

Determining the Size of the Carbon Footprints of Secondary School Students

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Abstract

A large part of the environmental problem, which is defined as the ecological footprint, is the carbon footprint. As a matter of fact, the consumption activities of the individual have many destructive and permanent effects on nature. In this research, it is aimed to determine the size of the carbon footprint, which is an important component of the ecological footprint of secondary school students, and to evaluate their views on the carbon footprint. The research is carried out with mixed method in accordance with its purpose and content. The quantitative sample group of the research consists of 750 students in total, studying at secondary schools in the Western Black Sea Region in the 2022-2023 academic year, with the maximum diversity sampling. The qualitative study group consists of 20 secondary school students randomly selected from the students participating in the quantitative part. In the research, "Carbon footprint calculation questionnaire" developed by Ertekin (2012) and "Semi-structured interview form" developed by researchers were used as data collection tools. As a result of the research, it is seen that the carbon footprints of the students are moderate. In addition, it was determined that the class level and family income status were effective on the carbon footprint size of the students. It is seen that the results obtained from the qualitative data support the quantitative results.

Keywords: Carbon footprint, sustainability, secondary school studies

Introduction

With the start and development of the industrial revolution, we entered a period in which climate changes occur and in this context, human activities affect the climate. As a result of this period, the increasing energy demand and consumed fossil fuels have put the world, living things and people under threat. In order to prevent these threats, steps are taken to transition to a low-carbon economy and studies are carried out for this (Kumas, Akyuz, Zaman & Gungor, 2019). In the world, natural resources are consumed unconsciously in parallel with rapid industrialization and population growth (İbret, Demirbaş & Demir, 2019).

As a result of use and pollution of the world we live in, an environment that is very difficult or impossible to live in, awaits future generations. Increasing population growth causes harm to the environment by increasing consumption habits. It is seen that people both witness and cause an environmental crisis. For this reason, individuals need to reduce their footprints by spending less energy in their business and private lives in order to contribute to the provision of a sustainable and safe environment for

the future (Heasly & Iliško, 2022; Salite, Fjodorova & Ivanova, 2023). Consequently, being knowledgeable, sensitive and consistent in this regard as conscious individuals, plays an important role for our common future (Birkan, 2014; Gokcek, Bozdag & Demirbag, 2019; Demir & Kocoglu, 2022; Demir & Ulukaya Oteles, 2023).

While the world is developing rapidly, on the one hand, rapid population growth, industrialization, urbanization and the increase in production and consumption, environmental problems also cause an increase, therefore, material production and consumption processes in societies especially affect the environment. The main environmental problems are climate change and global warming. These problems, which are caused by the rapid increase in the rate of gases that result in the greenhouse effect of the atmosphere, can be listed as the destruction of natural resources, desertification and decrease in biological diversity. Carbon dioxide (CO₂) gas, which is emitted into the atmosphere as a result of human activities or the use of fossil fuels (petroleum, coal, natural gas), comes first among the gases that create the greenhouse effect. Significantly, the consumption activities of the individual create destructive and permanent effects on nature as a consequence. The resulting global climate change creates a great threat and makes its effects felt. Carbon footprint is also a way of expressing these threats and lasting effects. For this reason, studies on the analysis of CO₂ gases have increased in recent years and the concept of "Carbon Footprint" has emerged (Akel, 2021; Argun, Erguc & Sarı, 2019; Gokcek, Bozdag & Demirbag, 2019; Barak & Avci, 2022).

The concept of "footprint" by environmental scientists generally refers to the measurement of how much natural resources are used by people. In this context, human footprints are expressed as ecological footprint, carbon footprint and water footprint (Birkan, 2014). The carbon footprint, which is the largest component of the ecological footprint, is the size of the biological productive area required to absorb the amount of carbon released into the atmosphere as a result of human activities (Ozdemir, 2017). Argun, Erguc & Sarı (2019) define carbon footprint as the sum of carbon gas released into the atmosphere in different processes for each product purchased or each activity performed. Carbon footprint is the amount of carbon dioxide gas accumulated throughout the life of the product created as a result of human activities (Wiedmann & Minx, 2008). In other words, it is the sum of all CO₂ emissions from an individual's activities in a given period (Modesto, 2019). Therefore, the concept of carbon footprint has been revealed in the studies carried out to calculate the CO₂ gas that directly affects global environmental problems.

