Acıbadem Univ. Sağlık Bilim. Derg. 2025; 16 (3)
https://doi.org/10.31067/acusaglik.1602549



# Determining the awareness of university students regarding carbon footprint

**Şemsinnur Göçer[1], Tuncay Polat[2], Fikret Arpacı[1]**

[1] Yozgat Bozok University Faculty of Medicine Department of Public Health Yozgat, Türkiye

[2] Vocation School of Health Services, Erzincan Binali Yıldırım University, Erzincan, Türkiye

Şemsinnur GÖÇER
0000-0002-2735-0073

Tuncay POLAT
0000-0002-1066-8886

Fikret ARPACI
0009-0008-9847-7718

**Correspondence:** Şemsinnur Göçer
Yozgat Bozok University Faculty of Medicine Department of Public Health, Yozgat, Türkiye
**Phone:** +90 354 212 62 01
**E-mail:** semsinnurgocer@gmail.com

**Received:** 16.12.2024
**Accepted:** 05.02.2025

**ABSTRACT**

**Purpose:** This study aimed to examine the behaviors of university students regarding their carbon footprint in their daily lives in the areas of home, shopping, transportation and food consumption.

**Methods:** This cross-sectional descriptive study was conducted at Yozgat Bozok University in the Spring Semester of the 2022-2023 Academic Year. The sample of the study consisted of 164 students studying at the Faculty of Health Sciences, Engineering and Communication at Yozgat Bozok University in the spring semester of the 2022-2023 academic year. The data for the study were obtained through a personal information form and a carbon footprint awareness survey administered online. Numbers and percentages were used in the analysis of demographic data, and the Chi-Square test was used in comparative analyses. The significance level in statistical tests was accepted as $p<0.05$.

**Findings:** According to the research results, it was determined that female students and students studying in the field of social sciences had a more positive tendency in terms of carbon footprint awareness, while health sciences students exhibited a more negative tendency.

**Conclusion:** As a result of the research, it is recommended that studies be carried out to develop students' environmental awareness, especially to increase their awareness about carbon footprint.

**Keywords:** Carbon footprint, awareness, students, environment.

**ÖZET**

**Amaç:** Bu araştırma, üniversite öğrencilerinin günlük yaşamlarında ev, alışveriş, ulaşım ve gıda tüketimi alanlarındaki karbon ayak iziyle ilgili davranışlarını incelemeyi amaçlamıştır.

**Gereç ve Yöntem:** Kesitsel tanımlayıcı tipteki bu araştırma, 2022-2023 akademik yılı bahar döneminde Yozgat Bozok Üniversitesi'nde yapılmıştır. Araştırmanın örneklemi, 2022-2023 akademik yılı bahar döneminde Yozgat Bozok Üniversitesi sağlık bilimleri, mühendislik ve iletişim fakültesinde öğrenim gören 164 öğrenciden oluşmuştur. Araştırmanın verileri, online olarak uygulanan, kişisel bilgi formu ve karbon ayak izi farkındalık anketi ile elde edilmiştir. Demografik verilerin analizinde sayı ve yüzdeler, karşılaştırmalı analizlerde ise Ki-Kare testi kullanıldı. İstatistiksel testlerde anlamlılık düzeyi $p<0,05$ olarak kabul edildi.

**Bulgular:** Araştırma sonuçlarına göre, kadın öğrencilerin ve sosyal bilimler alanında öğrenim gören öğrencilerin karbon ayak izi farkındalığı açısından daha olumlu bir eğilime sahip olduğu, sağlık bilimleri öğrencilerinin ise daha olumsuz bir eğilim sergilediği belirlenmiştir.

**Sonuç:** Araştırma sonucunda, öğrencilerin çevre bilincinin geliştirilmesi, özellikle karbon ayak izi konusunda farkındalıklarının artırılması için çalışmalar yapılması önerilmektedir.

**Anahtar kelimeler:** Karbon ayak izi, karbon ayak izi farkındalığı, üniversite öğrencisi, çevre.

Factors such as urbanization, population growth, developing technologies, industry and the development of the industrial sector also bring environmental pollution problems to the agenda. It is known that environmental pollution is an important problem that threatens the whole world today and that the environmental resources with which people interact are not unlimited (1-3).

Carbon footprint assessments are carried out to determine the effects of human activities on the environment, such as how much nature is used, how resources are consumed, etc. There are multiple definitions of carbon footprint in the literature. Carbon footprint is defined as the biological productive area needed to limit carbon dioxide (CO2) released into the atmosphere as a result of human activities (4). Carbon footprint constitutes the majority of the ecological footprints left behind as a result of production and consumption activities. The amount of people's share in global warming and the amount of carbon produced as a result of production and consumption in activities such as eating, drinking, transportation and heating also determine the carbon footprint value. Carbon footprint also expresses the proportion of greenhouse gases released into nature from a person, an institution or any product in the general total (5,6).

