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METHODOLOGICAL APPROACHES TO ASSESS THE AESTHETICS OF PARK ENVIRONMENT

Nadiia Oleksiichenko[1] and Nadiia Gatalska[2*]

[1]National University of Life and Environmental Sciences of Ukraine, Department of Landscape Architecture and Park-Garden Construction, 19 Heneral Rodimtsev Str., Kiev, Ukraine.
E-mail: noolex@ukr.net
[2]National University of Life and Environmental Sciences of Ukraine, Department of Landscape Architecture and Park-Garden Construction, 19 Heneral Rodimtsev Str., Kiev, Ukraine.
[*]E-mail: gatalska@ukr.net

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Abstract

The paper presents the spectrum of the research of aesthetic assessment of the landscape with the involvement of respondents (23 people), which was carried out during the summer-autumn period directly in the park environment and with the use of photographs. When using different methodological approaches and according to a comparative analysis of peculiarities of perception of the scenery park environment, the interconnections between aesthetic assessment of park landscape and features that affect its formation were revealed. It was discovered that while evaluating the park environment directly in the place, the estimation is reduced in comparison with the pictures, although at the same time the positive features of the landscapes noted by the respondents are similar, and the negative ones have significant differences in the summer and autumn periods, which are also present when using different methods of the research. Thus, the relationship between the assessment of the aesthetic qualities of the landscape and the frequency of references by respondents, both positive and negative features of the park environment are determined primarily rather by the season, than by the method of conducting research. Despite the significant difference in the frequency of references of the features of the park landscapes under the different conditions and methods of conducting the research, it has been discovered that the force of influence of a particular feature on the assessment of aesthetic quality of park landscape does not determine its factor weight in the assessment, but it is related to it. At the same time, the features (subliminal and compositional) are revealed and their influence on the aesthetic evaluation is significant, which can be taken into account during green space planning. It is revealed that conducting the research of park landscapes directly in the park is reasonable, first of all, if it is necessary, to determine the positive features of the park environment, which influence the formation of a subjective 'general-landscape' emotional reaction to a certain landscape, which is revealed in the definition of subliminal features by the respondents.

Key words: emotional reaction, landscape assessment methodology, park landscape perception.

Introduction

The issue of involving the public in the assessment of the aesthetic qualities of the park environment becomes more and more relevant due to a number of factors, among which the definition of the international normative documents of ex-

pediency of the study of the landscape through the prism of human perception and parallel development of subject-oriented approaches to study aesthetics, namely – focusing the attention of scientists on man as a subject of perception. Daniel (2001) notes that the visual quality of the landscape can be determined as ′the relative aesthetic perfection of any landscape′, what can be measured on the observer's assessment. Individual scientists (Dramstad et al. 2006) do not consider expert-based methods to assessing the aesthetic quality of the landscapes as rational, considering their subjectivity. These scientists support the view that the characteristics of the landscape, taken as indicators of its aesthetic qualities by experts, may not correspond to the priorities in the visual assessment of the landscape by the public.

Currently, the spectrum of the aesthetic assessment of the landscape with the involvement of the respondents is expanding, as well as the application of the results, which focuses both on practical aspects, and is used to substantiate theoretical conceptions. In this context, it should be noted that the question of the methods and materials for studying the aesthetic preferences of the landscape by interviewing the respondents is controversial in the sources of scientific literature. The main issues of the discussion include the choice of the ways of conducting a research – on-site and through photographs.

The use of on-site study of the aesthetic qualities of the landscape includes finding the subject (person) in the environment of the object at the very moment of his perception and evaluation. During the study the environment is perceived both during motion and static reviews. Due to the multisensory perception of the environment, sensory perception and emotional evaluation prevail (Osychenko 2015). When using photographs, the object is replaced by a model, which may include plans, maps, satellite imagery, photographs, 3D models, etc. When using models, visual perception and rational assessment dominates (Dramstad et al. 2006, Osychenko 2015).

In turn, the philosophical basis of the methods of studying the aesthetics of the landscape includes distance theories and activity theories. Distance theory is based on the assertion that an aesthetic sensation is possible only from the objects that do not have a practical meaning for a person and are at a ′distance′ from him (Hrozdynskyi and Savytska 2005). Aesthetics is considered as an internal property of the objects and does not depend on individual features of the person. Landscape substitutes are used for research – models (maps, plans, satellite imagery, photographs etc.). Theory of activity is based on the philosophical and aesthetic direction, which involves knowledge of the object by ′immersion′ in it (Hrozdynskyi and Savytska 2005).

Relevance of using both methods of the landscape aesthetics study became a prerequisite for the formation of scientific works aimed at comparative analysis of the results obtained directly in the environment and under the condition of using the models. In particular, studies of Shelby and Harris (1985), aimed at identifying the priority methods for choosing evaluation data to determine the preferences of camping users, showed that photographs and written descriptions were consistent with 90 and 80 % of environmental assessment on-site (in environment). The analysis of characteristics (desirability and preference) testifies less consistency of methods (65–80 %), probably because

the photos and written descriptions are limited in their ability to show background and context features.

Convincing results on the possibility of using models for studying the aesthetic qualities of the landscape, in particular the photographs, presented by Stamps (1990), are based on the conducted meta-analysis of secondary research results of several scientists (11 sources of scientific literature) devoted to the comparative analysis of the study of visual preferences in various ways. The author discovered a strong correlation (r = 0.67–0.99) between preferences based on the photographs and on-site (in the environment). However, the author neither gives any specific preferences that were discovered, nor shows the details of conducting the research, the results of which are used for meta-analysis.

Later, Stamps (2010) carried out a comparative analysis of the subjective responses of the respondents resulting from the use of diapositives, photographs and in the environment and found correlation at the 0.82 level, on the basis of which the author concludes that both types of simulation generate statistically equivalent results, and therefore the choice of simulation carriers should be based on efficiency, not on the degree of their validity.

In addition, the analysis of sources of scientific literature indicates the widespread usage of various substitutes (models) to analyse the aesthetic appeal of landscapes – photographs (Polat and Akay 2015; Osychenko 2014, 2015), satellite imagery and maps (Dramstad et al. 2006), and 3-D models (Sang et al. 2008). At the same time, Dramstad et al. (2006) and Polat and Akay (2015) observe the critique of using photographs when investigating aesthetic preferences of the respondents, since they cannot fully reflect and describe real landscapes.