Carbon footprint consists of two parts, primary and secondary footprint. The primary footprint is a direct measure of CO₂ emissions from the combustion of fossil fuels used for (direct) energy consumption and transport activities. The secondary footprint (indirect) is a measure of the CO₂ emissions that occur during the life cycle of the products used, from manufacture to breakdown. Carbon footprint causes climate change, warming of the world and deterioration of its balance. Emission values of individuals reveal how much of a role they play in climate change (Akel, 2021; Birkan, 2014). The carbon footprint is calculated by determining the amount of CO₂ that a person releases into the natural environment in a year. Transportation, heating, eating, drinking of the individual is included. The amount of carbon formed as a result of the products produced and consumed by the activities determines the carbon footprint. Thus, the measure of the share of individuals in global warming is determined by the carbon footprint (Kumas, Akyuz, Zaman & Gungor, 2019).

Today, the widespread use of fossil fuels leads to the greenhouse effect of carbon released into the atmosphere, causing global climate change. For this reason, climate change and global warming are among the most discussed issues in recent years. The most important reason for global warming is the very rapid increase in the rate of gases that cause greenhouse effect in the atmosphere. CO₂ gas, which is emitted into the atmosphere by the use of fossil fuels (petroleum, coal, natural gas), is one of the gases that create the greenhouse effect. In this context, carbon footprint calculations are made to draw attention to various dimensions of ecological destruction in order to increase environmental awareness. The carbon footprint is calculated in order to raise awareness among individuals and to reduce emissions. Many institutions and organizations calculate the carbon footprint and try to take measures to reduce it (Birkan, 2014; Ozdemir, 2017; Sarioglan & Ozkaya, 2021). When the issue is handled individually, almost every activity that consumes energy has a carbon cost. This carbon cost can be seen very clearly in some cases, - for example, they are the gases that come out of the exhaust pipe of the car while traveling. In some cases, this situation cannot be observed clearly. There are items hidden in imported goods purchased from the bazaar. Based on these examples, carbon footprint can be characterized as a measure of the share of an individual or an organization in global warming (Birkan, 2014).

The pressure of individuals on nature has become even more measurable with the emergence of the concept of carbon footprint. In addition, carbon footprint has an important role in raising environmentally-conscious individuals with both conceptual and practical dimensions. They will be able to control their behavior by seeing the results of the pressure of individuals on nature at an early age (Ertekin, 2012). Thus, with the awareness gained from a young age, children can grow up as individuals who are curious about the world, communicate and empathize with nature, are sensitive and concerned about ecological problems, seek solutions to these problems, and reflect ecologically ethical behaviors in their lives (Demir, 2021). As a direct result, by emphasizing the importance of the individual role in reducing carbon emissions that cause global climate change, the calculation of the carbon footprints of the students can raise awareness about the subject. It is important to raise environmental awareness in students and to guide them to create qualified information about environmental problems within the framework of global warming. Students' awareness of carbon footprint, which is an important factor in global warming, should also be evaluated from this perspective (Akel, 2021; Sarioglan & Ozkaya, 2021). In addition, carbon footprint, which is an important concept within the scope of sustainable development, is necessary for raising awareness among students.

When the studies on the related subject in the literature are examined, it has been determined that the studies for students are limited (Ertekin, 2012; Kurt, 2020). From this point of view, in this research, the focus is to determine the carbon footprints of the students studying in public secondary schools in the province of Bartın in Turkey. This study, which aims to raise the awareness of secondary school students about the carbon footprint within the scope of sustainable development, can be said to be an original study on the grounds that the calculated carbon footprint sizes are presented in a simple and understandable way suitable for the level of secondary school students. In addition, there are two main situations that reveal the original value of the research. First of all, with this research, it is thought that secondary school students will gain an understanding of sustainability and increase environmental awareness.