Due to the increasing population, consumption habits are increasing and harming the environment. In this context, carbon footprint calculations are made to draw attention to the different dimensions of ecological destruction in order to raise environmental awareness. For this reason, each individual in the society needs to review their individual consumption in order to contribute to the use of existing natural resources for today's needs, also defined as sustainability, but also to protect the resources for future generations and to create a safe and livable environment (7-11).

At the United Nations Conference on Environment and Development, it was stated that the two most important target groups for raising awareness on environmental issues are women and youth (12).

It is believed that determining the carbon footprint awareness of the young group, university students, will significantly contribute to their understanding of this concept, making them more aware of their environmental impact. This awareness can help eliminate or reduce negative approaches toward the environment, while reinforcing positive ones. In our country, studies on carbon footprint awareness and related trends among university students are limited(13-16).

This research aimed to examine the carbon footprint-related behaviors of university students in daily life in the areas of home, shopping, transportation and food consumption.

## Material and Methods

***Study Design:*** The research was conducted at Yozgat Bozok University in the Spring Term of the 2022-2023 Academic Year between April and June.

This study, which was conducted to examine the carbon footprint-related behaviors of university students, is descriptive and cross-sectional.

***Study Population:*** During the spring semester of 2022-2023, there were 22,400 students studying at Yozgat University. A G Power analysis was conducted to determine the sample size for the research. According to the results of the research, which identified the awareness of Turkish consumers regarding their carbon footprint as part of the "Brands For Good" collective brand movement initiated by the Sustainable Brands (SB) global community in Turkey, it was found that 36% of the participants correctly identified their carbon footprint(17). In determining the sample size, this criterion was taken into account, and with an expected frequency of 36%, a margin of error of 5%, a confidence level of 95%, and a design effect of 3, the sample size was calculated to be 111. Three faculties representing health, social, and natural sciences were selected: the Faculty of Communication for social sciences, the Faculty of Engineering for natural sciences, and the Faculty of Health Sciences for health sciences. Accordingly, the sample size

was weighted by the number of students in each faculty, and the minimum number of students to be reached from each faculty was determined as follows: 42 students from the Faculty of Engineering, 61 students from the Faculty of Health Sciences, and 61 students from the Faculty of Communication. The research was completed with a total of 164 students.

***Data Collection:*** The data of the research was obtained through "Personal Information Form" and "Carbon Footprint Survey".The personal information form includes questions regarding the students' age, gender and department of study. For the carbon footprint survey, a survey of 25 questions was prepared as a result of the literature review conducted by the researchers(13-17). The survey questions were sent to two academics who are experts in their fields and who contributed independently to the research and as a result of the feedback given, the survey questions were revised and a survey form with 14 questions was created regarding 4 areas: home, shopping, transportation and food consumption. The survey was prepared via Google form and conducted online. Before starting the survey, information about the study and a consent tab for participation in the study were added. This section asked for consent to participate in the study. Students in the relevant departments were reached through the administrators of the departments they were studying in..

***Data Analysis:*** SPSS 21 statistical analysis package program was used to evaluate the data. Numbers and percentages were used in the analysis of demographic data, and the Chi-Square test was used in comparative analyses. In statistical tests, the significance level was accepted as $p<0.05$.

***Ethics Approval And Consent To Participate****:* Ethical approval for the research was received from Erzincan Binali Yıldırım University Human Research Health and Sports Sciences ethics committee dated 29/06/2022 and numbered E-88012460-050.01.04-184034. Permission was obtained from the administrators of the relevant departments (Faculty of Communication, Engineering and Health Sciences) within Yozgat Bozok University for the research, and the participants were included in the research after accepting the informed consent text about the research in the online survey form. The principles of the Declaration of Helsinki were followed throughout the research.

## Results

The students participating in the study were at least 18 and at most 22 years old, the average age was 19.1±0.8, and 76.8% were female. 37.2% of the students were studying health, 32.7% were studying social sciences, and 25.6% were studying science.

The rate of students who completely turned off electrical appliances after use was 29.3%, the rate of those who turned off lights when leaving the room was 84.8%, the rate of those who left devices such as phones and computers on charge for a long time was 47.6%, the rate of those who turned off electrical appliances etc. when they were not at home for a long time was 52.4%, and the rate of those who recycled items such as metal, plastic, glass or paper at home was 6.7%. The rate of those who mostly shop at a market close to where they live was 65.9%, the rate of those who pay attention to whether it is environmentally friendly when buying electrical appliances was 33.5%, the rate of those who pay attention to whether it is environmentally friendly when buying clothing, textiles and shoes, etc. was 31.7%, the rate of those who walk or bike to school was 67.1% and the rate of those who take an average of 3 or more flights per year was 7.9%. The rate of students who mostly consume red meat is 61.0%, the rate of those who mostly consume seasonal foods is 66.5%, the rate of those who mostly throw away leftover food is 45.1%, and the rate of students who say they recycle food packaging waste is 58.5%.

