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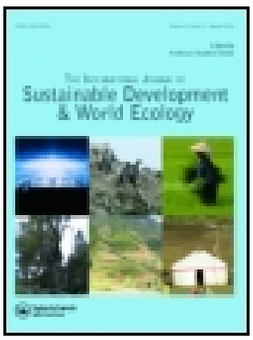

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Visitors' perception based on five physical senses on ecosystem services of urban parks from the perspective of landsenses ecology

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ABSTRACT

Urban parks not only improve the urban ecology but also provide cultural ecosystem services to city dwellers. This study investigated the relationship between cultural ecosystem services provided by urban parks and visitors' perception of urban park from the perspective of landsenses ecology. A perceptual indicator system was developed following the analysis of landsense elements among the park elements, for four sensory dimensions. A perceptual assessment model was established using the Importance-Performance Analysis (IPA) method, which could be used to divide the perceptual indicators into five grades. We found that the importance level of perceptual indicators was influenced by the type of park elements and the functional area of the visitors' sensory apparatus. On the one hand, park elements that are common or can be perceived easily receive more attention. On the other hand, among the distance receptors, wider functional area might be related to the higher importance level of the perceptual indicators; the immediate receptors also have considerable influence on perception since visitors contact with the environment directly through these. The most important indicators were related to vision and touch, including 'vision of plants', 'vision of water', 'feel of sunlight', 'touch of roads', and 'sound of animals'. Furthermore, we conducted an assessment on landsense satisfaction of a typical urban park in Beijing, suggesting ways to improve visitors' perception of urban parks from the perspective of landsenses ecology. The assessment showed that the urban park design and management practices could be improved to increase visitors' satisfaction.

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Landsense; urban ecology; ecosystem services; urban park; perception

1. Introduction

As one of the most important forms of green space (Hunter and Luck 2015), urban parks offer a unique setting within the urban landscape (McCormack et al. 2010), contributing to the urban sustainability by providing a wide range of ecosystem services (Yan et al. 2018). Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life (Daily et al. 1997; Zhao et al. 2009). Urban ecology can be improved through ecosystem services such as carbon capture (Kim et al. 2015), reduction of air pollution (Selmi et al. 2016), and mitigation of the 'Heat Island Effect' (Estoque et al. 2017).

More importantly, as the preferred place for recreation and amenity enjoyment in urban settings (Jim and Chen 2006), urban parks provide significant cultural ecosystem services by offering recreational opportunities to dwellers (Hayward and Weitzer 1984). Cultural ecosystem services (CES) are the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences (MA 2003). Exposure to green space is beneficial to physical health including contributing to a lower likelihood of obesity (Nielsen and Hansen 2007; Pereira et al. 2013), a lower risk of disease (Mitchell and Popham 2008; Samawi 2013), and an increased survival in elderly populations (Lee and Maheswaran 2011). Visiting urban parks can also lead to positive mental health outcomes (Barton and Pretty 2010) such as stress reduction (Ulrich 1981; Grahn and Stigsdotter 2003), restoring mental capacities (Kaplan 2016), and fostering social bonds (Coley et al. 1997; Kuo et al. 1998).

In this context, to encourage visits to urban parks, the perception of individual visitors in the parks must be taken into consideration. Further, conducting an assessment of urban parks from the perspective of landsenses ecology could help us obtain specific information about sensory experience of visitors, which could provide guidance on improving park environment to meet visitors' satisfaction criteria (Yan Yan et al. 2017). This study aims to investigate the relationship between cultural ecosystem services provided by the urban parks and visitors' perceptions of urban park, from the perspective of landsenses ecology. This is achieved by establishing a perceptual indicator system and developing a perceptual assessment model. Based

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on the results of supplementary satisfaction assessment, we suggest ways to improve urban park design and management practices, in order to promote visitors' satisfaction and well-being.

2. Indicators and methods

2.1 Landsenses ecology

Landsenses ecology (Zhao et al. 2016; Dong et al. 2016) is a scientific discipline that studies land-use planning, construction, and management toward sustainable development, based on ecological principles and the analysis framework of natural elements, physical senses, psychological perceptions, socio-economic perspectives, process-risk, and associated aspects. The natural elements include light, temperature, water, soil, geomagnetism, radioactivity, topography, and morphology, etc. Physical senses relate to the senses of sight, smell, hearing, taste, light, and touch (e.g. wind speed, wind direction, temperature, humidity, etc.). Psychological perceptions include some elements of religion, culture, vision, metaphor, security, community relations, well-being, etc.