Secondly, due to the limited number of studies on this subject, it can contribute to other researchers' future studies on a similar subject. It is aimed to determine the

carbon footprints, which are an important component of the ecological footprint of secondary school 5th, 6th, 7th and 8th grade students. It is aimed to determine the carbon footprints of secondary school 5th, 6th, 7th and 8th grade students, which is an important component of the ecological footprint, and to evaluate their views on carbon footprint. The research questions determined for this purpose are as follows:

1. What is the carbon footprint size of the students?
2. Is there a significant difference between the carbon footprint sizes of the students and the gender variable?
3. Is there a significant difference between carbon footprint sizes and grade levels of students?
4. Is there a significant difference between the carbon footprint sizes of the students and the mother education status variable?
5. Is there a significant difference between the carbon footprint sizes of the students and the variable of father education status?
6. Is there a significant difference between the carbon footprint sizes of the students and the variable of family income status?
7. What are the students' views on the carbon footprint?

Method

In the research, an explanatory design, one of the mixed method research designs, was used in order to determine the carbon footprints, which is an important component of the ecological footprint of secondary school students, and their views on the carbon footprint. The mixed method is an important research method in that the data collected by qualitative and quantitative methods support each other and strengthen the credibility of the results. The explanatory design is integrated in the discussion section by collecting the qualitative data after the data are obtained with the quantitative method (Creswell, 2008; Yıldırım & Simsek, 2016). In the current research, the explanatory design was preferred because both quantitative and qualitative approaches were used in examining the situations affecting the carbon footprint size of secondary school students and determining their thoughts about the carbon footprint.

Population and Sample of the Research

The population of the research consists of 5th, 6th, 7th and 8th grade students studying in the city center of Bartın in Turkey in the 2022-2023 academic year. Maximum diversity sampling was chosen in the study to determine what kind of similarities there are among the diverse situations (Yıldırım & Simsek, 2016). 750 students who continue their education in public secondary schools in the city center of Bartın constitute the sample of the research. Of the students participating in the research, 325 (43%) were female, 425 were male (57%); 266 were 5th grade (36%), 158 6th grade (21%), 173 7th grade (23%), 153 8th grade (20%) students. A semi-structured interview was conducted with 20 randomly selected students who participated in the quantitative part of the study to determine their thoughts on carbon footprint.

Instrument

Carbon footprint calculation survey: When the literature is examined, many web-based carbon footprint calculation tools are encountered. The results obtained using these calculation tools include only numerical data. In addition, the fact that most of the calculation tools are of foreign origin limits the validity of the calculation tools in terms of regional and cultural differences. It is difficult for middle school students to understand the data obtained from the calculation tools (Ertekin, 2012). For this reason, using the expressions in the web-based carbon footprint and ecological footprint calculation tools developed by Ertekin (2012) International Education and Resource Network, European Environmental Agency and Earth Day Network, "Carbon footprint calculation questionnaire" was developed. The questionnaire consists of a total of 22 statements in 3-point Likert type (yes, sometimes and no), corresponding to the "energy", "food" and "transportation" dimensions of resource use.

Semi-structured interview form: A form consisting of open-ended questions was used as a data collection tool in the study. In order to create the form, a pool of questions was created by examining the relevant studies by the researchers. The questions were prepared and presented to expert opinions (1 environmental educator and 1 expert social studies teacher). Necessary corrections were made in the form prepared in line with the expert opinion. The pre-applied form consists of three questions.

Data Collection Process and Analysis

The research was carried out in the fall semester of the 2022-2023 academic year, with the permission of the ethics committee and the research permissions from the Directorate of National Education. The questionnaire was applied to the students at all levels of the official secondary schools in the city center by the researchers in one class hour under the supervision of the relevant teacher of the course. Statistical analyzes were made with SPSS regarding the data collected in the research and the sub-problems determined. In the analysis process of the data, firstly, the obtained data were transferred to the program and normality distribution analysis was made and appropriate data analysis was decided. Then, the negative items (2, 7, 10, 12, 15, 17, 20) in the questionnaire were reverse coded.

Table 1

Normality Test Results of Scores Obtained from Carbon Footprint Calculation Survey Data Total Scores

Descriptive statistics values							Kolmogorov-Smirnov	
\bar{X}	Median	Mod	Min	Max	Skewness	Kurtosis	Sd	P
49,30	49	52	33	79	,072	,721	5,38	,17

According to Table 1, the descriptive statistical values obtained from the data of the Carbon Footprint Questionnaire and the results of the Kolmogorov-Smirnov normality test show a normal distribution. T-test for determining two differences (gender) between groups of data; In cases where there are more than two groups (class level, mother and father education level, family income status) ANOVA and the Tukey

test were used to determine which groups had a significant difference as a result of this analysis.