Table 1 shows the distribution of results regarding home, shopping, food and transportation.

**Table 1:** Frequency distribution of students' behaviors related to carbon footprint

| Variables | Response | n | % |
|---|---|---|---|
| Turning off electrical devices like TV, computer, etc., after use | Yes | 48 | 29.3 |
| | Sometimes | 64 | 39.0 |
| | No | 52 | 31.7 |
| Turning off lights when leaving the room | Yes | 139 | 84.8 |
| | Sometimes | 16 | 9.8 |
| | No | 9 | 5.5 |
| Leaving devices like phones and computers charging for a long time | Yes | 78 | 47.6 |
| | Sometimes | 64 | 39.0 |
| | No | 22 | 13.4 |
| Turning off heating systems like boilers when not home for a long time | Yes | 86 | 52.4 |
| | Sometimes | 52 | 31.7 |
| | No | 26 | 15.9 |
| Recycling items like metal, plastic, glass, or paper | Yes | 11 | 6.7 |
| | Sometimes | 98 | 59.8 |
| | No | 55 | 33.5 |
| Mainly shopping from | Local market | 108 | 65.9 |
| | Distant shopping mall | 17 | 10.4 |
| | Online market | 39 | 23.8 |
| Paying attention to whether electrical appliances are eco-friendly when buying | Yes | 55 | 33.5 |
| | Sometimes | 73 | 44.5 |
| | No | 36 | 22.0 |
| Paying attention to whether clothing, textiles, and shoes, etc., are eco-friendly when buying | Yes | 52 | 31.7 |
| | Sometimes | 79 | 48.2 |
| | No | 33 | 20.1 |
| Mode of transportation to school | Private car | 6 | 3.7 |
| | Shuttle bus | 48 | 29.3 |
| | Bicycle/Walking | 110 | 67.1 |
| Number of average airplane trips in a year | 0 | 137 | 83.5 |
| | 1-2 | 14 | 8.5 |
| | 3+ | 13 | 7.9 |
| General diet | Mostly vegetables and fruits | 43 | 26.2 |
| | Mostly red meat | 100 | 61.0 |
| | Equal amounts | 21 | 12.8 |
| Consuming foods in their season | Yes | 109 | 66.5 |
| | Sometimes | 52 | 31.7 |
| | No | 3 | 1.8 |
| Throwing away leftover food | Yes | 74 | 45.1 |
| | Sometimes | 68 | 41.5 |
| | No | 22 | 13.4 |
| Recycling food packaging waste | Yes | 96 | 58.5 |
| | Sometimes | 51 | 31.1 |
| | No | 17 | 10.4 |
| The average travel time by bu sor shuttle in a week | At least 30 min | 80 | 48.8 |
| | 30-60 min | 44 | 26.9 |
| | 60+ min | 40 | 24.4 |

87.7% of those who said "I sometimes pay attention to whether they are environmentally friendly or not" when purchasing electrical appliances in the shopping area were female students, and this rate is significantly higher than that of the male gender. Again, in the shopping area, clothing, textiles and shoes etc. 78.8% of those who said "yes, I pay attention to whether it is environmentally friendly or not" when purchasing were female students, and this rate is significantly higher than that of males. 100.0% of those who answered "sometimes" to the question of recycling food packaging waste in the field of food were female students, and this rate is significantly higher than that of male students.

There is no significant difference in comparison by gender with other questions regarding carbon footprint in all areas.

Table 2 shows the comparison of students' carbon footprint-related behaviors by gender.