Summing up the results of the analysis of the sources of scientific literature, it should be noted that under the conditions of the research of the aesthetic preferences using models, the method of semantic differential is dominant, which involves the use of verbal antonyms to determine the ′general-landscape′ emotional reaction of the respondent to a particular landscape (Hofmann et al. 2012), and his assessment characterises the degree of its correspondence to the given adjective. In this way, the general psycho-emotional reaction to a particular landscape or the environment of the experimental object on the whole is determined, and the very similarity of such reactions obtained using different methods has been found by individual authors (Hershberger and Cass 1973; Shuttleworth 1980; Shelby and Harris 1985; Trent et al. 1987; Stamps 1990, 2010). However, the peculiarities of human perception of the environment are difficult physiological and psycho-emotional reaction that causes the formation of a number of issues important both in terms of applied and theoretical aspects of the research and formation of the landscape objects. Along with a large number of scientific works (Hofmann et al. 2012, Dupont et al. 2014, Polat and Akay 2015, Du et al. 2016), in which present the results of the study of the influence of the material components of the landscape on the aesthetic value of the landscapes, there are no data on the peculiarities of their influence on the formation of specific emotional reactions, which are the basis of the semantic differential. The influence of culture-historical, informational and symbolic significance, both separate material components, and mental images, associative values of individual knowledge about the environment, which are under evaluation, also occurs in the researches

of the scientists of the second half of the twentieth century (Lynch 1960, Kaplan and Kaplan 1978, Kane 1981, Bell 1999, Gobster 2001, Jankovic 2017), and are the basis for the formation of semantic differential scale during the estimation of the particular landscape objects, however the strength of their influence on the formation of preferences, as well as the defined landscape locations in the semantic space by the respondent, was left without attention.

Thus, the question of analysing the research methods of the aesthetic qualities of the park environment and identifying those that will contribute to obtaining reliable results in accordance with the tasks set is relevant.

The purpose of the study is to analyse methodological approaches to assessing the aesthetics of the park environment and to identify the interrelationships between the aesthetic assessment of the park landscape and the features that influence its formation.

Objects and Methods

The methodological basis for the study is the paradigm of the aesthetic preference (Osychenko 2015), as well as the psychophysical paradigm (Zube et al. 1982), in which the aesthetic qualities of the objects and patterns of perception are determined by the survey and evaluation of the object with the involvement of the respondents. The research is based on the studies of Thorpert and Nielsen (2014), Dupont et al. (2014), Hofmann et al. (2012), Shelby and Harris (1985), however, there are significant differences. First, it is the comparative analysis of the perception peculiarities of the park environment landscapes using different methods of the research, as well as allowing the respondents to independently determine the factors, which affect their evaluation, instead of using semantic differential scales.

Twenty three people were involved in the study. When substantiating the number of the respondents, it is worth paying attention to the data available in sources of scientific literature, where their number varies from 23 (Thorpert and Nielsen 2014, Dupont et al. 2014), 30 (Shelby and Harris 1985), 82 (Hofmann et al. 2012) to 409 (Polat and Akay 2015), and in some cases up to 836 (Osychenko 2014). The significant difference in the number of the respondents is related to the methods of the research. In particular, the largest number of the respondents is involved in surveys using models, most often photographs. In the case of conducting the research directly in the environment (Thorpert and Nielsen 2014), their number is significantly reduced due to the complexity of measuring and material costs. Stamps (1990), referring to a reasonable number of the respondents for the study, states about the number from 10 to 50 people. Hrozdynskyi and Savytska (2005) note the need to involve at least 20 respondents.

Respondents are students at the National University of Bioresources and Natural Resources of Ukraine, ′Landscape Management′ department. They are 20–22-year-old, including 9 men and 14 women. All respondents are citizens of Ukraine.

Characteristics of the research object

The object of the research is the memorial park of garden and park art ′Mariinsky Park′, part of the Nature Preservation Fund of Ukraine, located in the central historical part of Kiev. Twenty six locations were determined within the park for the landscapes estimation (Fig. 1), which are

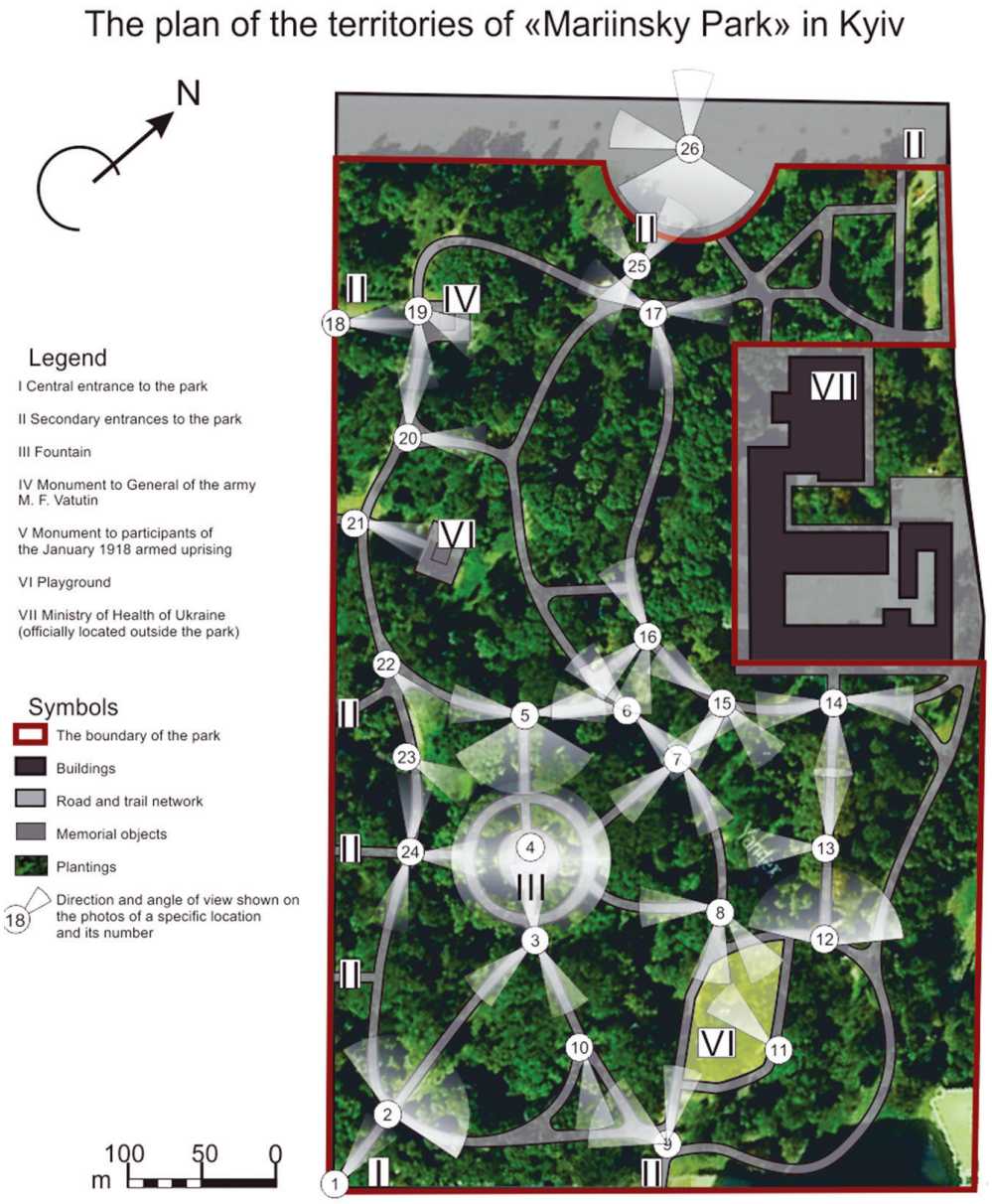


Fig. 1. Scheme of the locations in 'Mariinsky Park' (Kyiv, Ukraine) used to assess the aesthetic appeal of the park environment and the angles shown on the photographs.

presented in 63 pictures total.

