Factor Analysis of Spatial Design Attributes Influencing Users' Affective Attitudes in Nairobi's Neighborhood Parks

Sylvia Mutua[1*], Micah Makworo[1], Mugwima Njuguna[2] & Stella Kasiva[1]

[1]*Department of Landscape Architecture, Jomo Kenyatta University of Agriculture & Technology, Kenya*

[2]*Centre for Urban Studies, Jomo Kenyatta University of Agriculture & Technology, Kenya*

**Corresponding author: smutua@jkuat.ac.ke*

https://doi.org/10.62049/jkncu.v5i1.447

Abstract

Neighbourhood parks play a vital role in fostering vibrant and sustainable communities, promoting healthy lifestyles and social interactions among residents. However, the underlying factors influencing user attitudes towards neighbourhood parks in Nairobi City have not been identified. These latent factors serve as attractions that draw city residents into the parks, engaging with them continually to meet their recreational and social needs. This paper aims to identify the key factors that affect the affective component of attitudes formed after visual exposure to the attitude object, the neighbourhood park. It adopts a quantitative approach to data collection by surveying eight residential neighbourhood parks. A total of 416 park users were interviewed between July and August 2024, during which they rated thirty attitude statements on a seven-point Likert scale. To ensure diversity among park users, interviews were conducted at each park three times a day on one weekday and one weekend day. Exploratory Factor Analysis of the attitudinal statements revealed five underlying factors—complexity, richness, comfort, coherence, and legibility—that influence user attitudes towards neighbourhood parks. The paper recommends conducting a user needs assessment before park design to identify spatial attributes that encourage positive affective attitudes. Additionally, it suggests providing a range of park amenities and allocating a budget for park maintenance in park management plans.

Keywords: Affective Attitudes, Design Attributes, Factor Analysis, Neighbourhood Parks, Nairobi

Introduction

Neighbourhood parks in residential areas provide valuable ecosystem, recreational, social and economic benefits that foster vibrant, healthy and sustainable communities. However, despite these advantages, the usage of these open spaces in Nairobi City is declining with the parks facing numerous and competing activities resulting in neglect or alternative use (Figures 1 and 2). Attitudes comprising of three components affective (emotions and feelings), cognitive (beliefs), and behavioural (Thompson, 2024) are a learned tendency to respond positively or negatively to a specific object (Ajzen et al., 2018). In an environmental context, attitudes reflect individuals' feelings, beliefs, and intentions towards the environment (Rosa & Collado, 2019), highlighting the desire to engage in environmental actions (Ho & Au, 2020).

Previous studies in the global north and east examining user attitudes have identified underlying factors affecting users' affective responses (Berg et al., 2022; Halkos et al., 2022; Ho & Au, 2020; Nasar, 1994; Shayestefar et al., 2022). What remains unclear is which of these factors have a greater influence on neighbourhood park user attitudes, specifically in Nairobi City. This paper focuses on environmental affective attitudes, aiming to determine which spatial design factors influence the emotional responses of users towards neighbourhood parks in Nairobi.

Figure 1: Abandoned houses under construction at Kahawa West Community Park
Source: Generated using information from Bently et al. 1985

Figure 2: Solid waste dumping at Nyayo Highrise Estate Linear Park
Source: Generated using information from Bently et al. 1985

User Attitudes

Attitude Determinants and Functions

Personal experience, learning, conditioning, social influences, observation of others and physical surroundings significantly influence attitude formation (Thompson, 2024). Further, aesthetics shaped by formal variables like mystery, complexity, and order, besides symbolic variables such as naturalness and upkeep, significantly influence emotional responses (Nasar, 1994). Attitudes serve various functions, namely object-appraisal or utilitarian, knowledge, social-adjustment, externalisation or ego-defensive and value expression fulfilling an individual's psychological needs (Carpenter et al., 2012; Watt et al., 2008). This study evaluates how characteristics of neighbourhood parks shape users' affective attitudes towards them. The study focuses on the object-appraisal, utilitarian, and ego-defensive functions. Object-appraisal

enables quick judgments of positive and negative attributes, the utilitarian function distinguishes between pleasurable and uncomfortable objects, and the ego-defensive function help individuals avoid unpleasant aspects of an environment.

The Environment as an Information Source

Kaplan and Kaplan (1982) developed the information processing theory, viewing people as information processors to understand what influences their preferences for an environment. They further explained that preferences were quick evaluations that led to lasting attitudes. This theory assists in designing and managing environments based on user preferences. According to the theory, individuals perceive spaces in both 2D and 3D, seeking space organisation and interpretation (coherence), space readability to aid navigation (legibility), diversity to sustain interest (complexity), and mystery, which is characterised by space uncertainty, the promise of novelty, and the potential for further exploration (Table 1).

