Niğde Ömer Halisdemir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi

NOHÜSOSBİLD

e-ISSN: 2687-5306 / https://dergipark.org.tr/tr/pub/nohusosbil

Research Article

Urban Trees Through Gen Z Women's Eyes: Perceptions and Expectations from Turkish Cities

Z Kuşağı Kadınlarının Gözünden Kent Ağaçları Türk Şehirlerine İlişkin Algılar ve Beklentiler

Ahenk KARCI[1]

Ayşe KALAYCI ÖNAÇ[2]

Süleyman Aykutalp ÖZKUYUMCU[3]

ARTICLE INFO

Article history:

Received: 26 June 2025

Accepted: 29 June 2025

Keywords:

Urban Trees

Perception of Urban Trees

Generation Z

ABSTRACT

Abstract must Global population growth and rapid urbanization processes are expanding the structural areas of cities while also negatively affecting ecosystems and human psychology. In this context, trees within cities play a vital role in urban life not only for their aesthetic value but also for their functional contributions, such as improving air quality, providing shade, and supporting ecological balance. Trees, which positively influence psychological well-being by reducing stress levels in individuals, are a fundamental component of urban sustainability.

This study aims to reveal the perceptions and expectations of Generation Z women in Turkey regarding urban trees. Data obtained from 1,061 participants were evaluated through exploratory factor analysis and various nonparametric tests. As a result of the analysis, five main factors were identified: Ecological and Psychological Benefits, Urban Tree Issues, Tree Sufficiency and Species Diversity, Health and Safety Concerns, and Economic Value.

Among the participants, the Ecological and Psychological Benefits factor had the highest average, while Tree Sufficiency and Species Diversity had the lowest average. The results of the Kruskal-Wallis test showed significant differences in some factors according to city, education, and occupation variables. In particular, participants living in Ankara perceive the ecological and psychological benefits of urban trees at a higher level. In the evaluation based on education level, it was observed that participants with doctoral degrees placed greater importance on the economic value and psychological benefits of urban trees.

The findings of the study highlight the need for urban afforestation policies to be shaped by considering local conditions and public perceptions.

MAKALE BİLGİSİ

Makale geçmişi:

Başvuru tarihi: 26 Haziran 2025

Kabul tarihi: 29 Haziran 2025

ÖZET

Küresel nüfus artışı ve hızlı kentleşme süreçleri, şehirlerin yapısal alanlarını genişletirken aynı zamanda ekosistemleri ve insan psikolojisini olumsuz etkilemektedir. Bu bağlamda, kent içindeki ağaçlar yalnızca estetik değerleriyle değil, aynı zamanda hava kalitesini artırma, gölgelik alanlar sağlama ve ekolojik dengeyi destekleme gibi

[1]Ahenk KARCI , ahnkkarci@gmail.com.https://orcid.org/0000-0002-0069-4589

[2]Department of Urban Regeneration , Ayşe KALAYCI ÖNAÇ, aysklyc@gmail.com, https://orcid.org/0000-0003-1663-2662

[3]Department of Urban Regeneration, Süleyman Aykutalp ÖZKUYUMCU, s.aykutalpp@gmail.com. https://orcid.org/0009-0001-0215-0307

Anahtar Kelimeler:

Kentsel Ağaçlar

Kentsel Ağaçların Algılanması

Z Kuşağı

işlevsel katkılarıyla da şehir yaşamında hayati bir rol üstlenmektedir. Özellikle bireylerin stres seviyelerini azaltarak psikolojik iyilik hâllerine olumlu etkide bulunan ağaçlar, kent sürdürülebilirliğinin temel bileşenlerinden biridir.

Bu çalışma, Türkiye'deki Z kuşağı kadınlarının kent ağaçlarına yönelik algı ve beklentilerini ortaya koymayı amaçlamaktadır. 1.061 katılımcıdan elde edilen veriler, açıklayıcı faktör analizi ve çeşitli nonparametrik testler aracılığıyla değerlendirilmiştir. Analiz sonucunda beş temel faktör belirlenmiştir: Ekolojik ve Psikolojik Yararlar, Kentsel Ağaç Sorunları, Ağaç Yeterliliği ve Tür Çeşitliliği, Sağlık ve Güvenlik Endişeleri ile Ekonomik Değer.

Katılımcılar arasında Ekolojik ve Psikolojik Yararlar faktörü en yüksek ortalamaya sahipken, Ağaç Yeterliliği ve Tür Çeşitliliği en düşük ortalamayı almıştır. Kruskal-Wallis testi sonuçları, şehir, eğitim ve meslek değişkenlerine göre bazı faktörlerde anlamlı farklılıklar olduğunu göstermiştir. Özellikle Ankara'da yaşayan katılımcılar, kent ağaçlarının ekolojik ve psikolojik faydalarını daha yüksek düzeyde algılamaktadır. Eğitim düzeyine göre yapılan değerlendirmede ise, doktora mezunu katılımcıların kent ağaçlarının ekonomik değerine ve psikolojik yararlarına daha fazla önem verdikleri görülmüştür.

Çalışmanın bulguları, kentlerde uygulanacak ağaçlandırma politikalarının yerel koşullar ve halkın algıları göz önünde bulundurularak şekillendirilmesi gerektiğini ortaya koymaktadır.

INTRODUCTION

Cities are places where societal needs like accommodation, transport, job opportunities, recreation, and entertainment are fulfilled. These areas are marked by ongoing social progress, limited agricultural practices, and a high concentration of population.(Keleş 1998).