From the perspective of individual visitors, landsenses ecology highlights the consideration of natural elements and physical senses of visitors in the design, and management of urban parks, contributes to decision-making to increase landsense satisfaction of visitors exposed in nature. Two categories of the sensory apparatus can be defined: the distance receptors (e.g. eyes, ears, nose, etc.) and the immediate receptors (e.g. skin, membranes, muscles, etc.) (Hall 1966; Bell 1993; Grahn and Stigsdotter 2010). These receptors have different degrees of specialization and different functional spheres (Hall 1966). When visiting urban parks, people perceive the environment by multi-sense. However, the importance and performance level of each element varies, based on different sensory receptors. To improve urban parks from the perspective of landsenses ecology, it is essential to assess the cultural ecosystem services from the perspective of each senses; this will allow to put forward reasonable and efficient ways to improve the design and management of urban parks.

2.2. Development of the perceptual indicator system

The development of the perceptual indicator system needs to address the elements existing in urban parks. The natural elements that have an influence on the urban parks include, for example, the sunlight and wind. The inner elements vary depending on a park. A previous study has summarized the landscape architectural elements to include landform, pavement, vegetation, water, and structural elements (Booth 1989). In addition, design must be for people (Rutledge 1981), which makes them indispensable elements of urban parks. Based on the above, the perceptual indicator system was developed taking into account landsense elements such as sunlight, wind, water, plants, animals, humans, roads, and other facilities on the following four dimensions.

Vision dimension

Vision is a strongly dominant component in people's perceptions of green space, with over 80 percent of people's perception (Rock and Harris 1967). This means that when developing the perceptual indicator system, more weightage should be provided to the vision dimension. The indicators in these dimensions were selected as follows:

Space sequence. The space sequence of a landscape results from the organization of the basic elements in their endless variations (Bell 1993). The space sequence mainly influences the vision dimension since it directs the eye (Booth 1989), guiding visitors to different spaces (Simonds 2006). At the same time, as functions vary among these spaces (Bell 1993), visitors tend to visit a particular space for their planned activity. Additionally, if there are various types of space, visitors will concentrate on their movements from one type of space to another, rather than on how long the walk actually is (Gehl 1987). As a result, alternating street spaces often have the psychological effect of making the walking distances seem shorter (Gehl 1987). The well-planned space sequence has become a significant element in the design of urban parks.

Visual identification. Visual identification, a distinctive atmosphere (genius loci), is a characteristic that makes one landscape different from any other (Bell 1993) and is generally perceived by the eye. Having something special to see while visiting parks can be a powerful motivator of a leisure activity (Bedimo-Rung et al. 2005). Moreover, visitors tend to think highly of unique natural features (Arnberger et al. 2019), demonstrating that this feature is relatively important for them. Hence, 'visual identification' was selected as one of the vision indicators.

Vision of humans. The importance of attracting people to urban parks has been mentioned above (Rutledge 1981). On the one hand, people like to see other people in their vicinity (Rutledge 1981). On the other hand, high density of visitors in urban parks might lead to crowding (Schmidt and Keating 1979), diminishing the enjoyment degree of the park visitors. Hence, an important aspect of urban park design is not only attracting people but also managing the crowds.

Vision of plants. As the main element in urban parks or other kinds of green space, colourful vegetation can

add a sense of beauty to the landscape (Qi et al. 2017). Apart from aesthetic enjoyment, vegetation in urban parks can not only provide shelter and shade but also reduce urban noise (Ayala-Azcárraga et al. 2019), adding to the positive experience of enjoying the nature, and giving a sense of 'being away' from everyday life (Krenichyn 2006). Studies have shown that a mere presence of greenery can be powerful enough to confer psychological benefits (Krenichyn 2006). Furthermore, plants have a relatively important position in the survey of environmental attributes (Aspinall et al. 2010), proving these to be an essential perceptual indicator.

