that they were ambivalent in the item regarding working without pay for a liveable environment, if necessary, can be interpreted as their material worries about future. This conclusion verifies the result mentioned above. Individuals are sensitive about protecting the environment; however, in regard to practising it on an individual basis, the views could change.

Information about the differentiation of participants' environmental risk perception levels according to individual traits is given in Tables 4 and 5. The Mann-Whitney U Test has been used in bivariate comparisons, and the Kruskal-Wallis Test has been applied for multivariate comparisons.

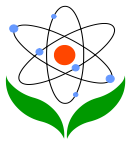
**Table 4.** Information about the differentiation of participants' environmental risk perception levels according to individual traits (Mann-Whitney U Test)

		<b>n</b>	<b>Mean rank</b>	<b>Sum of ranks</b>	<b>M-Whitney U</b>	<b>Z</b>	<b>p</b>
Gender	Male	<b>193</b>	<b>230.43</b>	<b>44473</b>	<b>16708</b>	<b>-3.737</b>	<b>0</b>
	Female	<b>220</b>	<b>186.45</b>	<b>41018</b>			

As seen in Table 4, the students' environmental risk perception levels of differ according to gender and school type, and males have higher levels of environmental risk perception than females. This difference could be related to the



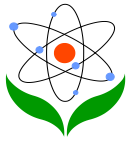
structure of the society: Turkish society has a more patriarchal family structure. The ultimate decision makers are men, particularly regarding the home and the matters outside the family. Women are primarily responsible for the home, children and the matters inside the family. The matter of environment is of particular concern for every individual in society; nevertheless, it may be a result of this patriarchal precept that men feel they are more responsible for the environment than women are. This could be the basic reason why different practices exist in different societies. A study that Sam et al (2010) conducted on undergraduate students revealed that female students have higher environmental risk perceptions than male students. In the comparison made by Slimak and Dietz (2006), no differences in terms of gender were found. It may be thought that the results obtained from this study and the two studies mentioned above support the comments about societal precepts. There is a significant difference between the students' perceptions based on their school types. Environmental risk awareness is significantly higher in Anatolian high schools and in science high schools than in general high schools. This difference may stem from both the curricula of Anatolian and science high schools and the academic and mental characteristics of the students attending these types of schools. The contents of the curricula used in Anatolian and science high schools are different from general high schools and are intensive in science and mathematics. Furthermore, the Turkey-wide selection of the students for these two types of high schools is carried out through an exam that aims to assess the academic and cognitive knowledge and skills. According to the score of this exam, students primarily prefer science or Anatolian high schools. The students attending general high schools have not been placed in any science or Anatolian high schools. A significant difference is not observed between high school students' level of environmental risk perception and their class, their age, and the education level of mother and father. Because eating unhealthily, having a sedentary lifestyle and smoking have been found among environmental factors such as eating healthily, exercising regularly and smoking, the differentiated results of these individual traits have not been examined.



**Table 5.** Information about the differentiation of participants' environmental risk perception levels according to individual characteristics (Kruskal-Wallis Test)

		n	Mean rank	df	X <sup>2</sup>	p	Differentiation results
<b>Type of high school</b>	Anatolian	201	218.48	2	15.361	0	General-Anatolian* General-Science*
	General	87	162.46				
	Science	125	219.54				
<b>Grade level</b>	9	72	215.97	3	0.838	0.84	-----
	10	246	207.26				
	11	79	200.85				
	12	16	193				
<b>Age</b>	15	87	218.5	3	1.617	0.656	-----
	16	224	205.44				
	17	83	204.53				
	18	19	183.53				
<b>Mother's education level</b>	Elementary	105	205.43	4	2.286	0.683	-----
	Secondary	44	226.24				
	High	136	211.4				
	University	120	197.56				
	Graduate	8	188.69				
<b>Father's education level</b>	Elementary	31	173.68	4	5.225	0.265	-----
	Secondary	28	234.32				
	High	146	215.26				
	University	199	203.53				
	Graduate	9	179.67				