Cities may also be described as systems that consist of both natural and human-constructed elements. At present, 55% of the global population lives in urban settings, and this proportion is projected to increase to 68% by the year 2050. Urban areas evolve through spatial and urban planning processes shaped by both public and private sector investments. As such, effective urban planning plays a vital role in ensuring the healthy growth and organization of cities.(Camacho Cervantes, Morelia, Shondube, Jorge E., Castillo, Alicia, MacGregor Fors 2014; Camacho-Cervantes et al. 2014; Department of Economic and Social Affairs 2019). As emphasized in the study by Grimm et al. (2008), the rise in urbanization contributes to global-scale challenges such as climate change, shifts in land use patterns, the spread of invasive species, and disruptions in biogeochemical cycles.(Camacho-Cervantes et al. 2014). Particularly, unplanned urban growth results in the depletion of natural resource areas, including forests, farmland, and wetlands. This degradation is especially severe in fast-expanding cities located near forested landscapes.(Jantz, Goetz, and Jantz 2005). Furthermore, the decline of green spaces in urban environments presents a significant risk to the mental health and overall well-being of city dwellers(White et al. 2013).

An essential element of urban environments is the existence of open green spaces and the trees they contain. Urban trees are considered the most prominent and vital type of vegetation, offering a wide range of social, ecological, and psychological benefits and services to both city inhabitants and the urban ecosystem.(Gül, Topay, and Örücü 2012).Urban trees not only maintain ecological balance, but are also an important factor in improving urban quality of life and socio-economic well-being. A study conducted in Baltimore City and County found a strong inverse relationship between tree cover and crime rates such as robbery, burglary and armed assault. Spatially adjusted analyses show that a 10% increase in tree cover is associated with about a 12% reduction in crime rates. Furthermore, tree cover in public spaces was found to be 40% more effective in reducing crime rates than on private property. These findings suggest that urban afforestation policies can support not only environmental sustainability but also the process of creating safe and livable cities (Troy et al., 2012). In addition, the positive effects of urban green spaces on individuals' psychological, physiological and cognitive health are increasingly being researched. Access to green spaces has been found to contribute significantly to

reduced stress levels, improved sleep quality and strengthened immune systems. Furthermore, the presence of green spaces reduces the risk of chronic diseases such as cardiovascular diseases, respiratory diseases, diabetes and obesity, while supporting mental well-being and alleviating symptoms of depression and anxiety (Hall & Knuth, 2019)

The environmental context in which physical activity is performed has a significant impact on the psychological health of individuals. It has been determined that physical activities performed in green natural areas provide more benefits in terms of anxiety, mood, energy levels and positive social interactions compared to those in urban environments. Research findings show that physical activities performed in natural environments contribute to reducing stress, eliminating fatigue and making individuals feel more vigorous (Wicks et al., 2022).A study carried out in the state of California, USA, identified a positive relationship between the density of urban trees and the overall health of the population.(Ulmer et al. 2016).

As urban areas expand, cities experience changes in their microclimates. The rise in temperature linked to urbanization can be alleviated through the beneficial impacts of urban vegetation. The urban heat island effect contributes to elevated temperatures and increased air pollution; however, studies have shown that enhancing urban greenery helps lower surface air temperatures in street canyons, roadways, and building exteriors.(Alkan, Adıgüzel, and Kaya 2017; Loughner et al. 2012).Research in Yeşilyurt, Tarsus (Mersin) highlights the impact of increased green space on microclimatic regulation. ENVI-met simulations show that expanding green areas from 2,487 m² to 4,398 m² reduces the average temperature by approximately 0.45°C. This finding emphasizes the importance of urban vegetation in mitigating heat stress and enhancing environmental quality. Integrating green spaces into urban planning is crucial for climate resilience and sustainable urban development(Adıgüzel, 2023). Urban trees and green infrastructure play a crucial role in delivering key urban ecosystem services, including carbon sequestration and the enhancement of air quality. Urban parks cover about 6% of city areas in the contiguous United States and contain approximately 370 million trees.These trees contribute significantly to air quality improvement, temperature regulation, air pollution reduction, and carbon dioxide absorption. The overall impact of parks and open spaces varies depending on the extent of parkland and tree cover, with additional benefits provided by vegetation in vacant urban lands (Nowak & Heisler, 2010).

In addition to providing ecological benefits, urban green spaces also play a crucial role in water regulation. Urban trees significantly contribute to this process by reducing runoff through hydrological mechanisms such as rainwater retention and evaporation. The effectiveness of these processes varies depending on climatic conditions, rainfall regime, and tree species. Species with dense and extensive leaf cover enhance rainwater interception, thereby reducing surface runoff, while large trees contribute to the water cycle by evaporating the captured water, further supporting urban hydrological balance(Carlyle-Moses et al., 2020). Additionally, urban trees provide vital habitats that help sustain wildlife within city environments, especially supporting the presence and continuity of bird species(von Döhren and Haase 2019; Wood and Esaian 2020).

Trees are powerful carbon sinks that capture atmospheric CO_2 and store it in biomass, a process that plays a critical role in mitigating the effects of climate change. It reveals that urban trees make a significant contribution to reducing CO_2 levels by supporting ecological sustainability. In this context, the integration of green infrastructure into urban planning is considered a strategic approach to temperature regulation and climate change mitigation (Sharma et al., 2024).

