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Review

A review of personal space and the factors affecting its perception in open-green areas from the perspective of landscape architecture

Gizem Bostancı, Pelin Keçecioğlu Dağlı*

Department of Landscape Architecture, Faculty of Engineering, Architecture and Design, Bartın University, 74100 Bartın, Turkey
*** Corresponding author:** Pelin Keçecioğlu Dağlı, pkececioglu@bartin.edu.tr

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Abstract: Landscape architects, who guide planning and design decisions by understanding the socio-cultural expectations, functional needs, and social behaviors of the community, create ideal spaces for people by integrating natural, social, cultural, and aesthetic factors with a holistic design approach in urban public areas. Public open green spaces are important urban areas that have a positive impact on people's physical, mental, and emotional health. In this context, the concept of personal space, its impact on individuals, and related perception studies have been examined. In landscape design, criteria that affect individuals' personal space distances and personal space perceptions have been identified, providing a basis for sustainable landscape design projects in public open and green spaces.

Keywords: public open green spaces; personal space; personal space perception; landscape design

1. Introduction

Human needs are one of the most important determinants of space design. Therefore, when designing spaces, first physical, then social and psychological needs must be met (Alp, 1993). Personal space emerges as a spatial formation based on the physical and psycho-social needs of individuals in the body-space relationship, which is realized through sensory and emotional bonds that arise when needs are met. The concept of personal space, which is emphasized in this context, is a phenomenon that goes beyond the boundaries defined by environmental psychologists, that each individual is creative and exceeds the limits of socially accepted behaviors. This concept is generally used as a definition with psychological and sociological dimensions in which spatial behaviors such as privacy, belonging, identity and sovereignty are shaped within the visually perceptible physical space (Göregenli, 2005; Tunçok, 2010). Spaces that are guided and connected by people enable the formation of structures and spaces that carry the understanding of the time and society in which they live to the present day. The urban lifestyle, social structure and the spaces produced by the social structure contain the memory, identity and image of the city. Public spaces are locations where urban life takes place, and urban public spaces are important reference points that connect the past and the present, creating belonging for individuals and identity for cities (Cengiz and Keçecioğlu Dağlı, 2019). In this context, public spaces, which have important functions, are also important urban parts in terms of landscape design. Since examining the criteria affecting the personal space distances of individuals and perception of personal space in the landscape design of public open and green spaces (Bekci, 2006) is important in terms of making correct and functional decisions, it is focused on this issue in the article.

The aim is to present a summary of fundamental information regarding personal space, the perception of personal space, and the factors influencing personal space perception within urban public spaces, as well as to outline the criterias that should be considered in future landscape design projects. In this context, answers to the following research questions were sought:

- How do users' behaviors and needs affect landscape designs in open-green areas?
- How does space organization in landscape design affect users' personal perception of space?
- What are the criterias that enable correct and effective decisions to be made regarding space organization in landscape design works to be carried out in open-green areas, taking into account the perception of personal space?

2. The concept of open-green space

The concepts of open and green space are defined in similar ways by different authors.

According to Akdoğan (1987), Özbilen (1991) and Öztan (1968), the concept of open space is an important part of the urban texture and is defined as empty or open areas outside architectural structures and transportation areas. These areas are defined as areas where there is no construction and have the potential for recreational use. For example, water surfaces, squares with no or limited vegetation cover and transportation areas are considered as open spaces (Gül and Küçük, 2001).

Miller (1986) defines urban open space as "any large, medium-sized or small land or water area in or near an urban area that can be used for recreation, aesthetic or ecological functions". Enger and Smith (2000) state that urban open space means only that which is not occupied or altered for development. According to Mpofu's (2013) own definition, the concept of open space; "Today, it is not limited to urban parks and conservation areas, but also includes non-park non-natural places. It includes public spaces such as streets, schoolyards, places of worship, outdoor sports complexes, cemeteries and public squares. The term is therefore broader in scope, encompassing all vacant or undeveloped urban land and is often used by planners as a composite of future urban planning and development. The working definition here refers to all vacant land in an urban area that is preserved for planting purposes or for future development, but is currently open".

According to Saatçioğlu (1978), green spaces are defined as areas in or on open spaces where vegetation consisting of woody and herbaceous plants is present or covered with plants. Green spaces generally include natural landscape elements. According to Pamay (1978), green spaces include areas that are generally located in or around the city and have various functions (Gül et al., 2020). Ceylan (2007) defines green spaces as areas that are created to meet the needs of people and that produce physical and social benefits, as well as being important pieces of nature for users due to the various functions they contain. Öztürk and Özdemir (2013) define open-green spaces as "public spaces that positively affect the social, physical and psychological status of the individual".

Green spaces are defined as any vegetation adjacent to an urban area and

include shrublands, nature reserves, national parks, outdoor sports areas, school playgrounds and rural or semi-rural areas immediately adjacent to an urban area (Chong et al., 2013). This definition emphasizes that green spaces can be found not only within the city, but also near or around urban areas.

According to the 2017 Planned Areas Zoning Ordinance (PAZO) No. 30113, Definitions, Article 4; "vvvv) Green spaces: refers to the sum total of playgardens, playgrounds, rest, stroll, picnic, entertainment, recreation and leisure areas allocated for the benefit of the public (Fairgrounds, botanical gardens and zoo gardens, and regional parks at metropolitan scale are within the scope of these areas), green spaces including the functions and construction conditions specified in Article 19" (PAZO, 2017).

According to Article 5-(1) of the 2014 Spatial Plans Construction Ordinance (SPCO) No. 29030; "It is the general name given to open and green spaces such as education, health, religious, cultural and administrative facilities, indoor and outdoor sports facilities, parks, playgardens, playgrounds, squares, recreation areas, etc. built by the public or private sector in order to meet the cultural, social and recreational needs of the individual and society and to increase their quality of life with a healthy environment." is defined as social infrastructure areas (SPCO, 2014).

In the light of the information obtained from literature, open and green spaces generally include various areas in or around the city that people and other living things use to meet their recreational needs with regard to their welfare. However, as stated by Pamay (1978), not all open spaces are considered as green spaces because they do not contain vegetation. Green spaces constitute a sub-category of the concept of open space and often stand out with their natural and aesthetic values.

In urban spaces, open and green spaces are generally located in a whole and complement each other. Open and green spaces shape the physical structure of the city and are one of the main land uses by forming the texture of the city, increasing the quality of life, supporting natural life, allowing people to rest and interact with nature. These areas play a critical role for the sustainability and prosperity of cities and should be considered as part of urban development strategies.

Open spaces are important places that need to be carefully considered in landscape planning and design. These areas are often considered by the planner as part of future urban planning and development. Therefore, in the urban planning process, it is important that open and green spaces are protected, developed and utilized appropriately.

2.1. The importance of urban open green spaces

In terms of landscape architecture, urban open-green spaces have an important place in the lives of all living things in terms of social, economic, ecological and aesthetic aspects for the city and urban people.

By meeting the basic needs of the city and the city dwellers such as housing, education, health and culture, as well as providing recreation areas for the citizens of the city, they contribute socially in improving the quality of life (Yazıcı and Gülgün Aslan, 2017) and strengthening social bonds (Kopar, 2015). Urban open green spaces are also socially important in contemporary societies regardless of religion,

language and race (Kopar, 2015).

They contribute ecologically to the city and its people by regulating the city's climate by reducing the urban heat island effect (Alkan et al., 2017), protecting the habitats of local plant and animal species and supporting biodiversity, improving air quality by filtering pollutants in the air (Cüce and Ortaçesme, 2020), protecting soil and water quality by preventing erosion and increasing the water absorption capacity of the soil, increasing and balancing groundwater levels (Mpofu, 2013).

Urban open green spaces play an important economic role directly and indirectly, such as increasing property value, saving energy (Cüce and Ortaçesme, 2020), revitalizing tourism and trade, reducing health costs, and contributing to the sustainable development of cities (Koçan, 2021). Urban open green spaces also contribute to the development of the landscape sector and create various job opportunities. They provide an aesthetic appearance by adding a natural and visual attraction to the city, as well as increasing the qualities of the buildings around them and forming the character and identity of the city (Koçan, 2021).

2.2. Classification of urban open-green spaces

The green area system in the city is divided into 2 types as dispersed green spaces and green bands system (Gül and Küçük, 2001):

- Dispersed green spaces: They are scattered as small or large pieces within the city and are not systematic. Generally formed as a result of unplanned urbanization.
- Green bands system: It is expressed as an approach that provides integrity by combining different regions or certain parts within the city and has an organic green texture.

