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Soundscape Perception and Preference in the context of Malaysian Urban Parks

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Abstract. Park soundscape studies are receiving increasing attention in cities due to the increasing noise pollution in urban centers. As soundscape is dependent on people-place-interaction, there is still a lack of knowledge on how the socio-demography of the park users influences the perceptions and preferences of the soundscapes in the parks of Malaysia. Most studies on soundscape perception are linked to the general population in developed Western and Eastern countries, investigating the relationship of perception with mental well-being. This paper addresses the gap between the park's sound profile and soundscape perception in the context of a developing country, Malaysia. A random sampling of 423 park users in four selected Kuala Lumpur and Putrajaya parks was used to conduct an on-site survey regarding their perceptions of the park's soundscape. The study revealed that soundscape perception differs among park visitors in a typical urban park in Malaysia. Three dimensions of socio-demographic and behavioural attributes were found to be associated with the perception and preferences of park soundscapes, which are (1) age and educational level, related to the perception of the dominance of human sounds; (2) distance from home and sensitivity of park users revealed that those who are stressed and more sensitive to noises influence their expectations of the pleasantness and calmness of the park's soundscape; and (3) gender and occupation on the other hand only relates to the dominance of natural sounds indicating that females are more sensitive to the sounds of nature when in a park. It is crucial to consider the needs of all park visitors to provide a supporting soundscape which matches the activities carried out in the parks. These results implicate Malaysian park planning and management by serving a further understanding of the relationship between the soundscape of the parks from the perspective of different park users.

1. Introduction

A good public space encourages social interaction and is safe and welcoming to all users. A public space with diverse use is activity responsive, since it can accommodate a variety of social events and activities, making it responsive and vibrant [1], [2]. Gehl [3] highlighted that public spaces with physical features and amenities make for a comfortable and liveable space. A good public space includes areas for both active and passive activities, resulting in a successful socially responsive public space [4].



Because of the limited access to these parks, particularly in urban areas, most park users emphasized the importance of the park's location and the facilities available in the park. If an appropriate setting could be created and maintained in the park, the number of park users would increase, and then the beneficial impacts of the parks would multiply. According to ISO 12913-1 [5], the soundscape of a park, which is perceived or experienced and/or understood by people in context, is highly linked to people's health.

Recent research has begun to focus on implementing the knowledge of the positive influence of sound on mental health to promote the well-being and mental health of urban communities [6]. This involves researching the benefits of natural sounds in restoring mental health and exploring the use of these sounds in pollution concealing and enhancing the acoustic environment. It is concluded that noise control alone is insufficient to improve the environment, and that incorporating environmental sounds yields greater outcomes.

Research on urban soundscapes pays close attention to pollution, environment, perception, soundscape quality, and human impact. Recent research has shown that the perception of soundscape is not related to the volume of the sounds, but rather to the type of soundscape and individual's personal preferences and sensitivity [7]–[10]. Fang et al. [11] found that the perception of soundscape is not directly linked to the level of decibels but to the type of soundscape and people's preferences. It is similar to another study [12] who concluded that different individuals have different reactions to the same sound based on their personal preferences. Various aspects, such as the individual's activities and the context in which the soundscape is encountered, can also influence soundscape perception [13].

A good park depends on the interaction between individual preferences and the soundscape of the park. Planners can create soundscapes that live up to the expectations of park visitors by examining individual preferences and increasing sounds that people like and Many studies on soundscape and social demographics have focused on specific regions, often in developed countries [11], [14]–[16]. This limited geographical scope creates a gap in understanding the experiences of diverse populations in different cultural and socio-economic contexts. Individual characteristics may influence how we hear sounds, as the soundscape does not always retain consistency and exhibits great variance across groups from various cultural, socioeconomical, and ethnic origin [17].

Therefore, the study attempts to identify the soundscape perception of park users in Malaysia. As the concept of soundscape depends on people-place interactions- provides a better understanding of the perception and importance of the soundscape approach in parks in Malaysia. This study focuses on how people perceive the park's soundscape in Malaysia and what socio-demographic factors may influence soundscape perception and preferences.

2. Theoretical Framework

Soundscape ecology model in this study allows us to determine the extent of people-place interaction in the park from the perspective of the acoustic environment. It investigates how people perceived the acoustic environment based on their preferences and the physical characteristics of the space [18], [19]. The concept of soundscape exists through human's perception and how they analyse the environment (figure 1). Findings has suggested that the perceptual processes are mediated by the sociocultural and psychological aspects of the context of study [20].

In ISO 12913-1 [5], the conceptual framework of soundscape research emphasises that the context influences the sound sources, the auditory perception, and the cognitive process, which in turn influences the individual's response and outcomes. Environmental ecology suggests that human beings have a direct relation with the environment and their responses to the environment, experience, mood and preferences of the listener also influences how people perceived the environment [18], [19]. Similarly, Yorukoglu and Kang [21] discussed the relationship between contextual experience, built entity and sound environment variables of soundscape framework in an indoor context. Within the framework of contextual experience, three following three primary factors are evaluated: psychological, space usage and demographics.

