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Urban Park Characteristic as a Key Element for Mental Health Restoration in Malaysia

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Abstract
A recent study has reported that the Malaysian urban population faces mental health problems due to urbanisation. Nature environment has been expected to give restoration experience among people. Therefore, the objective of this study is to analyse the relationship between park characteristics and mental health restoration in an urban park. Survey questionnaires (n=382) were distributed among urban park users. The analysis was conducted using the Partial Least Square Structural Equation Model. Results show that the Serene and Nature dimensions are the significant factors that give a restorative experience among urban park users. These findings can assist landscape architects in advocating for creating the urban park for mental health restoration.

Keywords: Mental health; restoration experience; perceived sensory dimension, restorative environment

1.0 Introduction
Many urban design and planning approaches are based on the idea of urbanisation that a city should promote high population density, economic development, effective public transportation, and short distances (Rérat, 2012). The rapid growth of urbanisation negatively impacts mental health, such as depression, stress, anxiety disorders, and the increase in schizophrenia among the people who live in the cities (Lederbogen et al., 2011). In Malaysia, mental health problems have been reported to have increased among adults who are above16 years old- from 10.7 percent in 2011 to 29.2 percent in 2015 (Health, 2018). A study also supported the occurrence of depression and anxiety symptoms among the Malaysian urban population due to COVID 19 (Leong Bin Abdullah et al., 2021). Moreover, it was reported that mental health issues related to the COVID-19 pandemic were mainly experienced by individuals who are single, females, age 40 years old and below, lower household income, lower education level, perceived risk of unemployment, student status, presence of chronic/psychiatric illnesses, lack of regular exercise, and frequent exposure to social media or news concerning COVID-19 (Xiong et al., 2020). Prolonged stress causes attentional fatigue and suicide (Kuroda & Yamamoto, 2016; Purani & Kumar, 2018; Sofiah et al., 2020). Stress restoration mitigation is needed to improve the urban population's quality of life.

A previous study has proven that natural environments have positive means to mitigate excessive stress (see Han, 2010). For an urban population, an urban park served as a sustaining mechanism for the impact of environmental elements and generated positive outcomes as had been supported (see Hashim et al., 2019; Liu et al., 2020; Sugiyama et al., 2018). Meanwhile, several studies have

looked at the components and characteristics in the urban park that affect physiology and psychological restoration and found that walking while watching the surrounding sceneries within a lovely greenery setting resulted in a significant reduction of blood pressure and stress (Conniff & Craig, 2016; Stigsdotter et al., 2017). Nonetheless, few research has examined the relationship between urban park characteristics and mental health restoration in Malaysia. Thus, to address this gap, this study aims to determine the characteristics of the urban park required for experiencing mental health restoration. In full filing the aims, the objective of this study is to analyse the relationship between the preference of urban park characteristics and mental health restoration by urban park users. This information may be useful in developing user needs design for mental health-promoting environments in Malaysia.

2.0 Literature Review

2.1 Urban parks as a preferable restorative environment in cities
An urban park is any public space designed for passive or active recreation in a densely populated region and serves as a valuable source of leisure for users, as well as a pleasant spot for urban dwellers to escape urban demands and tensions (Ahmad Shafee & Kamaruddin, 2019). Urban parks are essential elements of urban entities that significantly improve people's mental health. Kelly (2018) agrees that parks can provide people with opportunities to enhance physical health, mental wellbeing, social connections and enhanced quality of life. Conversely, less connection to the natural environment is associated with mental illness (Bratman et al., 2015; Subiza-P`érez et al., 2020).

Mental health restoration emphasis by Han, (2003) when he proposed the environment can influence the emotion, physiology, cognitive and behaviour of people. In the emotional aspect, the urban park allows people to rest or promote relaxation and favourable mood outcomes (Lakhani et al., 2019). Kuo and Sullivan (2001) study on low-income housing showed that residents who live in greenery surroundings performed better on a standardized attention test, handling major issues and violent behaviour than the residents of barren surrounding buildings. Meanwhile, for physiological aspect, exposed to sound from nature environment reduce stress, muscle tension and blood pressure (Li & Lau, 2020).