Vision of water. Waterscape increases the visual quality of parks, especially open and clear water (Polat and Akay 2015), rendering spirituality to the landscape (Qi et al. 2017), which could elicit positive emotions in park visitors (Zhai and Baran 2017). Some studies have suggested that compared to other green spaces without the body of water, presence of water resulted in greater improvements on mood (Barton and Pretty 2010).

Vision of roads. The type and layout of pavements have an impact on tour routes of visitors (Zhai and Baran 2017), leading to the different vision experiences that may impact the overall experience of visiting urban parks. Besides, aesthetic features of roads could provide a positive influence. For example, walking surfaces composed of different materials such as pebble and quartzite could produce positive effects while broad asphalt roads could contribute to negative effects of the visitors (Qi et al. 2017).

Vision of animals. City dwellers can be strongly positively influenced by the living organisms in the environment (Grahn and Stigsdotter 2010). Studies have shown that visitors who enjoy watching birds or squirrels in urban parks could forget the city life, gaining inner peace and reducing anxiety (Ratcliffe et al. 2013).

Hearing dimension

Creation of soundscape has come into focus recently (Liu et al. 2014; Esther et al. 2017). Soundscape is an acoustic environment as perceived or experienced and/or understood by a person or people (I.S.O 2014). Sounds in parks consist of natural sounds and anthropogenic sounds (Liu et al. 2014). Natural sounds, such as birdsong and sound of water, always exert positive influence (Hedblom et al. 2014), while anthropogenic sounds, such as construction noise and traffic noise, could cause negative effects (Pérez-Martínez et al. 2018). Hence, the common sounds in urban parks were selected as follows:

Sound of animals. Animals in parks let out a variety of sounds, with a birdsong being the most frequently perceived natural sounds (Liu et al. 2019). Hearing animal sounds can result in the feelings of tranquillity and peace, helping to relax by providing a sense of distance from everyday life (Ratcliffe et al. 2013), and increasing the happiness of the park visitors.

Sound of water. The sound of water mostly originates from fountains and waterfalls while still water is more common in parks (Pérez-Martínez et al. 2018), meaning that the percentage of perceived occurrences is relatively low (Liu et al. 2019). However, it can evoke pleasant feelings (Gidlöf-Gunnarsson and Öhrström 2007). Comparing to animal sounds, hearing water sounds is more likely to lead to a mental recovery (Pérez-Martínez et al. 2018). This indicator was selected to explore public perceptions of the water sounds.

Sound of voice. There are differing opinions with regards to the impact of the 'sound of voice'. Some studies suggested that it could have a negative impact on the public perception of urban parks (Pérez-Martínez et al. 2018), whilst other studies suggested that although visitors prefer to hear natural sounds, the sound of human voice was quite acceptable for them (Liu et al. 2014). This indicator was selected to explore its effect by comparing it with other indicators.

Sound of plants. The traditional Chinese plant landscape design has focused on the whistling sounds of wind blowing through pine trees and bamboo groves, and the rhythmical sounds of raindrops drumming against banana and lotus leaves (Yuan 2015). Even though much of this perception is relatively low for visitors, its existence could increase the degree of satisfaction of urban parks (Liu et al. 2019). Hence, sound of plants needs to be taken into consideration.

Sound of broadcast. The soundscape diversity in urban parks is made of anthropogenic sounds to a large extent (Liu et al. 2014), many of which have negative impact on perception (Pérez-Martínez et al. 2018). However, sounds like broadcast are indispensable as they provide a variety of information such as news, music and advertisements (Liu et al. 2009). Additionally, broadcasting services can be used for emergency announcements (Li 2009).

No noise. 'Peacefulness' is the quality valued most by the visitors, reducing the adverse effects on their health (Gidlöf-Gunnarsson and Öhrström 2007). However, a certain amount of noise is inevitable in urban parks and is one of the elements causing dissatisfaction (Roovers et al. 2002). Hence, 'No noise' was selected to be compared with other elements that can exert positive effect.

Touch dimension

Being an immediate receptor (Hall 1966; Grahn and Stigsdotter 2010), the skin contacts and perceives the environment directly, such as registering a temperature, humidity, soft touch, pressure, and texture of the objects (Grahn and Stigsdotter 2010). So far, there has been limited research investigating touch but numerous studies referring to comfort of road (Aspinall et al. 2010; Ayala-Azcárraga et al. 2019), and the balance between sun and shade (Bedimo-Rung et al. 2005; Lu 2010; Zhai and Baran 2017), which are related to touch.