In the literature, it is stated that green spaces have significant impacts on spatial identity, environmental quality and user satisfaction as well as their aesthetic value. In a study conducted in this context, the perception of urban squares was analyzed with different greening scenarios and the subconscious effects of trees were examined. The findings show that trees enhance aesthetic perception, positively affect city image and improve factors such as cleanliness and shopping atmosphere. Moreover, the presence of trees encourages individuals to spend more time in public spaces and increases social interaction. (Rašković & Decker, 2015).In a study conducted in 10 urban areas in South

Africa with different socio-economic contexts, 87% of 1200 respondents had a positive attitude towards urban trees, while more than 70% were dissatisfied with the appearance of their streets and the insufficient number of trees. Respondents emphasized that they would like to see more trees both in public spaces and on private property(Gwedla & Shackleton, 2019).Based on 944 interviews conducted by university students, the study examined citizens' perceptions of ornamental trees (Quercus ilex) dying due to root disease. The majority of respondents were able to distinguish between dead and healthy trees and 86.2% were aware of the risk of collapse. However, opinions on the cause of the death of trees differed, with younger respondents more likely to blame environmental pollution. Furthermore, 42.9% of respondents did not have or did not want to make any suggestions on the management of public green spaces (Nali & Lorenzini, 2009). Focus group interviews conducted in Zagreb (Croatia) examined the diversity of negative perceptions of urban green spaces, categorized these perceptions and explored their relationship with sociodemographic characteristics. Participants reported negative perceptions mostly due to the behavior of other users and inadequate management of green spaces, while negative perceptions of safety were among the least frequently mentioned issues.(Ostoić et al., 2024).The survey, conducted at Gothenburg Central Station, examines residents' preferences for eight different urban tree species and whether gender is an influential variable on these preferences. The findings show that there is no significant difference between the gender of the respondents, and that both groups consider trees with large and dense foliage to be more aesthetically pleasing than those with smaller and sparser foliage.(Dalros Sköld, 2023). The research examined individuals' perception of gardens and streets through semi-structured interviews conducted in four residential neighborhoods in Riga. The data show that in open and undefined spaces, low-branching trees and shrubs have a positive effect on the perception of space. However, in closed spaces, the effect of this vegetation is either neutral or negatively evaluated. These elements, which increase the sense of security in open spaces, become less functional in closed spaces as there are already clear boundaries (Kusmane et al., 2019).

Demographers and scholars typically refer to individuals born between 1995 and 2010 as members of Generation Z (Seemiller and Grace 2017). However, the Pew Research Center defines Generation Z as those born between 1996 and 2012.(Dimock 2019). Courtney (2020),high lights that Generation Z includes individuals born from the mid-1990s to the mid-2000s, who have not yet completed higher education but are starting to enter the workforce and participate in elections through voting. What sets Generation Z apart from previous generations is their birth into a world where technology is already deeply integrated into daily life. For this generation, technology and the internet play a central role in everyday routines. Unlike earlier generations who relied on traditional mass media to stay informed, Generation Z accesses information digitally and with confidence. Growing up with constant exposure to technology, they have developed more advanced motor skills, as they tend to engage with multiple topics simultaneously. Their educational, professional, and social lives are closely intertwined with technology, which can make face-to-face communication and in-person relationships more challenging for them (Irmak Aydın 2020; Taş, Demirdöğmez, and Küçükoğlu 2017; Turner 2015).

Generation Z, born into the digital age, actively engages with the vast information network provided by the internet and can effortlessly access current events from any location around the globe. This generation’s strong connection to global developments has fostered a heightened awareness of ecological issues and a deep commitment to universal values (Howard 2016).In line with this, a study conducted in Portugal revealed that environmental awareness significantly and positively influences sustainable consumption among Generation Z university students. The findings show that as environmental awareness increases, sustainable consumption behaviors also rise, highlighting the strong connection between ecological sensitivity and daily consumption choices in this generation (Ribeiro et al., 2024).

In a rapidly digitizing world, it is evident that the expectations of Generation Z individuals, especially young women, regarding nature and green spaces in urban life are changing as their environmental awareness increases. This generation's affinity for technology, quick access to information, and sensitivity to global issues have made them effective actors in the areas of environmental sustainability, ecological balance, and livable cities. Additionally, improving the quality

of life in cities is directly related not only to physical environmental planning but also to understanding social needs and individual demands. In this context, a detailed analysis of young women's perceptions and expectations regarding urban trees serves as an important data source for sustainable and human-centered urban planning.

This study aims to reveal the perceptions of Generation Z women living in Turkey regarding the trees in their cities, their awareness levels regarding the ecological, aesthetic, and psychological contributions of these trees, and their expectations regarding green spaces in urban life. The research findings aim to contribute to the shaping of urban tree planting policies in line with the needs and sensitivities of society, while also providing a comprehensive assessment by revealing the effects of demographic variables (city, education level, etc.) on these perceptions.

1.MATERIAL AND METHOD

1.1 Method

The study consists of five stages,the methodological flowchart is depicted below (Figure 1).

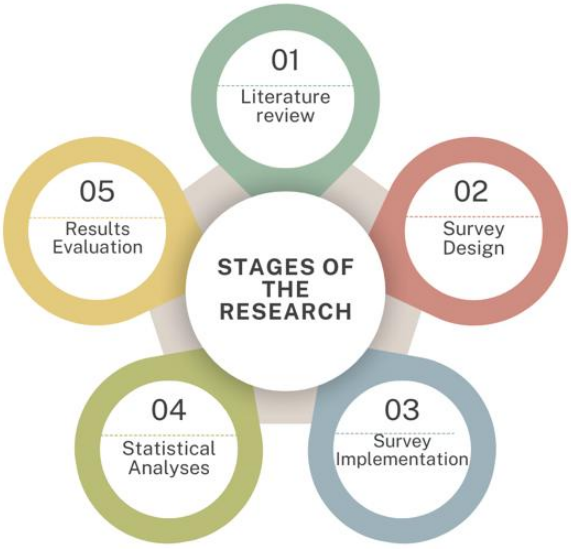

Figure 1: Flow chart

This study consists of five basic steps structuring the research process. First, a literature review was conducted to understand the existing knowledge on the subject and to establish the theoretical basis. This was followed by the questionnaire design process in which questions were determined in accordance with the purpose of the study. In the third stage, the questionnaire was administered online and the data collection process was completed. The collected data were analyzed with statistical methods to shed light on the research questions. Finally, the findings were evaluated from a general perspective and the results of the study were interpreted in a holistic way.