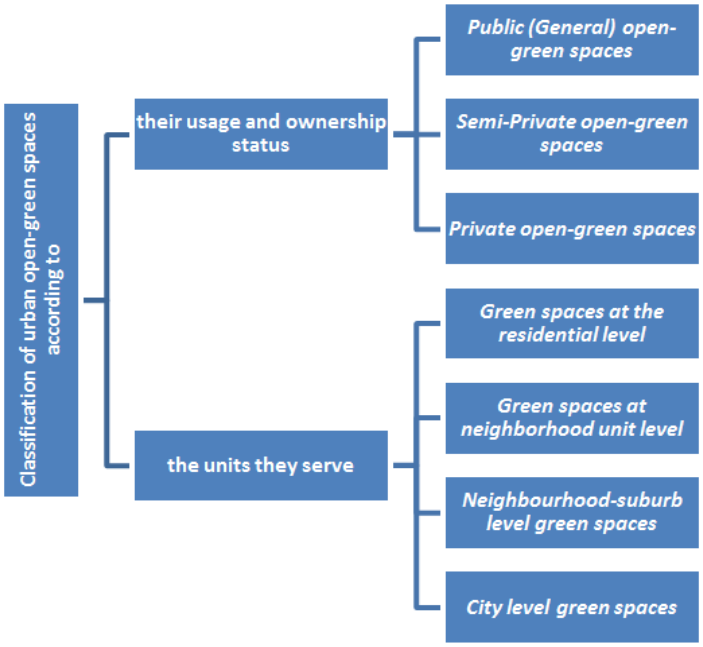


Figure 1. Classification of urban open-green spaces.

Open-green spaces are divided into 3 types according to their usage and

ownership status (Koçan, 2021; Önder, 1997), and divided into 4 categories according to the units they serve (Koçan, 2021; Yıldızcı, 1982) (**Figure 1**). Description of them were given in **Table 1**.

Table 1. Description of urban open-green spaces.

	Classes		Description
Classification of Urban Open-Green Spaces	According to their usage and ownership status:	Public (General) open-green spaces	They are open spaces where the society benefits and recreation needs are met. City and neighborhood parks, urban forests and groves, cemeteries, botanical gardens, fair and exhibition areas, sports fields, roads, boulevards and refuges are included in these areas.
		Semi-Private open-green spaces	These are areas that are not open to the use of the whole society and are suitable for the use of a certain group of people such as institutions and organizations. Education areas, military areas, factory gardens are included in these areas.
		Private open-green spaces	They include areas that can only be used by their owners, such as housing or public housing.
	According to the units they serve:	Green spaces at the residential level	These are the green spaces that constitute the smallest unit of green spaces and generally belong to individual residences. These areas appear in forms such as gardens, terraces, roof gardens and balcony arrangements around single or multi-storey houses. The size, functions and aesthetic effectiveness of green spaces at the residential level vary depending on the cultural and economic status of the owners.
		Green spaces at neighborhood unit level	They consist of units that contain approximately 6 to 400 houses in a city and usually accommodate 30 to 5000 inhabitants. It can cover an area of maximum 15 hectares. Green spaces at this level consist of collective housing gardens, children's gardens, sports and playgrounds.
		Neighbourhood-suburb level green spaces	In larger units, it consists of neighborhood parks, sports fields, playgardens, playgrounds and school gardens, and usually has a capacity of three neighborhood units, has a population of at least 15,000 and covers an area of 15 hectares.
		City level green spaces	It includes green spaces that will serve the entire population of a city and have a large impact area. It is recommended to be at least 3 times the size of the green space capacity at the neighborhood level, to have a population of at least 45 thousand, an area of 135 hectares and a capacity of at least 350 people per hectare. Green spaces at this level have various functions such as urban parks, sports complexes, zoo and botanical gardens, urban roads, urban forests and groves, green belts and cemeteries.

2.3. Open-green space standards

It is stated that green space standards began to take shape in England in the late 18th and early 19th centuries (Gül et al., 2020). "Open green space standard" is a criterion that generally indicates the amount of open green space per population of a city or region."

Open-green space standards are a phenomenon that can vary from country to country and even from city to city, and are influenced by many factors. Physical environmental characteristics, social and cultural factors, economic status, intensity of use and accessibility are important factors in determining open green space standards. A balanced consideration of these factors helps the formation of appropriate open green space policies to meet the various needs of cities and societies (Gül and Küçük, 2001). In cities where open and green spaces are easily accessible, people prefer these locations rather than indoor areas. Although there are many reasons for this tendency, open green spaces are recognized as a component of

livable and healthy cities (Özdede et al., 2021).

According to the World Cities Culture Forum (WCCF), green areas in urban metropolises are 33% in London, 34.70% in Los Angeles, 40% in Hong Kong, 13% in Toronto, 13.74% in Milan and 2.2% in Istanbul. Among 44 metropolises, Istanbul ranks last with 2.2% (WCCF, 2024a–i) (**Figure 2**).

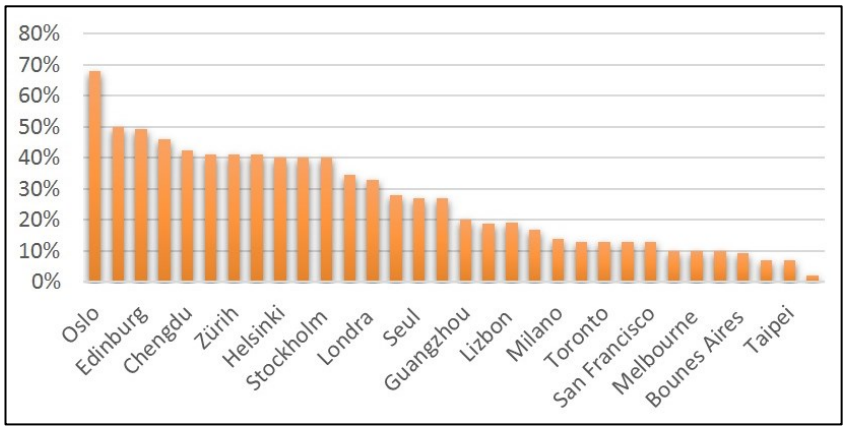


Figure 2. Green space percentages of cities (WCFF, 2024a–i).

According to the World Health Organization (WHO), green space per capita should be 9 m^2. In Edinburgh, this area is calculated as 42 m^2/person, in Vienna as 25 m^2/person, and in Washington as 38 m^2/person (Gül, 2020; Maryanti, 2016; Morar, 2014; Khan, 2012; Singh, 2010). With the "Carbon Neutral Cities on the Road to Green Development" project carried out by the General Directorate for Combating Desertification and Erosion of the Ministry of Environment, Urbanization and Climate Change (MoEUCD), this area has been increased to 12.63 m^2/person in 2024 (MoEUCD, 2024). According to Article 25 of the Zoning Law No. 6785 enacted in 1956 and amended by the Law No. 1605 dated 20.07.1972, the amount of green space per population is set as at least 7 m^2. However, with a regulation issued on 02.09.1999, this amount was increased to 10 m^2/person. In addition to this increase, the distribution of the amount of green space between different types is also determined. According to the Ministry of Public Works and Settlement, the distribution of 10 m^2 of green space per person in urban areas according to different types of green space is as follows (Önder and Polat, 2012):

- Neighborhood level units (such as apartment buildings or housing estates): Per capita children's playground area is 1.5 m^2.
- At the neighborhood and district level, the amount of sports area is 2 m^2 per person.
- For neighborhood parks, the amount of green space per capita is 3 m^2.
- At the urban level, the amount of urban parks per capita is 3.5 m^2.

Today, according to the Planned Areas Zoning Ordinance (PAZO), (Amended: RG-17/5/2017-30069) Social and Technical Infrastructure is determined as 10 m^2/person in the plans made within the provincial borders and 5 m^2/person in the plans made within the provincial borders in Annex-2 (PAZO, 2017). Outside of the municipality and its adjacent area, 14 m^2/person is recommended (Annex-1) (PAZO, 2017).

As can be seen from the **Table 2**, Türkiye lags behind the world countries in terms of open and green space standards. It is seen that the open and green area per capita in Istanbul in 2018 is 6 m^2 (Gül et al., 2020). Looking at the world cities, it is known that London has 40 m^2/person, Edinburg has 29 m^2/person, Cambridge has 46 m^2/person, Washington has 38 m^2/person, Los Angeles has 48.5 m^2/person, Brussels has 29 m^2/person, Vienna has 25 m^2/person and Munich has 16 m^2/person (Hızlı and Aktuğlu Aktan, 2023; Khan, 2012; Maryanti, 2016; Morar et al., 2014; Singh et al., 2010).

Table 2. Open and green space standards by countries (m^2/person) (Hızlı and Aktuğlu Aktan, 2023).

Country	City Park	Neighborhood Park	Playground	Sports Area	General
Switzerland	23	-	5.5	10	87
America	16	4	-	-	80
Britain	40	20	-	10	78
Italy	12	5.5	3	7.5	45
Holland	9	-	-	6.5	45
Poland	5	15	-	7.5	45
France	10	4	3.5	8	35
Turkey	3.5	2	1.5	3	10

3. The concept of space

The main purpose of landscape architecture is to design and manage open spaces where people live and interact by combining natural and artificial elements. While doing so, it also aims to protect nature and reconcile nature and artificial elements.

