Leading effect of visual plant characteristics for functional uses of green spaces

Beyza Şat Güngör [1*] , Kadriye Çulha Ozangüç [2]

[1*] Ozyegin University, Faculty of Architecture and Design, Department of Interior Architecture and Environmental Design, Istanbul, Turkey
[2] Trakya University, Institute of Science, Edirne, Turkey

[*] **Corresponding author e-mail:** sbeyzade@hotmail.com, beyza.gungor@ozyegin.edu.tr

Abstract: Plant materials have the ability to lead the people's functional use purposes with their visual characteristics. In this study, we examined whether the functional use follows the plant materials' visual characteristics like a big size tree's shade use. As visual characteristics of the plants; size, texture, color, and planting design basics are considered. Six urban green spaces determined for this experimental field study in the center of Kırklareli Province, and then a site survey implemented to determine apparent visual characteristics of the plants and matched functional uses with their visual characteristics. Five functional use types determined according to the visual plant characteristics (sitting and resting, pedestrian transition, meeting point, walking and recreational uses). Best representing four photos of each green space's plant materials are used in photo questionnaires. 89 photo questionnaires were conducted. Five functional use type options indicated in the questionnaire for each green space and one of the options were coinciding with the visual plant characteristics of that green space according to the site survey results. For the analyses of questionnaires; SPSS 17 statistical packages were used. As result; the hypothesis was confirmed by coinciding statistical analyses results with the site survey results.

Keywords: Green spaces, Kırklareli, photo questionnaire, visual plant characteristics, planting design.

Bitkilerin görsel karakteristiklerinin yeşil alan kullanımlarını yönlendirici etkisi

Özet: Bitkiler görsel özellikleri ile insanların yeşil alan kullanımlarını etkilemektedirler. Çalışma kapsamında; bitkisel materyalin görsel karakteristikleriyle insanların algısını ve dolayısı ile yeşil alan kullanımlarını etkiledikleri hipotezi araştırılmıştır. Büyük bir ağacın gölge amaçlı kullanılması buna örnektir. Bitkilerin görsel karakteristikleri kapsamında; büyüklük, doku, biçim, renk özellikleri yanı sıra bitkisel tasarımı açısından özellikleri incelenmiştir. Çalışma kapsamında öncelikle bir saha çalışması gerçekleştirilmiş ve Kırklareli şehir merkezinde nispeten yoğun kullanıldığı tespit edilen altı açık yeşil alanın bitkisel materyallerinin görsel karakteristikleri ve bitkisel tasarım özellikleri incelenmiştir. Saha çalışmasında açık yeşil alanların bitkisel tasarım özellikleri ile uyumlu beş kullanım tipi tespit edilmiştir. Tespit edilen 5 kullanım tipinin (oturma ve dinlenme, buluşma noktası, yürüyüş ve gezinme, geçiş alanı ve rekreasyonel kullanım); foto-anket metodu ile belirlenen 6 parkı ziyaret eden katılımcılar tarafından doğrulaması gerçekleştirilmiştir. Yeşil alanların bitkisel karakteristiklerini en iyi temsil eden 4 fotoğraf katılımcılara gösterilmiş ve kullanım biçimleri çoktan seçmeli sorular olarak yöneltilmiştir. Seçeneklerden biri saha çalışmasında o park alanındaki bitkilerin görsel karakteristiği ile örtüşen kullanım tipini içermektedir. Toplamda katılımcılar ile 89 anket yapılmıştır. Anket sonuçları, 6 açık yeşil alan için saha çalışmasında tespit edilen fonksiyonel kullanımlar ile katılımcı cevaplarının birebir uyuştuğunu göstermektedir. Analizler SPSS 17 istatistik paket programı kullanılarak gerçekleştirilmiştir.

Anahtar kelimeler: Yeşil alanlar, Kırklareli, foto-anket, bitkilerin görsel karakteristikleri, bitkisel tasarım.

1. INTRODUCTION

For centuries, plants have been used mostly for ethnobotanical and medical purposes in rural and local areas (Doğan et al 2013; Ahmad et al 2013; Saltan & Ozaydın 2013). At present time, especially in urban areas, plants have more roles in a recreational function by their visual characteristics (Müderrisoğlu et al 2006).