Information about the differentiation of participants' environmental awareness levels according to individual traits are shown in Tables 6 and 7. The Mann-Whitney U Test has been used once again in bivariate comparisons, and the Kruskal-Wallis test has been applied in multivariate comparisons. It is observed that the students' environmental awareness levels differ in the items related to eating healthily, smoking and school type. According to the average values of eating healthily and smoking in the Mann-Whitney test, there is a significant difference in favour of eating healthily and not smoking. A significant difference is observed regarding environmental risk perceptions according to school type; however, which school type creates a difference in favour of itself cannot be explained with these statistical results. According to this finding, it could be stated that the students who eat healthily and do not smoke have a higher level of environmental awareness than students who eat unhealthily and smoke. A significant difference is observed between the school type and the levels of environmental awareness. Analyses show that there is a significant difference, in the Anatolian high schools' favour, between Anatolian and science high schools and, in the general high schools' favour, between general and science high schools.



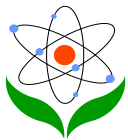
It may be thought that this difference stems from the reasons stated above. There is a significant difference between the levels of high school students' environmental awareness and gender, regular exercising, class, age, and the levels of mother's and father's education.

**Table 6.** Information about the differentiation of participants' environmental awareness levels according to individual characteristics (Mann-Whitney U Test)

		n	Mean rank	Sum of ranks	M-Whitney U	Z	p
<b>Gender</b>	Male	193	218.77	42222	18959	-1.878	0.06
	Female	220	196.68	43268			
<b>Eating healthily</b>	Yes	269	216.57	58527	16794	-2.228	0.026
	No	144	189.13	27234			
<b>Regular exercising</b>	Yes	178	220.03	39165	18596	-1.932	0.053
	No	235	197.13	46326			
<b>Smoking</b>	Yes	30	159.83	4795.5	4330	-2.249	0.025
	No	383	210.69	80696			

**Table 7.** Information about the differentiation of participants' environmental awareness levels according to individual characteristics (Kruskal-Wallis Test)

		n	Mean rank	df	X <sup>2</sup>	P	Differentiation results
Type of high school	Anatolian	201	221.55	2	14.952	0.001	Science-Anatolian* Science-General*
	General	87	222.87				
	Science	125	172.56				
Grade level	9	72	200.07	3	1.979	0.577	-----
	10	246	213.67				
	11	79	195.07				
	12	16	194.5				
Age	15	87	206.36	3	2.544	0.467	-----
	16	224	214.27				
	17	83	191.2				
	18	19	193.21				
Mother's education	Elementary	105	222.06	4	5.843	0.211	
	Secondary	44	187.28				



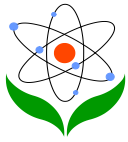
level	High	136	213.37				-----
	University	120	197.65				
	Graduate	8	149.75				
Father's education level	Elementary	31	188.92	4	4.843	0.304	-----
	Secondary	28	206.61				
	High	146	222.79				
	University	199	199.97				
	Graduate	9	169.67				

## Conclusion and recommendations

The general results of environmental risk perception levels show that high school students in Eskisehir have high risk perception levels towards environmental factors. Altunoglu and Atav (2009) obtained similar results in their study; they found that high school students have a risk perception over a medium level and that they have high awareness of environmental risks. Beyhun et al (2007) concluded that many topics accepted as environmental risks are not perceived as risks by the senior class students of a medical school. Future generations' environmental risk perception levels are encouragingly high; they will make efforts to minimise the environmental risks because they will be the ones to solve these problems.