There is evidence that the urban park promotes restoration, relaxation, and stress reduction for socio-demographic differences. However, there is a lack of studies on people's restoration in the urban park by scholar in a similar context in Malaysia, especially in terms of socio-demographic differences. The restoration experience in Malaysian urban parks might differ from other places.

2.2 Park characteristics for restorative experience
Research has attempted to integrate characteristics in an urban park for the restoration experience. The characteristics are primary listed in The Perceived Sensory Dimensions (PSDs). Researchers have recently recognised PSDs to be based on perceived and experienced characteristics of a park (Grahn & Stigsdotter, 2010). PSDs has been developed by Grahn and Stigsdotter, (2010) who have suggested the park characteristic that gives quality for the physical environment; the qualities consist of eight dimensions: nature (wild and untouched area for relaxing), culture, (living condition of human being), prospect (plane surface to give prospect, vista over the surrounding), social (people can meet and do activity), space (free and spacious open space), rich in species (experiencing many species), refuge (where people can feel safe, play or simply watch other people being active), and serene (silent and calm).

Research that has been conducted to support the PSDs with restoration effect in an urban area has been widely used. It has also been stated by Qiu and Nielsen, (2015) that the PSDs is the reliable tools for measuring green space. In a western country, study in urban park, care setting, forest, and small urban park have highlighted the positive effect of PSDs for stress restoration (Karlsson & Grahn, 2011; Memari et al., 2017; Peschardt & Stigsdotter, 2013; Ulrika Karlsson Stigsdotter et al., 2017). Meanwhile, in an Asian country, PSDs have also been used to measure the restorative experience among Malaysian university students (Malekinezhad & Lamit, 2017) and for specific dimensions of PSDs in China's urban parks for stress recovery (Gao et al., 2019). These eight dimensions are said to provide a basic foundation by delivering the desired natural attributes as well as the physical activity benefit (Memari et al., 2017). Thus, PSDs are suitable to be used for this study since little has been done to examine the association between PSDs and mental health restoration.

2.3 Relationship Between Perceived Sensory Dimension and Restoration Experience
Several studies provide the relationship between PSD and restoration experience. A study in Copenhagen city found that people with an average level of stress prefer the PSDs of social and serene dimensions. In contrast, stressed individuals choose nature dimension as well as the social and serene dimension in urban green space (Peschardt, 2014). Different result found in China, where the findings indicated that the best restorative setting for stress recovery may be described as multi-layered woodlands near to water, with a greater sense of tranquility (serene) and nature, fewer prospects, and little or no culture or social components (Gao et al., 2019). Additionally, serene, refuge, and nature dimensions are very beneficial for stress reduction in Denmark's urban green space, while social is frequently negatively related to stress recovery (Grahn and Stigsdotter, 2010). Thus, it can be conclude that PSDs appear to be interpreted similarly, regardless of cultural background or context. However, there is still a lack of research in an urban park on the relationship of PSDs with mental health restoration experience in Malaysia. The distinction of the eight PSDs influence on mental health restoration is first investigated in this study among the Malaysian sample (refer Figure 1). Therefore, this study proposes a hypothesis:

H1 : Nature dimension influence the mental health restoration of urban park user
H2 : Culture dimension influence the mental health restoration of urban park user
H3 : Prospect dimension influence the mental health restoration of urban park user
H4 : Social dimension influence the mental health restoration of urban park user
H5 : Space dimension influence the mental health restoration of urban park user