Table 1: Information Processing Preference Matrix

Interpretation Level	Making sense	Involvement
Visual array / 2D	Coherence	Complexity
3-D space	Legibility	Mystery

Source: Adopted from Kaplan et al. 1998

Principles of a Responsive Open Space

Responsive environments highlight environmental quality that engage the human senses and encourages use. Key design values (Figure 3) include legibility, permeability, variety, robustness, visual appropriateness, richness, and personalisation (Bently et al., 1985). Permeable spaces offer physical and visual access, promoting diverse routes for users. Variety refers to spaces with different functions that attract diverse people at different times, enhancing perceptual experiences. Legibility relates to how clearly a space's layout can be described, read and understood at both the physical and activity pattern levels, while robustness indicates a space's versatility. Visual appropriateness focuses on the meanings users derive from visual cues, influencing their engagement. Richness emphasises sensory experiences, and personalisation allows users to adapt spaces to their needs. This study evaluates these design values in the context of neighbourhood parks.

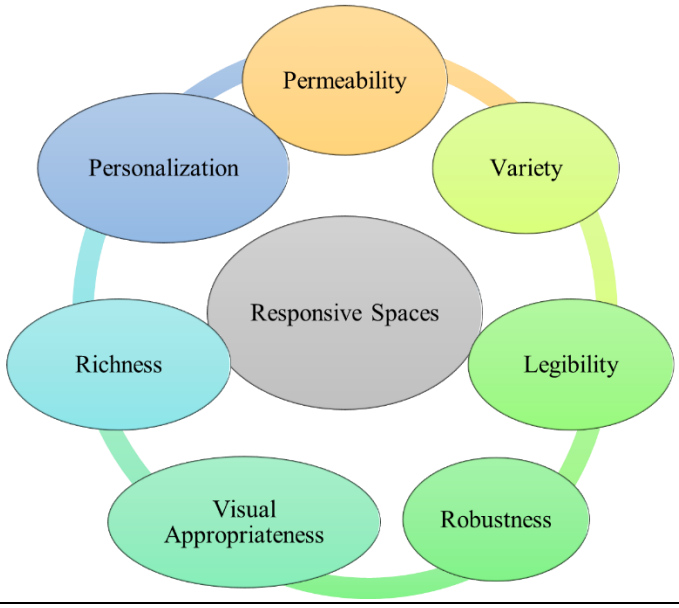

Figure 3: Design Values of a Responsive Environment
Source: Generated using information from Bently et al. 1985

Likeability and the Evaluative Image

The concept of likeability originated from the principle of 'affordances,' introduced by psychologist James Gibson in 1979. Affordances are features that help people understand possible uses of their environment, prompting specific actions (Gibson, 2014; Hamedani, 2019). Likeability, which includes affects and imageability, reflects subjective judgments of feelings toward environments and influences evaluative responses (Nasar, 1990). Imageability pertains to environmental qualities that evoke strong emotions, making them memorable. Assessing preferences improves our understanding of how people like or dislike certain environments. The interaction between evaluation and imageability leads to stronger memories of places linked to these intense feelings, resulting in the formation of sentiments about the imageable aspects of the environment. Perceived visual quality results from the interaction between individuals and their surroundings, eliciting powerful emotions (delight, fear, excitement, or pleasure) that shape approach-avoidance behaviour (Nasar, 1990, 2000). This study aims to examine how the visual quality of a neighbourhood park influences users' emotional attitudes after their assessment.

Methodology

Study Area

This study was carried out in Nairobi city, which has an administrative area of 696.1 square kilometres, lies at an altitude of 1,798 metres above sea level, and is located between longitudes $36^{0}45'$ East and latitude $1^{0}18'$ South (Nairobi City County, 2023). Nairobi, divided into 17 sub-counties with 85 wards, has a population of 4,397,073 persons with a population density of 6,247 persons per square kilometre. Overall, Nairobi has 826 public open spaces covering a total of 3106.4 hectares, equating to 5.32% of the built-up area (UN-Habitat, 2020). Nairobi is home to 15 parks and 19 gardens classified as either neighbourhood or city-level. To qualify for inclusion, a park had to: (1) be publicly owned; (2) be designated as a park or garden serving neighbourhood-level use; and (3) allow public access without restrictions. Eight parks met

the criteria located across different sub counties of Nairobi in low, medium and high-density housing neighbourhoods (Table 2, Figure 4).