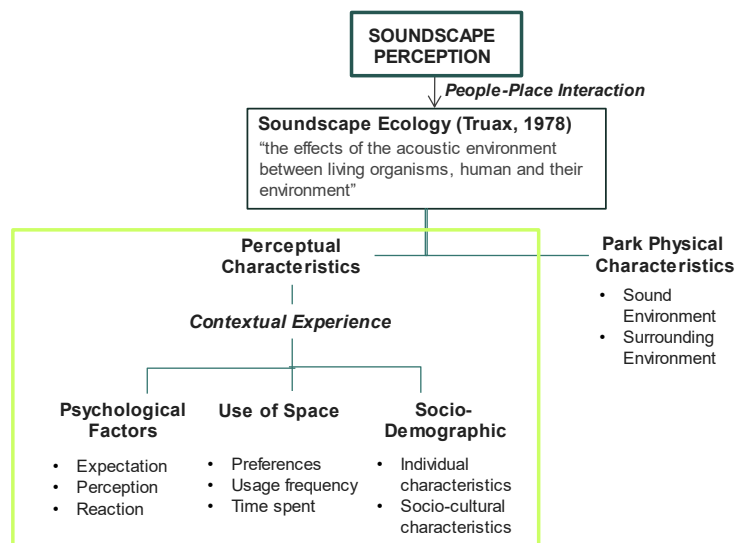


Figure 1. Variables of soundscape framework focusing on the perceptual characteristics and experience of the parks.

3. Methodology

3.1. Study Area

On-site surveys were conducted in four (4) selected parks in Kuala Lumpur and Putrajaya. The sampled parks represent the most common parks found in a city center based on its surrounding land uses and activities (table 1). The selected parks were based on four characteristics of the parks: (1) frequently visited by park visitors; (2) location of park; (3) surrounding land uses and activities producing a variety of sound sources; and (4) similar perceived sound sources in the parks (figure 2).

Prior to the main survey, pilot investigations revealed that similar dominant sounds are regularly noticeable in all parks. These include natural sounds such as those produced by birds, insects, leaves rustlings, and water fountains, as well as artificial sounds such as lawn mowing, surrounding construction sounds, traffic sounds, surrounding speech, and music.

Table 1. Characteristics of the selected parks.

Park	Type of Park	Short Description
1 KLCC Park	City Park (Urban Park)	Small hardscape and landscape space to act as a breathing space for people to rest and relax in a dense urban environment
2 Taman Tasik Permaisuri	District Park (Suburban Park-7km from city center)	Densely bordered by various residential neighbourhood and neighbours other sports and recreational facilities in the vicinity
3 Bukit Jalil Recreational Park	District Park (Suburban Park-20km from city center)	Located on hilly terrain and surrounded by ongoing developments in the district, commercial buildings and residential areas and a golf resort. Also integrated with other sports and recreational facilities in the neighbourhood
4 Putrajaya Botanical Garden	Metropolitan Park (Urban Park)	Located in the Putrajaya, often referred as "City in the Garden", the park is adjacent to the largest man-made pond and a neighbouring park

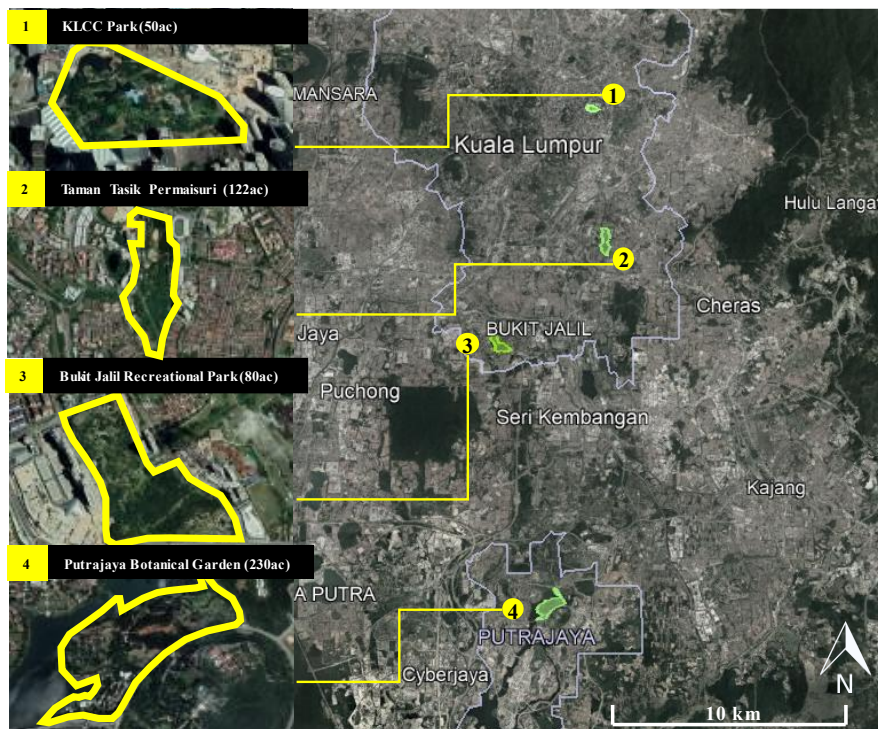


Figure 2. Study location of selected parks in Kuala Lumpur and Putrajaya.

3.2. Respondent Selections

The minimum sample size of semantic differential methods of evaluating soundscapes in urban open public spaces requires a sample of 100-150 samples, according to previous studies in the field of soundscape [22]. According to previous studies [8], [23], the study's results will only be reliable and valid if the participants have normal hearing in order to evaluate their perception of soundscapes.

A total of 428 respondents were chosen as the study sample, with equal ratios of males and females to reduce the gender-bias in the results. Respondents were recruited based on random sampling methods from March to May 2022. In order to represent the complete population of Kuala Lumpur and Putrajaya, the respondents were also selected from a wide variety of individuals from numerous origins in both cities. Figure 3 depicts a comprehensive distribution of respondents based on the study area.