Altunoglu and Atav (2009) identified the top five environmental risks by comparing various research results regarding environmental risk perception. In their study, greenhouse gases, radiation, ozone pollution, hazardous waste sites and sewage constitute the top five. Gürsoy et al (2008) identified the top five greatest environmental risks as ozone pollution, chemical pollution, global warming, water pollution and germs in drinking water. Beyhun et al (2007) determined the top five environmental risks as ozone pollution, air pollution, chemical pollution, passive smoking, radiation. Slimak and Dietz (2006) determined the top five to be hazardous waste sites, persistent toxic organic compounds, sewage, radiation, heavy metals. Lai et al (2003) determined the top five to be radiation, chemical waste, ozone pollution, water pollution, and smoking in public areas. Walsh Danisman and MacLachlan (2000) determined the top five to be ozone pollution, pollution caused by automobiles, smoking in public areas, pollution caused by factories, and radioactivity. Lazo, Kinnell and Fischer (2000) determined the top five to be ozone pollution, extinction of species, decrease in rainfall, desertification and loss of top soil. Riechard and Peterson (1998) determined water pollution, air



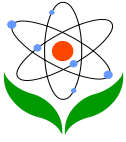


pollution, ozone pollution, oil extraction and damage to trophic forests as the top five risks. In this study, however, the top five environmental risks are identified as smoking, nuclear waste, global warming, drugs and passive smoking. It is necessary to note that the compared studies have been carried out in different times and with different universes and samples.

Based on the environmental awareness level outcomes, in general, it can be stated that the level of high school students' environmental awareness in Eskisehir are high. Kızılaslan (2005) stresses that the future generations can regard environmental awareness as a self-task and develop proper behaviours regarding the environment by being educated in this direction. Uzun and Saglam (2005) and Fernandez-Manzanal et al (2007) also mention the importance of a quality environmental education and the environmental awareness this education provides for the permanent solution of environmental problems.

In accordance with the findings obtained from this research, the below recommendations intend to increase the levels of environmental risk perception and environmental awareness.

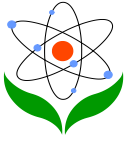
- Environmental education should be assured to take place at all stages, beginning with pre-school education.
- To solve environmental problems and have adequate environmental awareness also outside school, social activities should be arranged, along with panel discussions, conferences and seminars, which will inform the majority of society, primarily students and families. Programs about the environment should be given higher priority and time in visual communication tools. The publicity of non-governmental institutions should be assured.
- The number of scientific studies about the environment should be increased. The results of these scientific studies should activate environmental sensitivity.
- High school curricula should be revised by improving the quality of the environmental education given to high school students. Environmental education classes should be shaped in a way that will enable students to take responsibility for developing environmental awareness. When establishing the environmental education programs, cooperation should be established with teachers and students.



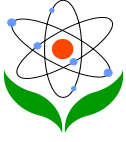
- The number of classes about the environment should be increased in high school programs and should be spread throughout the duration of high school. Applicable and project-focused courses should be added to the program instead of teaching primarily theoretical knowledge. Elective courses that include direct environmental education opportunities should be given priority.
- In-service seminars should be arranged to educate teachers about the environment. Teachers who have adequate environmental education will be more successful in nurturing students with high environmental risk perceptions and environmental awareness levels.