The visual characteristics of plants can lead people for functional use preferences by effecting their perception. The previous studies showed that visual perception is effective on decisions and use of green areas (Daniel and Boster, 1976; Brown and Daniel, 1984; Ribe, 1989; Tahvanainen et al., 2001) on the other hand psychological structure of the people is also effective on the perception of aesthetic (Kaplan and Kaplan, 1989).

The perception of the visual characteristics of plant materials differs individually. According to this difference the functional use of the green spaces can also vary. Perception is not the passive receipt of the signals, but it can be shaped by learning, memory and expectations (Gregory, 1987; Bernstein, 2010). Perception is a case that is related both for perceived objects and receptors. Planting design effects the perceived objects and leads uses in landscapes. The visual quality of intense planted photographs found high quality for visual landscape assessment studies (Çakçı, 2007). On the other hand, increased vegetation preferred for attractiveness but has a negative effect on perceive of personal safety (Jansson et al., 2013; Zhang et al., 2013).

Properties of components that form a landscape are directly related to perception of the space and effect the view for viewers. Plants can make a real difference in landscape perception and can highlight some characteristics of a place when their visual properties (size, form, color and texture) and basic design principles are taken into account. Landscapes that have a catchy environmental design are known as readable landscapes which have high perception (Lynch, 1960).

The main design element for landscape is plant material. Plant materials have three main functions in the outdoor environment. These are 1-structural-architectural, 2-environmental-engineering and climate control and 3-visual-aesthetic functions (Booth, 1983). Aesthetic concepts of plant materials influence the people's functional use choices in green areas (Kendal et al., 2012). With refereeing plant materials' leading effect on people's functional use preferences with their visual characteristics hypothesis; we examined whether the functional use follows the plant materials' visual characteristics.

2. MATERIALS AND METHODS

2.1 Study area

The center of Kırklareli Province which is located on the North West side of Turkey is the study area. The coordinates of the area are between $41°$ 14' and $42°$ 00' latitudes and $26°$ 53' and $28°$ 13' longitudes. Kırklareli is a border city to Bulgaria and this gives a transition character to the city. Kırklareli is a small-sized city with the population of about 62.152 (TUİK, 2011) and covering an area of approximately 1700 km^2 (Figure / Şekil 1).
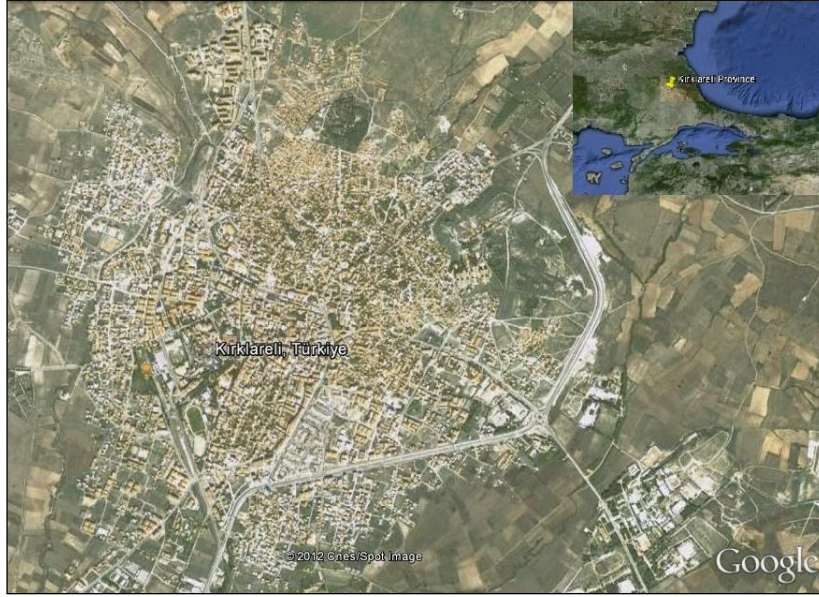
Figure 1. City center of Kırklareli and the location in Turkey
Şekil 1. Kırklareli Şehir Merkezi ve Türkiye'deki konumu