Locations and photographs were selected in accordance with generally accepted methods of such studies (Daniel and Boster 1976), in particular those used in Hofmann et al. (2012), Polat and Akay (2015). They are based on the determination of the photo according to the purpose

of the study; in this case, it is a comparative analysis of the perception and estimation of the aesthetics of the park environment while actually being present in it and using the photographs. Therefore, the main requirement for selecting the photo is the most complete reproduction of the real situation in the park environment.

The feasibility of using multiple points of view when photographing a single location is confirmed by Sang et al. (2008), who note that to provide a reasonable assessment of the landscape, rather than a particular landscape, it makes sense to take a number of the photographs that will provide the necessary information about the components of the park environment as a whole. Accordingly, the number of photos for one location was determined by the intensity of the change of the landscapes and viewing angle.

Photographing and order of conducting the research

Since the research involves identifying features of the perception of the park landscapes during the growing season, mainly those that characterise the season, the time was determined in accordance with this requirement. In particular, taking pictures of park landscapes took place on August 31, 2017 (to illustrate the summer features of the park environment) and on October 5, 2017 (to illustrate the autumn landscape features) from 13:00 to 16:00 taking into account the human factor on the photographs. For taking pictures, a semi-professional digital camera with a resolution of 20.1 million pixels, camera lens with 26× optical zoom and panoramic mode was used. The angle of the most photos (59) was 30°. Four photos were taken as 3-phase panoramas in such a way that they reflected all the characteristics of panoramic viewing points. The photos are printed in 10×15 format (matte paper), and panoramic in 10×29 format.

The assessment of the park landscapes directly in the environment was conducted twice – when the conditions were quite comfortable for the person, most often in the summer period and under the conditions that can worsen comfort due to lowering the temperature, presence of wind gusts, and increasing humidity (characteristic features of the autumn). Taking into consideration the aim of the study, as well as a number of objective and subjective factors, the first assessment (the main requirement of which is to conduct the study in comfortable for the person weather and colour conditions of the summer landscapes) was conducted on September 21, 2017, during 13:00–16:00, air temperature +24 °C, relative humidity during the assessment varied from 53 to 45 %, wind speed – 2 m/s and direction of wind was eastern, pressure was 742 mm, day was sunny. The estimation of the autumn landscapes was carried out on October 09, 2017, during 13–16 hours in the conditions that differed significantly – air temperature +10 °C, relative humidity varied from 83 to 59 %, wind speed – 4–5 m/s and direction of wind – north-western and western, pressure – 740 mm, the day was cloudy, which is typical for so-called ′golden autumn′. The very estimation of the landscapes in the environment was carried out after the respondents had already evaluated landscapes on the photographs.

Questioning and processing of the results

Methods of determining the aesthetic preferences of the respondents can be divided into 2 groups. Comparative analysis of the aesthetic assessment of the

landscape obtained by interviewing the respondents and analysis of the parameters of the landscape components belong to the first group. In this case, the parameterization of the components is carried out by the experts in accordance with the purpose of the study, and the photos are used as models (including panoramic (Polat and Akay 2015), satellite imagery and maps (Dramstad et al. 2006), 3-D models (Sang et al. 2008).

The second group is based on the use of semantic differential developed by Charles E. Osgood in 1952 and involves the use of verbal antonyms to determine the 'general-landscape' emotional response of the respondent to a particular landscape (Hofmann et al. 2012). A comparative analysis of using these two methods was carried out by Kane (1981), who determined that both methods provide high scores that highly correlate with each other (S_r = 0.81 at n = 46).

Both of these methods were used for the personal research, however in order to carry out the given tasks the parameterisation of the components of the park environment was not done by the experts. Instead, the respondents were offered to independently substantiate the features of the landscape, which are positive and increase its aesthetics or reduce it and might be defined as negative. Characteristics could include both the material components of the landscape and associative notions and feelings that should have been indicated in the appropriate column opposite the number of the photo or location (where the evaluation of the environment was conducted) after evaluating a particular landscape on a 10-point scale, where 10 is the highest score. As a basis, the technique used by Osychenko (2015) was used to determine the aesthetic preferences of urban environment.

The analysis of the results envisaged the distribution of the above-mentioned features of landscapes into groups (Table 1) located in the Excel spreadsheet, with the parallel calculation of the average points of each individual landscape, after which the frequency of mentioning a certain feature by the respondents in the negative and positive contexts was calculated.

For a comparative analysis of the average scores, to estimate the views by means of the photos and directly in the environment, the arithmetic mean values of the photos corresponding to one location were used. For the output data analysis, the statistical methods such as probability theory were used. In particular, the Pearson correlation analysis was used to determine the relationship between the average indicator of the visual quality of each photograph (and location) and the frequency of respondents` references, as well as the interdependence of the features among themselves.

Results

In the process of analysis of the average scores of park landscapes given by the respondents by photographs and in the environment, decrease was obtained in the estimation in the second case, which during the growing season makes 8.3 % in summer and 19.5 % in autumn. In particular, the average score for the park environment in summer according to the photographs makes 7.9, in the environment – 7.3, in autumn – 7.3 and 5.9, respectively. As a result of the correlation analysis, a significant correlation (0.539) was found between the average score of photos and locations in the environment in summer and moderate correlation (0.405) – in autumn.

Table 1. Groups of the features that are noted in different contexts by the respondents and selected according to the results of processing the questionnaires.

A group of the features	Components	Elements and characteristics
Material components of the park environment	Spatial components	Plantings
		Architectural elements
		Terrain
		Components of borrowed landscapes
	Elements of the planning system	Squares
		Road network planning
		Paving pattern
	Spatial characteristics	Panorama
		Perspective
		Visual connections
Colour		Colorfull, green, monotonous, gray etc.
Basic features of comfort (rational level)	Convenience of travel and recreation	The junction of road and path network
		Organization of places for rest
		Organization of places of public service
	The comfort of environment	Light or dark, spacious or cluttered, clean or dirty, comfortable of uncomfortable
	Sanitary condition of the park environment components	Road and path covering
		Lawn
		Street furniture of utilitarian purpose and elements of engineering equipment
Emotional and associative		Harmoniously or disharmoniously
		Bright or monotonous
		Interesting or boring
		Atmospheric and etc.