The value range distributions of the scores they received from the carbon footprint calculation questionnaire of Ertekin (2012) are given in Table 2. This level assessment was also used in this study.

Table 2
Carbon Footprint Size Value Ranges

Value range	Qualification	Classification
22-36	Small	Green
37-51	Middle	Yellow
52-66	Big	Red

The lowest score that can be obtained from the questionnaire is 22, and the highest score is 66. A high score in the survey means a large carbon footprint; a low score was accepted as an indication of being small. The carbon footprint sizes of the students are classified according to colors as green (small) in the range of 22-36 points, yellow (medium) in the range of 37-51 points, and red (large) in the range of 52-66 points (Ertekin, 2012).

In order to support the research in the qualitative dimension, data were obtained from secondary school students through a semi-structured interview form. Qualitative data obtained from students were analyzed by content analysis. In content analysis, any qualitative data reduction and meaning-making attempts are aimed at determining basic coherences and meanings by taking qualitative data (Patton, 2014: 453). Considering the ethical rules, the opinions of the students were given with codes such as S1, S2, and S3.

Assumptions and Limitations of the Study

The assumptions of this study are that the secondary school students who will participate in the research will voluntarily participate in the research and will sincerely answer the questions in the data collection tool. In addition, the participants of the research are limited to 750 secondary school students (5th, 6th, 7th and 8th grade students) in the 2022-2023 academic year. In addition, the participants of the research are limited to 750 students in the quantitative dimension and 20 students in the qualitative dimension, studying at secondary school (5th, 6th, 7th and 8th grade students) in the 2022-2023 academic year

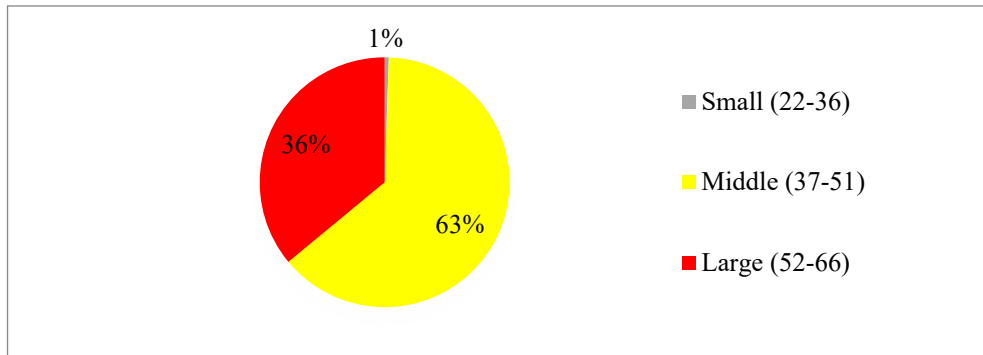
Research Findings

Findings on Quantitative Data

The carbon footprint size of students is presented in Figure 1.

Carbon Footprint Sizes of Students

Figure 1
Carbon Footprint Sizes of Students



When Figure 1 is examined, it is seen that 1% (4) of the students have small, 63% (476) medium and 36% (270) large carbon footprints. Students generally have a medium (yellow) footprint. It can be said that the majority of the students have moderate sustainable consumption habits.

Examination of Students in the Context of Carbon Footprint Sizes and Gender Variable

Findings regarding students' carbon footprint size and gender variable context are presented in Table 3.

Table 3
The Differences in the Total Scores of the Students for Carbon Footprint Sizes by Gender

Gender	N	\bar{X}	S	sd	T	p
Girl	325	48,93	5,42	748	1,60	,10
Male	345	49,57	5,33			

The average of the total scores of the carbon footprint survey was $\bar{X}=48.93$ for female students; $\bar{X}=49.57$ for male students. According to the t-test results given in Table 3, it was determined that there was no statistically significant difference between the carbon footprint sizes of the students and the gender variable [$t_{(748)} = 1,60$; $p < 0,05$]. Therefore, it can be said that the carbon footprint sizes of the students are at similar levels in terms of male and female students.

Examination of Students in the Context of Carbon Footprint Sizes and Grade Level Variables

Findings in the context of students' carbon footprint size and grade level variables are presented in Table 4.