2.2 Methods

We examined the relationship between functional uses of green spaces and visual plant characteristics. Photo questionnaires were conducted to the participants to analyze this relationship in six green spaces which are determined in site survey. Those six green spaces (Ahmet Cevdet Paşa Park, Atatürk Park, Şevket Dingiloğlu Park, Yayla Park, Festival Area and İstasyon Park) which are heavily used by the dwellers were determined in the urban center that including directive and apparent visual plant characteristics (Figure / Şekil 2). Best representing four photos of the determined green spaces were used in the photo questionnaire. All photographs were taken by using a digital camera. Firstly, a site survey was implemented to determine the visual plant characteristics of the green spaces, and appropriate functional use type with the plant's visual characteristics. Secondly, photo questionnaires were conducted to determine the participants' functional preferences for the green spaces. Participant survey includes multiple choice questions and user profile determination questions as age, gender and education. The reasonable use types coinciding with visual plant characteristics of the green spaces which determined by site survey were presented in one of the multiple choices. Five use type choices were indicated for each green space in the questionnaire. One of the choices was coinciding choice with the result of site survey for each open green space. 89 photo questionnaires were conducted with the dwellers that were familiar with the study area.

In the site survey study we determined the appropriate functional use types of the green spaces according to the general visual plant characteristics by considering the commonly agreed concepts in planting design. Briefly considered design concepts (Size, color, Texture and planting design) explained to give the referee for site survey study. Size is one of the most visually significant characteristic of the plant material in a landscape composition. Large trees are most significant plants that are perceived as dominant visual elements because of their height and mass, and consequently may serve as focal points (Booth, 1983). Focal points can be preferred as meeting points by people. Large and intermediate trees are also used for to provide shade (Arnold, 1980). Small size or fine texture trees imply foliage, fruit, branch, trunk properties of a plant material in a small space. They give a greater sense of depth in small scale spaces consequently they serve as visual and compositional accents where the landscape architect desires to attract attention. Creating a desired space can give the feeling of sitting and resting for people. Those characteristics were matching with Ahmet Cevdet Paşa and Yayla Parks in our field study.
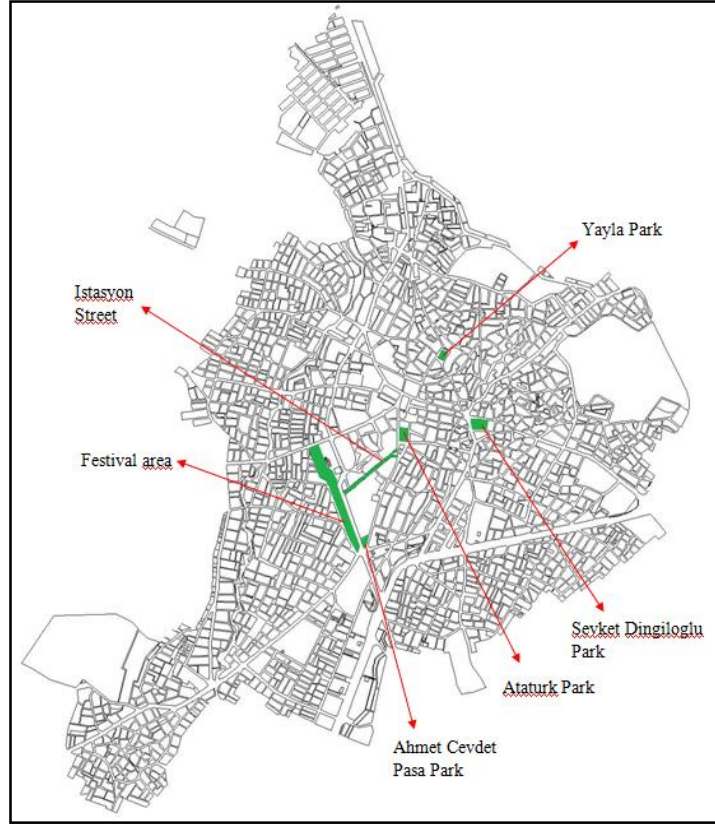
Figure 2. Location of the six green spaces in Kırklareli City Center
Şekil 2. Yeşil alanların Kırklareli'ndeki konumları

Sequentially formal planting of Istasyon Park, has the effect of leading person from one space to another. Regarding form as visual plant characteristic; spreading/horizontal forms and open lawn areas are used to give the feeling of breadth and extent (Booth, 1983). For most recreational activities these kind of areas are preferred as recreational purposes. Those plant forms matched with Festival green area in Kırklareli and we determined the appropriate use as recreational use in our field study.