According to Joedicke (1968), the concept of space is replaced by emptiness when there are no limited elements that can be perceived, and by objects when the intervals of limiting elements are too small to be perceived. Therefore, space and objects are considered as the upper and lower limits of the concept of space. This definition emphasizes that space can include abstract and concrete elements and that space is not limited to physical objects. Space is a broad concept that can encompass everything in the environment and can be associated not only with physical objects but also with atmospheric, emotional, cultural and social elements. For example, a place can be much more than just a physical space. A city square can be not only buildings and roads, but also a place full of human interactions, cultural events and emotional experiences. Therefore, the concept of space can be understood and interpreted in different ways in various disciplines, but in general, space is not limited to physical elements and has a much broader scope (Çınar, 1994; Gürel, 1970).

When looking at the definitions of the concept of space, definitions are generally made according to the rules of physics. While Newton argues that there is an absolute space, Leibniz rejects the acceptance of space as an absolute entity and sees it more as a relational or conceptual structure. This understanding argues that space is an independent entity and maintains its existence independently of the

existence of bodies. Leibniz, on the other hand, considers the existence of space at a more conceptual level. According to him, space is a concept in which objects exist relationally and emerges as a result of the relations between objects. According to this view, space is a relational structure that is formed according to the positions of objects and exists with the existence of objects. The space we perceive in our daily lives usually brings to mind the three-dimensional geographical space (Çınar, 1994; Tekeli, 1970).

In 1992, Altan makes a suggestion for a better understanding of the definition of space. Altan suggests that we find ourselves in three different environments to better understand the concept of space. These environments should be an open, seemingly endless natural environment in all directions; an environment partly surrounded by trees and partly by shrubs of different heights; a forest environment with dense tree trunks. According to Altan, among these three environments, the one that will enable the concept of space to be considered the most is the second environment. In other words, it refers to the environment surrounded by trees and bushes. This suggestion can help to understand how the concept of space is affected by environmental factors (Çınar, 1994).

As Bilgili (2020) states, space is dialectical; human beings both affect and are affected by space. As a result, different perceptions and uses of space can be created. "Space exists physically and mentally at every scale that can be reduced from the infinite universe to the city scale, to the smallest living space, wherever there is a human being, with the sense of organizing the components of human perception. In the physical context, the sense of space, volume and place is shaped by the person's perception capacity, level of consciousness and emotion, and the characteristics brought about by the time lived" (Gezer, 2012).

Space is a physical area where people interact, have emotional experiences, are used for functional purposes and shaped by natural and/or man-made elements. The design of spaces should take into account the needs and emotional reactions of users as well as aesthetic values. In this context, space is not only a physical environment but also a product of human interactions and experiences.

Elements and limiters of space

The quality of the elements that delimit the space and their relations with each other lead to the emergence of different types of space. These space types can be analyzed in terms of the limiters formed by the space. Examining the limiters of space can help us understand different types of space and deepen the perception of space. These limiters are (Altan, 1992; Çınar, 1994).

- Natural space: Areas formed without human intervention (such as sky, forests, rivers, vegetation etc.).
- Artificial space: Areas that are consciously designed and constructed. There are limiters such as walls and ceilings.
- Mixed space: Areas where both natural and artificial elements coexist. These spaces are places where structures created by human intervention interact with the natural environment.

Spaces are divided into soft and hard spaces according to the properties of the

materials (natural and artificial) used, and into open/free and enclosed spaces according to their limiters (Çakmaklı, 1992; Çınar, 1994):

- Soft space: It is defined as spaces where natural and artificial elements coexist. These spaces usually contain natural elements such as vegetation, water features, natural materials and organic forms as well as artificial elements. Soft spaces offer people a relaxing atmosphere.
- Hard space: These spaces are composed entirely of artificial elements. While such spaces create an orderly and disciplined atmosphere, they can sometimes evoke a cold and emotionless feeling.

Open/Free spaces are spaces with few environmental limitations and are usually located in open spaces. Such spaces offer a wide view and allow the user freedom of movement. Enclosed spaces, on the other hand, are spaces with clear environmental boundaries and are usually located inside buildings. Such spaces are surrounded and bounded by structural elements such as walls, ceilings and floors. Enclosed spaces are usually designed for a specific purpose and are organized to support social interactions. They can also be used to provide security and privacy.

4. The concept of perception

As stated by Göregenli (2005), since perception is one of the classical subjects of psychology, with the acceptance of "Environmental Psychology" as a sub-science, the entry of psychology into the environmental field is ensured. Based on the concept of reality, it can be said that perception is the conscious experiences that take place between objects and objects (Coren et al., 1993).

When the studies of Bakan and Kefe (2012), Çakcı and Çelem (2009), Gül and Bingöl (2022), Kalın (2004) are examined, the concept of perception as common definitions; people are shaped by the knowledge and experience they have and they perceive this information from their environment with their sense organs and senses, and interpret it through mental process. It creates differences in perception by developing new perspectives in time. According to Asar (2013), perception is the transformation of objective information into personal knowledge, sensory and instantaneous work, the use of senses as tools, awareness-analysis-recognizability and sensation. Perception is the interpretation of the sensory stimuli received from the environment. It is defined as comprehending and apprehending something by directing the attention (Cabıoğlu and İşeri, 2015). Göksu (2021) defines perception as; "It is the design of images and symbols coming from the outside world through sensations, realized in consciousness. It can be framed as the projection of reality, the reflection of truth, the shadow of events and phenomena".

In his definitions of urban space, Milgram (1972) defines it as a collection of areas, streets, buildings and other structures that have various meanings for people; Lynch (2018) is defined as places in people's minds through elements such as path, edge, node, district and landmarks (Göregenli, 2005). The qualities of the physical environment, not only in form but also in terms of structure and pattern, are also important in terms of perception and representation. It is known that patterns consisting of the arrangements of the elements that make up the physical environment differentiate the perception and representation of space (Göregenli,

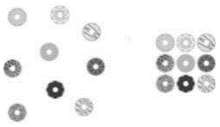
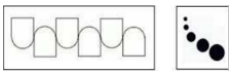
2005; Werner and Schindler, 2004). Environmental perception and therefore urban image vary depending on personal characteristics. This is the most important factor in the use of urban areas.

In summary, the concept of perception is based on individuals' own subjective experiences while receiving and interpreting information. Therefore, different people exposed to the same stimulus may perceive it in different ways. However, perception is not limited to the senses, but is also influenced by different factors such as the individual's experiences, beliefs, prejudices and emotional state. Perception is a fundamental process that affects people's thinking, decision-making and behavior.

Gestalt theory and its principles

Gestalt principles are psychological principles used to understand individuals' perceptual experiences and perceptual organization. The term "Gestalt" means "whole" or "shape" in German. Gestalt psychology was developed by German psychologists Max Wertheimer, Kurt Koffka and Wolfgang Köhler in the early 20th century (IIENSTITU, 2020).

Table 3. The basic principles of Gestalt theory.

Principle (IIENSTITU, 2020)	Sample Figure (Gezer, 2019)	Definition (IIENSTITU, 2020)
Similarity:		Objects with similar characteristics tend to be grouped. For example, among a series of colors, those with similar colors are perceived together.
Proximity:		Objects that are close to each other tend to be perceived as a group. For example, among a series of dots, those that are closer are perceived as a group.
Closure:		There is a tendency to complete the missing parts of an incomplete shape or pattern. For example, it is enough to see a part of a circle. The mind combines the missing parts.
Continuity:		There is a tendency to assume that objects on a plane move smoothly or follow one another. This includes the perception of a line in which a series of points or shapes follow one another.
Figure-Ground:		When there is an intersection between two objects (figure and ground), the human brain tends to perceive these objects as different groups. For example, if a line crosses another line, it perceives them as two separate shapes. In general, the shape is perceived more. The area where attention is not focused is the ground. However, in some cases it is not possible to decide which is the shape and which is the ground. Nevertheless, the human brain cannot perceive both equally at the same time. The figure-ground principle can be used to make some objects less perceptible.
Simplicity:		Objects with symmetrical arrangements tend to be associated and grouped together. Simple and organized objects are perceived more easily than complex objects.

Gestalt theory is a psychological theory that tries to regulate how holistic perception is shaped and organized. This theory argues that perceivers perceive items and events as a whole, rather than separating them. Gestalt theory includes some

basic principles for understanding the perceptual experiences to be realized (**Table 3**).

These principles are used to understand how perceptual experiences are organized and given meaning. Gestalt principles can be applied in art, design, communication and other fields and form the basis of effective communication and design.