**Table 2:** Comparison of students' behaviors related to carbon footprint by gender

| Variables | | Male | | Female | | |
|---|---|---|---|---|---|---|
| | Responses | n | % | n | % | $x^{2*}$ p |
| Turning off electrical devices like TV, computer, etc., after use | Yes | 10 | 20.8 | 38 | 79.2 | 0,619 0,734 |
| | Sometimes | 14 | 21.9 | 50 | 78.1 | |
| | No | 14 | 26.9 | 38 | 73.1 | |
| Turning off lights when leaving the room | Yes | 35 | 25.2 | 104 | 74.8 | 2,893 0,235 |
| | Sometimes | 1 | 6.3 | 15 | 93.8 | |
| | No | 2 | 22.2 | 7 | 77.8 | |
| Leaving devices like phones and computers charging for a long time | Yes | 22 | 28.2 | 56 | 71.8 | 2,121 0,346 |
| | Sometimes | 12 | 18.8 | 52 | 81.3 | |
| | No | 4 | 18.2 | 18 | 81.8 | |
| Turning off heating systems like boilers when not home for a long time | Yes | 20 | 23.3 | 66 | 76.7 | 0,001 1,000 |
| | Sometimes | 12 | 23,1 | 40 | 76,9 | |
| | No | 6 | 23.1 | 20 | 76.9 | |
| Recycling items like metal, plastic, glass, or paper | Yes | 3 | 27.3 | 8 | 72.7 | 0,432 0,806 |
| | Sometimes | 21 | 21.4 | 77 | 78.6 | |
| | No | 14 | 25.5 | 41 | 74.5 | |
| Mainly shopping from | Local market | 24 | 22.2 | 84 | 77.8 | 3,748 0,154 |
| | Distant shopping mall | 7 | 41.2 | 10 | 58.8 | |
| | Online market | 7 | 17.9 | 32 | 82.1 | |
| Paying attention to whether electrical appliances are eco-friendly when buying | Yes | 23 | 41.8 | 32 | 58.2 | **16,419 0,000** |
| | Sometimes | 9 | 12.3 | **64** | **87.7** | |
| | No | 6 | 16.7 | 30 | 83.3 | |
| Paying attention to whether clothing, textiles, and shoes, etc., are eco-friendly when buying | Yes | 11 | 21.2 | **41** | **78.8** | **6,100 0,000** |
| | Sometimes | 24 | 30.4 | 55 | 69.6 | |
| | No | 3 | 23.2 | 30 | 76.8 | |
| Mode of transportation to school | Private car | 3 | 50.0 | 3 | 50.0 | 4,737 0,094 |
| | Shuttle bus | 7 | 14.6 | 41 | 85.4 | |
| | Bicycle/Walking | 28 | 25.5 | 82 | 74.5 | |
| Number of average airplane trips in a year | 0 | 28 | 20.4 | 109 | 79.6 | 10,094 0,006 |
| | 1-2 | 8 | 57.1 | 6 | 42.9 | |
| | 3+ | 2 | 15.4 | 11 | 84.6 | |
| General diet | Mostly vegetables and fruits | 9 | 20.9 | 34 | 79.1 | 1,502 0,472 |
| | Mostly red meat | 26 | 26.0 | 74 | 74.0 | |
| | Equal amounts | 3 | 14.3 | 18 | 85.7 | |
| Consuming foods in their season | Yes | 21 | 19.3 | 88 | 80.7 | 5,063 0,080 |
| | Sometimes | 15 | 28.8 | 37 | 71.2 | |
| | No | 2 | 66.7 | 1 | 33.3 | |
| Throwing away leftover food | Yes | 20 | 27.0 | 54 | 73.0 | 1,248 0,536 |
| | Sometimes | 13 | 19.1 | 55 | 80.9 | |
| | No | 5 | 22.7 | 17 | 77.3 | |
| Recycling food packaging waste | Yes | 31 | 32.3 | 65 | 67.7 | **22,963 0,000** |
| | Sometimes | 0 | 0.0 | **51** | **100.0** | |
| | No | 7 | 41.2 | 10 | 58.8 | |

***Data are presented in numbers and percentages. Chi square test was used in comparisons.***

In the shopping area, 64.1% of the students who shopped at the virtual market were students studying in the science department and there was a significant difference compared to other departments. 41.8% of those who stated that they pay attention to whether they are environmentally friendly when purchasing electrical appliances were students studying in social sciences, and this rate is significantly higher than other departments.100% of those who said no to the question of consuming seasonal foods were students studying in health sciences, and there is a significant difference compared to other departments.62.7% of those who answered yes to the question of throwing away leftover food were students studying in health sciences, and there is a significant difference compared to other departments.58.3% of those who stated that they recycled food packaging waste in the field of food were students studying in social sciences, and there is a significant difference compared to other departments.

Table 3 shows the comparison of students' carbon footprint-related behaviors according to the department they study in.