Form and color characteristics are the most noticeable visual plant characteristics according to the results of the studies examining the preferences of people with respect to the visual plant characteristics of the plant composition (Acar et al., 2003; Müderrisoğlu et al., 2009). It directly affects the feeling and the mood of an outdoor space (Booth, 1983). Cool colors are restful while warm colors express action (Dewayne, 1991). Cool colors and light tints can give the feeling of calming and soothing (Hansen & Alverez, 2010). To give the feeling of large space to the composition, analogous colors can be used (Dewayne, 1991). Texture was another kind of visual characteristic that we considered in this study. Texture's general definition; describes the surface quality of an object that can be seen or felt (Dewayne, 1991). Plant texture is the visual roughness and smoothness of the plants. It is influenced by leaf size, twig and branch size, bark configuration, the overall habit of growth and the distance at which plant material is viewed. At a close range the leaf size, shape, surface is notable, while density of branches and general habit of growth are the main variables from a distance. Medium texture element serves as a transitional element between coarse and fine textures. It can link a composition. We determined the appropriate function for Atatürk Park as Pedestrian transition which included medium texture plants. But another reason for determining pedestrian transition function for this park was the location that lies between the houses. Fine texture is created by tiny leaves, thin branches and twigs. Fine textured plants are soft and delicate in appearance (Booth, 1983). In our study, we encountered places with fine textured plant characteristics were preferred also as sitting and resting purposes (Ahmet Cevdet Paşa and Yayla Parks) since the visual details of the plant materials can be seen from close range. The general visual plant

characteristics and their perception by people are examined briefly in this part to give the reason that how we determined appropriate functional uses for six green areas.

The questionnaire data were analyzed using the statistical software SPSS 17 Statistical Packages for Windows. For the comparison of quantitative variables, a Student's t-test was used for two groups. The Mann Whitney U test was used to assess the ordinal scales. Categorical variables were compared using a Chi-square or Fisher's exact test. The significance level was $p<0.05$ and all tests were 2-tailed.

3. RESULTS AND DISCUSSIONS

3.1 The user profile

The ratio of the male participants was 49 %; 51 % was female. The educational level of the participants rank was as; 15 % primary school, 27 % high school, 6 % associate degree, 32 % undergraduate degree and 20 % graduate degree. The age profiles of the participants were as follows: younger than 18 years old was 11 %, between 19-35 years old was 37 %, and between 36-50 years old was 31 % and 21 % were $50 \leq$ years old. Generally, the age group of participants was between 19 and 35 years (Table / Tablo 1).

Table 1. Demographic variables of participants
Tablo 1. Katılımcıların demografik yapısı

Gender	Frequency (n)	Percent (%)
Women	46	51.7
Men	43	48.3
Total	**89**	**100**
Age		
0-18	10	11.2
19-35	33	37.1
36-50	28	31.5
50<	18	20.2
Total	**89**	**100**
Education		
Primary school	14	15.7
High school	24	27
Associate degree	16	18
Undergraduate degree	29	32.6
Graduate degree	6	6.7
Total	**89**	**100**

3.2 The preference of the participants for the use types

In the site survey; five different use types determined for all green spaces in the center of Kırklareli Province that match with the visual plant characteristics of the green spaces. These use types are; sitting and resting, pedestrian transition, meeting point, walking and recreation (picnic, festival activities etc.). Participants' preferences for the green spaces in the center of Kırklareli province are determined by photo questionnaires. According to the results; 74 % of the participants prefer Ahmet Cevdet Paşa Park for sitting and resting purposes, 73 % of the participants prefer Atatürk Park for pedestrian transition, 55 % of the participants prefer Şevket Dingiloğlu Park as meeting point, % 83 of the participants prefer Istasyon Park for walking, 59.5 % of the participants prefer Yayla Park for sitting and resting purposes and 80 % of the participants prefer Festival field for recreational activities (picnic, concerts, festival activities etc.) From the aspect of visual plant characteristics of the green spaces; participants' preferences were coinciding with the site survey results (Table / Tablo 2-3).