Table 2: Population of Neighborhood Parks Studied in Nairobi City

SN	Name	Typology	Neighbourhood	Housing Density	Area (Acres)
1.	Kamukunji Historical Park (KHP)	Park	Kamukunji	Medium density	7.27
2.	Westlands Botanical Garden (WBG)	Park	Westlands	High density	10.21
3.	Jacaranda Grounds (JG)	Park	Kayole/ Jacaranda estate	High/ Low density	31.73
4.	Nyayo Highrise Estate Linear Park (NHELP)	Park	Nyayo Highrise	Low density	1.63
5.	Kahawa West Community Park (KWCP)	Park	Kahawa West	Low density	4.47
6.	Komb Green Riverfront Park (KGRP)	Garden	Korogocho	High density	1.07
7.	Rabai Road Garden (RRG)	Garden	Buruburu	Low density	2.45
8.	Kibera Social Grounds (KSG)	Garden	Kibera	High density	1.60

Source: Generated using data from UN-Habitat, 2020

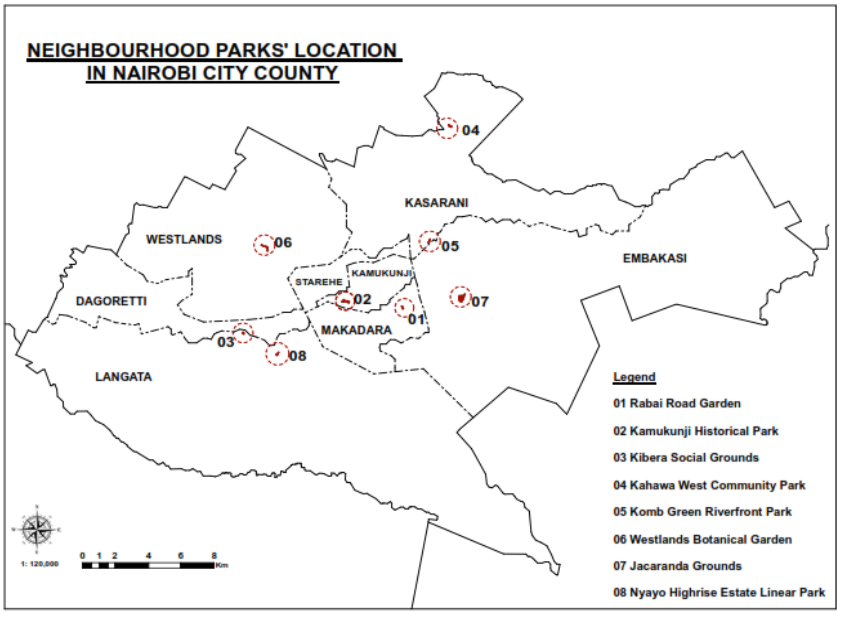

Figure 4: Distribution of neighbourhood parks in Nairobi City County by Sub-County
Source: Map generated using data derived from UN-Habitat, 2020

Research Design and Strategy

This study was designed as a survey of neighbourhood parks in NCC drawn from the UN-Habitat public space inventory (2020), which categorises public spaces by typology and scale of use. A quantitative research strategy was used to measure user attitudes quantitatively through scaling (Dubey & Kothari, 2022), and data analysed statistically.

Sampling Design

This inquiry sought to determine factors influencing user attitudes towards neighbourhood parks. Sampled Park users were the unit of analysis, and the neighbourhood park was the unit of observation. A sample size of at least 300 was proposed for reliable factor analysis (Halkos et al., 2022; Unal Cilek et al., 2023). Nine independent attitude variables—permeability, coherence, legibility, complexity, mystery, comfort, richness, visual appropriateness, and robustness—were identified from reviewed literature, resulting in thirty attitude statements. Following a 10:1 respondent-to-variable ratio (Pallant, 2016), the target was set at 300. In alignment with Zeisel's (2006) recommendation for environment-behaviour studies, 416 face-to-face structured interviews were conducted in eight neighbourhood parks. The statements were rated on a 7-point Likert scale from (1) strongly disagree to (7) strongly agree.

Data Collection

To ensure user diversity, interviews were conducted in each park three times per day: mid-morning (9-11 a.m.), lunchtime (12:00 noon – 2:00 p.m.), and in the afternoon (3:00 p.m. – 5:00 p.m.) on weekdays, as well as on one weekend day. This process lasted twenty-eight (28) days from July 2024, when schools were in session, to August 2024, during the school holiday, to gather various seasonal perspectives. The interview schedule was administered to male and female respondents alternately, ensuring representation across different age groups. Respondents were categorised into 11 age groups: children and adolescents were individuals aged 19 and below, young adults were those aged 20-34 years, mature adults encompassed individuals aged 35-64, and the elderly were classified as those aged 65 and older. Before each interview, consent was obtained from respondents, who were informed of their right to participate voluntarily and to withdraw at any time without repercussions.

Validity and Reliability

Confirmatory Factor Analysis (CFA) was used to verify the validity of the measurement items for the independent variable user attitudes (Seong et al., 2021; Al Rousan et al., 2023). Average Variance Extracted (AVE) values were used to check for convergent validity. Convergent validity evaluates whether a test measures the concept it was designed to measure. The required threshold for the AVE value is greater than 0.5 ($\geq$ 0.5). The Cronbach Alpha coefficient and composite reliability (CR) were used to ascertain the internal consistency reliability of the research instruments (Al Rousan et al., 2023), with both thresholds being more than or equal to 0.7 to ascertain the reliability of data collected.