1.1.1 Literature Review

The literature review conducted in the first stage of the research contributed to the determination of the research topic by examining the existing studies on urban trees. Following these reviews, the survey method was preferred as the most appropriate data collection tool for the purpose of the study. The main purpose of the study is to reveal how the perceptions of Generation Z female individuals living in Turkey are shaped towards urban trees.

1.1.2 Survey Design

The comprehensive literature review conducted in the first phase of the study contributed to the identification of the problem area by examining the existing body of knowledge on urban trees. In this process, current research addressing the environmental, social, and economic impacts of urban trees on individuals was utilized. After identifying gaps in the literature and research needs, the survey method was adopted in line with the objective of the study.

The main objective of this study is to examine how Generation Z women in Turkey perceive urban trees. The questionnaire developed for this purpose consists of closed-ended questions and is designed to assess the general condition of urban trees. The questions in the survey form aim to evaluate the environmental, social, and economic contributions of trees, their current status in cities, and the areas that need improvement, based on the participants' perceptions.

The survey consists of two main sections:

The first section contains questions about the demographic characteristics of the participants. In this section, information such as age, city of residence, education level, occupational status, and monthly income is collected, enabling the analysis of findings according to different socio-demographic variables.

The second section includes statements aimed at measuring individual attitudes, perceptions, and evaluations regarding urban trees. This section consists of a total of 33 items structured using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

1.1.3 Survey Implementation

The survey form was prepared and implemented using Google Forms during the online data collection process. The survey link was shared through various digital communication channels, primarily email and social media platforms, in order to reach participants. This method enabled access to a wide audience living in different cities across Turkey and resulted in a sample rich in demographic diversity. The online implementation of the survey both simplified the data collection process and enabled a high number of participants to respond in a shorter time period.

1.1.4 Statistical Analyses

Before beginning the analysis of the data obtained in the study, Kolmogorov-Smirnov and Shapiro-Wilk tests were applied to determine the distribution characteristics of the variables. Exploratory Factor Analysis (EFA) was performed to test the structural validity of the scale. EFA is a statistical technique that aims to reveal the fundamental dimensions that explain the relationships between observed variables. This analysis helps researchers develop theories with real explanatory power and contributes to the theoretical production phase of the scientific method (Ezzati et al., 2014)

To assess the applicability of factor analysis, the Kaiser-Meyer-Olkin (KMO) sample adequacy test and Bartlett's Sphericity Test were used. The KMO statistic evaluates the overall sample adequacy of each variable and model; a value between 0.80 and 1.00 indicates that the sample is adequate for analysis (Flury et al., 1988.; Shrestha, 2021) The Bartlett test determines whether the observed correlation matrix differs significantly from the identity matrix McClendon, 2002; Shrestha, 2021).The Kruskal-Wallis H test was applied to determine whether there were significant differences in the attitudes of participants according to the demographic variables (education level, employment status, income level, and city of residence) in the data set. This test is a nonparametric method that evaluates whether there are differences in mean ranks between independent groups. Additionally, Spearman's rho correlation coefficient was calculated to analyze the relationships between the five basic factors defined in the study. Spearman's correlation is an appropriate test used to determine the level of relationship between two ordinal (nonparametric) variables (MacFarland et al., 2016).

1.1.5 Results and Evaluation

In the study, differences and relationships between participants' perceptions of urban trees and their demographic characteristics (education level, income level, employment status, and city of residence) were examined using various statistical methods. The data obtained were evaluated in a way that shed light on the research questions and interpreted in line with meaningful findings.

1.2 Material

This research was conducted with participants living in 81 provinces across Turkey. The materials used in the study consisted of literature reviewing resources related to urban trees and prepared questionnaire forms. All statistical operations were performed using IBM SPSS 26 software, and the questionnaires were administered online via Google Forms for easy access. The participant group consists of women from Generation Z randomly selected from different cities across the country.

2. FINDINGS

The demographic distribution of the total 1,061 individuals participating in the study is presented in Table 1.

Table 1: Demographic Information Of The Participants

City	N.	(%)	Education	N.	(%)	Ocupation	N.	(%)	Income	N.	((%)
İstanbul	280	26,4	Primary E.	11	1,0	Student	710	6,9	Low	883	83,2
Izmir	214	20,2	High School	236	22,2	Not working	99	9,3	Middle	139	13,1
Ankara	124	11,7	University	746	70,3	Public employee	65	6,1	High	39	3,7
Bursa	50	4,7	Master's Deg.	57	5,4	Private Sector	173	16,3			
Other	393	37,0	PhD.	11	1,0	Self-emp.	14	1,3			

When examining the distribution according to educational level, 1.0% of participants had a primary school education, 22.2% had a high school education, 70.3% had a university education, 5.4% had a master's degree, and 1.0% had a doctorate.In accordance with their professional status, 66.9% of participants are students, 9.3% are unemployed, 6.1% are public employees, 16.3% work in the private sector, and 1.3% are self-employed.In terms of income level, 83.2% of participants are in the low-income group, 13.1% are in the middle-income group, and 3.7% are in the high-income group (Table 1).

Table 2 summarizes the findings of the exploratory factor analysis conducted as part of the study.