Table 4

The Differences in the Total Scores of the Students for Carbon Footprint Sizes by Grade Level

Source	of	KT	sd	KO	F	P	Significant difference
Variance							
Between groups		1594,638	3	1594,638			1-2
Within groups		20100,862	746	26,945	19,727	,00	1-3
Total		21695,500	749				1-4

It is seen that the total scores of the carbon footprint survey of the students differ statistically according to the grade level [$F_{(3-749)} = 19,727$; $p < 0,05$]. According to the results of the Tukey test, which was conducted to determine between which groups the difference was, 5th grade students ($\bar{X} = 51.18$) and 6th ($\bar{X} = 48.61$) 7th ($\bar{X} = 47.55$) and 8th grade students ($\bar{X} = 48,71$) students were found to be significantly different. The said difference was in favor of the 5th grade students, therefore, it can be said that the carbon footprint sizes of the students who are younger and at a lower level are smaller.

Examination of Students in the Context of Carbon Footprint Sizes and the Variable of Mother Educational Status

The findings in the context of students' carbon footprint size and mother's educational status variable are presented in Table 5.

Table 5

Differences in the Total Scores of the Students for the Size of the Carbon Footprint by Mother's Educational Status

Source	of	Source	of	KT	sd	KO	F	P
Variance		Variance						
Between groups		Between groups		183,263	5	36,653		
Within groups		Within groups		21501,333	243	28,939	1,26	,27
Total		Total		21684,595	248			

The total scores of the students' carbon footprint questionnaire did not differ statistically according to the mother's educational status [$F_{(5-248)} = 1,26$; $p > 0,05$]. It can be said, therefore, that the carbon footprint sizes of the students are at similar levels, regardless of their maternal education status.

Examination of Students in the Context of Carbon Footprint Sizes and the Variable of Father Educational Status

Findings regarding the context of students' carbon footprint size and father's educational attainment variable are presented in Table 6.

Table 6

The Differences in the Total Scores of the Students for the Size of the Carbon Footprints According to the Educational Status of the Father

Source of Variance	Source of Variance	Varyansın Kaynağı	KT	sd	KO	F	P
Between groups	Between groups	Gruplar arası	90,929	5	18,186	18,728	,00
Within groups	Within groups	Gruplar içi	21604,571	744	29,038		
Total	Total	Toplam	21695,500	749			

The total scores of the students' carbon footprint survey did not differ statistically according to the father's educational status [$F_{(5-749)} = 18,728$; $p < 0,05$]. It can be said, therefore, that the carbon footprint sizes of the students are at similar levels, regardless of their father's educational status.

Examination of Students in the Context of Carbon Footprint Sizes and the Variable of Family Income Status

The findings in the context of students' carbon footprint size and family income status variable are presented in Table 7.

Table 7

Differences in the Total Scores of the Students for the Size of the Carbon Footprint by Family Income Status

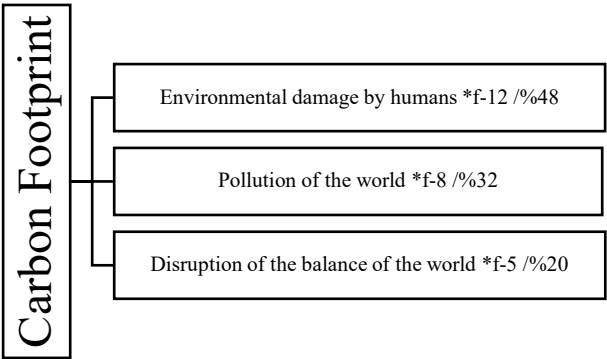
Source of Variance	Source of Variance	KT	sd	KO	F	P	Significant difference
Between groups	Between groups	4,679	2	2,340	,626	,01	1-3
Within groups	Within groups	21683,025	745	29,10			
Total	Total	21687,705	747				

It is seen that the total scores of the carbon footprint survey of the students differ statistically according to the family income status [$F_{(3-747)} = ,626$; $p < 0,05$]. According to the results of the Tukey test, which was conducted to determine between which groups the difference was, it was determined that there was a significant difference between students with low family income ($\bar{X} = 49,38$) and students with high family income ($\bar{X} = 38,71$). This difference was in favor of students with low family income. It can be said, therefore, that the carbon footprint sizes of students living in families with low-income status are smaller than those with families with high income status.