Feel of sunlight. The shade is critical when visiting parks (Lu 2010), relating to the activity in general (Zhai and Baran 2017). Having more shade in spring, summer and autumn, and less shade during the winter provides people with better thermal comfort (Yung et al. 2019), leading to a higher park attendance.

Feel of wind. Wind, as both a necessary natural and an important cultural element, had a significant role in ancient urban planning (Zhao et al. 2016). It is still an important element in today's urban environment, its speed exerting an impact on the outdoor thermal comfort (Yung et al. 2019). A dense foliage in urban parks can reduce the wind speed (Ottelé et al. 2011), providing a better comfort for the park visitors.

Touch of water. Studies have highlighted the importance of hydrophilic spaces (Yang et al. 2013). The area near the water gains attractiveness for visitors since they seek to be close to the water (Niemann and Werner 2016), especially if there is a chance to be able to touch the water like fountains and splash ponds for children (Esther et al. 2017). However, hydrophilic spaces are relatively rare in urban parks. This indicator was selected as a perceptual indicator of touch to explore the visitors' perceptions of it.

Touch of roads. Walking is one of the main recreational activities as well as the most popular physical activity for the urban parks visitors (Zhai and Baran 2017). Pavements exhibit a strong relationship with park use (Kaczynski et al. 2008); their strengths can be affected by the materials used to build the walking surface. In addition to the safety, pavements with a good design may also improve visitors' comfort (Lu 2010).

Contact with animals. Not all animals are well received by the visitors and some may even be considered noxious (Ayala-Azcárraga et al. 2019); the existence of the latter may lead to the perceptions of the park harbouring possible threats (Suppakittpaisarn et al. 2019). Here, the threats linked with sensory perception arise from direct contacts with potentially harmful animals such as mosquitoes and spiders, which could have negative effects on public perceptions of urban parks.

Smell dimension

The presence of distinctive smells in parks contributes to park aesthetics (McCormack et al. 2010). Studies have investigated the difference in the people's perception of the smell of various plants. Inrandan Flavours and Fragrancesinc (IFF) found that the smell of the apple was perceived as pleasant while the smell of galbanum was perceived as unpleasant through the examination of physiological changes in facial muscle tension, galvanic skin responses, heart rate, and skin temperature (Warrenburg 2002). Here, we paid a greater attention to the systemic perception of smell, rather than comparing the smell of different plants, selecting two perceptual indicators to measure it:

Smell of plants. There has been a significant amount of research focused on odours from different host plants. Some of these may have negative impact on part visitors, but the majority will have a positive effect (Krenichyn 2006). As a result, 'smell of plants' was selected to find out its effect on the visitors' perception of urban parks.

No odour. Similar to noise, odours that cause negative effects can arise from a variety of sources, some of which are hard to distinguish even for the visitors who are exposed to it. Here, all the unpleasant odours were grouped together as 'odour', using 'no odour' as one of the perceptual indicators on touch dimension.

Thus, the proposed perceptual indicator system consists of twenty indicators on four dimensions (Table 1).

2.3. Assessment method

The Importance-Performance Analysis (IPA) technique has been used to examine and suggest management strategies by providing important insights into the aspects that should receive more attention, which can facilitate management interpretation of the data and increase their usefulness in making strategic decisions, as proposed by Martilla and James (Martilla and James 1977; Sever 2015). Although originally developed for marketing purposes, its application has extended to various fields such as evaluation of service satisfaction (Chen and Liu 2019), evaluation of attraction (Go and Zhang 1997), policy making of tourism (Evans and Chon 1989), and evaluation of tourists' satisfaction (Sever 2015). IPA combines the measures of people's perceived performance and importance into one plot that classifies indicators into four quadrants, which are typically identified as 'keep up the good work', 'possible overkill', 'low priority' and 'concentrate here'.

Considering the multi-level of the perceptual indicators, we re-divided the degree of importance and dissatisfaction in this technique, using lower and upper quartiles of the importance and dissatisfaction degree

Table 1. The perceptual indicator system.

