URBAN PARK DESIGN FOR MENTAL HEALTH RESTORATION VIA DIFFERENT AGES IN MALAYSIA

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Abstract

Mental health is commonly faced by urban dwellers due to urbanisation. Nature is therapeutic, especially for urbanites, and can help with mental health issues. However, little is known about the park characteristics in the restorative setting that could restore mental health for different ages. In order to address these limitations, the purpose of this study is to examine the association between park characteristics and mental health restoration, as well as the age differences among urban park users. Hence, the objective of this study is to analyse the preference of park characteristics for mental health restoration that interact by age moderator by urban dwellers in the urban park. This study employed a mixed method study using a survey (n=382) and semi-structured interviews (n=40) within the two urban parks in Kuala Lumpur: Perdana Botanical Park and Titiwangsa Lake Park. The result showed that the prospects dimension is a significant indicator of mental health restoration. The survey data was analysed using Partial Least Squares Structural Equation Modelling (PLS SEM) and thematic analysis for semi-structured interviews. Nevertheless, this study contains certain constraints when the statistics exhibited age bias due to the higher level of activity and responsiveness exhibited by young people towards this investigation. Notably, this finding can aid landscape architects and urban designers in enhancing the quality of life in urban areas and in planning park designs that cater to users' demands.

Keywords: Perceived Sensory Dimension, Mental health restoration, Park characteristic, Restorative environment, Urban Park

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INTRODUCTION

Rapid urbanisation is thought to have negative effects on mental health and lead to an increase in depression, anxiety disorders, and schizophrenia among urban residents (Lederbogen et al., 2011). According to the Ministry of Health Malaysia, 28.8% of urban adults in Malaysia experience mental health problems, with Kuala Lumpur having the greatest prevalence at 39.8% (Institute for Public Health, 2015; Malaysian Healthcare Performance Unit, 2017; Subramaniam, 2016). Research also indicates that 70% of urban employees encounter work-related stress, whereas 12.3% of impoverished individuals in Selangor experience depression (Dahlgren, 2006; Mallow, 2016; Tan & Yadav, 2013).

A rising number of studies have investigated how utilisation and design of the natural environment can affect the mental health and well-being of city residents in response to the escalating mental health issues in urban settings (Nejade et al., 2022; Raman et al., 2021). However, little research and documentation is describing the precise urban parks' design that enhances the efficacy and restorative experience. In addition, the Malaysian open space planning and standards (National Landscape Guidelines Edition 2 (2008) only prioritise the creation and preservation of aesthetically pleasing landscapes to enhance people's quality of life rather than focusing on mental health restoration. Planners and park designers often overlook demographic patterns, leisure choices, behaviours, and attitudes, overlooking the demands of users such as the elderly, crippled, and juveniles (Maryanti et al., 2016). Such limitation hence halts the leading to visitor dissatisfaction (Mak & Jim, 2019). Therefore, it is a challenge for city planners and landscape architects to design an urban environment that matches the public's preferences, especially in restoring stress (Peschardt & Stigsdotter, 2013; Velarde et al., 2007).

Furthermore, Xiong et al. (2020) found that mental health issues are prevalent among females, young adults, and low-income urban residents. Yet, the lack of study on this issue has created uncertainty regarding whether natural environments truly provide healing experiences for these particular groups of individuals, and which park features are significant and helpful for improving their mental well-being. Therefore, this study is to examine the association between park characteristics and mental health restoration, as well as age differences among urban park users. In correspondence, the objectives of this study are to analyse the preference of park characteristics for mental health restoration that interact with age as the moderator by urban dwellers in the urban park.

LITERATURE REVIEW
Nature as a restorative environment for urban stressors
Urbanism has been contributing to stress-related *(issues/ problems/ concerns) in urban dwellers. Demographic factors such as ethnicity, marital status, age,

gender, education level, financial constraints, presence of chronic or psychiatric illnesses, and a lack of regular exercise are substantially associated with depression among urban dwellers (Kader Maideen et al., 2014; Leong Bin Abdullah et al., 2021; Tan & Yadav, 2013). Since the city has become a widespread migration, urban policy and guidelines for open space to be accessible for people's health and well-being have been established in the urban area.

Several studies have employed different techniques to compare responses to various landscapes. People with mental fatigue find natural sites to be the most restorative rather than the built environment. Studies have introduced a preference for restorative environments among young adults to be of various types such as forests, lakesides, and blue (Du et al., 2022; Li et al., 2023). These are all idyllic places for 'getting away' to get some rest rather than in the built environment.