Findings on Qualitative Data

"What comes to mind when you hear the word carbon footprint?" The answers given by the students regarding the question are presented in Figure 2.

Figure 2
Students' Views on Carbon Footprint



When Figure 2 is examined, it is seen that the students expressed three different views on the carbon footprint. These views are, respectively, the damage caused by humans to the environment (f-12), the pollution of the world (f-8) and the deterioration of the balance of the world (f-5). Examples of students' statements are as follows:

S-15: "People harm the environment by emitting carbon dioxide while meeting their needs."

S-1: "You can learn how much carbon people produce and how much damage is done to the environment."

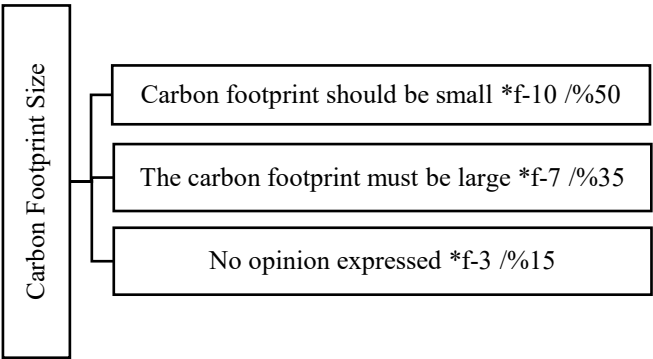
S-9: "The measure of the damage caused by human behavior to the world."

S-11: "The amount of carbon emitted into the atmosphere pollutes the world."

S-18: "The products we use disrupt the balance of the world."

"How do you think the size of the carbon footprint should be? Please explain." The answers given by the students regarding the question are presented in Figure 3.

Figure 3
Students' Views on the Size of the Carbon Footprint



When Figure 3 is examined, it is seen that the students expressed three different views on the size of the carbon footprint. These are, respectively, the carbon footprint

should be small (f-10), the carbon footprint should be large (f-7) and no opinion is expressed (f-3). Examples of students' statements are as follows.

S-18: "The carbon footprint should be small. Because

S-4: "Our carbon footprint should be large. According to me

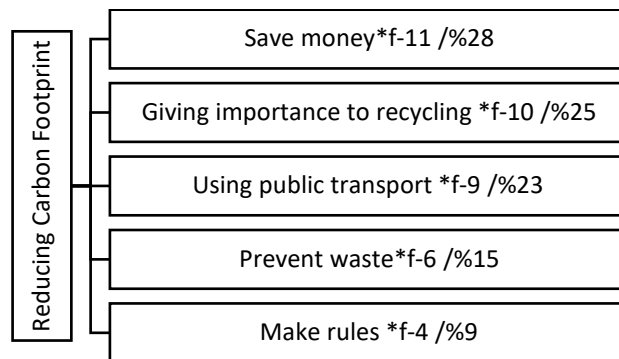
S-11: "I think the size of our carbon footprint is not important."

S-9: "Should the carbon footprint be large or small? I have no idea."

"What are ways to shrink your carbon footprint?" The answers given by the students regarding the question are presented in Figure 4.

Figure 4

Students' Views on Ways to Reduce their Carbon Footprint



When the data obtained from the students' opinions are examined, it is seen that the ways to reduce the carbon footprint are in the behavioral dimension. According to Figure 3, the ways to reduce the carbon footprint of students are respectively to save money (f-11), give importance to recycling (f-10), use public transportation (f-9), prevent waste (f-6), rules put (f-4). Examples of students' statements are as follows.

S-5: "We can use the bus or the bus to go to school or the market."

S-12: "Recyclable materials should be used."

S-9: "We should throw our wastes into recycling bins."

S-2: "We should use water and electricity sparingly."

S-20: "We should write rules to reduce the carbon footprint in places where people can see it. We must punish those who do not follow these rules."

S-17: "We should buy as much food as we can eat and as many clothes as we can wear."

Conclusions

In this research, determining the carbon footprint sizes of secondary school students in terms of various variables constitutes the main focus of the research. As a result of the analysis of the data obtained from the research, the following conclusions were reached:

It was determined that the carbon footprint sizes of the students were above the average. In this direction, it is understood that students generally have a medium (yellow) footprint. It can be said that the majority of the students have moderate to sustainable consumption habits. Students stated that the size of the carbon footprint

should be small in general. It is an indication that students do not have enough knowledge about this concept. In this case, it can be said that the qualitative results partially support the quantitative results.