5. Personal space

According to Sommer (1959), personal space is the distance that the living traditionally places between itself and other livings. This distance varies from species to species and from individual to individual. This concept seems to be relevant to the study of human behavior, although, as far as is known, it has never been empirically studied. People seem to feel uncomfortable when talking to someone standing too close or too far away. David Katz (1937) coined the term "personal space" and likened it to the shell of a snail. Von Uexkull (1957) gives a graphic analogy of people "surrounded by worlds of soap bubbles". Stern (1938) emphasizes the concept of personal world. He states that the physical world is not a center, but the personal world has a natural center from which everything that belongs to it extends. This center is the person to whom the personal world is directed. Stern's analogy to Katz's "snail's shell" and Von Uexkull's "soap bubble" defines the "personally close" as an "aura" surrounding the person (Sommer, 1959). Whereas Ergan (2020) defines personal distance as a language of space and an innate need to maintain a certain physical distance from people.

According to Hall (1974), personal space refers to a space where a person feels comfortable and safe and maintains a certain distance in his/her interactions with his/her environment, as can be understood from the works of Altman and Wohlwill (1977), Bulusu (1991), Göregenli (2005), and O'Regan and Buckley (2003) in the literature review. Hall (1974) defines personal space through field studies he calls "Proxemia". There are some main ideas that stand out in Hall's concept of proxemics. Hall argues that people behave according to the distances around them and that this distance determines personal space. The distance between people varies depending on the type of relationship, culture and other factors. It is emphasized that different cultures perceive and tend to use personal space in different ways. For example, some cultures have larger personal spaces, while others may prefer narrower personal spaces. It is noted that people use a variety of visual and sensory cues to protect their personal space. It is argued that personal space plays an important role in social relations and communication. By protecting and organizing their personal space, people are able to create a space where they can feel comfortable and communicate.

In summary, the concept of personal space is a distance that people determine as a result of their relationships with people and their environment. This space refers to a limited area where people feel comfortable and safe. It is a phenomenon that is invisible to the eye but can be felt, and is generally a product of the individual's perceptions and emotions. Personal space helps individuals to protect their physical and emotional boundaries. This space represents an area where individuals can

behave comfortably and express themselves freely. Others are not allowed or welcomed to interfere in this personal space.

Distance in human relations

Hall (1982) defines different distance types of personal space and explains them in terms of cultural, social and psychological factors. The types of distance according to Hall (1982) are (**Figure 3**):

- Intimate space: This type of distance is used between people in close relationships and refers to the distance at which one person is allowed physical contact. It is used between family members, close friends and partners. This distance type usually ranges from 0 to 45 cm.
- Personal space: This type of distance is used between people who have personal relationships but are not more formal or collaborative and is a common type of distance in everyday interactions. It is used between coworkers, acquaintances and non-acquaintances. This distance type usually ranges from 45 to 120 cm.
- Social space: This type of distance is used in more formal or non-collaborative relationships. Social distance is a type of distance encountered in general interactions in society, but is also used between colleagues at work, casual acquaintances and community members. It usually ranges from 120 to 360 cm.
- Public space: This type of distance is used in formal or public community interactions. It is a type of distance encountered in public spaces or public events. It refers to the distance to other passengers when giving a speech or on public transportation. It usually starts at a distance of more than 360 cm.

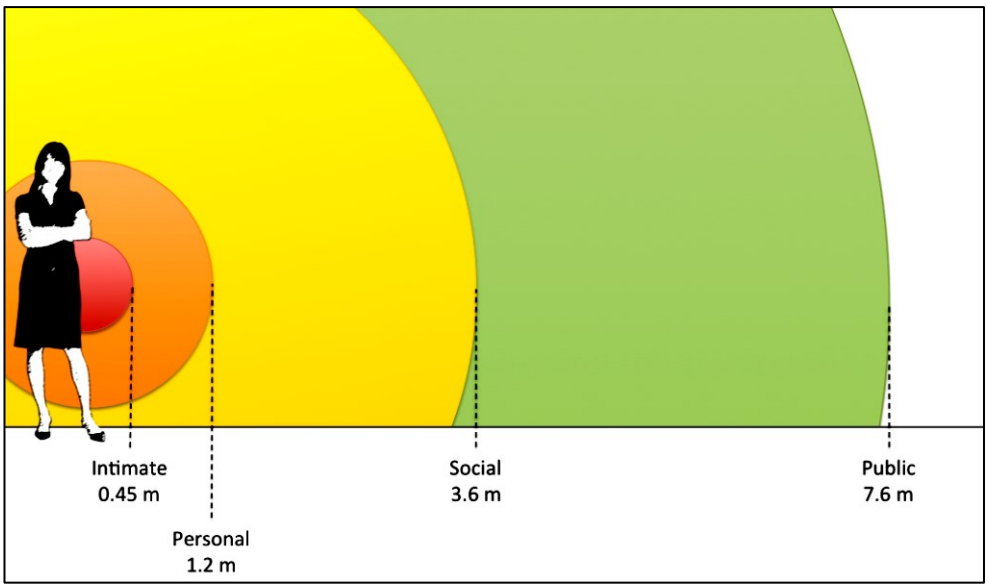


Figure 3. A visualization of Hall's distance zones (Hall, 1966; Nitsche, 2012).

6. Criteria affecting personal perception of space

The three main factors affecting personal space are personal differences, socio-demographic differences and cultural differences (**Figure 4**).

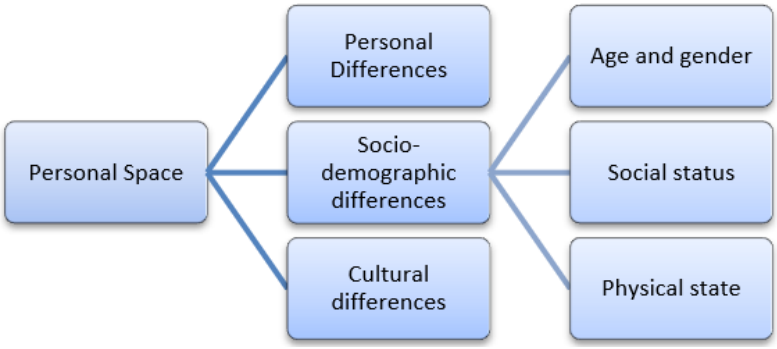


Figure 4. Factors affecting personal space.

These factors are explained as follows:

1) Personal differences: In a study by Doğan (2021), it is pointed out that the phenomenon of privacy experienced in various areas of the individual during the development of privacy is at risk of being violated by external factors in social life. In such a case, it is stated that the instincts of the individual take over and protect themselves and create their own private space (Doğan, 2021). The effects of gender on personal spatial distance are discussed and some studies indicate that men generally have wider distances than women (Bekçi, 2006; Evans and Howard, 1973; Fisher and Byrne, 1975) and that different personal spatial zones are observed in communication between people of the same gender (Sommer, 1959). Each individual has their own personal preferences, habits and needs. These differences include elements such as lifestyle, hobbies, and preferences for personal space. While some people need a more organized and minimalist space, others may prefer a more complex and colorful environment. All the positive and negative events that individuals experience in their daily lives are the determining factors that affect the perception of personal space among people.
2) Socio-demographic differences: It is stated that social status factors focus on the quality of the relationship between individuals, while physical status factors include all spatial and physical elements of the interaction (Bekçi, 2006). Social status factors include the social relationships between individuals, while physical status factors refer to the physical environment in which the interaction takes place. These factors affect the interactions, communication and behaviors of individuals with each other:
    - Age and gender: The study by Kahvecioğlu (1998) mentions the researches on the effect of gender on perception differences and states that women tend to lean towards individuals while men tend to lean towards objects. Guardo and Meisels argue that cultural learning takes place earlier in girls, while Alexander states that boys are able to perceive their surroundings in more detail and accurately due to an active life. Gender differences have been widely discussed in spatial behavior literature (Aiello, 1987; Göregenli, 2005; Morval, 1985; Rüstem, 1998; Stokols and Altman, 1987). In Rüstem's (1998) study on the case of Türkiye, it is stated that two experiments have been carried out to determine the personal space needs of men and women and the reactions of same- gender

and opposite- gender couples to intruders in this space. Experiment 1 was conducted among 32 male and 32 female undergraduate students on a bench where another person of the same or opposite gender was already sitting. In Experiment 2, 60 women and 60 men were observed among library users: (a) intrusion, (b) permission, and (c) control. The results of both studies showed that female subjects used longer distances when paired with a member of the opposite gender and got up from their seats more often and earlier than a woman when the man intruded. In homosexual pairings, it was observed that men used slightly longer distances than women and reacted faster to intrusions. Göregenli (2005), on the other hand, points out that women use closer distances among themselves, they generally use smaller spaces than men, there are differences according to various age groups, the differences are more minimal in very young children, and pre-adolescent children use longer distances in case of confrontation with a person of the same gender.