H6 : Rich in species dimension influence the mental health restoration of urban park user
H7 : Refuge dimension influence the mental health restoration of urban park user
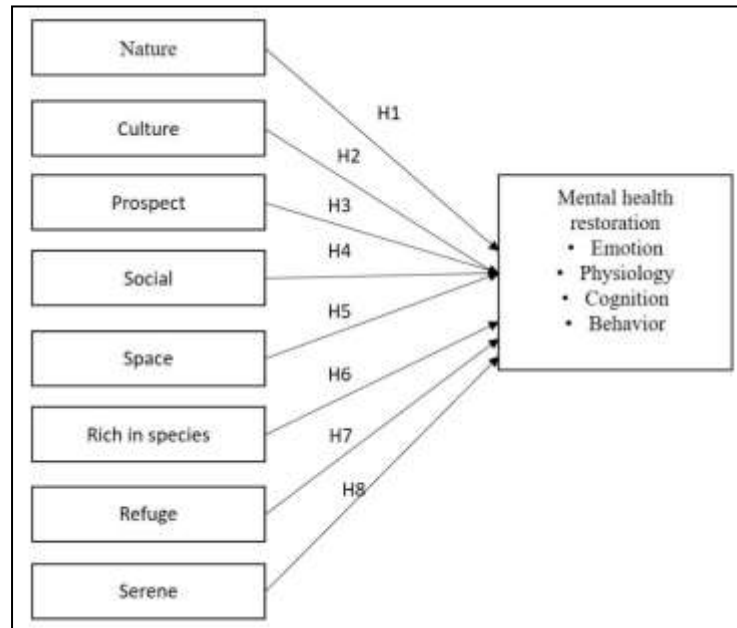H8 : Serene dimension influence the mental health restoration of urban park user

Fig. 1: Research framework of Perceived Sensory Dimensions and mental health restoration
(Source: Stigdotter, (2010) and Han, (2003))

3.0 Methodology

3.1. Data Collection and Procedure

To determine the characteristics in the urban park required for experiencing mental health restoration, a quantitative survey in the form of a questionnaire was collected in December 2020 to February 2021 at two selected urban parks in Kuala Lumpur city; Perdana Botanical Garden and Titiwangsa Lake Park. This study was conducted in Kuala Lumpur city as it status as one of the dense cities in Malaysia with most of the population being urban dwellers. Both urban parks have been chosen as size requirement of urban park between 40 to 100 hectares as suggested in the hierarchy of open space by the Department of Town and Planning Malaysia (2011). For both sites contain similar park characteristics to be evaluated, a checklist was developed, which contained 55 items adopted from the PSDs. During observation, both site have 48 identical items out of the 55 items.

A self-reported survey was done on-site and the respondent was randomly selected among the visitors of the urban park. A simple random sampling technique was used in this study. The prospective respondent must be an adult of 18 years old and above, who lives in Kuala Lumpur city centre, and is about to leave the park to ensure that the answer reflects his or her immediate experiences. People who had approached the main gate of the urban park were briefed by the author who explained the study goal. The respondents were also informed that they were free to leave at any time. The standard operation procedure was applied during the study due to the Covid-19 pandemic. There was a limit of only 5 people who were to answer at one time, keeping to the 1-meter social distancing requirement. The overall response rate was between 15 to 20 minutes for each respondent.

3.2. Measurement

The questionnaire survey consisted of five parts. However, for this study, the result targeted the (1) respondent profile, (2) preference of perceived sensory dimension, and (3) mental health restoration experience by urban park users. The respondent profile consists of demographic information about the respondent's gender, age, race, marital status, and monthly income. The second part addresses the eight dimensions of PSDs with 48 items. The respondent was asked to indicate their preference with five Likert scales ranging from 1= very unimportant, 2 = unimportant, 3= moderately important, 4 = important, and 5 = very important. The third part assesses the mental health restoration experience using the adapted Restorative Scale by Han (2003). The measured variable consists of emotional, physiological, cognitive, and behavioural responses through RS. The cognitive (5 items), physiology (4 items), cognitive (5 items) and behavioural responses (3 items) were measured using the nine Likert scale from 'not at all' to 'very much'. Meanwhile, for emotional responses, the nine Likert scale starts from the 'very much negative mood' to the 'very much positive mood.'

3.3 Data Analysis

For this study, the PSDs influence the mental health restoration was analysed with the Partial Least Square Equation Modelling (PLS-SEM). Also, this study performed the bootstrapping method with 5000 bootstrap subsamples and two tails to test the significant path coefficient. According to Heir Hair et al. (2017), the path coefficient is supported when t-value is > 1.645 (two tailed).