Table 2. Site survey results of six green spaces for use types
Tablo 2. Saha çalışmasında belirlenen açık yeşil alanların kullanım biçimleri

Green spaces	Sitting and resting	Pedestrian transition	Meeting point	Walking	Recreational uses
Ahmet Cevdet Paşa Park	+				
Atatürk Park		+			
Şevket Dingiloğlu Park			+		
Yayla Park	+				
Istasyon Street				+	
Festival Area					+

Table 3. Preferred functional uses of six green spaces by the participants
Tablo 3. Açık yeşil alanların tercih edilen kullanım biçimleri

Functional uses of green spaces	Frequency (n)	Percent (%)
Ahmet Cevdet Paşa Park		
Sitting and resting (expected)	66	74.15
pedestrian transition	21	23.59
Meeting point	1	1.13
Walking	0	0
Recreational uses	1	1.13
Total	**89**	**100**
Atatürk Park		
Sitting and resting	20	22.47
Pedestrian transition (expected)	65	73.03
Meeting point	4	4.5
Walking	0	0
Recreational uses	0	0
Total	**89**	**100**
Şevket Dingiloğlu Park		
Sitting and resting	17	19.1
pedestrian transition	21	23.59
Meeting point (expected)	49	55.05
Walking	1	1.13
Recreational uses	1	1.13
Total	**89**	**100**
Yayla Park		
Sitting and resting (expected)	53	59.55
pedestrian transition	32	35.95
Meeting point	0	0
Walking	3	3.37
Recreational uses	1	1.13
Total	**89**	**100**
Festival Area		
Sitting and resting	10	11.24
pedestrian transition	0	0
Meeting point	0	0
Walking	7	7.87
Recreational uses (expected)	72	80.89
Total	**89**	**100**
Istasyon Street		
Sitting and resting	12	13.48
pedestrian transition	0	0
Meeting point	3	3.37
Walking (expected)	74	83.15
Recreational uses	0	0
Total	**89**	**100**

Şevket Dingiloğlu Park is preferred as meeting point; this use type coincides by the land mark plant characteristics of the Park. There is a big size monumental tree perceived as a dominant, significant object that can be seen easily from every place and this visual size characteristic perceived by the participants as a focal point, so this space generally preferred as a meeting point. Istasyon Park has a planting design of sequentially trees at both sides of the park and this design has the effect of leading person from one space to another. According to the results; as sequentially plants can lead a person from one space to another; this space is preferred for walking. Visual plant characteristics of the festival field also coinciding with the participants' survey results. In the site survey, it was estimated to use for recreational purposes due to a large lawn area that allows for activities such as recreational, picnic and sportive as well as other social meetings (Figure / Şekil 3, 4, 5). The study of Nordh and Østby (2013) also supports our vision about the large lawn areas recreational using purposes. They indicate that looking grass is the most preferred restoration style for people in their study (Nordh and Østby, 2013).

Figure 3. Şevket Dingiloğlu Park including big size monumental trees is generally preferred for meeting point use
Şekil 3. Anıt niteliğinde büyük ağaçlar içeren Şevket Dingiloğlu Parkı genellikle buluşma noktası olarak kullanılmaktadır.

Figure 4. The sequentially planting design of Istasyon Park, lead people for walking
Şekil 4. İstasyon Parkı'nın sıralı bitkilerden oluşan bitkisel tasarımı insanları yürüyüşe yönlendirmektedir.

Figure 5. The open lawn area's planting design and clover planting, lead people for recreational uses
Şekil 5. Festival Parkı'nın çim ve yonca bitkilendirmesi insanları rekreasyonel aktivitelere yönlendirmektedir.

As Ahmet Cevdet Paşa and Yayla Parks including fine textured and medium sized ornamental plants that their visual characteristics can be observed from close or medium ranges are preferred for sitting and resting. Fine texture, small or medium size plants can be used to create spaces that can be perceived by their textures, detailed flowering, and branch, trunk bark features in close or medium ranges (Figure / Şekil 6).

Figure 6. Ahmet Cevdet Paşa and Yayla Parks have medium and fine textured plants and preferred for sitting and resting purposes
Şekil 6. Ahmet Cevdet Paşa ve Yayla Parklar orta ve ince tekstürlü bitkisel karakterleri ile insanların oturma ve dinlenme olarak tercih ettikleri parklardır.