- Social status: The concept of social status is the subject of research in all academic studies related to psychology, sociology, social sciences, and the environment. In society, which is also the subject of sociology in general, people differ in many ways (Eke, 1987). Social status is a phenomenon inherent in human nature and is the basis of communication. Factors such as economic status, education level, occupation and job status, cultural symbols and behaviors, birth and family background affect social status. The distances between those in cooperation and those in competition are different (Albas, 1991). Closer distance is established with people of the same mindset, while the distance between people of the opposite mindset is farther.
- Physical state: People's preferences for intimate spaces are influenced by the physical state. These environments can also visually impart intimate or non-intimate effects on people (Göregenli, 2005). People place the individuals they interact with at certain distances based on factors such as their acquaintances, relationship levels and cultural backgrounds. If people feel too close or too far away from each other, they often feel uncomfortable, and people adjust this distance by moving closer or further away (Hamm and Richardson, 2017). This distance affects the nature and comfort level of relationships between people.

3) Cultural differences: In an analysis, Hall (1959) examines the use of space by different cultures and explains how communication styles change depending on the cultural background. In this analysis, it is noted that Arabs communicate more closely with their own society, the French, South Americans, Japanese and British, whom he refers to as the four zones, maintain this but have changed dimension, and that people in North American and Northern European cultures are more cautious in their communication in public places and with strangers (Göregenli, 2005).

6.1. Perception of personal space in urban public open-green spaces

The network of relationships within urban life has a significant impact on the overall well-being of individuals and society. The success of urban public open green spaces is determined by the number of people using them (Mahziar Taghavi Araghi, 2022). It is stated that the balance between private and public spaces is critical for the livability of a city and the happiness of people. Private spaces refer to the personal spaces of individuals. Here, individuals can interact with people they know or do not know while maintaining their private lives. Public spaces, on the other hand, are areas where socialization, cultural interaction and social ties develop, where no one is considered a stranger, which are at the disposal of the whole society and shared in common by the individuals of the whole society (Sargut, 2016). The use and quality of these spaces may vary depending on individuals' lifestyles, preferences and social dynamics.

In a study by Fischer (1965), the relationship between the characteristics of space and preference is examined, and the psycho-physiological factors affecting people's preferences in space and how these factors direct their movements in space are revealed. Fischer's findings show that people make various evaluations under subconscious influences while moving in space. This study suggests that there is a perception framework that directs people's movements in space. Among the basic elements of this perceptual framework are evaluations of different parts of the space. For example, the close-up, lower left part of the space is used by people for evaluations such as closeness, privacy, confinement and protection, while the upper right part is used for evaluations such as distance, disappearance, aggression and freedom of movement. Furthermore, Fischer's study reveals that the middle space between the left and right areas is characterized as a transitional or demonstration zone. These zones help people organize their movements within the space and perceive the space (Aksoy, 1975; Çatal and Çelik, 2017).

The degree of use, boundaries, ownership and sense of belonging are shaped according to the cultural and social structure of the society (Kürkçüoğlu, 2009). These spaces encourage solidarity and cooperation by making the community feel together. They also create connections and relationships by integrating various people/users, elements (objects or natural resources) and places (Edwards, 2003; Hsiao and Huang, 2024; Star and Ruhleder, 1994).

These findings emphasize the importance of human psychology and perception in space design and organization. Understanding that different parts of the space trigger different evaluations can help landscape architects to organize the space in a way that better suits users' needs and preferences. In this way, spaces increase people's comfort and satisfaction and become more functional.

6.2. User needs in urban public open-green spaces

According to Uslu (2016), public spaces are defined as areas that are accessible to everyone in society and generally provide public services. These areas, such as squares, marketplaces, pedestrian sidewalks, promenades and coastline areas, are areas where people can come together and interact, organize cultural activities and increase social interaction. Public green spaces are an important sub-category of

public open spaces. These are areas with natural and artificial greenery and are generally used by people for rest, recreation, exercise and interaction with nature. Parks and gardens, sports facilities, planted streets and roads, hospital and school gardens are natural and semi-natural green spaces.

Human needs are one of the most important determinants of space design. Therefore, when designing spaces, physical, social and psychological needs should be met first and then social and psychological needs should be met (Alp, 1993). These spaces derive their value from their ability to meet the needs and requirements of users and their ability to contribute to people's well-being and improve the quality of life (Alwah et al., 2021). The most prioritized needs for the user are safety, comfort, rest, active and passive use, exploration, self-actualization and human needs (Akkaya, 2019; Akpınar, 2013; Carr et al., 1992). In the body-space relationship, which is realized through sensory and emotional bonds that arise by meeting needs, personal space emerges as a spatial formation as a result of individuals' physical and psycho-social needs. In this context, it is examined within the scope of psychological and sociological dimensions that spatial behaviors such as privacy, belonging, identity and sovereignty are shaped within the physical space that can be perceived visually (Göregenli, 2005) (**Figure 5**).

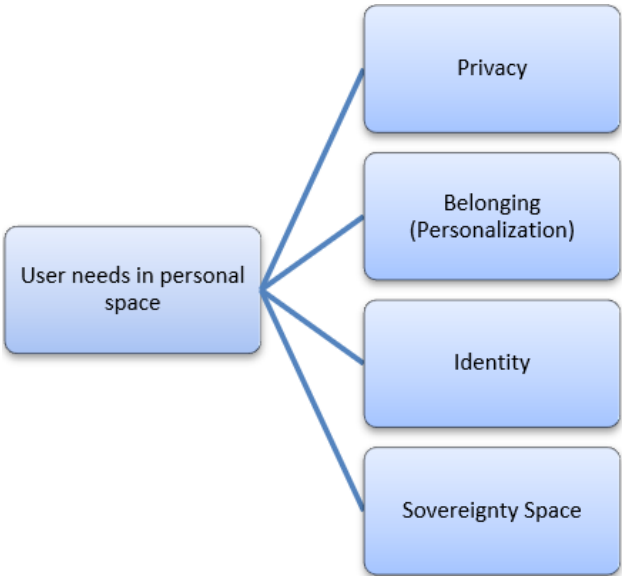


Figure 5. Physical and psycho-social needs of individuals in personal space.

The needs are explained as follows:

- Privacy: Privacy is defined as the ability of individuals or groups to protect their personal boundaries and control others' physical, emotional or mental interactions with them (Çatal and Çelik, 2017). Therefore, the concept of privacy is important in both psychological and sociological contexts. The steps suggested by Rapoport (1980) provide a very important framework for achieving harmony between lifestyle and place. First, factors such as the nature of the human group, its characteristics, lifestyles, behavioral rules, environmental preferences, images and cognition schemes need to be identified. This is a fundamental step in understanding how people interact with space and how space meets their needs, followed by an understanding of the mechanisms

and defenses used to meet communication and privacy needs. Understanding which emotional interactions are at the forefront and which means of communication people prefer is of great importance in the design of spaces. In order to meet psychological needs, it is necessary to understand people's perception-behavior processes and to determine the requirements that will ensure spatial satisfaction. At this point, the interaction between people and space initiates the communication process and makes the space suitable to meet the needs of its users (Günal, 2006). Therefore, it is important to consider the steps of this process when looking for parameters of psycho-social quality in space design. It is critical for landscape architects to follow these steps in order to understand people's interactions with space and to tailor spaces to their needs, ensuring harmony between lifestyle and space.

- Belonging (Personalization): The sense of belonging is closely related to the personalization of a place. People are not only physically present in the places where they spend time, but they are also psychologically affected. As a result, places are not only physical entities, but also spaces where people can meet their emotional, mental and social needs and develop (İlhan et al., 2024; Tanberken, 2004). In order for people to create their own personal space, adopting that space, adopting a more protective approach and establishing a psychological bond with that space comes from the sense of belonging. In short, it is the feeling of belonging to that space and the feeling of belonging oneself to that space. The user's feeling of being sovereign in that space or showing sovereignty over the space can also be given as an example. In recent years, designers (landscape architect, interior designer etc.) have been making efforts to offer solutions that can meet the personal preferences and needs of users. Within the standardized understanding of space, research is being carried out to develop solutions that provide personalization, to better meet the needs of users and to increase their satisfaction (Arabacıoğlu, 2005).
- Identity: Personal identity is a fundamental factor that determines a person's behavior and thus their interaction with the environment. The identity a person has influences the way he or she thinks, feels and behaves. This identity becomes evident when interacting with the environment through communication. In their interactions with their environment, people often make decisions through conscious and unconscious perception and cognition processes. Since these decisions vary according to the identity and values of the person, they determine the actions in the environment and show how the person perceives, values and shapes the environment. This behavior, called "appropriation", arises from a person's desire to control the elements in their environment and to personalize their environmental interactions. Individuals regulate, modify or customize the elements in their environment and in the process express their aesthetic preferences. However, in some cases, environments cannot be personalized without destruction or repair. This refers to situations where it is not possible to change or personalize environmental factors (Günal, 2006). The perception of a place is of great importance in the formation of its identity and image. This approach includes the evaluation of the

elements that make up the space within the landscape integrity in creating environmental development, cultural activities, visual perception and spatial design strategies. Public participation is also included to make this process successful (Cengiz and Keçecioğlu, 2014; Cengiz et al., 2017).