4.0 Result

4.1 Demographic Profile
A total of 400 people agreed to answer the survey. Later, 18 were excluded from the data set due to incomplete answers, thus resulting in a total of 382 respondents, with 200 from the Perdana Botanical Park and 182 from Titiwangsa Lake Park. The results from Table 1 show that females seem to dominate the number of park users in this study. The majority of the park users are young adults, Malay, single, and from the lower-income group. The result could imply that urban parks are still prominent and crucial for average city dwellers and that the socio-economic status of a particular group may influence the number of people who use urban parks.

. Table 1. Demographic profile of the park users

Variable		Items	Perdana Botanical n (%)	Titiwangsa Lake n (%)	Total n (%)
Gender		Male	117 (52.7)	68 (42.5)	185 (48.4)
		Female	105 (47.3)	92 (57.5)	197 (51.6)
Age	Young adult	18- 25 years	135 (60.8)	67 (41.9)	202 (52.9)
		26 - 30 years	30 (13.5)	44 (27.5)	74 (19.4)
		31 - 35 years	20 (9)	23 (14.4)	43 (11.3)
	Middle adult	36 - 40 years	6 (2.7)	14 (8.8)	20 (5.2)
		41 - 45 years	9 (4.1)	8 (5.0)	17 (4.5)
		46 - 50 years	3 (1.4)	3 (1.9)	6 (1.6)
	Older adult	51 - 55 years	2 (0.9)	0	2 (0.5)
		56 - 60 years	8 (3.6)	1 (0.6)	9 (2.4)
		61 - 65 years	6 (2.7)	0	6 (1.6)
		66 - 70 years	1 (0.5)	0	1 (0.3)
		70 years and above	2 (0.9)	0	2 (0.5)
Race		Malay	190 (85.6)	150 (93.8)	340 (89.0)
		Chinese	16 (7.2)	2 (1.3)	18 (4.7)
		Indian	11 (5.0)	4 (2.5)	15 (3.9)
		Others	5 (2.3)	4 (2.5)	9 (2.4)
Marital status		Single	155 (69.8)	118 (73.8)	273 (71.5)
		Married	67 (30.2)	40 (25.0)	107 (28.0)
		Divorced/widow	0	2 (1.3)	2 (0.5)
Monthly income	B40	No income	117 (52.7)	36 (22.5)	153 (40.1)
		RM2500 and below	53 (23.9)	53 (33.10)	106 (27.7)
		RM 2501 - RM 3169	16 (7.2)	29 (18.1)	45 (11.8)
		RM 3170 - RM 3969	7 (3.2)	17 (10.6)	24 (6.3)
		RM 3970 - RM 4849	4 (1.8)	8 (5.0)	12 (3.1)
	M40	RM 4850 - RM 5879	8 (3.6)	8 (5.0)	16 (4.2)
		RM 5880 - RM 7099	4 (1.8)	5 (3.1)	9 (2.4)
		RM 7100 - RM 8699	6 (2.7)	1 (0.6)	7 (1.8)
		RM 8700 - RM 10959	3 (1.4)	2 (1.3)	5 (1.3)
	T40	RM 10960 - RM 15039	2 (0.9)	0	2 (0.5)
		RM 15040 and above	2 (0.9)	1 (0.6)	3 (0.8)

4.2 Structural Model Path Analysis
The findings from the path coefficient was used to test the hypothesis. As shown in Table 2, two hypotheses were supported to have t-value ≥ 1.645. Specifically, the Nature (β = 0.125, t = 1.868, ρ < 0.062, f^2 = 0.011) and Serene (β = 0.129, t = 2.231, ρ < 0.026, f^2 = 0.012) dimensions are significant and positively related with mental health restorative experience.