**Table 3:** Comparison of students' behaviors related to carbon footprint by departments

| Variables | n | Health | | Science | | Social | $x^{2*}$ p |
|---|---|---|---|---|---|---|---|
| | | % | n | % | n | % | |
| Turning off electrical devices like TV, computer, etc., after use | Yes | 21 | 43.8 | 13 | 27.1 | 14 | 29.2 |
| | Sometimes | 23 | 35.9 | 19 | 29.7 | 22 | 34.4 |
| | No | 17 | 32.7 | 10 | 19.2 | 25 | 48.1 |
| | | | | | | | 4,772 0,312 |
| Turning off lights when leaving the room | Yes | 52 | 37.4 | 34 | 24.5 | 53 | 38.1 |
| | Sometimes | 7 | 43.8 | 3 | 18.8 | 6 | 37.5 |
| | No | 2 | 22.2 | 5 | 55.6 | 2 | 22.2 |
| | | | | | | | 4,822 0,306 |
| Leaving devices like phones and computers charging for a long time | Yes | 32 | 41.0 | 21 | 26.9 | 25 | 32.1 |
| | Sometimes | 18 | 28.1 | 14 | 21.9 | 32 | 50.0 |
| | No | 11 | 50.0 | 7 | 31.8 | 4 | 18.2 |
| | | | | | | | 8,940 0,063 |
| Turning off heating systems like boilers when not home for a long time | Yes | 37 | 43.0 | 18 | 20.9 | 31 | 36.0 |
| | Sometimes | 19 | 36.5 | 14 | 26.9 | 19 | 36.5 |
| | No | 5 | 19.2 | 10 | 38.5 | 11 | 42.3 |
| | | | | | | | 5,714 0,022 |
| Recycling items like metal, plastic, glass, or paper | Yes | 6 | 54.5 | 2 | 18.2 | 3 | 27.3 |
| | Sometimes | 30 | 30.6 | 27 | 27.6 | 41 | 41.8 |
| | No | 25 | 45.5 | 13 | 23.6 | 17 | 30.9 |
| | | | | | | | 4.949 0,293 |
| Mainly shopping from | Local market | 54 | 50.0 | 28 | 25.9 | 26 | 24.1 |
| | Distant shopping mall | 1 | 5.9 | 8 | 47.1 | 8 | 47.1 |
| | Online market | 6 | 15.4 | 25 | 64.1 | 8 | 20.5 |
| | | | | | | | **20,503 0,000** |
| Paying attention to whether electrical appliances are eco-friendly when buying | Yes | 14 | 25.5 | 18 | 32.7 | 23 | 41.8 |
| | Sometimes | 32 | 43.8 | 24 | 32.9 | 17 | 23.3 |
| | No | 15 | 41.7 | 19 | 52.8 | 2 | 5.6 |
| | | | | | | | **17,758 0,000** |
| Paying attention to whether clothing, textiles, and shoes, etc., are eco-friendly when buying | Yes | 25 | 48.1 | 16 | 30.8 | 11 | 21.2 |
| | Sometimes | 25 | 31.6 | 34 | 43.0 | 20 | 25.3 |
| | No | 11 | 33.3 | 11 | 33.3 | 11 | 33.3 |
| | | | | | | | 5,051 0,282 |
| Mode of transportation to school | Private car | 3 | 50.0 | 1 | 16.7 | 2 | 33.3 |
| | Shuttle bus | 18 | 37.5 | 13 | 27.1 | 17 | 35.4 |
| | Bicycle/Walking | 40 | 36.4 | 28 | 25.5 | 42 | 38.2 |
| | | | | | | | 0,609 0,962 |
| Number of average airplane trips in a year | 0 | 46 | 33.6 | 36 | 26.3 | 55 | 40.1 |
| | 1-2 | 8 | 57.1 | 4 | 28.6 | 2 | 14.3 |
| | 3+ | 7 | 53.8 | 2 | 15.4 | 4 | 30.8 |
| | | | | | | | 4,5475 0,334 |
| General diet | Mostly vegetables and fruits | 18 | 41.9 | 13 | 30.2 | 12 | 27.9 |
| | Mostly red meat | 38 | 38.0 | 37 | 37.0 | 25 | 25.0 |
| | Equal amounts | 5 | 23.8 | 11 | 52.4 | 5 | 23.8 |
| | | | | | | | 5,992 0,200 |
| Consuming foods in their season | Yes | 49 | 45.0 | 36 | 33.0 | 24 | 22.0 |
| | Sometimes | 9 | 17.3 | 25 | 48.1 | 18 | 34.6 |
| | No | 3 | 100 | 0 | 0.0 | 0 | 0.0 |
| | | | | | | | 3,274 0,513 |
| Recycling food packaging waste | Yes | 24 | 25.0 | 39 | 40.6 | 33 | 34.4 |
| | Sometimes | 32 | 62.7 | 16 | 31.4 | 3 | 5.9 |
| | No | 5 | 29.4 | 6 | 35.3 | 6 | 35.3 |
| | | | | | | | **16,719 0,002** |
| Throwing away leftover food | Yes | 25 | 33.8 | 30 | 40.5 | 19 | 25.7 |
| | Sometimes | 20 | 29.4 | 10 | 14.7 | 38 | 55.9 |
| | No | 16 | 72.7 | 2 | 9.0 | 4 | 18.3 |
| | | | | | | | **25,104 0,000** |
| The average travel time by bus or shuttle in a week | At least 30 min. | 36 | 45.0 | 19 | 23.8 | 25 | 31.3 |
| | 30-60 min. | 12 | 27.3 | 12 | 27.3 | 20 | 45.5 |
| | 60+ min | 13 | 32.5 | 11 | 27.5 | 16 | 40.0 |
| | | | | | | | **13,659 0,000** |

***Data are presented in numbers and percentages. Chi square test was used in comparisons.***

## Discussion

The students participating in the study were at least 18 and at most 22 years old, the average age was 19.1±0.8, and 76.8% were female. 37.2% of the students were studying health, 32.7% were studying social sciences, and 25.6% were studying science.