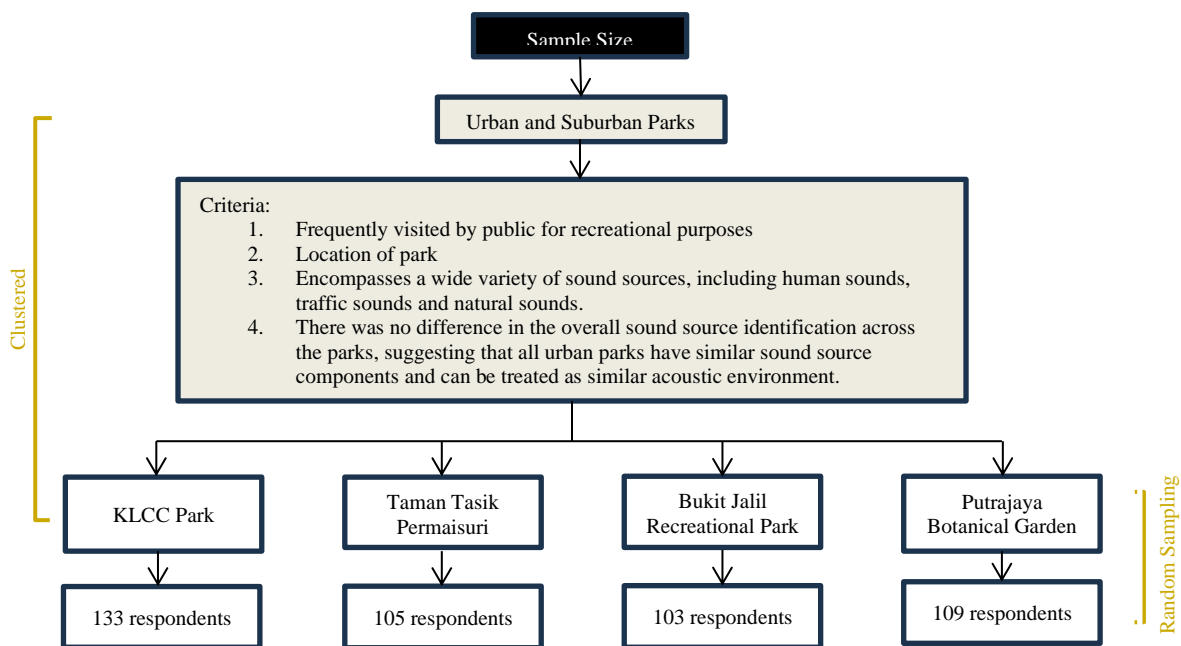


Figure 3. Sampling of users from the selected urban and suburban parks.

3.3. Soundscape Assessment

The questionnaire survey was conducted for three months from March to May 2022. The study used the sound walk method to measure soundscape perception of the park's respondent. Similarly like other studies in a soundscape research focusing on the influence of people's perceptions [24], [25], this study's approach of the park users' experience and perception is based on the opinions and preference of the park visitors from their live experience in the park. Soundscape perception is assessed based on the perceptual attributes of the soundscapes which is then plotted on the ISO complex of 'pleasantness' and 'eventfulness' as highlighted in the ISO 12913-2 [26], [27]. The approached respondents were first informed about the survey's objective and to answer the questions based on their perceptions of the park's soundscape. Respondents who were willing to participate in the study were given a QR code to scan with their mobile phone, providing a link to the questionnaire online and are invited to fill in individually to avoid interference from other participants on site. To minimize any deviations caused by the selection of participants during the survey period, the field study was carried out only during the peak hours of morning 8am to 10am and evening 4pm to 6pm on sunny, breezy days. Since the duration of the survey is only approximately 10-15 minutes, the respondents were asked to respond to the questionnaire based on their long-term experience in the parks within the usual length of time spent in the parks.

The sample size was selected based on prior soundscape research, which stipulated that the total valid responses should be greater than 100 [28]. Approximately 100 participants at each site were asked to complete a questionnaire (figure 3), that comprised the scaling of eight perceptual attributes on a five-point Likert scale: pleasant, unpleasant, calm, uneventful, monotonous, chaotic, eventful, and vibrant, ranging from "strongly disagree (1)" to "strongly agree (5).", which was based on a similar tool used by [25], [29]–[31] in previous studies.

The questionnaire covers the following six (6) parts:

- a. Demographic background of the respondents such as age, gender, noise sensitivity, stress level, race, occupation.
- b. Usage patterns of the parks: travel companion, travel distance, park visit purpose, time spent in the park.
- c. Expectation on acoustic and spatial factors (importance ratings)
- d. Perception of sounds in the park (annoyance ratings).

- e. Reaction to sound sources (perceived dominance ratings)
- f. Soundscape preferences based on the eight perceptual attributes measured (semantic ratings)

3.4. Stress Level and Noise Sensitivity Assessment

The study employed the standard Depression Anxiety and Stress Scale (DASS-21) for stress, which comprises a 7-item self-report tool measuring the attitudes and symptoms of stress with a 4-point Likert scale [32]. The stress scale assesses difficulty relaxing, nervous arousal, and being easily upset or irritable and impatient. A greater score indicates high severity of these negative symptoms.

Participants sensitivity towards noise were measured on a binary coding to a six-response options Weinstein's Noise Sensitivity Scale (WNS-6B) [33]. The WNS-6B was developed to exclude biased questions from the original WNS and binary coding was applied to reduce the response bias to the questions. Noise sensitivity is considered to predict noise annoyance and health-related outcomes from noises [34]. Indicators of the scale includes 'Noises get on my nerves and get me irritated none of the time/ all of the time', 'I find it hard to relax in a place that is noisy', and 'I am sensitive to noise'.

3.5. Statistical Procedure For Data Analysis

The distributions of the variables in the study were analyzed by a chi-square goodness of fit tests to determine if the data follows a distribution that differs from the theoretical expectations. Factor analysis was carried out on the distribution of the park users to extract the prominent factors for the socio-demographic categories of park users in Malaysia following a previous study in China carried out by Fang et al. [11].