Even though several types of restorative environments exist, many people in urban contexts may find no option to get into those places, as argued by Kaplan, (1995). It is also hard to find forest parks in an urban area nowadays due to land degradation in the urban city. Furthermore, Hadavi et al. (2015) argue that a natural environment is often limited in urban cities. Thus, the urban park provided by the authorities is the easiest to access and the most cost-effective, whereby the urban dwellers can find physiological and psychological restoration.

Urban parks as a restorative environment

Studies have shown that many people visit the parks to find peace, a quiet environment, a place where they are able to relax and recover from stress (Chiesura, 2004; Nor Akmar & Aziz, 2012; Pálsdóttir et al., 2018). According to the study, walking in parks lowers saline cortisol levels, diastolic blood pressure, and mood disturbances compared to city areas (Abdul Aziz et al., 2021; Mokhtar et al., 2018). Other study demonstrates that visitors acknowledge the benefits of pocket parks as crucial for the well-being, enhancing both their mental and physical health (Hashim et al, 2019). The result was also consistent with a study by China which stated that urban parks relieved stress and attentional levels (Wang et al., 2016).

The study also supports that urban park positively affects stress relief even on short-term visits (Mokhtar et al., 2018). Passive interaction with the environment interacts with the settings without being heavily engaged and creates a sense of relaxation, mainly by watching people (Memari et al., 2017). Thus, the study showed that the characteristics of the restorative environment were able to relieve stress and psychological comfort.

Park characteristics relates to restoration experience

Further studies assert that park characteristics or components contributed to the restoration experience. In public open spaces, natural elements such as trees,

greenery, water features, and being away from traffic make it easier for people to relax (Villagra-Islas & Alves, 2016). These park characteristics were mostly listed in the perceived sensory dimension (PSD) model developed by Grahn and Stigsdotter, (2010) that described the attributes of the urban park environment, including nature, rich in species, refuge, prospect, social, serene, space and culture.

The study by Grahn and Stigsdotter (2010) indicated that those who had reported experiencing stress exhibited a stronger preference towards urban parks that offered a combination of natural, refuge, and spaces that are rich in species. In another study, Peschardt (2014) shows that people with an average stress level tend to have a preference for social and serene dimensions, while stressed individuals are shown to derive the highest level of restorative experience from environments that encompass elements of nature, social interactions, and serenity. Moreover, in Malysia a study showed that PSD influences perceived restorativeness, improving the restoration experience, and correlating landscape characteristics among university students (Malekinezhad et al., 2020).

However, little research is done to determine the relationship between PSD, restorative experience in urban parks and age differences. Therefore, the aim of this study is to to examine the association between park characteristics and mental health restoration, as well as age differences among urban park users. This study suggests the following hypothesis (refer Figure 1):
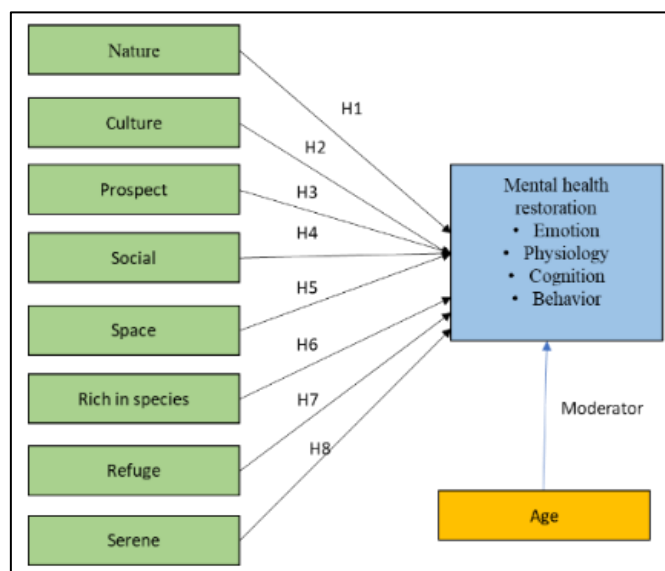

Figure. 1: Research framework of Perceived Sensory Dimensions and mental health restoration via age differences.
Source: Stigdotter, (2010) and Han, (2003)

METHODOLOGY

The mixed method research design is primarily used in this study. Accordingly, a survey and an interview based on a case study were conducted. The data was collected sequentially on January 2021 until the end of February 2021. An adult (18 years of age or older) from Kuala Lumpur's city was chosen for this study using a simple random sampling. The G*power calculator determined a minimal sample size of 160 with a medium effect size of 0.15, power 0.95, and a +/- 5% margin of error using eight predictors for this study. To ensure accurate responses, the respondent was approached at the park's main entrance before they left.