As the result of the correlation analysis between the average score and the frequency of mentioning by the respondents of the positive characteristics of the autumn landscapes on the photographs, that influenced their assessment, the correlation was identified at the 0.772 level, however between the negative ones it was inverse at the -0.703 level. Therefore, both negative and positive features of the landscapes given by the respondents are representative and determine a general aesthetic assessment. At the same time, the correlation between the similar indicators determined in the environment was at the 0.695 and -0.014 levels, which in turn suggests that there is no connection between the frequency of mentioning the characteristics that had a negative impact on the aesthetic assessment of the landscape. Comparing the results of the correlation analysis between similar indicators of the summer landscapes, it is advisable to pay attention to the similarity of the indicators obtained as a result of the photo estimation, where the correlation was 0.741 and negative – -0.85. The results obtained in the environment correlated far more closely, namely, the correlation between the assessment of the landscape and the frequency of mentioning the positive features and characteristics of the environment was 0.823, while the negative ones were 0.801. These results suggest

similarity of the relationship between the environment of 'Mariinsky Park' and its aesthetic quality in the various ways of conducting the study namely in this period.

The next stage was the analysis of the features of the park environment identified by the respondents (Fig. 2) using different research methods, during which the significant correlation (0.605) between the frequency of mentioning the positive features of the summer landscapes and moderate correlation (0.444) of the autumn landscapes of 'Mariinsky Park' was found. Comparing the results with the data of the literary sources (Stamps 1990), it is worth noting the consistency with the data received in summer and the difference from the results received in less comfortable autumn conditions.

In addition, an analysis was carried out of the connection between the benefits of respondents noted in different seasons, during which a strong correlation between the positive qualities noted in summer and autumn in the environment (0.769) and significant with similar data obtained from the analysis of photos (0.604). Such

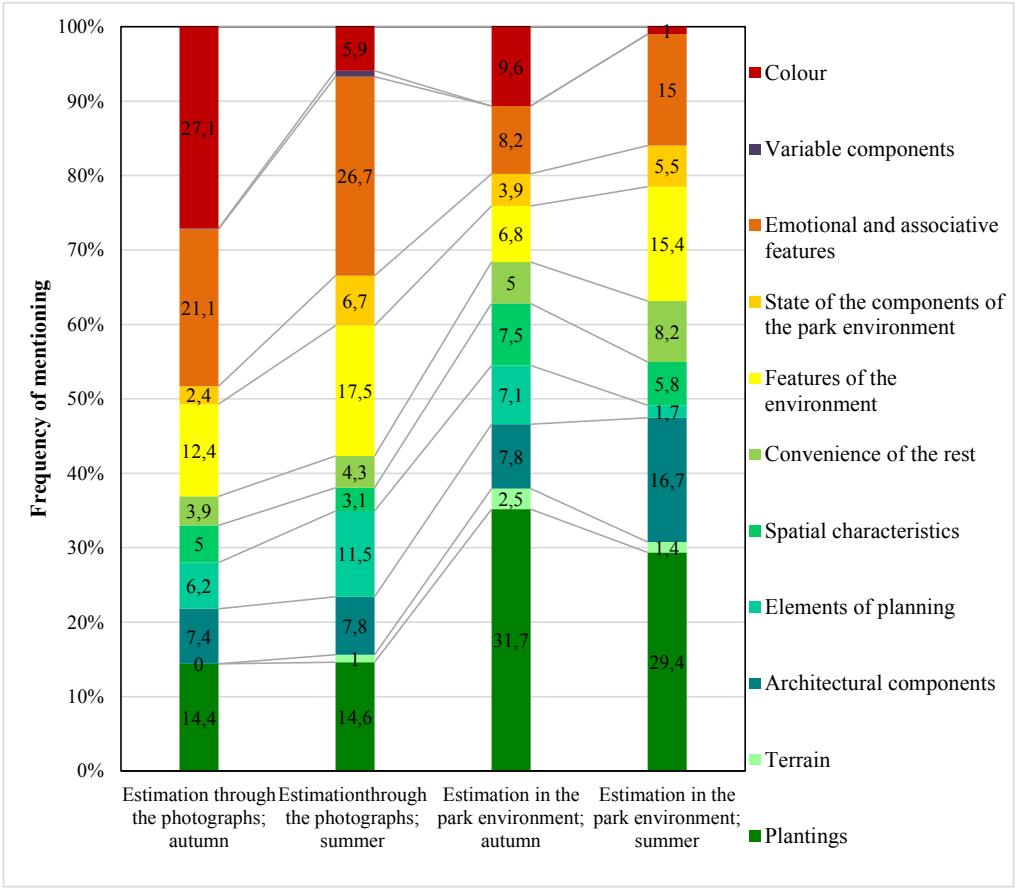


Fig. 2. The frequency of mentioning the group of the landscape features as positive factors influencing the assessment of their aesthetic qualities.

circumstances are a prerequisite for substantiating the hypothesis that the features and components of the Mariinsky Park landscapes, which have a positive effect on their aesthetic appeal, are similar during summer and autumn, and this connection is the closest when perceiving landscapes directly in the park environment.

At the same time, a correlation analysis between the frequency of mentioning the features that negatively affected the aesthetic quality of the park landscapes showed quite different results. Thus, along with a very strong correlation between the mentioning the features on summer and autumn photos (0.964) and in summer in the park environment and on the photos (0.929) the lack of connection is revealed between the features noted in different conditions in the park environment, as well as in the park environment in autumn and on the photos. Such circumstances substantiate a necessity of comparative analysis of the frequency of mentioning the features and characteristics of the environment obtained in different ways during the growing season in order to identify the probable causes that influenced the results of the autumn evaluation conducted within the park.

Among the positive factors of the park landscapes, the number of mentioning of which most often fluctuate between the photographs and the environment, it is worth noting the plantings (the number of mentioning was twice bigger in the environment), emotional and associative features (far fewer in the environment than on the photos) and colour (differences are observed both between methods and the time of conducting the research) (Fig. 3). In addition, a significant (more than double) increase in the frequency of mentioning of the architectural elements, as positive features of the summer landscape, while researching in the park environment in relation to other conditions was revealed.

The results of the analysis of the negative factors are significantly different – the difference in the frequency of the mentioning is the largest in the characteristics of the environmental features in the conditions of evaluation in the park in the last decade of October and are related mainly to microclimatic features and noted by the respondents as 'windy', 'cold', 'wet' and others (Fig. 4). In general, the number of mentioning related to the negative environmental features is 53.3 % of the total number of mentioning of the negative features and characteristics of the park environment during the period. At the same time, at this very time the frequency of mentioning the negative state of the components of the park environment comparing with other conditions and methods of conducting the research is the lowest.