Vision	Space sequence	There are varying sceneries with changing view-points.
	Visual Identification	There is a special scenery such as sculpture and landscape stone.
	Vision of humans	There is a moderate number of visitors and no visual disturbance.
	Vision of plants	You can see various plants such as trees, flowers and grass.
	Vision of water	You can enjoy the water scene.
	Vision of roads	You can enjoy the road layout and colour.
	Vision of animals	You can watch animals such as birds and wild ducks.
Sound	Sound of voice	There is a well-modulated voice.
	Sound of plants	You can hear leaves rustling.
	Sound of water	You can hear the sound of water.
	Sound of animals	You can hear sounds of animals like birds and insects.
	Sound of broadcast	There is music and other broadcast.
	No noise	No noise like traffic noise and construction noise.
Touch	Feel of sunlight	There is a balance between the sunlight and the shade.
	Feel of wind	You can enjoy the feel of the wind.
	Touch of water	You can enjoy touching the water.
	Touch of roads	You can walk comfortably.
	Contact with animals	No mosquito bites or other animals' threats.
Smell	No odour	There is no odour like water odour and waste odour.
	Smell of plants	You can smell the flowers, trees and grass.

to divide into the low, medium, and high importance and dissatisfaction, respectively; five grades were divided into 'concentrate here firstly', 'concentrate here secondly', 'low priority', 'possible overkill', and 'keep up the good work', to characterise the cultural ecosystem services in urban parks (Figure 1).

Following this, a survey on the importance of the perceptual indicators in urban parks was conducted, with the respondents being selected randomly from the urban parks in Beijing. In the survey questionnaire, the frequency (*f*) of each indicator was presented by the degree of importance, divided into three levels. The survey returned 522 questionnaires.

Based on the importance level of indicators, the supplementary survey of dissatisfaction could be conducted, dividing the degree of dissatisfaction into three levels in a given park. The main aim of the survey on perceptual dissatisfaction is not to find out the design faults of parks but to assess the cultural ecosystem services from the perspective of landsenses ecology, based on the visitors' perceptions. Combining the importance and dissatisfaction levels of indicators on sensory dimensions, the perceptual assessment model could suggest ways to improve the design of urban parks in the future.

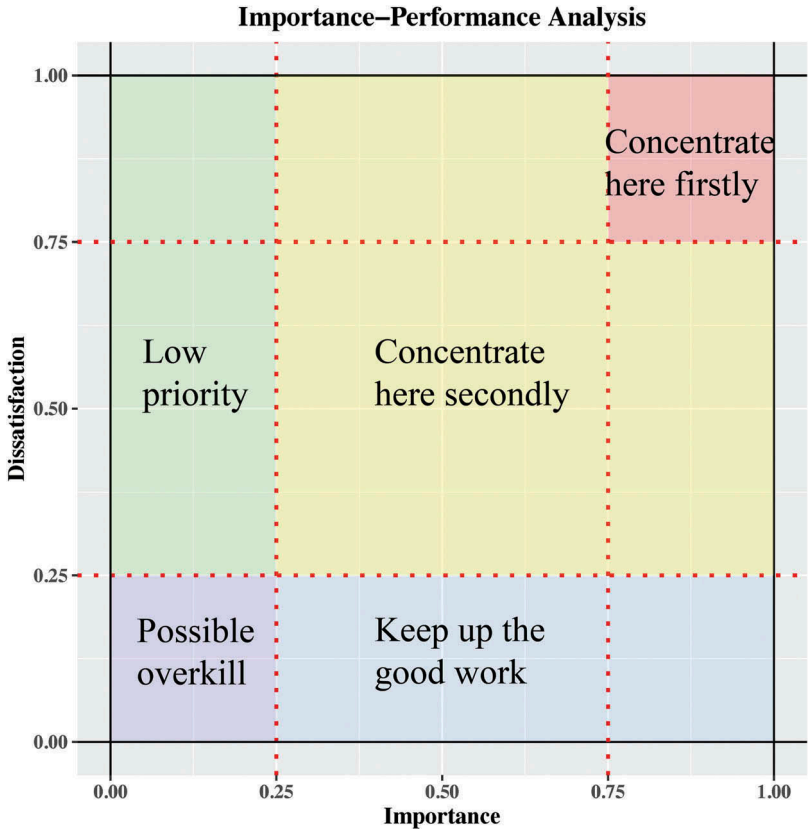

Figure 1. The perceptual assessment model.