Spearman's rho correlation analysis and collinearity diagnosis were used to explore the relationships between ordinal and nominal variables, investigating the relationships between soundscape perception measured by the perceptual attributes of soundscape as adopted in Method A of ISO12913-3 based on the Swedish Soundscape Quality Protocol (SSQP:41) (International Organization of Standardization, 2018) and socio-demographic preferences of the park users. This is consistent with previous studies relating to soundscape perception among urban park users [11], [29]–[31].

Results from the correlation tests identify if there is any substantial relationship between the investigated variables. The p-value represents the significance level where $p \leq 0.05$ ($p \leq 0.05$) signifies a relationship between the variables with higher p values signifying a stronger relationship among the tested variables. All statistical tests were carried out using IBM SPSS Statistics 27.0.

4. Results And Discussions

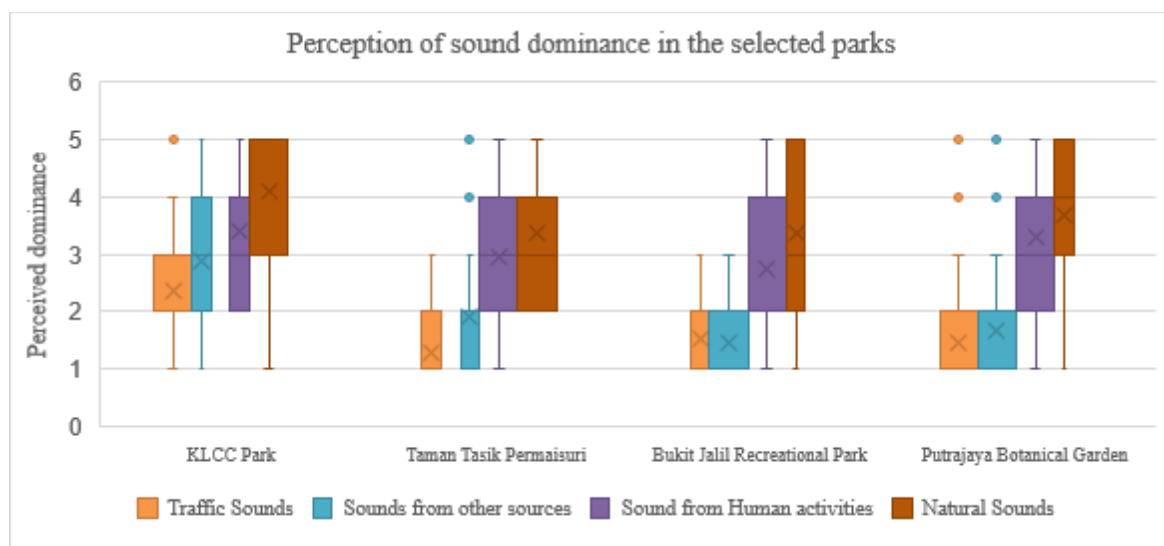
4.1. Soundscape Features of The Selected Parks

A total of 428 respondents answered the survey and no questionnaires were returned incomplete (table 2). The male and female ratio is approximately equal at KLCC Park and Bukit Jalil Recreational Park while the percentage of male visitors is higher than females (above 60%) in Taman Tasik Permaisuri and Putrajaya Botanical Garden. The four parks were visited by all age groups with young adults (25-35 year old) and adults aged 36-45 year old dominating the age groups across all four parks. Noise sensitivity showed that park visitors in KLCC Park are more sensitive to noises with 42.4% reporting that they are sensitive to noise, while the other three parks demonstrated a lower percentage of park visitors sensitive to noises. The DASS severity score for stress showed visitors reported being normal or mildly stressed across all four study areas.

Table 2. Background of respondents.

Variables	KLCC Park	Taman Tasik Permaisuri	Bukit Jalil Recreational Park	Putrajaya Botanical Garden
Gender, N (%)				
Male	49.2	62.9	53.5	66.7
Female	50.8	37.1	46.5	33.3
Ethnicity, N (%)				
Malay	35.6	20.0	32.0	32.0
Chinese	31.4	51.4	49.5	49.5
Indian	18.6	25.7	16.5	16.5
Others	14.4	2.9	1.9	1.9
Age, N (%)				
18 - 25	22.9	16.2	15.8	18.6
26 - 35	28.8	27.6	34.7	20.6
36 - 45	28.0	21.9	30.7	31.4
46 - 55	12.7	13.3	5.0	15.7
56 and above	7.6	21.0	13.9	13.7
Noise Sensitivity, N (%)				
Sensitive	42.4	28.4	19.0	31.1
Not Sensitive	57.6	71.6	81.0	68.9
Stress Level, N (%)				
Normal	43.2	37.1	52.9	49.5
Mild	49.1	60.0	38.2	43.7
Moderate	7.7	2.9	5.9	5.8
Severe	5.4	0.0	2.9	1.0
Extremely Severe	0.0	0.0	0.0	0.0

Significant differences were found for the perception of different sounds based on the average valuation from the study sites and all personal factors were controlled in the models. It is found that all parks have a similar perceived occurring sound with a high degree of natural sounds in all the parks, followed by sounds from human activities and traffic sounds (figure 4).

**Figure 4.** Comparison of sound source dominance in each park.

4.2. Perceived Soundscape of the Selected Parks

Eight (8) individual semantic attributes were used in this study to quantitatively analyze people's perceptions of the acoustic environment. *Eventfulness* and *vibrancy* were considered significant characteristics of the park soundscapes in Putrajaya Botanical Garden, while the other three parks reflect *calmness* and *pleasantness* as the significant characteristic of the park soundscapes (figure 5). This reflects the functions of the park, where many team-building and family day events are held in

Putrajaya Botanical Garden over the weekends, contributing to the eventfulness and vibrancy of the soundscapes in the park, whereas the other three parks reflect recreational and leisure purposes.