Table 2: Explanatory Factor and Relability Analysis

Factor	Statements	Component				
		1	2	3	4	5
Ecological & Psychological Benefits	Trees clean the air	0,910				
	Trees provide protection from the wind	0,753				
	Trees lower the temperature	0,589				
	Trees are home to birds and small animals	0,932				

	Trees beautify the view of the place where it islocated	0,930				
	Trees create an environment for children to play	0,799				
	Trees improve mood and reduce stress	0,913				
	Trees create shade areas in summer. Allows me to move around comfortably	0,922				
	Trees make hiking fun	0,923				
	Tree-lined streets positively affect city life	0,906				
	Trees on the streets of the city I live in are useful	0,873				
	It is important for me to have trees on the streets of the city I live in	0,807				
	The number of trees in the city where I live should be increased	0,898				
	Trees in the city I live in should be more well-maintained	0,842				
	Species diversity of trees in my city should beincreased	0,878				
	More trees should be planted in residential areas in the city I live in	0,857				
Urban Tree-Related Problems	Trees make the street look dirty		0,400			
	Trees take up a lot of space on the street		0,693			
	Trees root damage roads/sidewalks		0,755			
	Trees block traffic signs		0,815			
	Trees, lamp posts and utility pole become as one		0,773			
	Trees fall and cause damage		0,738			
	Trees create desolate space		0,767			
	Trees block the view of the city		0,684			
Tree Sufficiency & Diversity	The number of trees in the city I live in is sufficient			0,902		
	The trees in my city are made up of different species			0,722		
	In the city I live in, afforested areas are sufficient			0,876		
Health & Safety Concerns	Fallen leaves from trees cause drains to become clogged				0,543	
	Trees cause allergies				0,783	

	Trees attract unwanted insects and animals				0,794	
	Trees cause lightning strikes				0,632	
Economic Value	Trees increase real estate value on the street where they are located					0,576
	Trees have economic value					0,661
KMO and Barlett test		0,959 (p = 0.000*)				

As a result of the analysis in Table 2, only items with a factor loading of 0.40 or higher were included in the table. Each item was grouped under a single factor with the highest loading, resulting in five basic dimensions: Ecological & Psychological Benefits, Urban Tree-Related Problems, Tree Sufficiency & Diversity, Health & Safety Concerns, and Economic Value. The Kaiser-Meyer-Olkin (KMO) test, conducted to assess the suitability of the data for factor analysis, yielded a result of 0.959, indicating that the sample is highly suitable for analysis. Additionally, Bartlett's Test of Sphericity was significant ($p < .001$), indicating that there is a sufficient level of correlation among the variables for factor analysis.

Table 3 shows the statistical values, degrees of freedom, and significance levels of the Kolmogorov-Smirnov and Shapiro-Wilk tests for the five factors included in the study.

Table 3: Normality Test

Factor	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ecological & Psychological Benefits	0,306	1061	0,000	0,531	1061	0,000
Urban Tree-Related Problems	0,199	1061	0,000	0,804	1061	0,000
Tree Sufficiency & Diversity	0,089	1061	0,000	0,958	1061	0,000
Health & Safety Concerns	0,072	1061	0,000	0,975	1061	0,000
Ecomomic Value	0,064	1063	0,000	0,953	1063	0,000
$p < 0.05$						

For all factors, $p<0.05$ was found in both tests, indicating that the variables did not follow a normal distribution. Therefore, nonparametric tests were preferred in the analyses (Table 3).

Descriptive statistics for the five key factors included in the study are presented in Table 4

Table 4: Descriptive Statistics

Factor	Minimum	Maximum	Mean	Std. Deviation
Ecological & Psychological Benefits	1,13	7,93	6,7487	1,387
Urban Tree-Related Problems	1,00	7,00	6,2160	0,928
Tree Sufficiency & Diversity	1,00	7,00	3,5556	1,649
Health & Safety Concerns	1,00	7,00	4,9459	1,252
Ecomomic Value	1,00	7,00	5,1756	1,698

The average values for the five key factors included in the study are examined in Table 4. The average for the Ecological and Psychological Benefits factor was calculated as 6.75. For the Urban Tree-Related Issues factor, this value is 6.22. The average for the Tree Sufficiency and Species Diversity factor is 3.56, and the average for the Health and Safety Concerns factor is 4.95. Finally, the average value for the Economic Value factor is 5.18.

Table 5 shows the results of the Kruskal-Wallis H test conducted to determine the differences between participants' perceptions of five key factors and the cities in which they live.

Table 5

Factor	City	Mean Rank	Kruskal-Wallis H	Sig
Ecological & Psychological Benefits	İstanbul	498,06	10,223	0,037*
	Izmir	554,64		
	Ankara	570,31		
	Bursa	451,56		
	Other	539,30		
Urban Tree-Related Problems	İstanbul	580,23	10,211	0,037*
	Izmir	506,25		
	Ankara	521,46		
	Bursa	509,82		
	Other	516,33		
Tree Sufficiency & Species Diversity	İstanbul	420,09	60,611	0,000*
	Izmir	569,74		
	Ankara	495,44		
	Bursa	591,53		
	Other	594,08		
Health & Safety Concerns	İstanbul	575,04	10,046	0,040*
	Izmir	494,69		
	Ankara	506,56		
	Bursa	554,76		
	Other	525,32		
Economic Value	İstanbul	571,12	17,053	0,002*
	Izmir	540,67		
	Ankara	579,41		
	Bursa	475,45		
	Other	490,20		
*p < 0,05				

Statistically significant differences were found across all factors ($p < 0.05$). In the Ecological and Psychological Benefitsfactor, Ankara had the highest mean rank (570.31), while the lowest was observed in Bursa (451.56). For the Urban Tree-Related Issues factor, Istanbul recorded the highest mean rank (580.23), whereas Izmir had the lowest (506.25). In the Tree Sufficiency and Species Diversity factor, the highest mean rank was found in the "Other" cities group (594.08), and the lowest in Istanbul (420.09). Regarding the Health and Safety Concerns factor, Istanbul again had the highest rank (575.04), while Izmir had the lowest (494.69). Finally, for the Economic Value factor, Ankara exhibited the highest mean rank (579.41), with Bursa showing the lowest (475.45) (Table 5).

Table 6 presents the findings of the Kruskal-Wallis H test conducted to examine whether there is a statistically significant difference in participants' perceptions of five key factors according to their educational levels.