In our research, more than half of the students (66.5%) stated that they consume seasonal foods. In a study conducted with university students, it was determined that the tendency to consume organic food was low (1). We think that this result obtained from our research is due to the fact that students know that consuming foods in season is a healthier and more environmentally friendly behavior, and that products sold in season are more affordable.

In our research, more than half of the students stated that they preferred a red meat-based diet (61.0%). Studies have shown that the majority of students consume red meat at a rate of 87.1% and 92.4% (11,18). Again, in the literature, studies conducted with university students have shown an increase in meat consumption (19). Our research revealed similar results to the literature in terms of red meat consumption. It suggests that the majority of students' tendency to consume red meat may be due to the fact that they frequently consume ready-made foods, especially fast food.

In our research, 29.3% of the students stated that they turned off electrical devices completely after use, and 31.7% stated that they sometimes turned them off. Again, the rate of those who turn off the lights when they leave the room was determined as 84.8%, the rate of those who leave their devices such as phones and computers on charge for a long time was determined as 47.6%, and the rate of those who turn off the lights when they are not at home for a long time was determined as 52.4%. In a study, more than half of the students stated that they turned off the combi boiler when they were not at home, did not leave the refrigerator door open for a long time, etc. results have been obtained (1). At this point, considering the common features of these questions in our research, they reveal behavioral patterns that indicate both environmental protection and economic savings. This result we obtained from our research may be due not only to students' environmentally friendly behavior but also to their thriftiness.

The percentage of students in our study who stated that they recycle household items such as metal, plastic, glass or paper was quite low (6.7%). Similar to our study, in Birand's (13) study examining ecological footprint tendencies and environmentally friendly behaviors, it was determined that the participants did not exhibit positive tendencies regarding recycling. Again, it was determined that more than half of the students participating in different studies did not pay attention to recycling and that the students were not active in recycling activities (20,21). Our research suggests that the reason why students do not exhibit a positive approach to recycling at the expected level is due to the fact that they do not have sufficient knowledge about recycling. In our research, 33.5% of the students buy electrical equipment, 31.7% buy clothing, textiles and shoes, etc. and they stated that when purchasing, they pay attention to whether it is environmentally friendly or not.

In Aslan et al. study on university students, students did not have sufficient knowledge about green marketing activities and were undecided about purchasing green products (22). In Koçoğlu et al. study, it was found that students receiving tourism education had a large It has been determined that the majority of them contribute to the protection of the environment by purchasing environmentally friendly products(23). This result obtained from our research suggests that students may not have sufficient awareness about purchasing environmentally friendly products, and that economic concerns may be prioritized in their product purchasing preferences. In our research, electrical appliances, clothing, textiles and shoes, etc. it has been determined that more than half of those who pay attention to whether it is environmentally friendly when purchasing and who express positive behavior in terms of recycling food packaging waste are female students, and that female students differ significantly from male students in all of these areas.

In a study conducted on carbon footprint among university students, it was found that female students had lower carbon footprints than males (24), and in another study(1), it was found that the average carbon footprint of women in food, energy and waste areas was significantly higher than the average of men, and that the ecological footprint of women was significantly higher than that of men in food, energy and waste areas.

It has been determined that awareness of environmental issues is higher than men, and women have a more positive environmental approach than men (1).

Environmental behaviors do not include a positive or negative judgment and represent the actions of individuals regarding the environment. Individuals' environmental behaviors can be environmentally friendly behaviors or the exact opposite. Environmentally friendly behaviors, on the other hand, refer to behaviors that individuals exhibit that will cause the least possible harm to nature (25). The term pro-environment or environmentally sensitive behaviors, which are used instead of environmentally friendly behavior, refers to behaviors that individuals exhibit in order to contribute to environmental sustainability. Examples of these include behaviors such as choosing recyclable products and taking them to recycling points, preventing unnecessary energy and water consumption, and supporting public opinion formation by participating in environmental awareness activities(26).Our research result supports the literature. The reason why female students have more positive approaches to environmental awareness and ecological footprint awareness is that in our society with a traditional family structure, women's primary duties are related to the home, especially food, waste, shopping, etc. We think this is related to daily activities.

It was determined that the rate of students who stated that they recycle food packaging waste and pay attention to whether they are environmentally friendly when purchasing electrical appliances is significantly higher among students studying in social sciences compared to other departments. This result obtained from the research may be due to the fact that the subjects included in the courses taught in the field of social sciences are effective in gaining positive behaviors regarding environmental education.