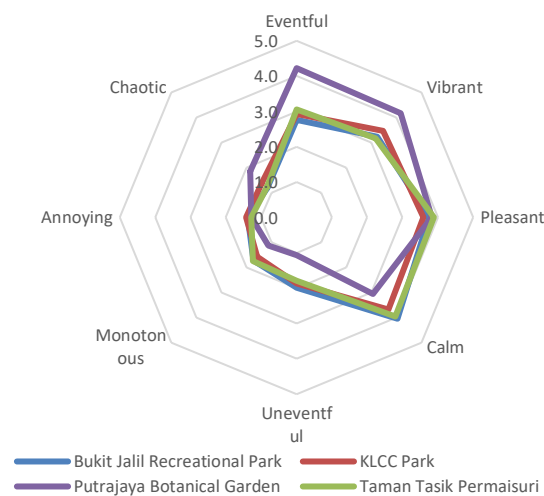


Figure 5. Perception of acoustic environment in the selected parks.

The soundscape perception in the other three parks was rated similarly in terms of pleasantness and eventfulness, but Putrajaya Botanical Garden scored higher on pleasantness which may be due to the park's location in a quiet area. However, the higher value of chaotic perception in Putrajaya Botanical Garden may also be attributed to the presence of traffic sounds during peak hours. It is consistent with the results that mentioned that environments with the predominant presence of traffic were classified as chaotic and annoying [26], [35], [36]. Uebel et al. [37] also concluded that anthropogenic noise relates to unpleasant experiences within parks, like the three selected study areas.

When the individual perceptual attributes are combined to measure soundscape perception based on “Eventfulness” and “Pleasantness” as described in Method A of ISO12913-2 [38], it is found that the soundscape perception in Malaysia is explained by Eventfulness (Factor 1) with 40.1% variation and Pleasantness (Factor 2) with 33.4% variation, which is comparable to the results of soundscape perception in East Asian countries such as China and Korea [39], [40]. When measured individually, the “Eventfulness” of the park soundscape scored a higher variation in three (3) out of the four (4) study area, signifying that sounds from park’s soundscape such as noises from human activities and music contributes to the vibrancy and attractions of the park, is considered an important factor in the park’s environment. This is different in KLCC Park where “Pleasantness” leads with a 42.2% variation of the soundscape perception, reflective of the role of park in a crowded urban center and acts as a sanctuary for people to escape from the busy urban settings. “Eventfulness” in Putrajaya Botanical Garden can be explained by the nature of the urban area where Putrajaya is an administrative center, which is relatively quiet during off-office hours. Therefore, many events were organized in the botanical park to attract visitors to the park, especially during weekends. These events contribute to the lively environment in the park which then increases the eventfulness of the park’s soundscape.

In China, dominant sound sources of talking and children playing in open public spaces were positively related to soundscape of interest and comfort [41]. A structural equation model of urban soundscapes demonstrated human sounds from leisure activities played a role in constructing the soundscapes of urban recreational areas in Korea [42]. On the other hand, suburban parks in Greater Stockholm were considered as ‘pleasant’ and ‘soothing’ [43]. Similarly in Spain where soundscape studies were conducted in a monumental site of a semi-natural environment, a high percentage of visitors reported pleasant sounds as dominant in the area [44]. This illustrates a difference with the cultural distinctions between countries where parks in Western countries are dominated by Pleasantness (Factor 2).

However, the Figure 6 also demonstrated the dominance of “Pleasantness” in the 0.5-0.6 range as compared to “Eventfulness” in 0.15-0.4 in all four parks (Figure 6). This is explained by the importance of pleasant soundscapes which emphasises how being in the park allows us to feel pleasant and calm in all urban parks where even though “Eventfulness” contributes dominantly to the soundscape perception of Malaysians, “Pleasantness” in the parks is equally important and highly perceived in the context of park environments.

In this context, “Pleasantness” of these parks refers to how the auditory attributes of the park, rich in biodiversity allows for relaxation and restoration. This is especially in the parks of Kuala Lumpur where pleasantness scores are similar at approximately 0.50 in the ISO Complex, indicating that the natural sounds heard in the parks are similar; while in Putrajaya Botanical Garden, pleasantness scored higher due to the function of the park as a botanical garden, which houses different variety of plants and attracts more diversity of birds and insects to the parks. The large size of Putrajaya Botanical Garden also allows the park to feel quieter and calmer as noises disperse in larger proximity. On the other hand, “Eventfulness” of the parks in Kuala Lumpur is significantly lower than in Putrajaya than in Putrajaya, mainly due to the events planned in the Putrajaya Botanical Garden. As highlighted previously, many park events were organised in the botanical garden to encourage the use of the park, resulting in high volumes of human activities during weekends. Instead, the parks in Kuala Lumpur were located in busy urban and suburban areas, which are in close proximity to residential and commercial areas, which resulted in “eventfulness” of the parks’ soundscape generated from people visiting the parks for leisure activities and the activities happening outside the park boundaries.

This result also emphasizes the significance of a pleasant soundscape as the primary attribute that fulfils the purpose of green parks for restoration and stress reduction. Additionally, the discovery of an eventful soundscape represents a novel finding for Malaysian park attributes, specifically in Kuala Lumpur. This is in line with findings that soundscape experts dominated by natural sounds such as birds, insects and trees rustling were found to be pleasant, and those dominated by human sounds were eventful [30]. It also suggests that communities in Malaysia value the eventfulness of a park more than its pleasantness as people are more likely to visit a park for sport or leisure activities. This is not to say that a park with pleasant soundscape was not considered important, but that “eventfulness” reflects the purpose of park visits and activities carried out in the parks. This is reflected when the parks in the selected sites were not assessed as “calm” but instead as “exciting” when plotted in the ISO complex of soundscape perception (Figure 6), as most of the research on soundscapes in public spaces would suggest so to reflect a tranquil area for relaxation [30], [45]. Therefore, further investigation into the type of park users and the influence of the socio-demography onto soundscape perception should be undertaken.