Summing up the analysis of the frequency of mentioning the features of the park environment and the average score, it is advisable to pay attention to Osychenko (2015), who believes that the effect of the feature on the assessment of the aesthetic quality is not limited by the frequency of mentioning, but it is a process even more complicated and requires further studies. Taking into account the author's opinion based on a comprehensive analysis of the aesthetics of urban environment, an analysis of the interrelations between the groups of the features and the average score, as well as among them, was made, which became the third stage of the study.

Correlation relationship of different strengths between the numbers of the features, mostly indicated by the evaluation of the summer landscapes, was revealed. At the same time there are some

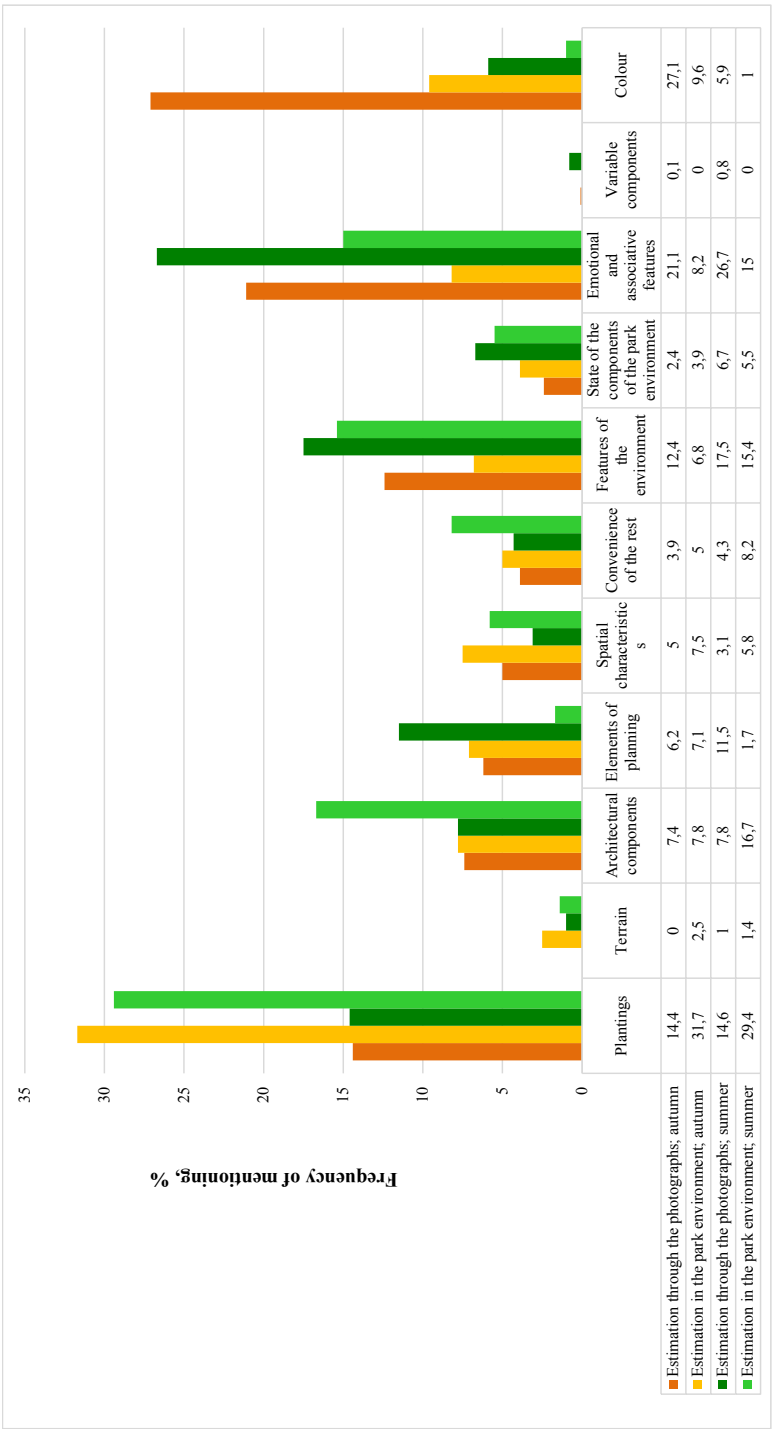


Fig. 3. Structure of the frequency of mentioning the positive qualities of the landscapes under different conditions and methods of the research.

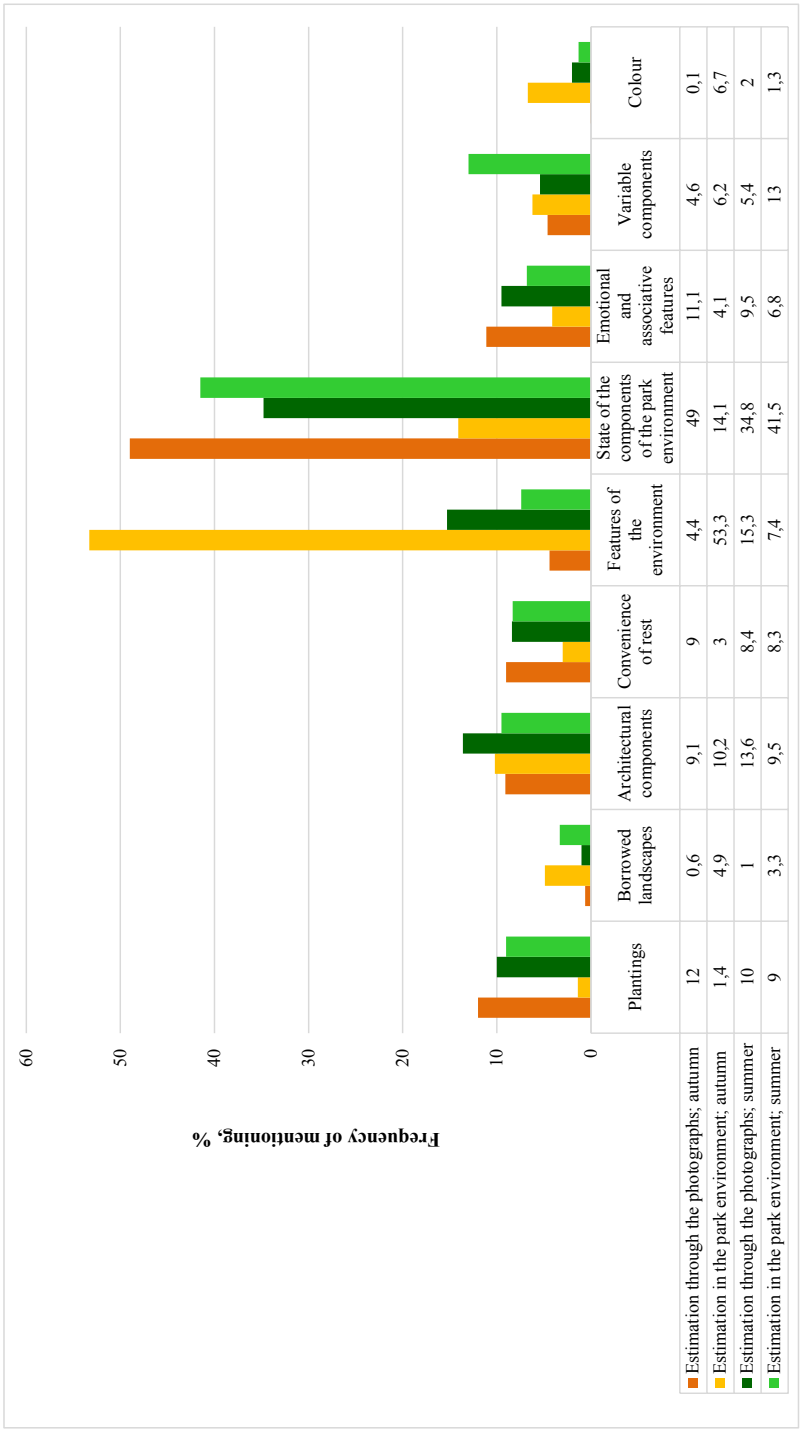
features between which and the average score the correlation relationship both direct and inverse is almost absent. First of all, it is advisable to note the negative features of the environment when assessing respondents' comments in autumn between which despite the huge number of mentioning (see Fig. 4) and an average score, correlation is at 0.054 level. It is interesting to note the presence of inverse correlation between the features of the environment (mainly related to comfort), which is negative in respondents' opinion and the average score noted in the summer landscape in the environment (-0.211) and in the photo (-0.264).