As indicated in the Figure / Şekil 7; results show that the visual perceptions of the participants coincide with site survey results (Figure / Şekil 7).
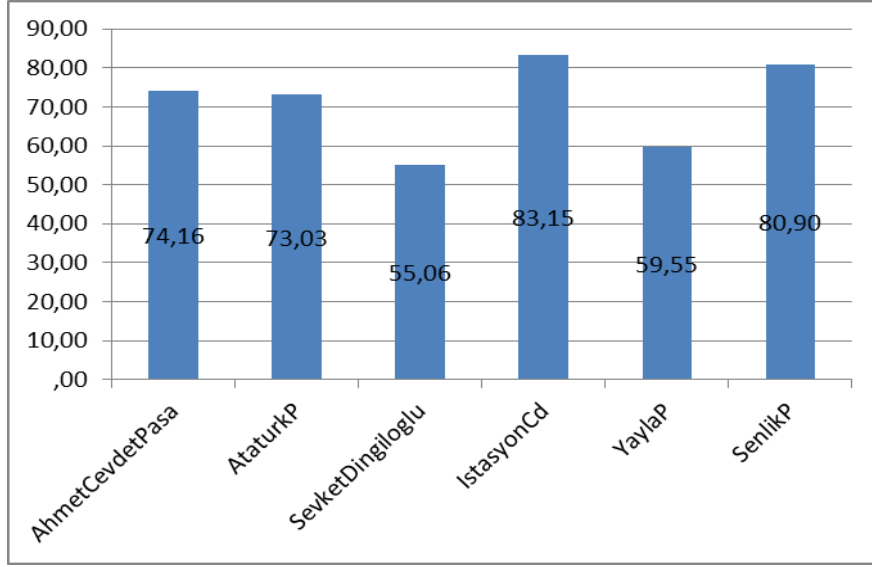

Figure 7. Coinciding results graphic for green spaces
Şekil 7. Yeşil alanlar için öngörülen fonksiyonel kullanımlar ile örtüşen katılımcı cevapları

If we examine the coinciding results according to the gender, education and age categories; male participants have high perception with statistical significance value for Yayla Park and Festival field (Yayla: 76.7 %, 43.5%; p=0.001 and Şenlik: 90.7%, 71.7%; p=0.02). Without statistically significance difference; men have high perception for other green spaces except for Ahmet Cevdet Paşa Park (Table / Tablo 4).

Table 5. Examining the coinciding results from the aspect of gender
Tablo 5. Örtüşen cevapların cinsiyet açısından istatistiksel anlamlılık düzeyinde incelenmesi

	Women				Men					
	Percipient		Impercipient		Percipient		Impercipient			
	n	%	n	%	n	%	n	%	Chi square	p
Ahmet Cevdet Pasa	36	78.3%	10	21.7%	30	69.8%	13	30.2%	0.83	0.36
Ataturk	32	69.6%	14	30.4%	33	76.7%	10	23.3%	0.58	0.45
Sevket Dingiloglu	22	47.8%	24	52.2%	27	62.8%	16	37.2%	2.01	0.16
Istasyon Park	38	82.6%	8	17.4%	36	83.7%	7	16.3%	0.02	0.89
Yayla	20	43.5%	26	56.5%	33	76.7%	10	23.3%	10.20	**<0.01**
Festival Area	33	71.7%	13	28.3%	39	90.7%	4	9.3%	5.20	**0.02**

The education level of the participants was relatively high with a statistical significance value from the aspect of the comprehension ability of the visual plant characteristics of Yayla Park (p=0.006). For other green spaces; the education level of the participants was relatively high without statistically significance difference (p> 0.05) from the aspect of comprehension ability of the visual plant characteristics. Generally the undergraduate degree education level has high comprehension ability (Table / Tablo 6).

Table 6. Examining the coinciding expected results from the aspect of Education levels
Tablo 6. Örtüşen cevapların eğitim seviyesi açısından istatistiksel anlamlılık düzeyinde incelenmesi