3. Results

Figure 2 shows the landsense importance degree of the perceptual indicators. The indicators with a higher level of importance ($f > 48\%$) were mainly those on vision and touch dimensions while those on the hearing dimension were relatively unimportant ($f < 22\%$), and the indicators on the smell dimension had a medium importance. On vision dimension, all the indicators had a high or medium importance level, relatively higher than those on other dimensions. The importance degree of touch indicators distributed at each level, 'feel of sunlight' and 'touch of roads' showing a high level of importance. Hearing dimension indicators showed a lower level of importance overall; however, the 'sound of animals' was rather important.

On vision dimension, indicators with the high importance level were 'vision of plants' and 'vision of water', followed by the 'space sequence', 'visual identification', 'vision of humans', 'vision of roads' and 'vision of animals' at the medium level; there were no indicators with a low level of importance in this dimension. On hearing dimension, the 'sound of animals' was the only indicator with a high level of importance (as mentioned above), with 'no noise' being perceived at the medium level and all other indicators in this dimension, including 'sound of voice', 'sound of plants', 'sound of water' and 'sound of broadcast' perceived as being of low importance. On touch dimension, 'feel of sunlight' and 'touch of roads' were highly important, while 'contact with animals' had a medium importance level and 'touch of water' was not perceived as important. Both 'no odour' and 'smell of plants' parameters on the smell dimension were perceived as having medium importance levels.

4. Discussion

4.1. Differences between the indicator importance levels in the perceptual indicator system

This study revealed the difference between the importance levels of the perceptual indicators, which was related to the type of park elements. Urban park visitors attach more attention to the elements that can be perceived more easily. 'Vision of plants' was perceived as one of the most important indicators while the importance of the 'sound of plants' and 'smell of plants' was perceived to be relatively low, which may be caused by the lower perception of the hearing and odour of plants, unlike the easy access to seeing the plants. 'Sound of animals' could be perceived frequently by the park visitors (Liu et al. 2019), but it might not be necessary for them to actually see the animals. At the same time, elements that are common received more attention in parks. For example, open water is popular in urban parks (Polat and Akay 2015), yet soundscape of water is not widely designed for parks, resulting in the high importance level for the vision of water but low importance level for the hearing of water. Further, sunlight could be easily experienced but wind flow could not because of its low speed, which is reduced by plants (Ottelé et al. 2011). Hence, the respondents perceived the 'feel of wind' to be of lower importance, compared with the 'feel of sunlight'.