Table 6

Factors	Educational Level	Mean Rank	Kruskal-Wallis H	Sig
Ecological & Psychological Benefits	Primary Education	552,36	18,880	0,001*
	High School	462,08		
	University	548,30		
	Master Degree	548,96		
	PhD.	721,95		
Urban Tree-Related Problems	Primary Education	580,86	7,514	0,111
	High School	490,49		
	University	545,24		
	Master Degree	531,77		
	PhD.	427,18		
Tree Sufficiency & Diversity	Primary Education	667,82	3,403	0,423
	High School	521,95		
	University	532,86		
	Master Degree	511,61		
	PhD.	610,73		
Health & Safety Concerns	Primary Education	592,45	16,176	0,003*
	High School	507,62		
	University	545,70		
	Master Degree	493,86		
	PhD.	213,91		
Ecomomic Value	Primary Education	487,55	21,391	0,000*
	High School	463,66		
	University	544,19		
	Master Degree	627,25		
	PhD.	673,14		

*p < 0,05

According to the Kruskal-Wallis analysis, statistically significant differences were observed in some factors according to education level ($p < 0.05$).The significance level for the Ecological and Psychological Benefits factor was $p = 0.001$, with the highest average rank value recorded in the PhD group (721.95) and the lowest value in the High School group (462.08).In the Health and Safety Concerns factor, $p = 0.003$ was found; in this variable, the highest average rank value was in the Primary Education group (592.45), and the lowest value was in the PhD group (213.91).

In the Economic Value factor, $p = 0.000$ is one of the variables with the highest level of significance. In this factor, the highest average rank value was reported in the PhD group (673.14), and the lowest value was in the High School group (463.66).

On the contrary, since the significance levels obtained in the Urban Tree-Related Problems ($p = 0.111$) and Tree Sufficiency and Diversity ($p = 0.423$) factors are above 0.05, there is no statistically significant difference between the groups in these variables.

Table 7 shows the results of the Kruskal-Wallis H test, which was conducted to examine the statistical significance of differences in participants' perceptions of five key factors according to their occupation.

Table 7

Factor	Occupation	Mean Rank	Kruskal-Wallis H	Sig
Ecological & Psychological Benefits	Student	522,11	8,225	0,084
	Not working	575,79		
	Public employee	613,31		
	Private Sector	514,55		
	Self-emp.	485,68		
Urban Tree-Related Problems	Student	509,31	13,220	0,010*
	Not working	596,60		
	Public employee	536,62		
	Private Sector	579,53		
	Self-emp.	580,68		
Tree Sufficiency & Diversity	Student	540,54	5,406	0,248
	Not working	538,77		
	Public employee	554,92		
	Private Sector	486,76		
	Self-emp.	465,25		
Health & Safety Concerns	Student	520,41	10,428	0,034*
	Not working	596,02		
	Public employee	488,01		
	Private Sector	544,11		
	Self-emp.	684,46		

Ecomomic Value	Student	510,73	13,980	0,007*
	Not working	559,06		
	Public employee	623,09		
	Private Sector	572,43		
	Self-emp.	460,29		
*p < 0,05				

As shown in Table 7, statistically significant differences were found in the factors of Urban Tree-Related Problems (p = 0.010), Health and Safety Concerns (p = 0.034), and Economic Value (p = 0.007). In the Urban Tree-Related Problems factor, the group with the highest average rank value was self-employed participants with 580.68, while the lowest value was observed in the students group with 509.31. In the Health and Safety Concerns factor, the highest average rank value was in the self-employed group (684.46), while the lowest value was in the public employees group (488.01). In the Economic Value factor, the highest average rank value was in the public employees group (623.09), while the lowest value was in the self-employed group (460.29).

On the other hand, since the significance values obtained in the Ecological and Psychological Benefits (p = 0.084) and Tree Sufficiency and Diversity (p = 0.248) factors were above 0.05, there were no statistically significant differences between the groups in these variables.

Table 8 provides the results of the Kruskal-Wallis H test, which was applied to determine whether there were significant differences in participants' assessments of the five factors according to their income levels.

Table 8

Factor	Income Level	Mean Rank	Kruskal-Wallis H	Sig
Ecological & Psychological Benefits	Low	529,96	1,040	0,595
	Middle	548,20		
	High	493,33		
Urban Tree-Related Problems	Low	529,63	0,202	0,904
	Middle	540,52		
	High	541,68		
Tree-Tree Sufficiency & Diversity	Low	529,89	4,253	0,119
	Middle	564,12		
	High	451,69		
Health & Safety Concerns	Low	535,56	0,926	0,629
	Middle	511,28		
	High	511,62		
Economic Value	Low	524,73	3,590	0,166
	Middle	576,97		

	High	522,87		
*p < 0,05				

According to the analysis results in Table 8, no statistically significant difference was found in any factor based on income level (p > .05).

Table 9. This table shows the pairwise relationships between the five key factors included in the study. Correlation coefficients were calculated using Spearman's rho (r_s) method.

Table 9: Correlation Analysis

Factors	Ecological & Psychological Benefits	Urban Tree-Related Problems	Tree Sufficiency & Diversity	Health & Safety Concerns	Ecomomic Value
Ecological & Psychological Benefits	1	0,183**	0,411**	–0,010	0,412**
Urban Tree-Related Problems	0,183**	1	–0,100**	0,524**	0,032
Tree Sufficiency & Diversity	0,411**	–0,100**	1	–0,150**	0,114**
Health & Safety Concerns	–0,010	0,524**	–0,150**	1	–0,078*
Ecomomic Value	0,412**	0,032	0,114**	–0,078*	1
*p < 0,05, **p <0 ,01					

The Spearman's rho correlation analysis conducted as part of the study revealed that the Ecological and Psychological Benefits factor was significantly correlated with Urban Tree-Related Problems ($r = 0.183$, $p < 0.01$), Tree Sufficiency and Species Diversity ($r = 0.411$, $p < 0.01$), and Economic Value ($r = 0.412$, $p < 0.01$) factors. No significant relationship was found between this factor and Health and Safety Concerns ($r = –0.010$, $p > 0.05$).A positive and significant relationship ($r = 0.524$, $p < 0.01$) was found between the Urban Tree-Related Problems factor and Health and Safety Concerns, as well as a negative and significant relationship ($r = –0.100$, $p < 0.01$) with Tree Sufficiency and Species Diversity.