100% of those who said no to the question of consuming seasonal foods were students studying in health sciences, and there was a significant difference compared to other departments. 62.7% of those who answered yes to the question of throwing away leftover food were students studying in health sciences, and there was a significant difference compared to other departments.In Keleş et al. study (14), it was determined that food was the most effective in ecological footprint results, and in another study, it was determined that the highest carbon footprint values were in medical faculty students (24). Our research result supports the literature.

## Conclusion

According to the results of the research, it was determined that female students and students studying in social sciences had a more positive tendency in terms of carbon footprint awareness, while students studying in health sciences had a more negative tendency. In line with the results obtained from the research, it is recommended that studies be conducted to increase the awareness of university students about environmental awareness in general and carbon footprint in particular.

### *Study limitations*

The fact that the research was conducted with students at a single university is a limitation of our research.

## Declarations

### ***Funding***

This study was not financially supported by any person or institution.

### ***Conflict of interest***

The authors declare that there is no conflict of interests

### *Ethics approval*

Ethical approval for the research was received from Erzincan Binali Yıldırım University Human Research Health and Sports Sciences ethics committee dated 29/06/2022 and numbered E-88012460-050.01.04-184034.

### *Acknowledgements*

We would like to thank all participants who supported the research.

### *Availability of data and material*

The datasets utilized and analyzed in this study are not publicly accessible due to privacy concerns regarding participant information. However, they can be obtained from the corresponding author upon reasonable request.

*Authors' contributions*

SG and TP conceived and designed the study. SG and TP were responsible for study implementation, data collection, and data management. SG and TP wrote the frst draft of the report. Both authors contributed to, and approved, the fnal manuscript.

## References


1. Günal N, Yücel Işıldar G, Atik AD. Üniversite öğrencilerinin ekolojik ayak izi azaltılması konusundaki eğilimlerinin incelenmesi. TÜBAV Bilim Dergisi 2018;11:34-46. https://dergipark.org.tr/tr/download/article-file/616986
2. Basogul Y. Akademisyen ve idari personelin ekolojik ve karbon ayak izinin belirlenmesi: Adıyaman Üniversitesi Mühendislik Fakültesi Örneği. Journal of Engineering Sciences and Design 2018; 6(3):464 – 470. https://dergipark.org.tr/tr/pub/jesd/issue/38660/427682
3. Koç N, Saraç TB, Koç ÖE. Türkiye'de çevre kirliliğinin belirleyicileri üzerine ekonometrik bir analiz. Anadolu Üniversitesi İktisadi Ve İdari Bilimler Fakültesi Dergisi 2022; 23(4), 204-225. https://doi.org/10.53443/anadoluibfd.1137098
4. Kaypak Ş. Ekolojik ayak izinden çevre barışına bakmak. Türk Bilimsel Derleme Dergisi 2013;1:154-159. https://dergipark.org.tr/en/pub/derleme/issue/35088/389194
5. Dinçel D. Doğadaki izimiz: Ekolojik ayak izi. Sağlık Çevre Kültürü Dergisi Zeytinburnu Tıbbi Bitkiler Bahçesi Süreli Yayını 2008; 21-22. https://media.ztbb.org/yayinlar/kitaplar/saglik-ve-cevre-kulturu-1.pdf
6. Kumaş K, Akyüz A, Zaman M et all."Sürdürülebilir bir çevre için karbon ayak izi tespiti: MAKÜ Bucak Sağlık Yüksekokulu Örneği" El-Cezerî Fen ve Mühendislik Dergisi 2019; 6 (1): 108-117. https://dergipark.org.tr/tr/download/article-file/639027
7. Özçelik G. "Çanakkale Onsekiz Mart Üniversitesi Terzioğlu Kampüsü'nün enerji ve karbon ayak izi açısından değerlendirilmesi", Yüksek Lisans Tezi, 2017; Çanakkale Onsekiz Mart Üniversitesi, Fen Bilimleri Enstitüsü.
8. Brody SD, HC Ryu. Measuring the educational impacts of a graduate course on sustainable

development. Environmental Education Research 2006; 12 (2): 179–199. http://dx.doi.org/10.1080/13504620600688955