This result is similar to Ertekin's (2012) study on environmental education practices on reducing carbon footprint sizes. This result is similar to Ertekin's (2012) study on environmental education practices on reducing carbon footprint sizes. Significantly, different institutions and organizations for the relevant subject calculate the carbon footprint (Bostan Sarioglan & Senturk Ozkaya, 2021). In addition, attention is drawn to the use of learning activities that require student participation in calculating the carbon footprint of students (Rudd, Horry & Skains, 2019). Kurt & Cavus Gungoren (2020) determined that the carbon footprint information of secondary school students is moderate, therefore, activities and practices prepared for students play an important role in reducing the existing carbon footprints of students. It has been determined that there is no statistical difference in the carbon footprint sizes of the students according to the gender variable, therefore, it can be said that the carbon footprint sizes of the students are at similar levels in terms of male and female students.

This result is similar to Kurt & Cavus Gungoren's (2020) study conducted for the carbon footprint knowledge test of 7th and 8th grade students. In the study of Gokcek, Bozdağ & Demirbağ (2019), which determined the carbon footprint of university students, it was stated that the CO₂ emission of male students was higher than that of female students, while in the study of Medina & Toledo-Bruno (2016), the carbon footprint awareness levels of students differed significantly in favor of male students. determined. It can therefore be said that the difference between the study group of the study and the study group of similar studies caused a significant difference in the gender variable. One of the other results of the research is to examine the differentiation status of class level and carbon footprint sizes. It is seen that carbon footprint sizes of students with lower grade level (5th grade) are smaller than students with high grade level (8th grade).

The study of Kurt & Cavus Gungoren (2020), who stated that the carbon footprint knowledge test average scores of 7th and 8th grade students did not differ according to the grade level, differs from the result of the current study. In this case, while there is no difference in the carbon footprint information at the class level, it has been determined in this study that the carbon footprint sizes increase as the class level increases. In this study, it was concluded that the carbon footprint sizes of the parents of the students are at similar levels regardless of the educational status of their parents. In addition, in the qualitative results, it can be said that their suggestions on ways to reduce their carbon footprint are related to what they observe from their families and their environment. In this context, the attitude of the family is important in behavioral activities related to the environment. In studies on environmental awareness and sensitivity to environmental problems, it is stated that the difference according to educational status is in cases where the level of education is high (Keskin Gurel, 2008; Kukrer, 2012). In the current study, it can be said that the fact that the educational status of the families is different does not affect the carbon footprint of the students, and that the approach of the families to this issue is more important than their educational status.

A statistical difference was determined in the carbon footprint sizes according to the income status of the families of the students. It can be said that the carbon footprint sizes of students living in families with low income status are smaller than those with families with high income status. Basogul (2018), who realized the reasons for the high

carbon footprint value with different study groups, stated that the carnivorous diet is predominant, the use of large volume vehicles, the use of public transportation vehicles, the time spent for travel is excessive, the insufficient energy saving systems, the number of household appliances and jewelry expenditures. The fact that the waste is too high and the recycling of wastes is insufficient emphasizes that the carbon footprint value increases. This is an indication that the increase in income status is directly proportional to the increase in carbon footprint. Significantly, the consumption activities that occur as a result of human behavior and the damage caused by the individual to the nature are proportional to the size of the carbon footprint (Yaka, Kocer & Gungor, 2015). Similarly, in related studies, it is stated that as income increases, carbon footprint sizes increase in parallel with the increase in consumption (Akilli, Kemahli, Okudan & Polat, 2008). Consequently, it can be said that income status has an effect on the amount of consumption and carbon footprint.

The current research contributes to an important gap in the literature in determining the carbon footprint sizes of secondary school students within the scope of sustainability. In addition, there is a need to carry out studies using different methods by researchers. Students should be informed about the concept of carbon footprint. On the grounds that the carbon footprints of the students are determined at a medium level, it can be suggested that applications (planting trees, recycling, energy efficiency,) to reach the small (green) level of carbon footprints should be carried out both at school and at home. In order to prevent future generations from experiencing the effects of global warming, it is important to draw attention to this issue, to raise awareness on the issue and to develop knowledge, skills and attitudes to reduce the effects.

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