Kuala Lumpur is one of the most densely populated states in Malaysia, according to the Department of Statistics Malaysia (2016). Hence, due to Kuala Lumpur's high population two parks have been selected for this study, they are Perdana Botanical Park (PBP) and Titiwangsa Lake Park (TLP). The selection of the case study was based on its adherence to the size criteria outlined in the Department of Town and Planning Malaysia's (2011) hierarchy of open space, which recommends urban parks to be between 40 and 100 hectares. According to Grahn and Stigsdotter (2010), larger urban spaces were chosen to showcase more park characters. Additionally, the urban park needs to fall within Kuala Lumpur City Hall's purview in order to receive the same care and maintenance.

A survey questionnaire was employed to ascertain the PSDs' preferences for mental health restoration. The questionnaire was divided into five components. Correspondingly, the findings of this study were limited to three areas: (1) respondent profile, which includes the respondent's age disparities; (2) preferences of the perceived sensory dimension, which addresses the eight PSD aspects with 48 items that are adopted from Grahn and Stigsdotter, (2010); and (3) mental health restoration of park visitors that is adopted from Han, (2018). Partial Least Square Equation Modelling (PLS-SEM) was utilised in this study to analyse the PSDs effect on mental health restoration via the age difference.

In this study, a semi-structured interview methodology was employed to comprehensively elicit the perspectives of park users regarding several aspects that were related to their engagement at the urban park. The interview question is (Q1) "Can you describe the park characteristics that you find restorative in this urban park?" Participants' responses were facilitated by a list of park characteristics probes, which included "wild and natural" (Nature), "quiet and peaceful" (Serene), "prospective" (Prospect), "safe and enclosed" (Refuge), "social" (Social), "feeling of spaciousness and freedom" (Space), "cultural" (Culture), and "rich in species" (animal and plant diversity). In contrast, restorative encompassed mood, focus, behaviour, and physiology.

The interview data were analysed using thematic analysis by employing Saldana's (2013) thematic coding methodology. The interviews transcription was

coding with the PSDs dimension (Nature, Serene, Culture, Social, Rich in Species, Prospect, Refuge, and Space).

RESULT AND DISCUSSION

Initially, 400 park visitors volunteered to complete the survey and 40 visitors volunteered to be interviewed. However, 18 questions were disqualified following the screening procedure since their responses were not completed.

Table 1. Demographic results of the urban park users

Variable		Item	Perdana Botanical n (%)	Titiwangsa Lake n (%)	Total n (%)
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 above	2 (0.9)	0	2 (0.5)

The results in Table 2 reveal that the interaction is not supported for Culture, Nature, Refuge, Social, Rich in Species, Space, and Serene; the exception being Prospect ($\beta = -0.574$, t =1.879, $\rho = 0.060$). Thus, Table 2 shows that age is a significant moderator to the relationship between preference of park characteristics and mental health restoration.

Later, the results were explored using the simple slope analysis. Figure 2 shows that the mental health restoration is higher for young adults at higher Prospect. In contrast, plotting shows that higher prospect has resulted in lower mental health restoration for older adults. This indicates a significant negative relationship ($\beta = -0.376$) between rich in species and mental health restoration that is moderated by the age difference.

Table 2. Relationship Between the Preference of Park Characteristics and
Restorative Experience with Age as Moderator