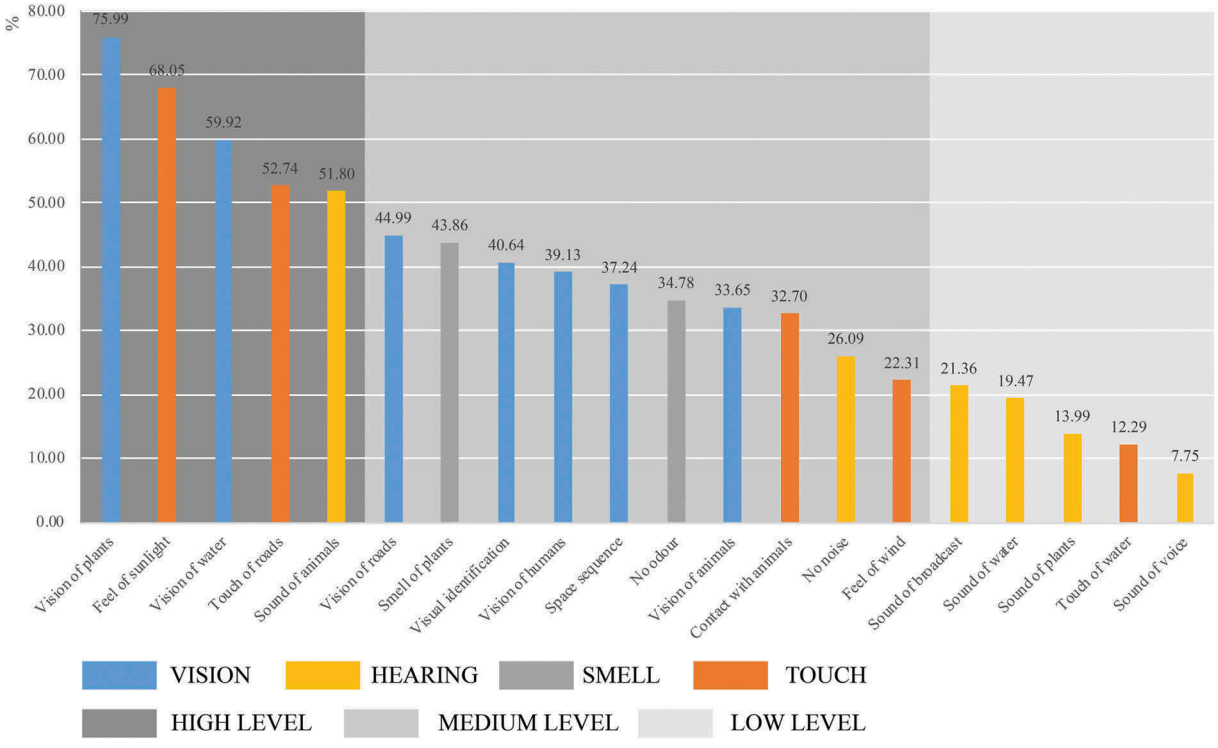

Figure 2. Landsense importance degree of the perceptual indicators.

On the other hand, every receptor has its functional area, which may cause the difference in the level of importance of perceptual indicators. Among distance receptors, vision has the widest functional area while hearing has a relatively wide functional area; the functional area of smell is limited (Gehl 1987). Wider functional area might be related to the higher importance level of the perceptual indicators. The respondents attached a high importance to the visual perception indicators, especially the vision of plants and water, proving the importance of vision from the perspective of landsenses ecology. Although design of soundscape is a significant aspect for urban parks (Liu et al. 2014; Anderson et al. 2016), lower importance level was given to this by the respondents, who focused more on visual perception. However, 'sound of animals' was the only perceptual indicator on hearing dimension with a high importance level attached to it. The immediate receptors are the most limited receptors. Since visitors contact with the environment takes place directly through these, they have considerable influence on perception, particularly the sunlight touching the skin, and a surface walked on in a park. As for the smell dimension, it has limited functional area as well, and some of the respondents ignored its importance. Since we did not select adequate indicators on smell dimension, this dimension lacks more concrete and accurate indicators and needs further research.

4.2. Ways to improve landsense satisfaction of a typical urban park in Beijing

Satisfaction of urban park visitors is a subjective realization of lived experiences, understanding of which is useful for public managers to identify the neighbourhood landscape that improves their wellbeing (Wu et al. 2019). Based on the perceptual assessment model and landsense importance level of the perceptual indicator system, we carried out a supplementary survey for a typical urban park in Beijing, in order to investigate the perceptual dissatisfaction of visitors, involving 72 park visitors. The perceptual assessment model showed that 'vision of plants', 'feel of sunlight' and 'sound of animals' were all the indicators that needed to be concentrated on firstly. Additionally, most of the other visual indicators should be focused on. Many hearing indicators were perceived as 'low priority', 'keep up the good work' and 'possible overkill'. The touch indicators just differed at a certain range. Ways to improve landsense satisfaction of this urban park could be proposed based on the model (Figure 3).

Animals and plants

Rational distribution of plants and landscape sketches such as pavilions is necessary to ensure the balance between the sunlight and the shade. The number of