Data Analysis

Following data cleaning, 404 interview schedules were deemed suitable for analysis using IBM SPSS Statistics version 27. Exploratory factor analysis (EFA), specifically principal components analysis (PCA) with Varimax rotation, was performed to analyse and identify the latent factors influencing park user attitudes towards neighbourhood parks. This process reduced the thirty attitude variables to a smaller set of

underlying summary variables called a 'component' that significantly contributed to park user attitudes. The statistical assumptions were that all variables were correlated and that the relationships between variables were linear (Pallant, 2016). An anti-image correlation matrix was used to identify variables with low factor scores needing removal from the analysis.

Results and Findings

Data normality was assessed using skewness, kurtosis, the Kolmogorov-Smirnov (K-S) test, and the Shapiro-Wilk (S-W) test. Except for one variable (2.157), skewness values for the 30 variables were within the acceptable range of -2 to +2 (Hair et al., 2017). For kurtosis, two variables (4.694 and 8.033) were outside the -2 to +2 range. Overall, the dataset was considered approximately normally distributed. Both K-S and S-W tests indicated p-values <.001, suggesting a violation of normality, which is common in large samples (n>50) (Pallant, 2016). Q-Q plots confirmed that the data distribution was approximately normal.

Thirty variables were analysed using PCA. MSA values below 0.5 on the diagonal of the anti-image correlation matrix were removed to stabilise loadings, and the PCA was rerun, resulting in twenty-nine variables with MSA values of at least 0.5 and communalities above 0.30. The Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity assessed data suitability and sample adequacy, yielded a KMO value of 0.855 and a significant Bartlett's test result, x2(406, N=404) = 3160.507, p<0.000 (Table 3). This indicated appropriate conditions for conducting factor analysis

Table 3: KMO and Bartlett's test of sphericity

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.855
Bartlett's Test of Sphericity	Approx. Chi-Square	3160.507
	df	406
	Sig.	.000

Source: Author, 2025

The Cronbach Alpha internal consistency coefficient was determined at 0.833 for all attitude variables considered as acceptable and good reliability (Halkos et al., 2022; Ruengtam, 2017; Sharkhuu et al., 2024; Unal Cilek et al., 2023). CR scores for the five components were above 0.6 (0.822- complexity, 0.713- richness, 0.637 – comfort, 0.696 – coherence, and 0.609 – legibility) ascertaining reliability (Hair et al., 2017; Othman & Yusuff, 2022). AVE scores for the five components were as follows; 0.436- complexity, 0.388- richness, 0.344 – comfort, 0.368 – coherence, and 0.331 – legibility (see Table 4). The AVE scores were accepted since the corresponding CR values were above 0.6 (Hair et al., 2017).

Table 4: Results for Reliability and Validity for the Five Components

Construct	**Indicators**	**Factor Loading**	**Composite Reliability (Cr)**	**Cronbach Alpha**	**Average Variance Extracted (Ave)**
Complexity	AF12	0.621	0.822	0.822	0.436
	AF13	0.653			
	AF26	0.649			
	AF27	0.707			
	AF29	0.683			
	AF30	0.646			

Richness	AF15	0.562	0.713	0.716	0.388
	AF19	0.710			
	AF22	0.517			
	AF24	0.692			
Comfort	AF4	0.490	0.637	0.633	0.344
	AF14	0.651			
	AF16	0.538			
	AF17	0.526			
Coherence	AF6	0.740	0.697	0.699	0.368
	AF7	0.549			
	AF8	0.549			
	AF28	0.570			
Legibility	AF1	0.497	0.609	0.604	0.332
	AF2	0.548			
	AF3	0.669			
	AF5	0.410			

Source: Author, 2025

The total variance analysis revealed seven factors influencing park user attitudes, with eigenvalues greater than one explaining 54.536% of the variance (Table 5). Twenty-two components with eigenvalues less than one were excluded from further analysis.

Table 5: Total Variance Explained from Analysis Using PCA

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation of Sums of Squared Loadings**
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.153	21.216	21.216	6.153	21.216	21.216	3.544
2	2.757	9.506	30.721	2.757	9.506	30.721	3.027
3	1.802	6.213	36.935	1.802	6.213	36.935	2.138
4	1.499	5.168	42.103	1.499	5.168	42.103	2.100
5	1.366	4.712	46.815	1.366	4.712	46.815	1.977
6	1.139	3.929	50.744	1.139	3.929	50.744	1.688
7	1.100	3.792	54.536	1.100	3.792	54.536	1.343
Extraction Method: Principal Component Analysis							

Source: Author, 2025

Parallel analysis with the Monte Carlo Simulator was used to decide the number of factors to retain by comparing PCA eigenvalues with those from parallel analysis (Table 6). A scree plot comparing the two eigenvalues (Figure 5) showed an intersection after the fifth component, indicating retention of only five factors. Parallel analysis has empirically demonstrated the ability to adjust the effect of sampling error by retaining only factors with eigenvalues exceeding those generated by chance (Goretzko, 2022; Hayton & Allen, 2004).