- Sovereignty Space: The concept of sovereignty plays an important role in reducing spatial boundaries to the scale of the individual. The individual wants to create a sphere of sovereignty where they can control the space around them and feel that it belongs to them. This area of sovereignty can be determined by visible and invisible borders (Tunçok, 2010). Visible boundaries consist of concrete elements such as physical barriers or certain structures (garden fences, gates, walls, etc.). These represent the boundaries through which a person can control his/her environment and feel that he/she belongs to it. Invisible boundaries are related to one's personal space or privacy. One's emotional or psychological boundaries prevent others from entering one's personal space and make one feel safe. For example, a person has emotional boundaries that are only open to close friends and the person feels uncomfortable if strangers violate these boundaries. Sovereignty space is one that a person creates during his/her search for himself/herself, a space that he/she creates while making personal contributions to the space where he/she is located, and refers to the process of making it his/her own (Kaplan and Tanrıverdi Kaya, 2020). Privacy and sovereignty are closely related to each other and are often thought of together. The sphere of sovereignty is a physical or emotional space that a person can control and feel belongs to them. This space provides the ability to control one's environment and a sense of feeling safe (Ilgın, 2005; Kaplan and Tanrıverdi Kaya, 2020). As Altay (1999) stated, not preferring to create a sovereignty area by isolating living areas is an important approach in urban design. This means that seating areas should be related and integrated with the environment. This view aims to strengthen people's social interactions and connections with the environment in public spaces. Instead of isolated seating areas, open seating arrangements integrated with the environment enable users to be more involved in the space and increase social interactions (Çatal and Çelik, 2017; Mumcu, 2002).

6.3. User conflicts in urban public open-green spaces

User conflicts in urban public open green spaces can arise due to various problems experienced by different people and how they use these spaces. There are some common causes of these conflicts as shown in **Figure 6**.

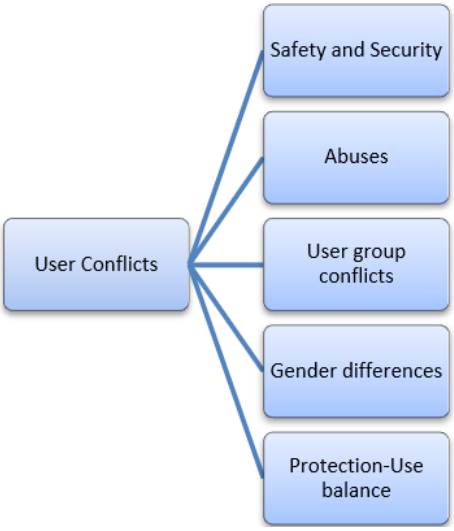


Figure 6. User conflicts in urban public open green spaces.

The user conflicts are explained as follows:

- Safety and Security: The concept of security is one of the main factors affecting human life and is of great importance for the quality and livability of urban life. The security of an area is shaped by the combination of various elements such as crime rates and threats, stability in governance and social order, urban space design and use, and is considered from a broad perspective (Gazel, 2022). The design and organization of urban public open-green spaces is extremely important to ensure the safety and security of users. Francis (2003) states that ensuring the safety of women in particular is an important element to be considered in the design of urban spaces. Because the fear and violence perceived by women can make that space unusable (Akpınar, 2013; Francis, 2003). This can be related to factors such as lighting, visibility, access, and control of users. Poor entrances and inaccessible spaces create a sense of insecurity on people's psychology. Places where security is ensured are perceived by people as more preferred and more vibrant, living spaces (Metin, 2019). In some cases, the use of plants in open-green areas plays an important role in ensuring security and creating more friendly environments (Çelik 2018; Mambretti, 2011). Intensive use of plants in some places negatively affects users in terms of security. Intensive plant use creates blind spots, prevents long-distance vision, and affects the perception of safety and security by restricting mobility (Çelik, 2018; Fuller and Irvine, 2010). Creating safe areas requires a holistic approach with design and post-implementation maintenance, management and user participation (Çelik, 2018).
- Abuses: The abuses in urban public open-green spaces are nowadays seen as vandalism and domination. Elements that are owned and cared for by the public such as benches, garbage bins, playgrounds, sculptures can be the target of such damages. Comfort vandalism deteriorates the appearance of the space, jeopardizes the safety of users and causes resources to be spent on repairs. The domination of some user groups over other users is also a common form of abuse in urban public open-green spaces. This is characterized by attempts by a particular group or individual to control the space or to put pressure on other

users. This prevents the space from being an environment that is equally accessible to everyone and restricts the freedom of society to use these spaces (Carr et al., 1992; Çatal and Çelik, 2017). Individuals will not feel comfortable and safe in spaces where such abuses cannot be prevented.

- User group conflicts: Conflicts between different user groups are quite common in urban public open-green spaces. While each group uses the spaces in line with their own needs and expectations, they may have the potential for conflict with other groups. Common conflicts between different user groups include bicycle users and pedestrians, dog owners and other users, children and traffic, skateboarding youth and other users, unwanted homeless people and street children (Çatal and Çelik, 2017). While designing these spaces, user group conflicts are taken into account, and safe and pleasant usage areas are created for everyone by designing for different group users. Various methods and policies can be used to resolve these conflicts and promote peace and harmony in urban public open-green spaces. For example, clear rules for the use of the space and their enforcement can reduce conflicts between users. Furthermore, the design and organization of the space should be balanced to meet the needs of different user groups. Participatory planning processes and user involvement can also be effective in resolving such conflicts in landscape plan and design.
- Gender differences: The habitability of urban public open green spaces is closely related not only to physical characteristics, but also to the personal preferences, quality of life expectations and perceptual differences of other individuals. The impact of gender on spatial behavior is an important issue. Women generally use closer distances during interactions and require smaller spaces than men. However, these differences are not very reliable with young children. Although women engage in closer relationships than men, they find the proximity of a stranger more threatening and leave the situation faster than men. Moreover, the spatial patterns of mixed-gender interactions are not consistent across different age levels (Göregenli, 2005). The issue of gender differences is discussed in detail under the heading “Criteria Affecting Personal Space” under “Age and Gender”. There are many studies on this developmental model in the USA. There are very few studies conducted in other countries. Although these studies do not have universal consistency, more studies should be included (Aiello, 1987; Göregenli, 2005).
- Protection-Use balance: The rapid growth of cities and the expansion of residential areas fragment natural habitats and divide the habitats of living things. Urban and public open spaces such as green spaces, parks, groves and greenways create important habitats and corridors for wildlife. These areas can provide the environments that wild animals need for migration, feeding, breeding and sheltering (Akpınar, 2013). In addition, these green areas are active and passive recreation areas for people living in cities. However, it is important to maintain a balance between the use and protection of urban public open green spaces. While meeting the needs of people, these areas should also ensure the protection of natural life. It is an important issue that should not be ignored by landscape architects in the design of spaces.

6.4. The impact of outdoor furniture in urban public open-green spaces and the importance of ergonomics

Urban public open green spaces are a work of architecture (Hasol, 2008) and important urban component environments formed by natural and artificial systems that improve the quality of life of individuals and provide many benefits in terms of physical, social, cultural and psychological (Yücel, 2006).

According to the International Ergonomics Association (IEA) (2024), ergonomics is a multidisciplinary science concerned with understanding and improving the interaction of people and systems. This discipline uses theories, principles, data and methods to understand the physical, mental and emotional needs of people and to design and develop systems to meet these needs. It emphasizes the importance of ergonomics with the slogan "Better Life Ergonomics for the People of the Future". Urban and public open green spaces are democratic spaces that everyone has the right to use equally, and the right to equal use, aesthetics and ergonomics are of fundamental importance in space organization (Çelikyay and Karayılmazlar, 2016).

Figure 7. The Vigeland park (Çelebioğlu, 2020).

Furnitures, beyond being just physical objects, are recognized as important elements that improve the quality of urban life, give identity to spaces and support individual and social interaction (**Figure 7**). The role of landscape architects in this process is to create sustainable and aesthetically rich urban public open green spaces by balancing the needs of society and environmental requirements (Güngör and Akyüz, 2020). Considering ergonomic features in the design of urban and public open green space outdoor furniture and ensuring compliance with international standards both increases the comfort of users and contributes to the creation of safe and functional urban and public open green spaces (Yücel, 2006). Outdoor furniture include important tools that meet the needs of users and serve them. There is a direct relationship between the ergonomics of these elements, their functionality, ease of use and capacity to respond to needs. In other words, the more ergonomic an element

is, the more likely it is that users will use it effectively (Bulut et al., 2008; Türker and Sakınmaz, 2021). Bekçi and Özbilen (2012) emphasize the importance of complying with ergonomic principles in the design of equipment. Non-ergonomic reinforcement elements are not preferred by users and are perceived as non-private spaces by users. In this context, the design of outdoor furniture must be made in line with design principles. Being compatible with the environment also adds identity features to the area (Akpınar Külekçi and Irmak, 2019; Türker and Sakınmaz, 2021).