Table 2. Relationship between the preference of urban park characteristics and mental health restorative experience

Hypothesis	Relationship	Std beta	Std error	t value	ρ values	f²	Decision
H1	Nature -> mental health restoration	0.125	0.067	1.868	0.062	0.011	Supported
H2	Culture -> mental health restoration	0.117	0.090	1.302	0.193	0.007	Not support
H3	Prospect -> mental health restoration	0.054	0.064	0.840	0.401	0.002	Not support
H4	Social -> mental health restoration	0.028	0.073	0.375	0.708	0.000	Not support
H5	Space -> mental health restoration	0.123	0.080	1.529	0.126	0.007	Not support
H6	Rich sp -> mental health restoration	-0.039	0.063	0.625	0.532	0.001	Not support
H7	Refuge -> mental health restoration	0.035	0.085	0.417	0.677	0.001	Not support
H8	Serene -> mental health restoration	0.129	0.058	2.231	0.026	0.012	Supported

(Source: Author,2022)

5.0 Discussion

This study aimed to determine the restorative urban park characteristics by identifying PSDs related to mental health restorative potential. According to the result, serene and nature are two major urban park characteristics that considerably add to the mental health restorative experience. The result is parallel with previous studies which reported that Serene and Nature are generally perceived as restorative park characteristics in most urban parks (Chee et al., 2015; Liu et al., 2018; Peschardt & Stigsdotter, 2013). The result indicates that people have a stronger feeling of being free from everyday pressure in a silent and calm environment that is not crowded, has no traffic noise, and has a well-maintained urban park (Serene). It also found that peacefulness was the most appreciated characteristic by visitors and the most chosen affordance since it is thought to satisfy several demands by people (Skärbäck et al., 2015; Grahn & Stigsdotter, 2010). It has also been supported that a calm, silent, and undisturbed environment where people can completely relax without any noise and disturbance was most preferred by the highest stress person (Grahn & Stigsdotter, 2010). In addition, certain research propounded on the Serene dimension where people choose to visit nature to obtain tranquillity, silence, and a calm environment (Memari et al., 2017). Following Serenity, the results of this study conclusively show that naturalness has beneficial effects on the restoration experience. The natural quality such as fresh air, free-growing lawn and forest-like elements, may have been considered less demanding than other more demanding PSDs dimensions. According to Kaplan (1990), the importance of nature has been highlighted to have a favourable effect on cognitive restoration for mentally fatigued individuals. Aside from a sensation of freedom to do nothing in nature (Pálsdóttir et al., 2014), the undemanding situations offered the experience of being away from stressful daily environments in the context of urban life. For these reasons, wilderness and nature are highly demanded in the four qualities of recovery environments and restorative experiences (Chang et al., 2008). As a result, the cognitive influence of natural experiences in the wild helps to promote mental health restoration experience.

6.0 Conclusion and Recommendation

This study aims to determine the urban park characteristic that influences the mental health restoration among the urban park users. It was found that serene and nature dimensions positively affect mental health restoration. Accordingly, the combination of these two qualities, (1) a silent and calm environment; and (2) natural qualities, are suggested in designing an urban park that is inviting and desirable to all users, especially for mental health restoration. Therefore, the findings of this study can identify the preferred park characteristics and restorative park characteristics that may contribute to the design of future urban park development.

Nonetheless, this study has several limitations that can be explored in future research. First, the data was biased according to age and race. This was because young adults and Malays were more active and willing to respond to this study. Since the data was collected during the COVID-19 pandemic period, the lack of people who visited the parks had imposed a significant challenge to the data collection process. Future studies should include the impact of ethnicity on how people respond to landscapes. This study also limited to assessing the preference of park characteristics and restoration experience among adults. Future research can thus investigate the topic from the adolescent context so that park design can consider the restorative benefits for multiple age groups. Moreover, future urban park research should consider how people relate to different open spaces in urban cities by focusing on urban forests and workplace greenery.

7.0 Paper Contribution to Related Field of Study

This study fills the gap in the body of knowledge relating to urban parks in restorative environments, which focuses on the preference of park characteristics across different demographics. The concept of an urban park for restoration experience has been studied in Western and Asian countries. However, there is a lack of studies in Malaysia's context of urban parks. Therefore, the level of preference for park characteristics revealed in this study is different from previous studies based on the socio-demographic background of users in Malaysia. This study also attempts to provide evidence on the preference and effectiveness for urban dwellers' psychology and physiology restoration. The results of this study can help landscape architects and urban designers to enliven the quality of life in urban cities and assist them in determining suitable park design that meets the users' needs.

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