A positive and significant relationship ($r = 0.114$, $p < 0.01$) was found between Tree Sufficiency and Species Diversity and the Economic Value factor, while a negative and significant relationship ($r = –0.150$, $p < 0.01$) was found between Health and Safety Concerns(Table 9).

3.RESULT AND CONCLUSION

The findings of this study indicate that demographic variables play a significant role in shaping participants' perceptions of urban trees. According to the results of the Kruskal-Wallis H test, statistically significant differences were observed across five core factors based on participants' city of residence, educational background, and occupation. However, no significant differences were found based on income level ($p > 0.05$), suggesting that perceptions of urban trees are more influenced by educational and social factors than by economic status.

City-based analyses revealed significant differences across all factors ($p < 0.05$). Notably, participants residing in Ankara exhibited the highest mean rank scores in the "Ecological and Psychological Benefits" dimension, while those living in Istanbul recorded the lowest. In contrast, the highest mean score for the "Problems Caused by Urban Trees" factor was observed in Istanbul, whereas Izmir had the lowest. Istanbul also ranked lowest in terms of "Tree Adequacy and Species Diversity," suggesting a perception among residents of insufficient quantity and variety of urban trees. Conversely, higher scores from participants in other cities may reflect greater satisfaction with green spaces in less densely urbanized or more rural environments. Similarly, in the "Health and Safety Concerns" factor, respondents from Istanbul reported higher scores, indicating a greater awareness of physical risks associated with trees in a highly urbanized context. The "Economic Value" factor yielded the highest scores in Ankara, possibly reflecting greater awareness of the impact of green spaces on real estate values.

Analysis based on education level also revealed significant differences in some dimensions. The highest average rank in the "Ecological and Psychological Benefits" dimension was reported by participants holding doctoral degrees (721.95), implying that higher education levels are associated with increased awareness of the environmental and psychological contributions of trees. A similar trend was found in the "Economic Value" factor. In contrast, participants with only primary school education reported the highest scores in the "Health and Safety Concerns" dimension, while those with doctoral degrees had the lowest scores. This may indicate that higher education levels are associated with a more rational assessment of potential risks and a lower perception of threat.

Occupational status also showed significant differences in three dimensions: "Problems Caused by Urban Trees," "Health and Safety Concerns," and "Economic Value." Self-employed individuals reported the highest concern scores for both potential damage caused by trees (e.g., to infrastructure or signage) and safety risks. This heightened sensitivity may stem from their greater personal responsibility and property ownership. Public sector employees, on the other hand, placed the highest value on the economic contributions of trees. Students generally recorded the lowest scores across all factors, likely due to their limited engagement with urban infrastructure and economic concerns.

In contrast, the Kruskal-Wallis test results showed no significant differences across any factors based on income level. This finding underscores the limited influence of economic status on perceptions of urban trees, especially considering that the majority of participants belonged to the lower-income group.

Furthermore, Spearman correlation analysis was conducted to examine interrelationships between the factors, yielding several valuable insights. Positive and statistically significant correlations were found between "Ecological and Psychological Benefits" and "Problems Caused by Urban Trees" ($r = 0.183$, $p < 0.01$), "Tree Adequacy and Species Diversity" ($r = 0.411$, $p < 0.01$), and "Economic Value" ($r = 0.412$, $p < 0.01$). These results suggest that individuals who perceive strong ecological and psychological benefits from trees are also likely to value their diversity and economic contributions. No significant correlation was found between "Ecological and Psychological Benefits" and "Health and Safety Concerns" ($r = –0.010$, $p > 0.05$), indicating that positive perceptions do not overlap with perceived risks. A strong positive correlation was observed between "Problems Caused by Urban Trees" and "Health and Safety Concerns" ($r = 0.524$, $p < 0.01$), implying that individuals who are more aware of problems associated with urban trees are also more concerned about related safety issues. Meanwhile, negative and significant correlations were found between "Tree Adequacy and Species Diversity" and

both “Problems Caused by Urban Trees” ($r = –0.100$) and “Health and Safety Concerns” ($r = –0.150$, $p < 0.01$), suggesting that satisfaction with tree quantity and diversity reduces the perception of related problems and risks. Additionally, a weak but significant negative correlation was identified between “Economic Value” and “Health and Safety Concerns” ($r = –0.078$, $p < 0.05$).

In summary, the results of this study reveal that perceptions of urban trees are multifaceted and significantly shaped by demographic factors. Variables such as education and occupational status, which define an individual's societal position, influence both the perceived benefits and risks associated with urban trees. These findings highlight the need for targeted awareness-raising initiatives within urban planning and environmental policy frameworks.

ACKNOWLEDGEMENT

An earlier and concise version of this study was initially presented as a conference paper at the 8th International Students Science Congress and published in the congress proceedings under the title “Perceptions and Expectations of Generation Z Women Regarding Trees in Turkish Cities”.

REFERENCES

Adıgüzel, F. (2023). Effects of green spaces on microclimate in sustainable urban planning. *International Journal of Environment and Geoinformatics*, *10*(3), 124–131.

Alkan, A., Adıgüzel, F., & Kaya, E. (2017). Batman Kentinde Kentsel Isınmanın Azaltılmasında Yeşil Alanların Önemi. *Coğrafya Dergisi*, *34*, 62–76.

Camacho Cervantes, Morelia, Shondube, Jorge E., Castillo, Alicia, MacGregor Fors, I. (2014). How do people perceive urban trees? Assessing likes and dislikes in relation to the trees of a city. *Urban Ecosystems*, *17*(3), 716–773.