Table 6: Comparison Between Monte Carlo Parallel Analysis and Actual Eigenvalues from PCA

Variable	Eigenvalue from Parallel Analysis	Actual Eigenvalue from PCA	Decision
1	1.5347	6.153	Accept
2	1.4575	2.757	Accept
3	1.3994	1.802	Accept
4	1.3471	1.499	Accept
5	1.3035	1.366	Accept
6	1.2651	1.139	Reject
7	1.2299	1.1	Reject

Source: Author, 2025

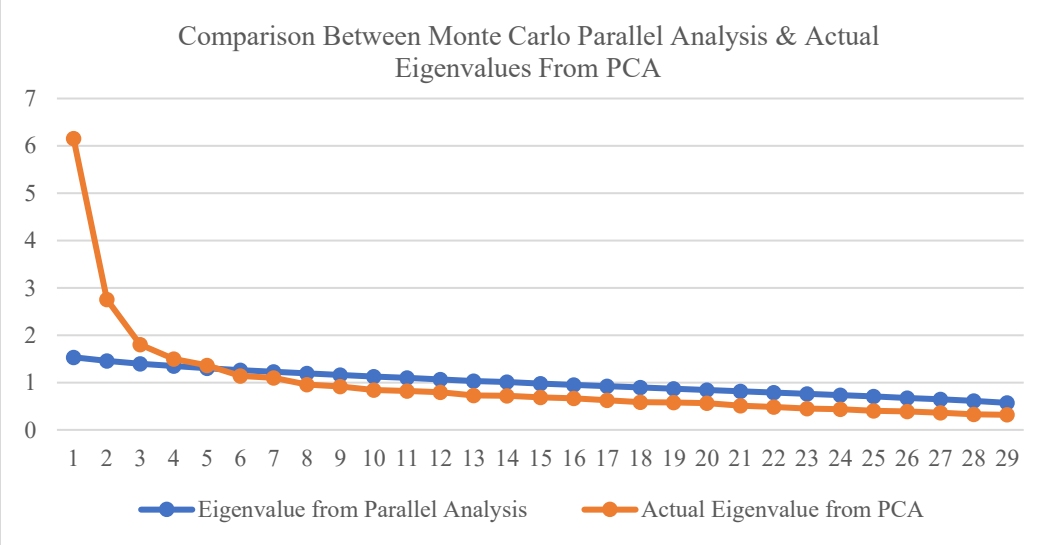

Figure 5: Scree Plot Comparing Monte Carlo Parallel Analysis and Actual Eigenvalues from PCA

Source: Author, 2025

Varimax rotation performed to extract factors resulted in the rotated component matrix (Table 7) displaying items with loading values exceeding 0.4 across the components: six items were associated with component 1, five with component 2, and four each with components 3, 4, and 5. Further analysis of the matrix revealed two additional factors, with each of these components containing two to three items loading above the 0.4 threshold.]

Table 7: Table Pattern Matrix

	Component						
Attitude Statement	**1**	**2**	**3**	**4**	**5**	**6**	**7**
AF30	.725	.221	.152	-.076	.032	-.037	-.048
AF29	.717	-.080	.175	.062	.102	-.079	.082
AF25	.714	.226	.033	.111	.084	.152	.016
AF26	.708	-.154	.173	.089	.184	.124	-.076
AF12	.651	-.054	.048	.325	.069	-.157	.128
AF13	.584	-.100	.444	-.027	.125	-.050	.044
AF24	.195	.713	.059	.071	.111	-.149	.019
AF15	-.179	.712	.025	.120	.040	.004	.098
AF22	-.033	.581	.091	-.002	.089	-.206	.254
AF19	.148	.570	.319	.247	.045	-.236	-.170
AF9	-.039	.500	.036	.100	.010	.205	.083
AF4	.139	-.065	.603	.187	.239	-.213	.103
AF17	.148	.355	.602	.108	-.086	.143	-.081
AF16	.232	.077	.520	.254	.120	-.021	-.054
AF14	.312	.405	.519	.042	.039	.070	.057
AF7	.102	.163	.100	.780	.044	.087	.015
AF8	.045	.115	.306	.676	.032	-.055	.114
AF6	.129	.371	.358	.439	.192	-.213	-.136
AF28	.316	.387	-.084	.411	.302	-.116	-.143
AF1	.034	.117	-.111	.152	.753	.107	-.087
AF2	.146	.264	.139	-.195	.661	-.118	.043
AF3	.163	.044	.199	.212	.635	-.056	.073
AF5	.226	-.249	.278	-.020	.442	-.033	.108
AF20	-.052	.048	.003	-.007	.022	.661	.036
AF27	.277	-.013	-.152	.034	-.188	.607	.077
AF21	-.126	-.326	.061	-.083	.083	.600	.054
AF10	.118	.099	-.019	.300	.025	-.038	.728
AF11	.022	.195	.044	-.166	.045	.194	.655
AF18	.320	.155	.237	.318	.142	-.277	-.357
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.							
a. Rotation converged in 6 iterations.							