| Relationship	Std beta	Std error	*t* value	pValues	Decision	R²	f²
age*na -> MHR	-0.352	0.361	0.975	0.330	Not support	0.255	0.003
age*cl -> MHR	0.331	0.391	0.846	0.398	Not support		0.002
age*ps -> MHR	-0.574	0.306	1.879	0.060	Support		0.015
age*sc -> MHR	-0.160	0.428	0.374	0.709	Not support		0.000
age*sp -> MHR	0.405	0.515	0.786	0.432	Not support		0.003
age*ric -> MHR	0.043	0.242	0.179	0.858	Not support		0.000
age*re -> MHR	-0.149	0.449	0.333	0.739	Not support		0.000
age*se -> MHR	-0.081	0.285	0.284	0.776	Not support		0.000
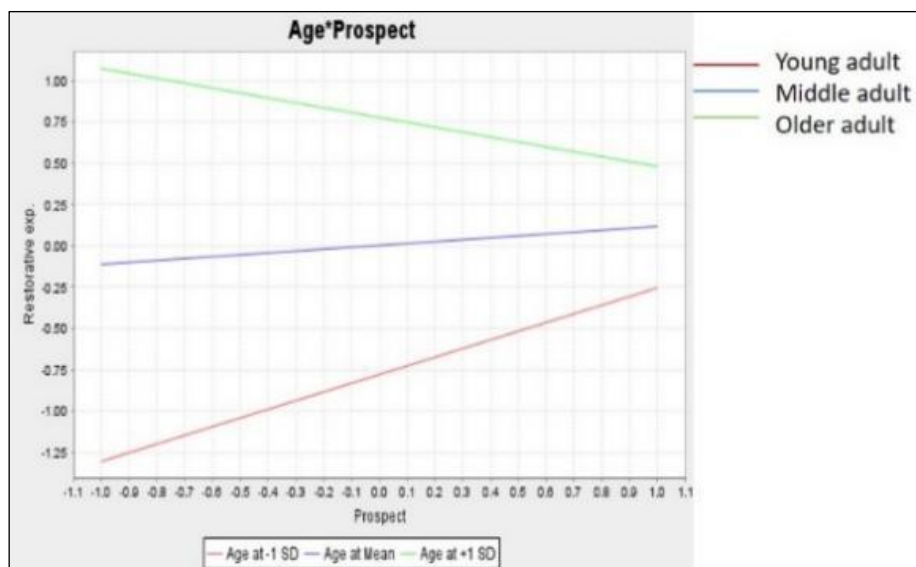
Figure 2. Plotting Graph for Age Difference

One possible interpretation for young adults, related to the prospect dimension and mental health restoration, was to have a vista over the surroundings. Several young adults felt a sense of release from work stress; they

felt more positive vibes and were energetic, relaxed, and happy after doing physical activities on the open and flat surface of the urban park:

I prefer to come to this park because the outdoor environment has more fresh air than the indoor gym. I feel happy, healthy and release my work stress after doing high-intensity training and Tabata here. The flat pavement looks functional and safe for me to do high-intensity training and Tabata workout activities. **(Interviewee 1,27 years old, PBP)**

I usually work out here because the place is prominent, surrounded by nature and not crowded with people. This place preferred me to come here to do activities and release my stress. **(Interviewee 10, 23 years old, PBP)**

After running, I will do a fitness test or play badminton at the Astaka. I feel fresh, positive for the whole day, relaxed and happy after doing those activities. **(Interviewee 28, 30 years old, TLP)**

A group interview among younger adults in TLP also found that they preferred to sit on the grass under shaded trees or at or at sheltered places after jogging and running to relax and chat (social activity). As they were still students, they met at the urban park to relax, clear their thoughts, and refresh themselves, even if they were tired:

We usually jog, run or play football on the field. After that, we sat on the grass lawn under shaded trees or at the Astaka with shaded roofs. We can chat since this is the only time to meet up because most are busy studying at different universities. Meeting up, doing activities, and chatting together makes us feel happy and fresh, although we are sweating and tired. We don't think any problems, feel relaxed, happy and fresh. **(Interviewee 33, group of young adults, 22 years old, TLP)**

The grassy surface also provides a space for young adults to socialise and hold picnic activities. A group of young adults did mention that the grass lawn under the shaded trees and near the toilet facilities is their favourite place to sit for picnic activities:

Our usual picnic activity was at the open lawn, under the shady tree and near the public toilet. It's easy for us to go to the toilet. I feel happy and energized after doing the activity, the natural setting, and the fresh air in this park. **(Interviewee 5, group of young adults, 23 years old, PBP)**

The result contrasted with that of a middle-aged adult who felt relieved from stress whenever he watched his children playing freely and fearlessly on the grassy field and have vista over the surrounding area:

My job is an indefinite time since I am self-employed. I always feel tired and stressed. So, I'll bring my family to the park when I have time. I can see my children do anything they want and move freely without obstruction on this lawn. I prefer the lawn because it is spacious and free. It is also next to the playground and has many shaded trees. I feel released and very calm **(Interviewee 22, middle adult, 38 years old, TLP)**