## References

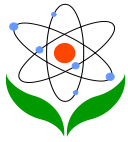
- Alım, M. (2006). Avrupa Birliği üyelik sürecinde Türkiye’de çevre ve ilköğretimde çevre eğitimi. *Kastamonu Eğitim Dergisi*, 14 (2), 599–616.
- Altunoğlu, B.D., & Atav, E. (2009). Ortaöğretim öğrencilerinin çevre risk algısı. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 36, 1-11.
- Aslan, A., Sağır, Ş.U & Cansaran, A. (2008). Çevre tutum ölçeği uyarlanması ve ilköğretim öğrencilerinin çevre tutumlarının belirlenmesi. *Ahmet Keleşoğlu Eğitim Fakültesi Dergisi*, 25, 283 -295.
- Beck, U. (1992). *Risk society, towards a new modernity*, London: Sage Publications.
- Beyhun, N. E., Vaizoğlu S. A., Mete, A., Okur, S., Ongun, M., Orçan, S., & Güler, Ç., (2007). Hacettepe Üniversitesi Tıp Fakültesi 2005-2006 öğretim dönemi son sınıf öğrencilerinde çevresel risk algılama düzeyi. *TSK Koruyucu Hekimlik Bülteni* 6(5), 345-350.
- Bozkurt, O. (Ed.) (2008). *Çevre Eğitimi*. Ankara: Pegem Akademi
- Çabuk, B. & Karacaoğlu, C. (2003). Üniversite öğrencilerinin çevre duyarlılıklarının incelenmesi. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 36(1-2), 189-198.
- Demirbaş, M. ve Pektaş, H. M. (2009). İlköğretim öğrencilerinin çevre sorunu ile ilişkili temel kavramları gerçekleştirme düzeyleri. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi*, 3 (2), 195-211.
- Dunlap, R. E., Van Liere, K. D., Mertig, A. G. & Jones, R. E.(2000). Measuring endorsement of new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425-442.
- Esa N. (2010). Environmental knowledge, attitude and practices of student teachers. *International Research in Geographical and Environmental Education*, 19(1), 39-50.
- Fernandez-Manzanal R., Rodriguez-Barreiro L., & Carrasquer J. (2007). Evaluation of environmental attitudes: Analysis and results of a scale applied to university students. *Science Education*, 91, 988-1009.
- Gökdere, M. (2005). A study on environmental knowledge level of primary students in Turkey. *Asia-Pacific Forum on Science Learning and Teaching*, 6(2), Article 5.
- Görmez, K. (1997). *Çevre sorunları ve Türkiye*. Ankara: Gazi Kitabevi.