Some outdoor furniture that can be used in urban and public open green spaces and their design criteria are given below (Sağlık et al., 2014; Yücel, 2006):

- Surrounding elements: It explains how restrictive elements should be designed by taking into account their aesthetic, functional and psychological effects. In particular, it is emphasized that they should be in harmony with the architectural concept. Surrounding elements can be made of various materials such as walls (brick, stone or concrete), screens, iron and wooden railings or green fences (**Figure 8**). The height of the surrounding elements is determined in accordance with the law, environmental factors and their function:
    - Low surrounding elements: 20–60 cm,
    - Moderate height surrounding elements: 80–140 cm,
    - High surrounding elements: 180–250 cm

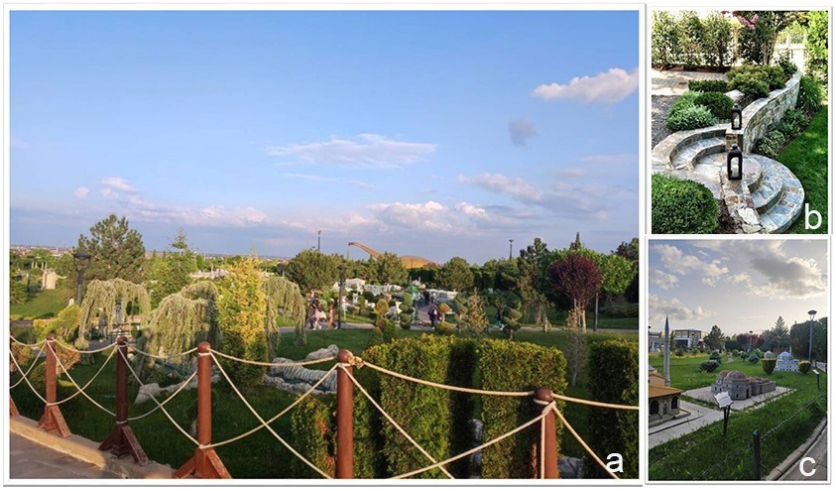


Figure 8. Samples of surrounding elements in open green areas. **(a)** Rope limiter (Theme Park Project, 2023); **(b)** stone wall limiter (Stone Wall, 2022); **(c)** chain limiter (Theme Park Project, 2023).

These heights are used according to environmental conditions and intended use. The quality and degree of restraint should also be appropriate to the environment. In addition to aesthetic and functional principles, psychological effects should also be taken into account in the design. For example, to provide privacy, restrictors higher than human height should be used. If it is desired to prevent people from entering, solid enclosures higher than human height should be preferred in order to hide a bad view. If it is desired to prevent people from entering, high and dense structures that are difficult to overcome and impossible to pass through should be used. If the park or the surrounding area is to remain open to good views, the enclosures should be partially open and low or not at all. This interpretation implies that both aesthetic and

functional requirements should be taken into account in a balanced way in the design of delimiting elements. It also emphasizes that enclosure elements should be selected and designed in harmony with the environment and in accordance with their purpose.

- Seating units: Seating units should be aesthetic, ergonomic, easily portable, consisting of few parts, and resistant to long-term use and weather conditions (**Figure 9**). According to the dimensions and criteria, the design and layout criteria of the seating units should be as follows:
  - The length of the seating area per person should be 60 cm.
  - Bench dimensions; Seat height 42.5 cm, backrest height 50 cm, seat width 35–40 cm, backrest height used to support the user's back 32.5–37.5 cm, angle between seat and backrest 95–100 degrees, angle between seat and horizontal 10 degrees.
  - Benches with backrests and armrests provide comfort by better supporting users' bodies.
  - Seating units should be placed within 60 cm to avoid interrupting the road flow.
  - A 90 cm flat area should be left next to the bench for disabled users and baby/dog strollers.

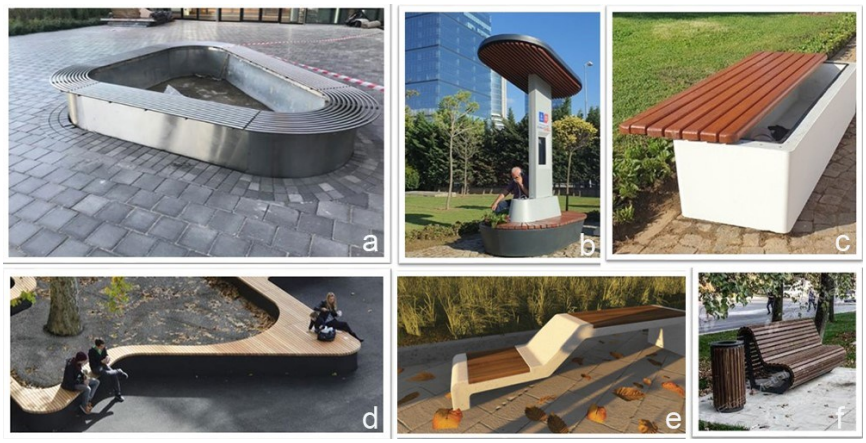


Figure 9. Samples of seating units in open green areas **(a)** Elit Project, 2024; **(b)** Togay, 2020; **(c)** İston, 2020; **(d)** Rastas, 2022; **(e)** Asbeton, 2016; **(f)** Fiber Metal, 2024.

Figure 10. Samples of lighting elements in open green areas. **(a)** Yılmaz, 2018; **(b)** Pedas, 2023.

- Lighting elements: Lighting for security, necessity and function is of great importance to facilitate the use of spaces at night and to add aesthetic value.

Parks, walkways, seating areas and other outdoor spaces are made both safe and visually more attractive with appropriate lighting (**Figure 10**). Lighting elements consist of lamps, lighting devices, systems and materials that connect these systems to circuits.

- Garbage bins and recycling units: Proper design and positioning of garbage bins and recycling units are important for users. Garbage bins and recycling units should be made of materials (metal, high-strength plastic, stainless steel) that are resistant to weather conditions and intensive use. The units should be vandal-resistant and designed not to tip over easily. They should have sufficient capacity so that they do not need to be emptied frequently. They should have compartments suitable for different types of recycling (paper, plastic, metal, glass). Garbage bins should be easily accessible and, in the case of clamshell models, the lid should be easy to open. Recycling units should be equipped with color codes and clear labels indicating what type of waste goes where. The units should fit in with the overall aesthetics and design of the space (**Figure 11**). They should be noticeable without being eye-catching and should have colors that are in harmony with the environment. Garbage bins and recycling units should be located near the entrances and exits of the park, recreation areas, playgrounds and picnic areas. They should be placed at 30 m intervals along main roads and walkways. The distance can be reduced in areas of high use. Units should be placed where they can be easily recognized and reached. They should not be behind trees, bushes or other obstacles. They should be placed in sufficiently illuminated areas so that they are safe for use at night. Garbage bins and recycling units can be located some distance away from the area's busy seating and recreation areas to avoid the spread of bad odors. They should also be placed in convenient locations so that the units can be emptied and cleaned regularly.

Figure 11. Samples of garbage bins and recycling units in open green areas. **(a)** Çetin, 2021; **(b)** Çetin, 2021; **(c)** Baştaş Grup, 2020.

- Signposts: Signposts in spaces are very important to ensure that users can navigate, move safely and make the best use of the facilities of the space (**Figure 12**). The features and positioning rules that signboards should have been listed below:

- Signposts should be made of materials resistant to weather conditions and external factors (metal, wood, high-strength plastic).
- UV-protected materials should be used to prevent fading due to sunlight.
- Signs should be designed using high contrast colors.
- Fonts and symbols should be of a size that can be easily read from a distance.
- Messages should be short, concise and understandable.
- Widely accepted symbols should be used so that users speaking different languages can understand them.
- Signs should be in harmony with the overall aesthetics and theme of the area. They should integrate with the natural landscape without harming the environment.
- Maps and directional signs should be placed at the main entrance and exit points of the park.
- Directional signs should be placed at critical locations such as toilets, playgrounds, picnic areas and parking lots.
- Signs should be at an easily visible height (approximately 1.5–2 m above the ground). Signs along walkways and pathways should be at people's eye level.
- Signs should be positioned so that they are not obscured by vegetation or other obstacles.
- Directional signs should be regularly spaced throughout the site. There should be signs at set distances along long routes and directional signs should be visible from at least 20 m.
- Regular directional signage should be provided for specific routes such as walking and cycling paths.
- Signs indicating emergency exits, first aid points and safety instructions should be placed in strategic locations.
- There should be warning signs about hazardous areas (steep slopes, water edges, wildlife areas).
- They should also be visible for disabled users.

Figure 12. Samples of signposts in open green areas (Çetin, 2021).

- Plastic objects (Sculptures): Plastic objects, sculptures and other works of art used in landscape design play an important role in increasing the aesthetic value of the environment and bringing artistic expressions to the outdoors. They make

landscape design more effective and perceivable with their color, form, shape and size. They also function to introduce art to the public and give the environment a new identity. There are some important elements to be considered in the use of these objects. Visibility and focal points in site selection, material selection and durability according to the climate of the area, suitability to the area and the culture of the area in terms of aesthetic and artistic value, rich in interactive designs and educational information, safe by mounting securely, and designs should be developed by ensuring that the works of art are properly illuminated for night users to see (**Figure 13**).