9. Bonamente E, Pelliccia L, Merico CM. The multifunctional environmental energy tower: Carbon Footprint and Land Use Analysis of an Integrated Renewable Energy Plant. Sustainability 2015;7: 13564-13584. https://doi.org/10.3390/su71013564
10. Kurt P, Cavus-Gungoren S. Ortaokul 7. ve 8. sınıf öğrencilerinin sürdürülebilirliğe yönelik tutum, davranış ve farkındalıkları ile karbon ayak izi bilgi düzeylerinin incelenmesi. Akdeniz Eğitim Araştırmaları Dergisi 2020; 14(34): 529-552. Doi:10.29329/mjer.2020.322.25
11. Palamutoğlu R, İnce Palamutoğlu M, Kantar AG et all. Üniversite öğrencilerinin et tüketimi ve gıda neofobisinin değerlendirilmesi. Kırşehir Ahi Evran Üniversitesi Sağlık Bilimleri Dergisi 2022; 6 (3):144-153. https://dergipark.org.tr/tr/pub/ahievransaglik/issue/73988/1138878
12. United Nations Conference on Environment and Development 1992. https://www.un.org/en/conferences/environment/rio1992. Erişim tarihi: 10.10.2024
13. Birand A. Okul öncesi öğretmen adaylarının ekolojik ayak izi farkındalıkları ve çevre dostu davranışları. Yüksek Lisans Tezi, 2016, Yakın Doğu Üniversitesi Eğitim Bilimleri Enstitüsü, Lefkoşa, 48-85.
14. Keleş Ö, Uzun N, Özsoy S. Öğretmen adaylarının ekolojik ayak izlerinin hesaplanması ve değerlendirilmesi, Ege Eğitim Dergisi 2008; 9(2):1–14. https://dergipark.org.tr/tr/pub/egeefd/issue/4911/67248
15. Coşkun, I. Ç. ve Sarıkaya R. Sınıf öğretmeni adaylarının ekolojik ayak izi farkındalık düzeylerinin belirlenmesi. Journal of Turkish Studies 2014; 9(5), 1761-1787. http://dx.doi.org/10.7827/TurkishStudies.6598
16. Yıldız, E. Fen ve teknoloji öğretmen adaylarının ekolojik ayak izi farkındalık düzeylerinin belirlenmesi ve değerlendirilmesi. Yüksek Lisans Tezi, 2014, Gazi Üniversitesi, Fen Bilimleri Enstitüsü, Ankara.
17. https://www.cevko.org.tr/index.php?lang=tr Erişim tarihi: 10.10.2024
18. Taşkın T, Engindeniz S, Gbadamonsi AA et all. Analysis of red meat consumption preferences of youth: a case study for ege university students, Ege Üniv. Ziraat Fak. Derg 2020; 57 (1):63-71. https://doi.org/10.20289/zfdergi.587525
19. Ortiz-Moncada R, Morales-Suárez-varela M, Avecilla-Benítez Á et al. Factors associated with meat consumption in students of Spanish universities: Unihcos project. International Journal of Environmental Research and Public Health 2019; 16:1–16. https://doi.org/10.3390/ijerph16203924
20. Demircioğlu G, Demircioğlu H, Yadigaroğlu M. Fizik, kimya ve biyoloji öğretmen adaylarının çevre bilinç düzeylerinin değerlendirilmesi. Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi 2015;19: 167-193. https://dergipark.org.tr/tr/pub/adyusbd/issue/1405/16648
21. Köse S, Şahin K, Savaşer et al. Üniversite öğrencilerinin geri dönüştürülebilen evsel atıklara ilişkin farkındalık durumları. Adnan Menderes Üniversitesi Sağlık Bilimleri Fakültesi Dergisi 2021; 5 (2): 209-219. https://doi.org/10.46237/amusbfd.718190
22. Aslan F, Çınar R. Yeşil planlama faaliyetleri çerçevesinde Kafkas üniversitesi öğrencilerinin çevreye duyarlı ürünleri kullanma eğilimlerini belirlemeye yönelik bir araştırma. Kafkas Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi 2015; 6 (9): 169–184. http://dx.doi.org/10.18025/kauiibf.30588
23. Koçoğlu CM, Koçoğlu Y. Yeşil pazarlama kapsamında çevreye duyarlı ürünlerin satın alma eğilimleri: lisans düzeyinde turizm eğitimi alan öğrenciler üzerinde bir araştırma. Uluslararası Yönetim İktisat ve İşletme Dergisi 2017; ICMEB17 Özel Sayısı: 417-427. https://dergipark.org.tr/tr/pub/ijmeb/issue/54601/744481
24. Gökçek B, Bozdağ A, Demirbağ H. Niğde Ömer Halisdemir Üniversitesi örneğinde karbon ayak izinin belirlenmesi. Niğde Ömer Halisdemir Üniversitesi Mühendislik Bilimleri Dergisi 2019; 8(2):721-730. https://doi.org/10.28948/ngumuh.514438.
25. Kanbak A. Üniversite öğrencilerinin çevresel tutum ve davranışları: farklı değişkenler açısından Kocaeli Üniversitesi örneği. Kocaeli Üniversitesi Sosyal Bilimler Dergisi 2015; 30: 77-90. https://dergipark.org.tr/tr/pub/kosbed/issue/25689/271113
26. Sancak İ.T.B. Çevresel bilincin, tutum ve davranış üzerindeki etkisinin incelenmesi: Bingöl Üniversitesi Örneği. Akademik Matbuat 2022; 6(1), 91-110. https://dergipark.org.tr/tr/pub/matbuat/issue/71397/1102211