For another interviewee, engaging in a physical activity on the grassy lawn in the urban park while socialising with family members brings mental health benefits:

My favourite place is an open space or lawn where I can play badminton with my family. I feel healthier, fit and released from stress at the same time. I can see and enjoy the natural scenery and fresh air. **(Interviewee 9, middle adult, 39 years old, PBP)**

For older adults, a prospect is unnecessary since they are mainly motivated to come to the park for walks and to enjoy nature:

I came here just brisk walking, taking pictures of nature, and socialising with my friends. **(Interviewee 4, older adult, 63 years old, PBP)**

I just do fast walking for exercise under the shaded walkway. While walking, I can stop to take a picture of nature. **(Interviewee 6, older adult, 63 years old, PBP)**

This study has discovered that age difference influences the relationship between preference for park characteristics and restoration experience. For young and middle-aged individuals, the prospect dimension is the most significant predictor for mental health restoration. Thus, most of them prefer the open space such as a lawn or pavement that has been provided with safety to carry out their activities. A study has demonstrated that youths are most likely to visit the park for sports, to walk or to ride their bicycles if the facilities and amenities are present (Zainol & Au-Yong, 2016). Hence, a place with facilities and amenities for them to participate in sports and physical activities, and for socialising, safety is essential in the design of a restorative urban park.

The interview results further reveal that young adults are more psychologically restored when they are carrying out physical activities and

socialising with their friends. Among the preferred activities include picnic, yoga, Tabata, badminton, or high-intensity training on a flat and spacious pavement or lawn. They have also mentioned that holding activities together with friends is related to the restoration experience as they can appreciate nature while carrying out the activity. This result had been predicted since the study Malaysians enjoy social and physical activity in neighbourhood parks (Malek & Nashar, 2018). Areas with grassy surface are needed for them to do sports and physical activities as well as to socialise with each other safely (Kim & Jin, 2018). These physical activities can restore the younger adults' mental health (Ashish Sharma et al., 2006).

Middle-aged adults restored their mental health when they carried out physical activities and socialised with their family members. They also prefer activities such as cycling, jogging, badminton, and bringing their children to play on the lawn. As mentioned by several older adults in the interview, the prospect dimension is insignificant for them since they usually do lower impact activities such as walking within the natural setting of the urban parks for their mental health restoration. Correspondingly, many studies have proven the restorative experience of adults' walking in green spaces (Coventry et al., 2019; Li et al., 2019; Zuniga-Teran et al., 2019).

This finding is expected since Twedt et al. (2019) have mentioned that an exciting social setting might be potentially restorative for young adults compared to older people who love a quiet environment. This also supported by the findings that a lower rate of mental illness is predicted for city dwellers who regularly use green places for physical activities and relaxation rather than the gym or the streets. However, the results from this research appeared to contradict with previous studies where young adults were reported to have perceived lower restoration potential in the urban park during their visit, as studied by White et al. (2013) and Berto (2007).

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ETHICAL STATEMENT
This research is dedicated to upholding the greatest ethical standards, assuring respect, fairness, and responsibility throughout the project. Approval to undertake this research has been granted by the Landscape and Recreation Development Department of the Kuala Lumpur City Hall. Consent was individually acquired from those who participated. This was accomplished by engaging and interviewing potential participants chosen among urban park users, who were subsequently informed about the research objectives. They were advised that their participation was voluntary, that their personal contact information would be protected, and that they could withdraw from the study at any time. The

research findings also ensure integrity, honesty, transparency, and the absence of manipulation or bias.

CONCLUSION
This study explores the link between park characteristics and mental health restoration, as well as age differences among urban park users. Findings discovered that young and middle-aged adults were more likely to perceive mental health restoration in the prospect dimension. Therefore, the findings of this research that may contribute to the design of future urban park development that is inviting and desirable to all users, especially for physiological and psychological restoration.

However, this study has several limitations that could be investigated in greater depth in future research. The data were biased according to age. This was because young adults were more active and willing to respond to this research. A future study should examine the topic from the perspective of adolescents since this study is restricted to assessing adult preferences.

The findings of this research have significant implications for the implementation of landscape architecture and urban design in urban parks. Additionally, these results could be beneficial for parks and public spaces with similar characteristics in other Malaysian cities or nations with comparable circumstances.

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