- Gündüz, T. (2004). *Çevre sorunları*. Ankara: Gazi Kitabevi.
- Gürsoy, Ş.T., Çiçeklioğlu, M., Börekçi, N., Soyer, M.T., & Öcek, Z. (2008). İzmir Karşıyaka Belediye çalışanlarında çevresel risk algılama düzeyi. *Cumhuriyet Üniversitesi Tıp Fakültesi Dergisi*, 30 (1), 20-27.
- Hertsgaard, M. (2001). *Yeryüzü gezgini*. İstanbul: Tema Vakfı Yayınları.
- Hamamcı C. & Keleş, R. (1998). *Çevrebilim*. Ankara: İmge Kitabevi Yayınları.
- Kahyaoğlu, M. & Özgen, N. (2011). Öğretmen adaylarının çevre sorunlarına yönelik tutumlarının çeşitli değişkenler açısından incelenmesi. *Kuramsal Eğitimbilim Dergisi - Journal of Theoretical Educational Science*, 5(2), 171-185.
- Karasar, N. (2005). *Bilimsel araştırma yöntemi*. 15. Baskı. Ankara: Nobel Yayın Dağıtım.
- Kaya E., Akıllı M. ve Sezek F. (2009). Lise öğrencilerinin çevreye karşı tutumlarının cinsiyet açısından incelenmesi. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi*, 18, 43-54.
- Kızılaslan, H. & Kızılaslan, N. (2005). Çevre konularında kırsal halkın bilinç düzeyi ve davranışları (Tokat ili Artova ilçesi örneği). *ZKÜ Sosyal Bilimler Dergisi*, 1(1), 67-68.
- Kızıroğlu, İ. (2000) *Türk eğitim sisteminde çevre eğitimi ve karşılaşılan sorunlar*, V. Uluslararası Ekoloji ve Çevre Sorunları Sempozyumu, Ankara, s.167.
- La Trobe, H. L., & Acott, T. G. (2000). A modified NEP/DSP environmental attitudes scale. *Journal of Environmental Education*, 32(1), 12-20.
- Lai, C. J., Brennan, A., Chan, H. & Tao, J. (2003). Disposition toward environmental hazards in Hong Kong Chinese: validation of a Chinese version of the environmental appraisal inventory (EAI-C). *Journal of Environmental Psychology* 23, 369-384.
- Lazo, K. J., Kinnell, J. C. & Fisher, A. (2000). Expert and layperson perception of ecosystem risk. *Risk Analysis*, 20(2), 179-193.
- Özdemir, O., Yıldız, A., Ocaktan, E. ve Sarışen, Ö. (2004). Tıp fakültesi öğrencilerinin çevre sorunları konusundaki farkındalık ve duyarlılıkları. *Ankara Üniversitesi Tıp Fakültesi Mecmuası*, 57 (3), 117-127.
- Özer, U. (1993). *Yükseköğretimde çevre için eğitim, çevre eğitimi*, Ankara: Türkiye Çevre Vakfı Yayını.
- Özncar, M. D. (2005). *İlköğretim fen bilgisi dersi biyolojik çeşitlilik, çevre kirliliği ve erozyon konularının yapıcı (constructivist) öğrenme kuramına göre öğretiminin, akademik başarıya ve kalıcılığa etkisi*. (Yayımlanmamış yüksek lisans tezi). Çukurova Üniversitesi, Adana.
- Riechard, D. E. & Peterson S. J. (1998). Perception of environmental risk related to gender, community socioeconomic setting, age, and locus of control. *The Journal of Environmental Education*, 30(1), 11-19.
- Sam, N., Gürsakal, S. & Sam, R. (2010). Üniversite öğrencilerinin çevresel risk algısı ve çevresel tutumlarının belirlenmesi. *Akademik Bakış Dergisi*, 20, 1-16.
- Satterfield, T.A., Mertz, C.K. & Slovic, P. (2004). Discrimination, vulnerability and justice in the face of risk. *Risk Analysis*, 24(1), 115-129.
- Slimak, M. W. & Dietz, T. (2006). Personal values, beliefs and ecological risk perception. *Risk Analysis*, 26(6), 1689-1705.
- Sülün, Y. (2002). Çevre kirliliğini önlemede eğitimin rolü. *Muğla Üniversitesi, SBE Dergisi*, Bahar, 8.
- Szasz, A. (1994). *Ecopopulism: Toxic waste and the movement for environmental justice*. Minneapolis, MN: University of Minnesota Press.



- Şimşekli Y.(2004). Çevre bilincinin geliştirilmesine yönelik çevre eğitimi etkinliklerine ilköğretim okullarının duyarlılığı, *Uludağ Üniversitesi Eğitim Fakültesi Dergisi*, 17, 83–92.
- Tezbaşaran, A. (1996). *Likert tipi ölçek geliştirme*. Ankara: Psikologlar Derneği Yayınları
- Türküm, A. S. (2006). *Çağdaş Toplumda Çevre Sorunları ve Çevre Bilinci*. [http://www.aof.anadolu.edu.tr/kitap/IOLTP/1268/unite\\_10.pdf](http://www.aof.anadolu.edu.tr/kitap/IOLTP/1268/unite_10.pdf).
- Tokat, N., & Mutlu, A. (2004). Çevre bilinci ve duyarlılığı bakımından Çorum’ daki ortaöğretim öğrencileri üzerine bir araştırma. *İktisadi ve İdari Bilimler Fakültesi Dergisi*, 6(1), 1-14.
- Uzun, N. & Sağlam, N. (2006). Orta öğretim öğrencileri için çevresel tutum ölçeği geliştirme ve geçerliliği. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 30, 240–250.
- Ünal, S. ve Dımışkı, E. (1999). Üniversite öncesi çevre eğitimi ve sorunları, *T.C. Çevre Bakanlığı Çevre ve İnsan Dergisi*, 42–56.
- Walsh-Daneshmandi, A. & MacLachlan, M. (2000). Environmental risk to self: Factor analysis and development of subscales for the environmental appraisal inventory (EAI) with an Irish sample. *Journal of Environmental Psychology*, 20, 141-149.
- Yalçınkaya T. & Özsoy E. (2003, Mayıs). *Risk toplumu: Bilgi toplumunun evriminde yeni boyut*. II. Uluslararası Bilgi, Ekonomi ve Yönetim Kongresi, Kocaeli
- Yılmaz, A., Morgil, İ., Aktuğ, P. ve Göbekli, İ. (2002). Ortaöğretim ve üniversite öğrencilerinin çevre kavramları ve sorunları konusundaki bilgileri ve öneriler. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 22, 156-162.