Analysing the direct correlation between the average score and the individual features of the landscapes, it is worth starting with the features, which are the emotional and associative characteristic of the park environment, and the share of their mentioning by the respondents is significant both in the summer and autumn landscapes under the different methods of conducting the research. In addition to the emotional and associative features, the significant correlation was found only between the colour of the photos of the autumn landscapes and the average score (0.502), as well as between the architectural components and the assessment of the summer landscapes, carried out directly in the park environment (0.547). In the context of the significant frequency of the plantings mentioning, as a positive feature of the evaluation in the park environment, it is worth noting that there is a moderate correlation in both seasons (summer – 0.310, autumn – 0.432).

The closest inverse correlation was found between the state of the components of the park environment and the average score in the evaluation of summer landscapes by the photo, which is on the level -0.614. Significant inverse correlation was found between the assessment of the landscape and the number of the mentioning of people and cars presence within the park – during the photo assessment it was at the -0.6 level, while in the environment it is level -0.558, which confirmed the research results of Acar et al. (2006); Arriaza et al. (2004) about the negative impact of people and artificial elements (not inherent to the park environment) in the landscapes.

The results of the analysis of the aesthetic attractiveness of individual park landscapes testify to the importance of the influence of disharmonious variable components of the park environment. Thus, it was determined that autumn landscapes estimated by photos No 26.2 and No 26.4 received the lowest score (5.0), however the same photos, with 9.2 and 9.7, respectively, and taken in summer, received the highest score (Fig. 5). The main difference between the landscapes is the presence of people and vehicles in the park in October.

The average score of the landscapes of this location (No 26) obtained by estimating photos is significantly different, namely, it is the highest among all summer photographs and the lowest among all autumn photographs. In the environment conditions, the situation is similar: the highest score (9.3) was found in the assessment of the 26th location in summer, and the lowest (4.1) within the 25th location in autumn near the 26th location (see Fig. 1), whose average score was 4.6. Describing the characteristics that the respondents identified as negative on the photos of the autumn landscapes, it should be noted that 91 % of the respondents indicated such variable components as cars and people on photo No 26.2 and 86 % on photo No 26.4. At the same time,



	Plantings	Borrowed landscapes	Architectural components	Convenience of rest	Features of the environment	State of the components of the park environment	Emotional and associative features	Variable components	Colour
Estimation through the photographs; autumn	12	0,6	9,1	9	4,4	49	11,1	4,6	0,1
Estimation in the park environment; autumn	1,4	4,9	10,2	3	53,3	14,1	4,1	6,2	6,7
Estimation through the photographs; summer	10	1	13,6	8,4	15,3	34,8	9,5	5,4	2
Estimation in the park environment; summer	9	3,3	9,5	8,3	7,4	41,5	6,8	13	1,3

Fig. 4. Structure of the frequency of mentioning the negative qualities of the landscapes under the different conditions and methods of the research.

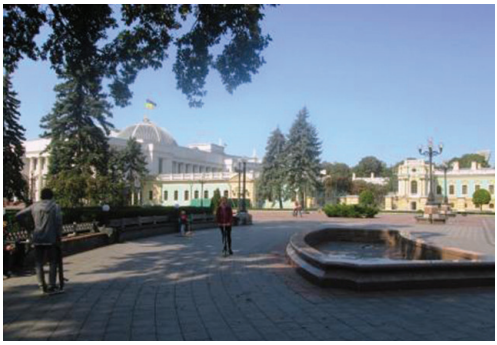


Photo No 26.2 (31.08.2017)

Photo No 26.2 (05.10.2017)

Photo No 26.4 (31.08.2017)

Photo No 26.4 (05.10.2017)

Fig. 5. The photos that received the highest (left) and the lowest (right) average scores.

only 10 % paid attention to the disharmony of the environment and another 10 % – to the broken fountain. In turn, far fewer respondents paid attention to the positive characteristics of the autumn landscapes – only 20 % (photo No 26.2) and 40 % (photo No 26.4), including planting composition, architecture of the palace, as well as space and illumination of the square. In the environment conditions the situation is the same – the presence of variable components that are inappropriate in this environment was noted by 57 % of the respondents on location No 25 and 54 % – on location No 26. At the same time, 19 % of the respondents (location No 25) and 14 % (location No 26) identified other negative features, including the environment – cold, noise, wind, bad smell.

In the case when the assessment of the landscapes on the 25th and 26th locations was the highest, as a positive feature the respondents highlighted the architecture of the palace – 20 % and 25 % respectively (under the conditions of the assessment in the environment) and 19 % (under the conditions of the assessment by the photos, photo No 26.4). On photo No 26.2, taken in summer, the respondents highlighted topiaries (19 %) as a positive feature of the landscape. Actually, when evaluating in the environment of the 26th location, respondents highlighted groups and regular compositions placed in niches directly on the square (30 % of the respondents in total), however the mentioning of the topiaries was absent.