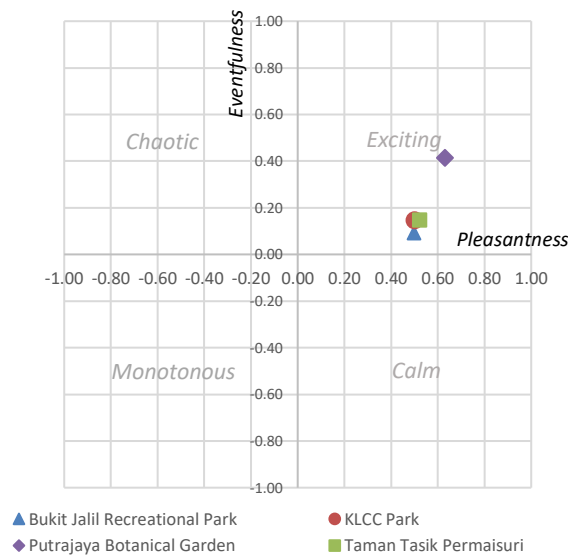


Figure 6. Pleasantness and eventfulness of the soundscapes on ISO complex.

4.3. Type Of Park Users

Factor analysis was carried out on the park users' social, demographic, and behavioral attributes to eliminate variable collinearity. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .543, with Bartlett's Test of Sphericity ($p < .001$) indicating that factor analysis can be carried out on the data. The personal attributes of the park users were classified into three components after a Varimax rotation with Kaiser normalized loading (table 3).

Table 3. Component scores of respondent's attributes.

Attributes	Component (Explained Variance, %)		
	1 (17.62%)	2 (16.49%)	3 (12.63)
Age	-0.802	-.033	-.075
Education	.666	-.134	-.398
Frequency of visit	.607	.066	.221
Distance to park	.228	.809	.125
Time spent in the park	-.121	.765	-.011
Noise Sensitivity	.277	-.461	.068
Stress Level	.306	.460	-.062
Race	-.174	.184	.106
Occupation	.071	-.030	.780
Gender	-.001	.019	.654

Notes: Bold values represent parameters belonging to one of the components

Component 1 exhibits 17.62% explanatory power with negative loadings on "age" and positive "education" and "frequency of visit"; it is labelled as C1 (Age and Educational Condition). High C1 are groups of people who are young with high educational levels and a higher frequency of visits to the park. Component 2 explained (16.49%) with positive loadings on "distance to the park", "time spent in the park", "stress level", "race", and negative "noise sensitivity". Therefore, those who scored low on C2 are those who are sensitive to sounds, stressed and willing to spend longer time in the park. Component 3 refers to 12.63% of the variation with positive loadings on occupation and gender. High values of C3 loadings indicate females with more free time.

Even though soundscape perceptions in Asian countries were similar in terms of their Eventfulness, results from factor analysis suggests a difference in the relationship between personal attributes when compared to a study in China. According to Fang [11], there is five main dimensions of socio-demography and behavioural attributes linked to the soundscape perception and preferences: familiarity, education, use of park, gender and time spent. However, findings in a Malaysian context suggests a less complex relationship in which only three (3) dimensions were found: age, familiarity with park and gender.

One similar dimension across both study is gender, suggesting that irrespective of the context of study, generally, females in Asian countries are more sensitive to their perception of the surroundings. Another similarity would be the familiarity to the park where in both China and Malaysia, frequency of visit or the familiarity to the park is one of the main dimensions to the socio-demographic difference of the park users. The difference in the components of personal attributes also indicates the difference in use of parks when comparing China and Malaysia.

Similarly in Western Countries, socio-demography plays a role in influencing with the perception of soundscape. Such as gender and age plays an important role in the soundscape perception of Malaysia, in Sweden, women and older people are reported to have stronger experience and felt calmer at the sounds of nature in parks as compared to middle-aged and young people as women were more active in green space, and has a higher well-being associated with higher activities [46], [47]. Gender differences were associated to the use of parks and health benefits in the UK as well, suggesting to the gender differences in perception and usage of urban green spaces [48].

Even though Malaysia is a multi-cultural country, the low factor loading of race (.184) indicates that race does not significantly affect how soundscape of the park is perceived. This shows that all races in Malaysia frequent the parks and that there are no soundscape preferences that can be attributed to a particular race. Overall, this suggests that although soundscape perception is dependent on the cultural settings of the study, similar socio-demography influences such as age and gender on the perception of sounds and use of green spaces can be similar across all countries.

4.4. Different Soundscape Perceptions Among Different Park Users

The semiotic approach highlighted by Yorukoglu and Omar [49] focuses on the meaning and interpretation of sounds, suggesting that understanding people's preferences in soundscapes can help to create spaces that cater to the needs and preferences of visitors. Factors such as natural sounds, background noises and the cultural contexts play a role in shaping these preferences. This study further investigates if the cultural patterns of Malaysian influences the park usage pattern and the soundscape perception of park users.

The results showed that the socio-demography of the park users significantly influences the type of sounds heard within the park. Specifically, the age and educational level dimension influences the perceived dominance of sounds from human beings with a negative correlation, suggesting that older people are less sensitive to sounds from human activities. This is in line with Fang et al. [11] that familiarity and age make people more tolerant of sounds people find annoying.

Distance from the park and the sensitivity of users significantly influence the perceived occurrence of three types of sound profiles: traffic noise sounds from human activities and natural sounds. These are those who are more sensitive to the natural sounds in the park for relaxation and recreational purposes. Occupation and gender only relate to the perceived occurrence of natural sounds signifying that female and those with more free time are more sensitive to natural sounds in parks. Female shows higher sensitivity to sounds and lower tolerance towards several sounds [11].