## Appendix

### Environmental risk perception and environmental awareness survey

#### SECTION I

School :

Grade :

Age :

Gender :

Mother's education level and occupation :

Father's education level and occupation :

Do you eat healthily? :

Do you exercise regularly? :

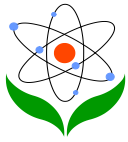
Do you smoke? :

#### SECTION II

Please rate the risk levels of the environmental factors listed below.

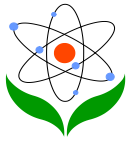
Environmental factors	Not at all	Not very	Neutral	Somewhat	Very
Stress					
Mobile phone					
Smoking					
Passive smoking					
Global warming					
HIV					
<b>Sedentary lifestyle</b>					
Nuclear wastes					
Traffic accidents					
Alcohol					
Drugs					
Battery and accumulator					
Eating unhealthily					
Soil pollution					
Air pollution					
Water pollution					
Noise pollution					
Waste					
Cognitive diseases					
Food additives					

(Sedentary lifestyle: lifestyle of people with no or irregular physical activity)



### SECTION III

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neither Agree nor Disagree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
1. Environmental education cannot be helpful in solving environmental problems. This is only possible through technology.					
2. Environmental education classes must be added to high school curricula.					
3. I would like to volunteer in an activity at our school related to environmental cleaning.					
4. I believe environmental problems are exaggerated; nature will provide balance, in a way.					
5. We must change our values and attitudes rather than solve environmental problems.					
6. I would like to be a member of an environment protection team because this is the best way to understand the environment I live in.					
7. People have to be informed to be aware of the effect of their behaviours on the environment.					
8. Recently, regulations and the government have worked to get environmental pollution under control.					
9. Societies with developed technology can ignore the noises coming from vehicles.					
10. The benefit of the technological products used is more important than the harm they cause to the environment.					
11. Economic growth is more important than environmental pollution.					
12. Environmental education activities are useful only for children at young ages.					
13. Individuals should adapt to the nature rather than changing					



it as per their needs.					
<b>14.</b> People today have moral duties and obligations for people in the future.					
<b>15.</b> A high-quality satisfactory life is more important than money and health.					
<b>16.</b> I can give up my comfort and consume less, if it will help to protect the environment.					
<b>17.</b> We can do many things to save energy.					
<b>18.</b> While brushing my teeth, I turn off the faucet to save water.					
<b>19.</b> I read books other than textbooks about the environment.					
<b>20.</b> It makes me glad when people recycle used bottles, tin cans and paper.					
<b>21.</b> When buying a product, I pay attention to whether the package can be recycled.					
<b>22.</b> I share my knowledge about environment with my friends.					
<b>23.</b> I watch and listen to programs about the environment on TV and the radio.					
<b>24.</b> I go door to door to teach people recycling.					
<b>25.</b> I prefer environmentally friendly products even if they are more expensive.					
<b>26.</b> Turning off the lights when going out of the room does not provide much energy saving.					
<b>27.</b> Human beings are not a part of nature.					
<b>28.</b> I can work without pay if necessary for a liveable environment.					
<b>29.</b> There is no erosion in our country anymore.					
<b>30.</b> I warn without hesitation somebody who is harming nature.					