Source: Author, 2025

The clustering of the factors laid the groundwork for interpreting the components by thematic elements based on their factor loadings.

Interpretation of Underlying Factors Influencing Park User Attitudes

Attitude statements associated with each of the five components were grouped along with their corresponding scores (Table 8).

Table 8: Underlying Factors Influencing Park User Attitudes

	Attitude statement	Construct	Loading	Component Score Coefficient	Mean	Mean score	Eigenvalue	Variance explained (%)
	Component 1					5.085	6.558	21.859
AF30	This neighbourhood park has maintained its recreational and social use over the years	Robustness	0.725	.267	4.75			
AF29	The neighbourhood park spaces are used for different activities	Space multiuse	0.717	.238	5.18			
AF25	This neighbourhood park is used for recreation	Recreation	0.714	.262	4.71			
AF26	This neighbourhood park is a social gathering space	Social interaction	0.708	.219	5.13			
AF12	There are a variety of users of different ages and genders in this park	User variety	0.651	.223	5.59			
AF13	Many activities are occurring in this park	Activity variety	0.584	.135	5.15			
	Component 2					4.528	2.848	9.493
AF24	The movement of vegetation and water is calming	Sensory experience	0.713	.268	4.30			
AF15	There are different types of biodiversity in this park	Biodiversity variety	0.712	.266	4.60			
AF22	There are sounds of birds and animals in this neighbourhood park	Fauna variety	0.581	.198	4.81			
AF19	This neighbourhood park is clean and generally well cared for	Maintenance	0.570	.170	4.84			
AF9	Some neighbourhood park spaces are hidden from view	Mystery	0.500	.198	4.09			
	Component 3					4.225	1.803	6.009

AF4	This park contains distinctive features that could serve as landmarks to help me find my way	Landmarks	0.603	.358	4.73			
AF17	There are sufficient seating areas in this neighbourhood park	Seating furniture	0.602	.381	3.24			
AF16	I find it easy to walk on the neighbourhood park pathways	Walkability	0.520	.278	4.99			
AF14	There are many different kinds of landscape facilities and amenities	Park features variety	0.519	.277	3.95			
	Component 4					4.74	1.502	5.005
AF7	The neighbourhood park boundaries are well-defined	Boundary definition	0.780	.488	4.87			
AF8	This neighbourhood park has a clear entrance/exit point	Access	0.676	.376	4.78			
AF6	This neighbourhood park is well-organised	Park organization	0.439	.152	4.29			
AF28	I find this neighbourhood park to be beautiful and pleasant to be in	Beauty	0.411	.182	5.02			
	Component 5					5.378	1.386	4.620
AF1	I can physically access this neighbourhood park	Physical access	0.753	.471	5.93			
AF2	I can visually see what is happening inside this neighbourhood park from the immediate surrounding	Visual access	0.661	.374	5.34			
AF3	It is very easy to find my way around this park since all parts are linked to each other	Way finding	0.635	.341	5.51			
AF5	I can see very well what is happening inside this neighbourhood park	Openness	0.442	.231	4.73			

Source: Author, 2025

The interpretation of the extracted components gave the following identities to the constructs, components 1, 2, 3, 4, and 5 as complexity, richness, comfort, coherence, and legibility, respectively.

Component 1: Complexity

This component, accounting for 21.86% of the total variance comprised six statements, as detailed in Table 8, with an average score of 5.085 on a 7-point Likert scale, reflecting positive responses. Statements AF12, AF13 and AF29 had mean scores of 5.59, 5.15 and 5.18, respectively. These illustrated that the studied neighbourhood parks had a diverse range of park users in terms of gender and age, a variety of park spaces and occurring activities. Statement AF25 had the least mean score of 4.71, illustrating that the studied parks were not only used for recreation. Statement AF30 scored 4.75, indicating a slight agreement that the studied parks had maintained a balance of recreational and social use over time, pointing towards robustness over the years while also incorporating other land uses. The factor model shows the constructs represented by coefficient scores influencing complexity.