Table 4. Correlation for the impact of respondent's factors on soundscape profile and perceptions.

		Age and Educational Level	Distance from Park and Sensitivity of Users	Gender and Occupation
Sound profiles				
Traffic noise	Correlation Coefficient	.000	.280**	-.063
	Sig. (2-tailed)	.997	.000	.196
Other noise	Correlation Coefficient	.067	-.047	.054
	Sig. (2-tailed)	.171	.329	.267
Sounds from human beings	Correlation Coefficient	-.161**	.242**	.019
	Sig. (2-tailed)	.001	.000	.696
Natural sounds	Correlation Coefficient	.038	-.118*	.109*
	Sig. (2-tailed)	.439	.015	.025
Soundscape Perceptions				
Eventfulness	Correlation Coefficient	.033	.015	-.022
	Sig. (2-tailed)	.491	.756	.657
Vibrancy	Correlation Coefficient	.036	-.081	.023
	Sig. (2-tailed)	.462	.096	.639
Pleasantness	Correlation Coefficient	-.004	-.171**	.034
	Sig. (2-tailed)	.940	.000	.488
Calmness	Correlation Coefficient	-.072	-.171**	.021
	Sig. (2-tailed)	.140	.000	.666
Loudness	Correlation Coefficient	.097*	-.025	.013
	Sig. (2-tailed)	.045	.605	.797
Satisfaction	Correlation Coefficient	.145**	-.201**	.049
	Sig. (2-tailed)	.003	.000	.313

Notes: ** represents significant variables

In terms of soundscape perception, the gender and occupations of the park visitors are not significantly related to how this group of users perceive the soundscape of the park. Age and educational status of the park users correlate positively to the perceived loudness and satisfaction towards the park soundscape. This is similar to previous studies showing that the higher the social status is, the less tolerance there is for the soundscape [50]. Fang et al. [11] also mentioned that the perception of a park's soundscape can vary among different groups of users as the factors and preferences influence how visitors perceive and evaluate the soundscape.

Findings of this study suggest that distance, time spent in the park and sensitivity of park users correlate negatively with the perceived pleasantness and calmness of the park. This suggests that the park's soundscape is more influential on those who are stressed and sensitive to the surrounding noises, which is in line with study suggesting that psychological wellbeing, age and gender mediates soundscape pleasantness and eventfulness [14]. It is similar to Shepherd et al., [51] who highlighted that noise-sensitive individuals were more susceptible to noise-induced annoyance. Di et al., [52] also highlighted that people who are noise-sensitive, experienced 26% higher perceived annoyance from noises. Prolonged exposure to certain surroundings might potentially lessen their restorative benefits [53], [54], in the context of parks, suggesting that extended stays may lead to a decline in the perceived pleasantness and calmness when the individuals become accustomed to the environment.

It is found that park visitors who stay further from the park also have higher expectations on the acoustic environment, where the park's pleasantness and calmness are important for a better experience of soundscape in the park. Nilsson & Bergund [43] suggests that despite the differences in expectations of soundscapes in city parks and suburban parks where it is expected to be quieter, traffic noise is taken for granted in cities and have a negative effect on soundscape quality. Therefore, park visitors who are visiting city parks tend to have higher tolerance towards the prominence of traffic noises in the area.

Spending time in the park and the satisfaction with the overall soundscape of the park are interconnected [55]. The longer the respondents spent in the parks, the more satisfaction they had about the overall soundscape [11], [56]. Liu et al. [55] found that visitors who stayed longer in the park perceived more singing and broadcasting sounds, providing positive effects to the park visitors. Similarly, the activities visitors engage in the parks are also positively associated with pleasant bird sound experiences and they are less likely to be disturbed by traffic noises [37]. This indicates that the auditory role of soundscape is important to provide a satisfactory experience to these type of park users as their expectations of the space is higher.

Therefore, by assessing the importance and satisfaction of soundscapes for different individuals, park designers and planners can make informed decisions to enhance the overall park experience. For example, Liu et al., [55] mentioned that increasing the presence of natural sounds and mitigating unwanted noises can lead to a more satisfactory experience in city parks. According to Yorukoglu and Kang [21], experiencing soundscapes trigger psychological process to be analyzed, starting with expectations, leading to perception and finishing with reaction.

The perception of the park users is crucial in this study to as research has shown that pleasant and appropriate sound environments can positively influence our perception of comfort, safety, and the overall satisfaction of a place. Soundscape plays a vital role in shaping the ambiance of a place, it affects the mood, perception, and overall wellbeing, making it crucial to design urban parks that provide a pleasant and harmonious environment for the park visitors to enjoy. Therefore, soundscapes of a park which aligns with the users' expectations can promote relaxation, concentration, social interaction, and other beneficial outcomes. This research can serve as a guide for urban planning and park design strategies to optimize the restorative potential of parks.

5. Limitation And Scope For Further Studies

It should be noted that the findings described in this study are based on psychological factors and such variables are dependent on cultural and contextual variations. Therefore, cross-cultural studies could provide a deeper insight on the relationship and effect of different cultural settings on the behaviour of park users. Another study's limitation is related to the participants' behaviour during the interview. Interview and semantic scaling require the participant's awareness and attention to the acoustic environment [27]. In this case, the focus of the participant's attention to the acoustic environment might not reflect their subconscious hearing in the park and influence how they perceived the sound environment compared to their everyday experiences. This study relies on the perception of the respondents during their time spent in the park from their usual in-situ park experience. However, like the soundwalk method, the result of this study implies that when people were asked questions regarding the soundscapes of the park, the results may not reflect the usual auditory influence on the experience in the parks. Therefore, the researcher may consider using behavioral observation to deal with this limitation so that the participants are unaware of the study and might not influence the results.