The negative factors include the state of the components of the park environment – 50 % of the respondents during photo assessment and 10 % during the environmental assessment. Using the determination coefficient, it is possible to state with a probability of 99 % that the decrease of the aesthetic qualities of 'Mariinsky Park' landscapes at the level of 31–36 % (depending on the method of research) is influenced by the variable components discovered in autumn.

The correlation analysis between several groups of the features and the average score for identifying closer interconnections of the features of the park environment and its aesthetic appeal to human being was performed (Table 2).

Table 2. Correlation between the frequency of mentioning several groups of the features and characteristics and the average score of the landscape.

The characteristics and features of the environment	Correlation between the frequency of mentioning and the average score of the landscape			
	Estimation by the photographs		Estimation in the park environment	
	Autumn	Summer	Autumn	Summer
Positive				
Compositional features (plantings+architectural components+terrain+spatial characteristics+ elements of planning)	0.358	0.518	0.496	0.607
Basic features (convenience+features of the environment+state of the components of the park environment)	0.014	0.290	0.053	0.499
Comfort of the rest+state of the components of the park environment	0.054	0.256	0.138	0.273
Features of the environment+ emotional and associative features	0.496	0.553	0.510	0.698
Colour+plantings+architectural components	0.589	0.766	0.617	0.556
Negative				
Plantings+borrowed landscapes+architectural components	-0.053	-0.419	-0.181	-0.421
Comfort of the rest+state of the components of the park environment	-0.196	-0.613	0.383	-0.557
Features of the environment+ emotional and associative features	-0.251	-0.449	-0.037	-0.238
State of the components of the park environment+features of the environment	-0.293	-0.642	-0.191	-0.519
Variable components+state of the components of the park environment+features of the environment	-0.694	-0.651	-0.371	-0.539
Colour+plantings+borrowed landscapes+ architectural components	-0.123	-0.422	-0.194	-0.455
Variable components+features of the environment	-0.625	-0.314	-0.324	-0.248

Taking into account the significant influence of the emotional and associative features on the assessment of the aesthetic quality of the park environment (confirmed both by the frequency of mentioning these features and by the results of the correlation analysis), the correlation analysis between these features and other characteristics of the park environment (basic and compositional) was carried out to determine those that may affect the formation of emotional and associative concepts that determine the peculiarities of the perception of the characteristic of the environment. The distribution of the park environment features was measured in accordance with their peculiarities – the basic features characterise the general, both visual and physical comfort of the park environment, and compositionally are associated with the compositional consistency of the landscapes.

According to the results of the analysis, positive basic characteristics do not affect the formation of the positive emotional and associative features, regardless of the time and method of conducting the research. Instead, the negative ones have minor negative effect, which is revealed through a moderate inverse correlation between given groups of the features, which also does not have a significant difference under the different conditions of the research (Table 3).

Specifying which groups of the basic features of the park environment can influence the formation of the emotional and associative concepts, one should pay attention to the heterogeneity of the correlation between both groups of the features, and the way of the research and seasonal peculiarities. In particular, a direct moderate correlation (0.360) is observed only between emotional and associative features and the state of the components of the park environment together with the variable parts of the landscapes in the autumn environment, and the inverse correlation is only on level -0.091. In other cases, the situation is the opposite – a direct relationship is either poor or almost absent, whereas the inverse relationship is moderate (see Table 3). In addition, the presence of a poor (both direct and inverse) correlation between the features of the environment and emotional and associative under different conditions and time of the research should be noted. The exception is the reverse moderate correlation between given features based on the results of the research conducted in the environment in early September. At the same time, the number of negative mentioning of the environmental features in this period is only 7.4 %, as opposed to 53.3 %, recorded at the end of October during research in the park environment (see Fig. 4).

The results of the correlation analysis of the compositional and emotional and associative features showed the existence of a direct poor correlation in the autumn landscapes of ′Mariinsky Park′ in terms of the research using photographs. In other cases, direct correlation are moderate, which may be the evidence of a certain influence of the positive compositional features of the park environment on the formation of psycho-emotional associations in the process of perception. At the same time, the influence of the negative compositional features, which is determined by the inverse correlation, is hardly tangible while evaluating autumn landscapes, despite the method of conducting the research, and in the summer landscapes it is moderate and poor in the conditions of the on-site method and through the photographs, respectively.

Table 3. Correlation between the frequency of mentioning the emotional and associative features and characteristics of the material components of the park environment.

Features of the park environment that correlate with the subliminal features	Correlation (direct/inverse)	Method of conducting	Time of conducting
Compositional features of the components of the park environment	0.317/-0.318	On-site	Summer landscapes
	0.306/-0.269	Through photographs	
	0.342/0.059	On-site	Autumn landscapes
	0.248/-0.046	Through photographs	
Plantings+architectural components+ elements of planning	0.567/-0.420	On-site	Summer landscapes
	0.274/-0.292	Through photographs	
	0.367/ 0.059	On-site	Autumn landscapes
	0.032/0.066	Through photographs	
Plantings+architectural components+colour	0.288/-0.305	On-site	Summer landscapes
	0.331/-0.298	Through photographs	
	0.453/0.128	On-site	Autumn landscapes
	0.265/-0.087	Through photographs	
Basic features	0.058/-0.346	On-site	Summer landscapes
	0.026/-0.378	Through photographs	
	0.026/-0.378	On-site	Autumn landscapes
	0.029/-0.419	Through photographs	
State of the components of the park environment+variable components	0.056/-0.312	On-site	Summer landscapes
	0.161/-0.349	Through photographs	
	0.360/-0.091	On-site	Autumn landscapes
	0.069/-0.426	Through photographs	
Features of the landscape	0.127/-0.346	On-site	Summer landscapes
	0.059/-0.109	Through photographs	
	0.140/-0.220	On-site	Autumn landscapes
	0.100/-0.052	Through photographs	

In the context of determining the relationship between the certain groups of the features with the emotional and associative characteristics, the results of the analysis of the material components of the park environment are important. Thus, as a result, a significant direct correlation (0.567) was found between the emotional

and associative features and the material components of the summer landscape (plantings, architectural components and planning elements), determined directly in the park environment. At the same time, under the conditions of using the photographs during the research, the correlation is greatly reduced. A similar situation is observed when comparing the correlation between the negative features of the above mentioned components. From methodological point of view, it is worth paying attention to reducing the correlation between these features in autumn, when using the on-site method of research and its significant reduction when using photographs.

At the same time, in the case of inclusion of the colour to the features of the plantings and architecture and exclusion of the mentioning of the planning elements, the situation is changing – the correlation between the features of the autumn landscapes and emotional and associative increases (especially when evaluated in the environment), and between the features of the summer landscapes this indicator decreases. Such circumstances can be an evidence of the significant influence of colour on the perception of the park environment namely in the autumn period, as evidenced by the presence of a moderate positive correlation (0.4) between the emotional and associative features and colour on the photos of October landscapes. This pattern can be an evidence of the difference in the influence of the components of the park environment on the formation of associations in its perception in different research conditions. In particular, the evaluation of the photos does not give us a clear idea about the needed features of 'Mariinsky Park', which determine the location of its landscapes in the semantic space, unlike the environment.