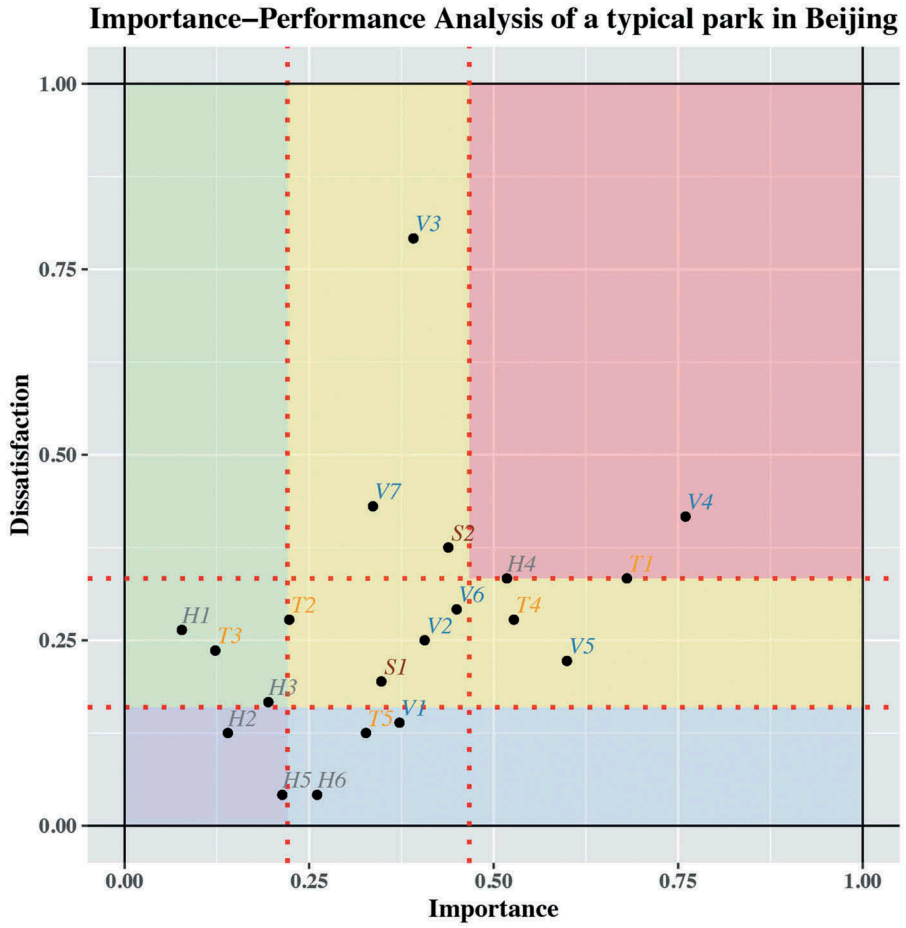

Figure 3. The perceptual assessment model of a typical urban park in Beijing.

evergreen plants should be increased to ensure green plants in all seasons. Fruit trees could be taken into consideration to attract animals. Aquatic animals like ducks could be kept in small areas for the visitors to admire.

Artificial facilities

Diverse pavement materials could be used in different parts of the same pavement for attractive appearance as well as to provide various tactile experiences for the visitors. These could also be used on pavements located in different areas or with different road grades, to allow the visitors to choose their preferred road.

Visitors

More reasonable layouts of urban park facilities could be arranged, along with setting up of rest facilities in the areas with fewer visitors, to diffuse the crowds at peak hours. Public managers and academics should strengthen the technical support, by establishing a platform to manage urban ecological risks of landsense satisfaction based on landsenses ecology and environmental internet of things technique, to monitor the dynamics on landsense satisfaction of visitors online and lead to a corresponding adjustment of landsense elements through it (Tang et al. 2018; Wang et al. 2018).

5. Conclusions

Urban parks provide significant cultural ecosystem services to city dwellers. Based on the perspective of landsenses ecology, this study established a perceptual assessment model based on the improved IPA technique and proposed a perceptual indicator system for the urban park design based on four sensory dimensions. This was done to explore the relationship between cultural ecosystem services provided by urban parks and public perceptions of various indicators in the proposed system. A questionnaire survey was used to assess public perceptions. Our findings showed that the importance level of the perceptual indicators was influenced by the type of park elements and the functional area of the visitors' sensory apparatus. On the one hand, park elements that are common or can be perceived easily received more attention. On the other hand, among the distance receptors, wider functional area might be related to the higher importance level of the perceptual indicators; the immediate receptors also have considerable influence on perception since visitors contact with the environment directly through these. Most of the important indicators were considered to be those concerning vision and touch, including 'vision of plants', 'vision of water', 'feel of sunlight', 'touch of roads', and 'sound of animals'. Furthermore, an assessment on landsense satisfaction of a typical urban park in Beijing was conducted, and varied improved ways were proposed to design urban parks from the perspective of landsenses ecology.

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