		Primary school		High school		Associate degree		Undergraduate degree		5 Graduate degree		Mann-Whitney	
		n	%	n	%	n	%	n	%	n	%	z	p
Ahmet Cevdet Pasa	Percipient	10	15.2%	18	27.3%	10	15.2%	24	36.4%	4	6.1%	0.47	0.63
	Impercipient	4	17.4%	6	26.1%	6	26.1%	5	21.7%	2	8.7%		
Ataturk	Percipient	10	15.4%	19	29.2%	7	10.8%	24	36.9%	5	7.7%	0.64	0.52
	Impercipient	4	16.7%	5	20.8%	9	37.5%	5	20.8%	1	4.2%		
Sevket Dingiloglu	Percipient	7	14.3%	13	26.5%	7	14.3%	18	36.7%	4	8.2%	0.89	0.37
	Impercipient	7	17.5%	11	27.5%	9	22.5%	11	27.5%	2	5.0%		
Istasyon Park	Percipient	12	16.2%	19	25.7%	15	20.3%	22	29.7%	6	8.1%	0.02	0.98
	Impercipient	2	13.3%	5	33.3%	1	6.7%	7	46.7%	0	0%		
Yayla	Percipient	5	9.4%	12	22.6%	10	18.9%	21	39.6%	5	9.4%	2.74	**0.006**
	Impercipient	9	25.0%	12	33.3%	6	16.7%	8	22.2%	1	2.8%		
Festival Area	Percipient	9	12.5%	19	26.4%	14	19.4%	24	33.3%	6	8.3%	1.69	0.09
	Impercipient	5	29.4%	5	29.4%	2	11.8%	5	29.4%	0	.0%		

Participants with comprehension ability for Yayla and Ahmet Cevdet Paşa Parks were relatively older with statistical significance. There were no statistically significant differences for other green spaces. Generally the age group of the percipients is 19-35 age groups. Also the impercipient age group is between 19-35 and 36-50 age groups (Table / Tablo 7).

Table 7. Examining the coinciding expected results from the aspect of Age groups
Tablo 7. Örtüşen cevapların yaş grupları açısından istatistiksel anlamlılık düzeyinde incelenmesi

		0-18		19-35		36-50		>50		Mann-Whitney	
		n	%	n	%	n	%	n	%	z	p
Ahmet Cevdet Pasa	Percipient	5	7.6%	24	36.4%	21	31.8%	16	24.2%	1.97	**0.048**
	Impercipient	5	21.7%	9	39.1%	7	30.4%	2	8.7%		
Ataturk	Percipient	5	7.7%	25	38.5%	20	30.8%	15	23.1%	1.31	0.19
	Impercipient	5	20.8%	8	33.3%	8	33.3%	3	12.5%		
Sevket Dingiloglu	Percipient	4	8.2%	18	36.7%	18	36.7%	9	18,4.	0.54	0.59
	Impercipient	6	15.0%	15	37.5%	10	25.0%	9	22.5%		
Istasyon St.	Percipient	7	9.5%	25	33.8%	27	36.5%	15	20.3%	1.65	0.099
	Impercipient	3	20.0%	8	53.3%	1	6.7%	3	20.0%		
Yayla	Percipient	3	5.7%	19	35.8%	16	30.2%	15	28.3%	2.38	**0.017**
	Impercipient	7	19.4%	14	38.9%	12	33.3%	3	8.3%		
Festival area	Percipient	7	9.7%	30	41.7%	22	30.6%	13	18.1%	0.87	0.38
	Impercipient	3	17.6%	3	17.6%	6	35.3%	5	29.4%		

4. CONCLUSIONS

In conclusion; most of the people's preference for functional use of the green spaces is same with the results determined in site survey studies. Only the pedestrian transition use of Atatürk Park was weak on matching plants' visual characteristics with functional use. We more considered the location for that park which lies between houses. Besides, the medium texture plant characteristics that links the composition. Either consciously or unconsciously the visual characteristics of plant materials lead people to the subject of functional use of the green spaces. Visual perception affects the functional use preferences. Some previous studies emphasize the visual characteristics on perception as an indicator of the effectiveness of visuality on perception (Yumin et al., 2012; Çakçı & Çelem, 2009). Actually further research, especially on the psychological perception should need for our hypothesis confirmation but in the frame of our work and according to the data gained from this study; the visual characteristics are more dominant relatively to the participants' psychological perception and social features on preferences for functional uses of green spaces.

REFERENCES (KAYNAKLAR)

Acar, C., Demirbaş, E., Dinçer P., Acer, H., 2003. Evaluation of Semantic Differential Scale Technique for Plant Composition Samples. *Journal of Forestry Faculty of Süleyman Demirel University* A(1): 15-28.