Complexity = .267AF30(robustness) + .238AF29(space multiuse) + .262AF25(recreation) + .219AF26(socialisation) + .223AF12(user variety) + .135AF13(activity variety)

Component 2: Richness

'Richness' accounting for 9.49% of the total variance comprised five statements, scoring an average of 4.528 on a 7-point Likert scale, indicating that scenes that provoked the senses, with natural vegetation and wildlife, are well maintained and mysterious, were perceived as rich (see factor model). All four statements had mean scores ranging from 4.09 to 4.84, indicating mild agreement with the statements, pointing to low richness levels in the studied parks. Statement AF19 scored the highest mean at 4.84, mildly agreeing that the parks were clean and well-maintained, alluding to inadequate park cleanliness and maintenance. Statement AF9 scoring the lowest mean of 4.09 indicated that the parks were not mysterious, yet mysterious scenes that are well maintained enhanced perceived landscape richness, which contributed to regular use.

Richness = .268AF24(sensory experience) + .266AF15(biodiversity variety) + .198AF22(fauna variety) + .170AF19(maintenance) + .198AF9(mystery)

Component 3: Comfort

The "Comfort" component explained 6.01% of the total variance and received an average score of 4.225 on a 7-point Likert scale. Defined as having navigable landmarks, adequate seating, walkability, and amenities, it revealed some shortcomings in the studied parks. Statements AF17 and AF14 about variety in landscape facilities and seating scored low, at 3.24 and 3.95, highlighting insufficient amenities. Statement AF4 regarding landmarks scored 4.73, indicating few wayfinding features, while park path walkability (AF16) scored 4.99, suggesting moderate walkability. The factor model below outlines how these constructs, represented by coefficient score, relate to user comfort in parks.

Comfort = .358AF4(landmarks) + .381AF17(seating furniture) + .278AF16(walkability) + .277AF14(park features variety)

Component 4: Coherence

'Coherence,' explaining 5.01% of the total variance and composed of four statements, received an average score of 4.74. In this study, coherence was influenced by the park's boundaries, access points, spatial organisation, and beauty as illustrated in the factor model. Statement AF28 scored the highest mean score of 5.02, indicating that users mildly agreed that the studied parks were beautiful and pleasant. Beauty pertains to visual appeal and serves as a symbolic aesthetic that conveys connotative meaning (preferences of like or dislike) linked to spatial organisation. Statement AF6 on park spatial organisation scored the lowest mean of 4.29, confirming that the studied parks are not spatially designed, without clear access points (AF8 mean score of 4.78) and are not well defined (AF7 mean score of 4.87).

Coherence = .488AF7(boundary definition) + .376AF8(access points) + .152AF6(park organization) + .182AF28(beauty)

Component 5: Legibility

'Legibility' explaining 4.62% of the total variance, included four statements and relates to how easily a space's layout can be read, described, and understood. In this study, legibility was defined by physical and visual access, wayfinding, and openness as seen in the factor model. Statements AF1 (mean score of 5.93), AF2 (mean score of 5.34) and AF3 (mean score of 5.51) focussing on physical and visual accessibility and wayfinding respectively confirmed that the studied parks were accessible and navigable. Statement AF5 (mean score of 4.73) indicated low levels of openness which would impair visual assessment of what is present and occurring in a park.

Legibility = .471AF1(physical access) + .374AF2(visual access) + .341AF3(wayfinding) + .231AF5(openness)

Discussion of Findings

In the context of this study's findings, complexity, richness, comfort, coherence and legibility are the underlying latent factors influencing user attitudes. Complexity represented 21.86% of the total variance. A park was deemed complex if it attracts users across different genders and age groups and offers a broad spectrum of activities such as KGRP, KHP, and KSG. In contrast, parks like NHELP, KWCP and RRG, with fewer park users and activities, were seen as less complex. Additionally, robustness contributed to this complexity by facilitating multipurpose use, specifically recreation, socialisation and continuity in the same land use over time. This complexity fostered scene exploration (Kaplan et al., 1998) and enhanced a place's attractiveness, drawing in park users (Shayestefar et al., 2022). The combination of different features, users, and activities promoted socialisation and recreational experiences, enriching park visits.

Richness in this study refers to the sensory experience of a landscape. Sensory experiences and visual appropriateness enhance a space's meaning and perception (Bently et al., 1985). Similar to this study, people favour vegetated landscapes (Berg et al., 2022; Hao et al., 2024; Maurice et al., 2025). Perceived botanical richness, focusing on plant diversity, colour variation, and a connection to nature, positively correlates with landscape preference (Southon et al., 2018). Additionally, corroborating this study, mysterious scenes are also viewed as rich (Costa, 2022). This differs from Kaplan's Information Processing Theory, which suggested that mystery influences preference independently, without being grouped with other variables like richness. Meanwhile, clean and well-maintained park spaces further enhanced the perceived richness

of the landscape, contributing to its regular use like in KGRP and KHP. Neglected spaces with overgrown vegetation like in NHELP, and RRG were avoided hence underutilised.