Camacho-Cervantes, M., Schondube, J. E., Castillo, A., & MacGregor-Fors, I. (2014). How do people perceive urban trees? Assessing likes and dislikes in relation to the trees of a city. *Urban Ecosystems*, *17*(3), 761–773.

Carlyle-Moses, D. E., Livesley, S., Baptista, M. D., Thom, J., & Szota, C. (2020). Urban trees as green infrastructure for stormwater mitigation and use. *Forest-Water Interactions*, 397–432.

Courtney, D. A. (2020). *Exploring Generation Z’s Environmental Concerns and Its Effects on their Purchasing Behaviors*.

Dalros Sköld, E. (2023). *PERCEPTION OF URBAN TREES AND THEIR ECOSYSTEM SERVICES*.

Department of Economic and Social Affairs. (2019). *World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420)*.

Dimock, M. (2019). Defining generations: Where Millennials end and Generation Z begins. *Pew Research Center*, *17*(1), 1–7.

Ezzati, E., Farmanbar, R., & Khaleghizadeh, S. (2014). Influencing Factors in the Communication Skills of Basic Sciences Teachers: An Explanatory Factor Analysis. *J. Appl. Environ. Biol. Sci*, *4*(2), 181–186.

Flury, B., & Riedwyl, H. (n.d.). *Multivariate Statistics: A Practical Approach.(1988)*. London: Chapman and Hall.

Gül, A., Topay, M., & Örücü, Ö. K. (2012). *CBS YARDIMIYLA AĞAÇ ENVANTERİ MODELİNİN OLUŞTURULMASI*. 16–19.

Gwedla, N., & Shackleton, C. M. (2019). Perceptions and preferences for urban trees across multiple socio-economic contexts in the Eastern Cape, South Africa. *Landscape and Urban Planning*, *189*, 225–234.

Hall, C. R., & Knuth, M. J. (2019). An update of the literature supporting the well-being benefits of plants: Part 2 physiological health benefits. *Journal of Environmental Horticulture*, *37*(2), 63–73.

Keleş, R. (1998). Kentbilim Terimleri Sözlüğü, İmge Kitabevi, 2. *Baskı, Ankara*.

Kusmane, A. S., Ile, U., & Ziemelniece, A. (2019). Importance of trees with low-growing branches and shrubs in perception of urban spaces. *IOP Conference Series: Materials Science and Engineering*, *471*(9), 92061.

Loughner, C. P., Allen, D. J., Zhang, D.-L., Pickering, K. E., Dickerson, R. R., & Landry, L. (2012). Roles of urban tree canopy and buildings in urban heat island effects: Parameterization and preliminary results. *Journal of Applied Meteorology and Climatology*, *51*(10), 1775–1793.

MacFarland, T. W., Yates, J. M., MacFarland, T. W., & Yates, J. M. (2016). Spearman's rank-difference coefficient of correlation. *Introduction to Nonparametric Statistics for the Biological Sciences Using R*, 249–297.

McClendon, M. J. (2002). *Multiple regression and causal analysis*. Waveland Press.

Nali, C., & Lorenzini, G. (2009). Residents' perception of tree diseases in the urban environment. *Arboriculture & Urban Forestry (AUF)*, *35*(2), 87–93.

Nowak, D., & Heisler, G. (2010). Air quality effects of urban trees and parks. *Research Series Monograph. Ashburn, VA: National Recreation and Parks Association Research Series Monograph. 44 p.*, 1–44.

Ostoić, S. K., Vuletić, D., & Kičić, M. (2024). Exploring the negative perceptions of tree-based urban green space. People's behaviour and management are crucial. *Urban Forestry & Urban Greening*, *101*, 128539.

Rašković, S., & Decker, R. (2015). The influence of trees on the perception of urban squares. *Urban Forestry & Urban Greening*, *14*(2), 237–245.

Ribeiro, M. I. B., Lopes, I. M., & Fernandes, A. J. G. (2024). Environmental Awareness and Sustainable Consumption Among Portuguese University Students from Generation Z. *International Conference in Information Technology and Education*, 311–323.

Sharma, S., Hussain, S., Kumar, P., & Singh, A. N. (2024). Urban trees' potential for regulatory services in the urban environment: an exploration of carbon sequestration. *Environmental Monitoring and Assessment*, *196*(6), 504.

Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American Journal of Applied Mathematics and Statistics*, *9*(1), 4–11.

Troy, A., Grove, J. M., & O'Neil-Dunne, J. (2012). The relationship between tree canopy and crime rates across an urban–rural gradient in the greater Baltimore region. *Landscape and Urban Planning*, *106*(3), 262–270.

Ulmer, J. M., Wolf, K. L., Backman, D. R., Tretheway, R. L., Blain, C. J. A., O'Neil-Dunne, J. P. M., & Frank, L. D. (2016). Multiple health benefits of urban tree canopy: The mounting evidence for a green prescription. *Health & Place*, *42*, 54–62. https://doi.org/https://doi.org/10.1016/j.healthplace.2016.08.011

Von Döhren, P., & Haase, D. (2019). Risk assessment concerning urban ecosystem disservices: The example of street trees in Berlin, Germany. *Ecosystem Services*, *40*, 101031. https://doi.org/https://doi.org/10.1016/j.ecoser.2019.101031

White, M. P., Alcock, I., Wheeler, B. W., & Depledge, M. H. (2013). Would you be happier living in a greener urban area? A fixed-effects analysis of panel data. *Psychological Science*, *24*(6), 920–928.

Wicks, C., Barton, J., Orbell, S., & Andrews, L. (2022). Psychological benefits of outdoor physical activity in natural versus urban environments: A systematic review and meta-analysis of experimental studies. *Applied Psychology: Health and Well-Being*, *14*(3), 1037–1061.

Wood, E. M., & Esaian, S. (2020). The importance of street trees to urban avifauna. *Ecological Applications*, *30*(7).