Ahmad, K., Ahmad, M., Wekerle, C., 2013. Ethnobotanical Studies of the Eastern Plains of Takht-E- Sulaiman Hills. *Pakistan Journal of Botany* 45 (S1): 197-205.

Arnold, H., 1980. Trees in Urban Design, Von Nostrand Reinhold, New York.

Bernstein, D., 2010. Essentials of Psychology. Wadsworth, Cengage Learning.

Booth, N. K., 1983. Basic Elements of Landscape Architectural Design. Elsevier, U.S.A.

Brown, T.C., Daniel, T.C., 1984. Modelling Forest Scenic Beauty: Concepts and Application to Ponderosa Pine. USDA Forest Service Research Paper, RM-256.

Çakçı, I., 2007. A Research of Methodology for Visual Landscape Assessment in Landscape Planning. PhD. Thesis. Science Institute University of Ankara, Turkey.

Çakçı, I., Çelem, H., 2009. Assessment of visual landscape perception of urban parks. *Journal of Agricultural Sciences* 15 (1): 88-95.

Daniel, T.C., Boster, R.S., 1976. Measuring Landscape Aesthetics: The Scenic Beauty Estimation Method. USDA Forest Service Research Paper. RM-167.

Dewayne, L.I., 1991. Basic Principles of Landscape Design. Florida Cooperative Extension Service. University of Florida.

Doğan Y, Ugulu I & Durkan N (2013). Wild edible plants sold in the local market of Izmir, Turkey. *Pakistan Journal of Botany* 45 (S1): 177-184.

Gregory, R., 1987. The Oxford Companion to the Mind, Oxford University Press, New York.

Hansen, G., Alverez, E., 2010. Landscape Design: Aesthetic Characteristics of Plants. Environmental Horticulture Department. Florida Cooperative Extension Service. Institute of Food and Agricultural Sciences. University of Florida.

Jansson, M., Fors, H., Lindgren, T., Wiström, B., 2013. Perceived personal safety in relation to urban woodland vegetation – A review: *Urban Forestry and Urban Greening* (12):127-133.

Kaplan, R., Kaplan, S., 1989. The experience of Nature: A Psychological Perspective. Cambridge University Press, UK .

Kendal, D., Williams, K. J. H., Williams, N. S. G., 2012. Plant traits link people's plant preferences to the composition of their gardens. *Landscape and Urban Planning* (105): 34-42.

Lynch, K., 1960. The Image of the City. Publication of the Joint Center for Urban Studies, U.S.A.

Müderrisoğlu, H., Eroğlu, E., Özkan, Ş., Ak, K., 2006 Visual perception of tree forms. *Building and Environment* 41 (6): 796-806.

Müderrisoğlu, H., Aydin, Ş., Yerli, Ö., Kutay, E., 2009. Effects of Colors and Forms of Trees on Visual Perceptions. *Pakistan Journal of Botany* 41(6): 2697-2710.

Nordh, H., Østby, K., 2013. Pocket parks for people – A study of park design and use. *Urban Forestry and Urban Greening* (12): 12-17.

Ribe, R., 1989. The aesthetics of forestry: what has empirical preference research taught us? *Environmental Management* 13 (1): 55-74.

Saltan, Z. F., Ozaydin, O., 2013. Ethnobotany of Eskişehir and Its Environs. *Pakistan Journal of Botany* 45(S1): 207-214.

Tahvanainen, L., Tyrväinen, L., Ihalainen, M., Vuorela, N., Kolehmainen, O., 2001. Forest management and public perceptions – visual versus verbal information. *Landscape and Urban Planning* (53): 53-70.

TUİK, 2011. Türkiye İstatistik Yıllığı, Türkiye İstatistik Kurumu Matbaası, Ankara. ISBN: 978-975-19-5295-0.

Yumin, Y., Xiaodong, Z., Haiyan, Y., Xian, W., Yangfan, L., Yanfeng, Z., 2012. Assessing the visual quality of green landscaping in rural residential areas: the case of Changzhou, China. *Environmental Monitoring and Assessment* 184 (2): 951-967.

Zhang, H., Chen, B., Sun, Z., Bao, Z., 2013. Landscape perception and recreation needs in urban green space in Fuyang Hangzhou, China. *Urban Forestry and Urban Greening* (12): 44-52.