Discussion

As a result of the conducted researches, it was discovered that in the conditions of the park environment evaluation on-site (in the environment), the assessment is reduced in comparison with the photographs, while the positive features of the landscapes are similar, as mentioned in the literature (Stamps 1990, 2010). However, the negative features of the summer and autumn landscapes have significant differences that are also present under the conditions of using different research methods in the last decade of October, which can be the evidence of the impact of weather conditions and reduced environmental comfort, especially taking into account the frequency of mentioning these characteristics by the respondents.

As a result of the correlation analysis between the frequency of mentioning the features of the park landscapes and the average score given by the respondents, it was found that the effect of the attribute on the assessment of the aesthetic quality does not directly determine its factor weight in the assessment, but it is related to it, as evidenced by the study of Osychenko (2015). In particular, the positive influence of the plantings on the perception of the park landscapes is much more highlighted by the respondents in the conditions of observation in the park environment than when looking at the photos, but the correlation between the positive characteristic of this feature and the average score is similar regardless of the conditions and method of conducting the research.

Among the features that influence the aesthetic value of the landscapes, it is useful to note the emotional and associative features that characterise the psycho-emotional impact of the park envi-

ronment on the person and correlate with the average score irrespective of the vegetation season and the methods of conducting the research, and therefore, the results can be considered reliable. In addition, this is confirmed by the data available in the sources of scientific literature. At the same time, the widest range of the associative notions, which make it possible to determine the place of the park landscapes in semantic space, is found in the conditions of the landscape evaluation by the photographs.

Regardless of the research method, the disharmoniously variable components of the park environment, which negatively affected the aesthetics of the landscapes, as well as the state of the components of the park environment, can be attributed to the features which reveal reliable results. In particular, an analysis of the interrelation of the variable parts of the park space (vehicles, significant number of people, including the police) with an assessment of the aesthetic appeal of the Mariinsky Park landscapes negatively affected the aesthetics of the park environment, regardless of the method of research. A similar situation is observed in the relatively unsatisfactory state of the components of the park space. In particular, the frequency of mentioning the features varies in the summer and autumn landscapes and under the different conditions of the studies, but it is the highest in the evaluation of the autumn landscapes in the conditions of the park environment. However, the correlation with the average score in the autumn period is poor under the different ways of carrying out the research.

The only one group of the park environment, the perception of which has significant differences in the evaluation in the environment and on the photos, are positive characteristics of the architectural components highlighted in the summer landscapes, which is confirmed by both the frequency of mentioning this feature and the significant correlation relationship (0.547). However, the negative characteristics of this feature do not have significant differences in the use of the different methods of the research. Such circumstances are the basis for making a conclusion about the possibility of underestimating the influence of the architectural components of ′Mariinsky Park′ during the photograph evaluation.

Significant influence on the perception of the landscapes of ′Mariinsky Park′ is observed according to the colour of the autumn landscapes evaluated on the photographs, which is confirmed by the frequency of mentioning this feature (27.7 %) and the correlation with the average score of 0.502. The frequency of mentioning the autumn colour of the park landscapes as a positive feature under the condition of the assessment in the environment is also greater than in the summer, but the correlation with the average score is moderate. Respondents noted that the colour as a positive feature in the park environment has the least effect on the respondents' preferences in the summer, which may be due to the perception of mainly green colour as the background of other components of the park space, especially the architectural elements. At the same time a moderate inverse correlation connection at the -0.305 level, between the frequency of mentioning the colour as the feature, that negatively affects the aesthetics of the landscape during the summer period in the environment, and the average score was revealed.

During the analysis of the interconnection of several groups of the features with the average score, it was found that the closest direct correlation are observed

between the total number of positive mentioning of the colour, plantings and architecture and aesthetic assessment of park landscapes. The tightness of the relationship has minor differences depending on the conditions of the research method, which testifies in favour of the similarity of their perception, as well as the impact on the aesthetic qualities of the landscapes during the summer-autumn period. Focusing on the correlation analysis of the interconnection of the several groups of the features with the average score, it is reasonable to note that the significant differences are observed, mainly, between the results obtained at different times, rather than using different methods (see Table 2).

It is reasonable to conduct the study of the park landscapes directly in the park, in the first place, in case of necessity to determine the positive features of the park environment that influence the formation of the subjective ′general-landscape′ emotional reaction to a particular landscape. This is shown in the definition of the emotional and associative features by the respondents, because according to the results of the analysis of the relationship between the compositional and basic features with emotional and associative, the increase of the direct correlation between the results obtained in the environment in comparison with the photos (see Table 3) has been received. In the conditions of conducting the research though photographs, the correlation between the features that characterises the compositional features of the park environment is muchpoorer, which complicates the process of understanding which one influence the emotional and associative perception of the landscapes of the researched park object largely. The results of the analysis of the influence of the negative characteristics of the material components of the park environment on the definition of the emotional and associative features are also important. In particular, it is a poorer inverse correlation while estimating the autumn landscapes and the presence of moderate and poor while estimating the summer landscapes (on-site and through photographs, respectively). The given results are the reason for forming the statement that the compositional imperfection of the material components of the park environment has no pronounced effect on the emotional and associative perception of the environment of ′Mariinsky Park′ in autumn, and in summer, it is poorly expressed.

Conclusions

When applying various methodological approaches and according to the results of comparative analysis of the peculiarities of the perception of landscapes of the park environment, interrelations between the aesthetic assessment of the park landscape and the features influencing its formation are revealed. The relationship between the assessment of the aesthetic qualities of the landscape and the frequency of mentioning by respondents to both positive and negative signs and characteristics of the park environment is primarily determined by the season of conducting the research, and not by the way of conducting them. It is established that the force of influence of a specific feature (or group of features) on the assessment of aesthetic quality does not directly determine its factor weight in the assessment, but is related to it. Along with that the revealed features (emotional and associative and compositional), the influence of which on aesthetic assessment

are significant regardless of the season or method of their determination.

The results obtained in the autumn period, where, along with the strong positive correlation between the estimation and the positive characteristics of the landscape, the inverse correlation between the negative characteristics and the estimation is almost absent.

It is determined that conducting the research of the park landscapes directly in the park is relevant, first of all, if it is necessary to determine the positive features of the park environment, which influence the formation of the subjective 'general-landscape' emotional reaction to a certain landscape by the respondents, which can be taken into account in the study of existing park objects and the development of reconstructive measures.

Further scientific researches may be aimed at studying the peculiarities of the influence of cultural-historical, informational and symbolic significance, both as certain material components and mental images, associative values, which may arise in the perception of the park environment and influence the formation of the preferences of the respondent.

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