This study also focuses on the impact of socio-demography on soundscape (auditory senses) in urban parks. However, recent studies have found that the stimulation of all five senses may influence our experience in the park [57], [58], suggesting that future research can look further into the perception of park visitors from the perspective of "landsenses" ecology to increase visitors' satisfaction. The design and layout of a park influences its functionality, aesthetics, accessibility, and overall user experience. Specifically, landscape design influences user experience and soundscape perception by enhancing visual experience and functions as noise masking effect and create positive sounds [59]–[61]. Landscape features influence visitor's behaviour pattern depending on their contexts such as landmarks serving as gathering points and the effect of vegetation cover varies among the visitors [62]. The design of social space in a park also encourages planned behaviors in the park allowing spaces for leisure and social activities such as singing and dancing [62] which encourages a variety of sounds and influence the expectations of the users in the parks. As the four different study area in this research have different park designs which impacts the patterns of movement and preferred areas within the park, it is suggested that future research can further consider comparing the soundscape perception of parks with similar design intention or to deeply compare different planned areas within a park to explore how far does the design of the park influences the soundscape perceptions.

6. Conclusion

This paper details the relationship between park users and the usage pattern of urban parks. It investigates the differences between the perception of sound profiles and soundscapes of different types of users in urban parks. Extending the previous knowledge on how socio-demographics influences the dominance of sound type occurrence, this study also includes soundscape perception

regarding calmness, eventfulness, vibrancy, pleasantness, perceived loudness, and satisfaction towards the park's soundscape.

Findings of this paper discussed the role of "pleasantness" as the common perceived soundscape in the parks of Malaysia where "pleasantness" scored a higher scoring for the park soundscape perception. The above finding is consistent with numerous studies [30], [43], [45], [63] that showed pleasantness as predominant perceived soundscape of parks. This demonstrates how people in the parks experienced a high perception of natural sounds which allows them to feel calm and restored in the park. The high scores of the "pleasantness" also indicates that the feeling of being in nature in the parks of Malaysia is high, and that the experiences of the park visits allow people to feel as though they are away from the busy urban settings. However, it is also shown that "eventfulness" is considered the main variance in influencing the soundscape perception of Malaysian park visitors. This can be interpreted as the activities and sounds from human activities can greatly impact the park visitation and experiences. In other words, parks that offer a diverse range of activities and events attract Malaysians who seek dynamic and engaging experiences during their visits. In summary, the paper highlights how the combination of "pleasantness" and "eventfulness" plays a crucial role in shaping the overall perception of soundscape in Malaysian parks. The presence of a tranquil and natural environment alongside vibrant and varied activities makes these parks appealing and enjoyable destinations for visitors seeking respite and a connection with nature amid the urban landscape.

The soundscape perception in Malaysia reflects similarly with how other Asian countries perceived soundscape, with Eventfulness as the main factors in influencing the perception. All the parks in the study area reflects a similar soundscape perception with high levels of Pleasantness and Eventfulness, suggesting that the parks in Malaysia, specifically in Kuala Lumpur and Putrajaya are "exciting" instead of calming, suggesting the importance of park design to emphasize the provision of different activities for all ages so that people are more attracted to the leisure opportunities in the parks. Therefore, it is crucial that both the "pleasantness" and "eventfulness" of the park's soundscape requires careful planning to ensure that both characteristics of a park soundscape coexist harmoniously. The perceived soundscape of the parks in Malaysia demonstrated higher values for "pleasantness", providing a serene and calm quality park soundscape, acting a good opportunity for relaxing purposes. While "eventfulness" of the park's soundscape adds to the vitality and vibrancy of the park, which is mainly from the activities carried out in the park, it can also be described as adding life to the park. However, a park with only high levels of pleasantness can be too quiet for a comforting experience, while a park with too high levels of vibrancy and eventfulness can disrupt the role of a park as a space for relaxation. Proper balancing of these two attributes can significantly enhance the visitor's experience and create a vibrant and inviting atmosphere that caters to various user preferences while preserving the park's natural serenity and environmental integrity.

The four selected urban parks recorded a slight difference in the purpose of visit, although most of the respondents go to the park to exercise and for relaxation purposes in nature. There appears to be a significant but weak relationship between the socio-demography of the respondents, stress level, noise sensitivity, the frequency of park use, and time spent in the park. This result is in line with previous research that there is a significant but weak relationship between age and the perception of soundscape [14], [64].

The dimensions of socio-demographic factors showed different degrees of importance from various perspectives signifying the importance of personal attributes on soundscape perception in urban parks. However, less socio-demography dimensions were found in the Malaysian context as compared to the cultural context of China. This suggests that while soundscapes were perceived similarly across Asian countries, there were differences in how the socio-demographics of the community influenced those perceptions. The main factor in Malaysia were age and education, followed by the distance to the park and the sensitivity of the park users and lastly the gender and occupation. It implies that Malaysian's utilize parks primarily to fulfill the demand of leisure activities and to participate in park activities, supporting the idea that soundscapes of the parks were exciting. It also suggests that in dealing with park designs, urban planners should design exciting soundscapes in the park to support the recreational needs of the community.

Therefore, supportive soundscapes are expected to contribute to the overall experience of a place. Parks are always perceived as 'calm and tranquil', and much research has confirmed the positive effects of 'natural sounds' [7], [65]. That is why the soundscapes should match expectations created by the context and purpose of the place. This is supported by the idea that our perception and experience of different spaces are shaped by the acoustic environment. Understanding the park's intended use and the expectations attached to it will help in creating appropriate soundscapes because parks are always desired as places for leisure and connection with nature.

Overall, the design and emphasis of a park's soundscape need to meet different expectations of people in the three dimensions, as their perceptions can shape the user's experience and enhance any restorative benefits from the park visits. Therefore, further emphasis should be undertaken on the concept of soundscape in parks to enhance the park environment in Malaysia.

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