Figure 13. Samples of plastic objects (sculptures) in open green areas. **(a)** İzmir Metropolitan Municipality, 2020; **(b)** İzmir Metropolitan Municipality, 2020; **(c)** Çelebioğlu, 2020.

Figure 14. Samples of water features in open green areas. **(a)** Çetin, 2021; **(b)** P&R, 2017; **(c)** Alnwick Castle, 2024.

- Water features: Water features in spaces constitute an important part of the landscape with various functions such as aesthetic beauty, relaxation, sound and cooling. Water features can take various forms such as fountains, ponds, waterfalls, water channels and fountains (**Figure 14**). Proper design and positioning of these elements increase the overall attractiveness and functionality of the park. The use of fountains is common in small areas.
- Pavings: Paving slabs are one of the most important elements of open spaces. These elements both function as a critical part of transportation and add aesthetic value. They have functional features such as pedestrian and disabled orientation, separating pedestrian, bicycle and vehicular traffic, highlighting and separating spaces, and offer important visual alternatives in terms of aesthetics. Functionality, climate of the area, aesthetic and visual value, cost, natural and cultural compatibility are taken into account in the design of the paving in landscape design studies (**Figure 15**).

Figure 15. Sample of paving in open green areas (Çetin, 2021).

6.5. The impact of plants in urban public open-green spaces

It is largely outdoor ornamental plants that increase the aesthetics and personal distance of urban and public open-green spaces. Outdoor ornamental plants consist of trees, shrubs, seasonal plants and ground covers (Yazıcı and Gülgün Aslan, 2017). Plants have physical, ecological, social, aesthetic, health and psychological contributions to improve the quality of these areas.

Plants provide privacy in urban and public open green spaces and private use areas by reducing the disturbing effect of sunlight through screening and at the same time creating personal space. This allows people to spend time in a more comfortable environment and maintain their privacy, especially in private spaces. They are used to accentuate the space, making it more attractive and creating identity. Plants, by delimiting and directing the spaces, regulate the circulation of people, create a security area and make users feel comfortable (Gültekin, 1994; Önder and Akbulut, 2011).

According to the criterias stated by Ahıskalı (1998), Özgüç (1998), Yılmaz and Bulut (2002), there are important points about plant selection and placement in children's playgrounds. Thorny and toxic species such as *Nerium oleander* and *Ilex aquifolium* should not be included in children's playgrounds. Small plants that may cause children to bump, fall and get injured should not be used. In playgrounds and other areas of use, species such as the large-fruited *Aesculus hippocastanum* L., the

branch-dropping tree *Tilia* sp. and *Albizia julibrissin* should also be avoided. Broad-leaved trees should generally be used to create natural spaces.

The use of plants in these areas also has benefits for human health. Kuo (2003) found that in areas with plantings, bonds between people are strengthened, a greater sense of security and harmony develops, children play in a healthier environment, there is less incivility and less violent crime. It demonstrates the link between vegetation and a healthier social ecosystem. He defines areas with less vegetation as "no man's land" and states that these areas act as a deterrent to human interaction and invite crime (Kuo, 2003). Research shows that being with nature has a positive impact on longevity. It has been found that people who spend time in natural environments are generally healthier and live longer lives.

7. Conclusion

In the study, personal space and factors affecting the perception of personal space were comprehensively examined from the perspective of landscape architecture. The findings of the study present significant insights that are consistent with existing literature in the disipline. These findings emphasize the importance of personal space for individuals and its critical role in landscape design. It is highlighted that the design of spaces that meet the physical and psychosocial needs of individuals is a process that directly affects users' comfort, satisfaction, and space utilization preferences. In this context, taking personal space perception into account allows for more effective and sustainable use of public open and green spaces.

In terms of landscape architecture, determining personal space distances and perceptions is an important guide in achieving functional and aesthetic balances in design decisions. A review of the literature reveals that personal space varies according to user profiles, underscoring the necessity for a dynamic and flexible approach that accommodates differences in user perceptions. Personal differences, societal values, and cultural distinctions have strong impacts on lifestyle, daily behaviors, and approaches to problem-solving, necessitating special attention to these factors. While there are fundamental similarities across all countries, significant differences in values and cultures can be observed. Consequently, the results of a study conducted in one country or region may not be directly applicable to another. At this point, designs that are tailored to the requirements of users will ensure the sustainability of landscape designs. The criteria outlined in the study's findings provide a systematic and theoretical foundation for user-centered landscape designs in urban public spaces. The study demonstrates how various criteria can be universally integrated. While design criteria for personal space and perception in open green spaces may differ between countries or regions, some general conclusions regarding the landscape design process can still be drawn:

- Including public participation in the design process and encouraging individuals to get involved is crucial. This approach not only addresses user needs but also strengthens social engagement and a sense of belonging.
- In urban landscape areas, individuals are influenced by various positive and negative factors. They assess their perception of the severity, importance, predictability, and controllability of threatening situations, which helps them

interpret environmental conditions. Based on this understanding, they determine whether the design of a space is comfortable or uncomfortable for them and decide whether to continue using the space (Lazarus and Cohen, 1977). Within open green area systems, parks offer city dwellers places to escape daily life stress (Packer, 2008). Academic studies have shown that parks designed to meet physical and psychological comfort needs can have restorative effects (Chong et al., 2013; de Vries et al., 2003; Keçecioğlu, 2014; Maas et al., 2006; Ulrich et al., 1991; Ulrich, 1981). Meeting personal and social needs and supporting personal and social identity enhance positive feelings and perceptions about a place, strengthening attachment to it. Otherwise, these areas will become underutilized and neglected within the urban landscape.

- It is important to organize spaces in a way that balances social interaction and privacy levels. Ensuring this balance allows for the creation of environments that cater to varying user needs and preferences.
- Maintaining a balance between the homogeneity and heterogeneity of designs is also essential. Spaces should offer a variety of environments and activities to accommodate different numbers of users and users with diverse socio-demographic characteristics. The advantages and disadvantages of clustering spaces together or separating them should be carefully considered, aiming for an optimal design that addresses both perspectives effectively.
- In the design of urban and public open green space outdoor furniture, considering ergonomic features and adhering to international standards will enhance user comfort and contribute to the creation of safe and functional urban and public open green spaces. Ergonomic design, supportive environments, increased personal control, and other design criteria positively impact users' perception of personal space. Conversely, non-ergonomic amenities are generally not favored by users and are perceived as lacking privacy. Therefore, the design of these furniture should take into account design principles and interpersonal distances. Additionally, ensuring that furniture are in harmony with the surrounding environment will further support the identity characteristics of the area.
- In public open green spaces, the correct use of plant elements that enable people to spend time in a more comfortable environment is crucial in landscape design due to the effects they have on individuals. Establishing a connection between planting and a healthier social ecosystem has been shown to reduce user conflicts. Care should be taken in selecting plant species that suit the characteristics of the space. Implementing plant designs that regulate pedestrian flow and create a sense of security will contribute to users feeling more at ease. Additionally, incorporating plant arrangements that maintain privacy perceptions or encourage social interaction within the space is essential.
- Creating secure public green spaces requires a holistic approach that encompasses planning, design, implementation, maintenance, management, and user participation. As Mpofu (2013) points out, local authorities, police commissioners, and other stakeholders should collaborate with designers to work together for public safety.

- The design should also consider the psychological effects. Designing environments that are as comfortable, satisfying, respectful of personal space, and livable as possible will enhance not only individuals' quality of life but also the quality of the environment itself. Considering the interaction between humans and their surroundings, improving the quality of where people live enhances their overall quality of life.

The findings should be taken into consideration by relevant administrations, designers, and other stakeholders. Further research and studies on the subject are necessary. While there are numerous studies that combine several criteria, specifically examining all the criteria mentioned in the article is limited. Increasing the number of studies that examine all criteria, especially within disciplines such as landscape architecture that encompass social and cultural dimensions and involve designing living spaces for individuals, will enhance the quality and sustainability of environments. Studies should investigate the characteristics of selected open green spaces, the qualities of different parks, and their interactions with socio-demographic factors at the neighborhood, district, and city levels, taking into account all the criteria mentioned in the article. Such studies require collaboration among various professional disciplines including psychology, urban planning, landscape design, and others.

In summary, landscape architects play a critical role in enhancing urban quality of life and creating sustainable urban green spaces by considering personal space perception and the factors influencing it in their designs. Future landscape design endeavors should adopt more user-centered and sustainable approaches in light of these findings, making green spaces more attractive and functional for city residents. Ultimately, this study demonstrates that considering personal space perception in public open and green spaces contributes to creating environments that better meet the needs and expectations of both individuals and communities. It serves as an important resource on how personal space perception can be more effectively leveraged in landscape architecture.

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