Madden (2018) and Francis (2003) noted that comfort was essential for successful public spaces. Adequate seating furniture and well-maintained lawns encouraged various passive recreational static activities, namely sitting, reading, and sleeping, as seen in KHP, WBG, KSG, and JG. This study agrees with Vos et al. (2023) in recognising that well-defined pedestrian paths with suitable surface finishes improved comfort and encouraged walking, as observed in KGRP, KHP, KSG, and at WBG. The presence of a variety of park amenities, as corroborated by Raina & Mandal (2025), Vliet et al. (2021), Fontan-Vela et al. (2021), and Taylor et al. (2020), increased comfort by enabling diverse activities within a park.

Coherence, as the ease with which to understand a space, facilitates quick comprehension of the spatial layout encourages engagement and emotional connections as noted by Shayestefar (2022) and Kaplan et al. (1998). This understanding not only imparts emotional meaning but also influences user interaction. This study expands on Kaplans' Information Processing Theory by integrating beauty as a core component of coherence. The concept of beauty is defined by the structural organisation of space that provides clarity, harmony and coherent patterns (Cozzolino, 2022). Visual appeal evokes emotional evaluations (Nasar, 1994) linked to order – a key aspect of coherence. Ultimately, an individual's interpretation of these environmental features and their personal experiences shape preferences for beauty.

Legibility, which accounts for 4.62% of the total variance, is influenced by factors such as spatial structure, accessibility, openness, identifiable elements, and wayfinding features. Accessibility enables individuals to enter a space, while wayfinding facilitates movement through park areas, enhancing scene clarity and directly affecting the user experience (Musa, 2025). Openness is crucial for enhancing personal safety to increase comfort level, which is necessary for exploration and engagement with a space. Madden (2018) notes that legible environments are easy to navigate, encourage exploration, and help individuals comprehend their surroundings. Nasar (2000) posits that a legible setting features memorable landmarks that assist with orientation, making navigation to and from destinations simpler. Well-connected spaces enhance wayfinding and improve overall landscape understanding (Kaplan et al., 1998). Research indicates that legibility influences how long people spend in parks and fosters social interaction among residents (Moulay et al., 2017).

Conclusion

Referring to spatial design attributes affecting park user attitudes towards neighbourhood parks in Nairobi City, this paper concluded that there are five latent factors, namely complexity, richness, comfort, coherence, and legibility (Figure 4). The study expanded the Information Processing theory by introducing comfort and richness as new predictors of landscape preferences. Further, the study added the construct beauty to the predictor coherence and incorporated the constructs of mystery and maintenance (upkeep) as contributors to the richness of space. Continued visual exposure to the identified spatial attributes enhances perceived park usefulness, leading to preferences for park use.

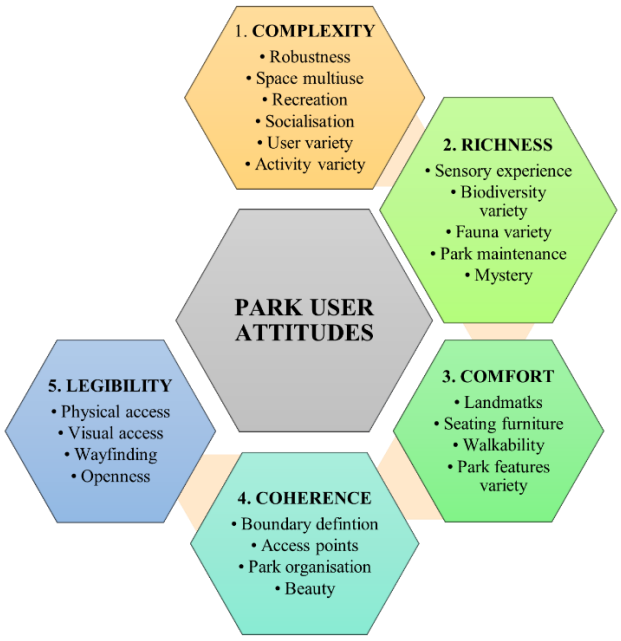

Figure 6: Underlying latent factors influencing user attitudes towards neighbourhood parks in Nairobi City

Source: Author, 2025

Recommendations

This study provides knowledge for designing neighbourhood parks in developing cities such as Nairobi that would help park planners and designers create attractive spaces for recreation and socialisation. Undertaking a needs assessment to determine the desired spatial attributes by users will allow for the creation of meaningful usable parks. Having determined that park maintenance is a factor of comfort, it is recommended that in the park management plan, a budget be provided for consistent park cleanliness and maintenance of park amenities and vegetation. This study points to the significance of complexity within neighbourhood parks and recommends inclusion of diverse park elements to create attractive multifunctional spaces.

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