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"Warning in Spaces: Blending Heritage, Nature and Design"

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(i-TALKS 6.0)

Organizer:

Bachelor of Landscape Architecture (Hons.)
Programme of Landscape Architecture, Department of Built Environment & Technology,
Faculty of Built Environment, UiTM Perak Branch, Seri Iskandar Campus



TALKS 6.0

THE ACCLAIMED LANDSCAPE OF KNOWLEDGE SHARING

"Harmony in Spaces : Blending Heritage, Nature and Design"

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Nature's Diversity and the Mind: Investigating the Role of Biodiversity in Psychological Restoration at Taiping Lake Garden, Perak

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Abstract

Biodiversity is known to promote the mental well-being of people and the benefits of nature on mental well-being are extensively acknowledged, yet the role of nature biodiversity is often overlooked, with nature being treated as a homogeneous entity. Recognizing the complexity of perception and experiential processes, this study examines how biodiversity at the Taiping Lake Garden can help or hinder short-term psychological recovery among visitors. The objective of this study is to assess visitor's psychological restoration experiences of biodiversity in public parks. Next is to provide recommendations on biodiversity (flora and fauna) for future public park planning and design. This study employed a quantitative study using questionnaire (n=51) were distributed among users in Taiping Lake Garden. The results of the study show that biodiversity (flora and fauna) influences psychological recovery. The findings will inform evidence-based park design and management in Malaysia.

Key words: *Biodiversity, Psychological Restoration*

INTRODUCTION

The rapid pace of urbanization has contributed to mental health, which in turn affects human health and well-being. A growing body of research suggests that contact with nature can enhance psychological restoration by reducing stress, improving mood, and supporting cognitive recovery (Kasap et al., 2021; Fu et al., 2025). Buxton et al. (2024) found that the species richness in nature fosters a deep sense of awe and ecological belonging, which is scientifically proven to lower anxiety and build long-term emotional resilience. However, the role of biodiversity and the variety of life within these environments is often overlooked in psychological research, with "nature" frequently treated as a homogeneous or undifferentiated entity. The role of biodiversity through the ecological richness of these environments in amplifying such restorative benefits also remains under explored, particularly in the Malaysian context. Recognizing the complexity of perception and experiential processes, this study examines how biodiversity at the Taiping Lake Garden site can help or hinder short-term psychological recovery among visitors (Ali, Yaacob, W. N. A. W., et al. 2025; Thani, S. K. S. O., et al. 2018). Thus, the objective of this study is to assess visitors' the psychological restoration experiences of biodiversity in public parks and to provide recommendations on species richness (flora and fauna) for future public park planning and design.

LITERATURE REVIEW

Psychological Restoration Theories

According to Berto, R. (2014) Attention Restoration Theory (ART), natural environments support the

restoration of directed attention through key qualities such as fascination, being away, extent, and compatibility. Landscapes characterized by expansive water bodies, mature trees, and visually engaging natural backdrops embody these restorative attributes. Such environments promote effortless attention and mental engagement, enabling individuals to recover from cognitive fatigue. The presence of spacious layouts and a perceptible separation from urban noise further enhances the sense of “being away,” reinforcing their restorative potential.

Besides, Ulrich’s (1983) Stress Reduction Theory (SRT) emphasizes that exposure to natural settings evokes positive emotional responses and contributes to physiological stress reduction. Calming elements such as water features, rustling vegetation, and natural soundscapes create a soothing atmosphere that encourages relaxation and emotional balance. Visitors commonly experience feelings of calmness, reduced tension, and improved mood while engaging with these environments, reflecting their capacity to facilitate both emotional and physiological restoration in line with SRT.

Together, ART and SRT provide complementary frameworks for understanding the restorative qualities of natural landscapes. While ART explains how natural features and biodiversity assist in replenishing directed attention, SRT highlights the role of tranquil environments in reducing stress and enhancing emotional well-being. Within tropical and culturally rich contexts, such landscapes function not only as biodiversity-supporting green spaces but also as heritage and recreational environments that promote psychological restoration, underscoring their importance as urban refugees for both mental and physical well-being (Berto, R. 2014; Charisi et al, 2025).

Biodiversity and Human Well-being

Martin Dallimer, Katherine N. Irvine, et al. demonstrated that psychological benefits increase with greater exposure to biodiversity, particularly when species richness is visually perceptible to users. Similarly, Rachel R. Y. Oh et al 2021, reported that higher levels of biodiversity in urban parks are associated with stronger restorative outcomes, including reduced stress and improved mood. Research from South Asia and other tropical regions further suggests that cultural context plays a significant role in shaping how biodiversity is perceived, experienced, and valued by individuals. These findings align with attention restoration and stress reduction frameworks, reinforcing the importance of biologically rich landscapes in promoting mental well-being (Martin Dallimer, Katherine N. Irvine, et al.; Rachel R. Y. Oh et al 2021)

Perceived vs. Actual Biodiversity

Wood et al. (2018) observed that individuals often underestimate the actual levels of biodiversity present in natural environments, suggesting that psychological benefits do not always correspond directly with measured ecological richness. Instead, perceptions of biodiversity play a critical role in shaping restorative outcomes, as individuals respond not only to ecological conditions but also to what they believe and perceive within a landscape. Consequently, restorative experiences are influenced by subjective visual and experiential cues as much as by objective biodiversity itself (Wood et al. 2018; Farris et al., 2024).

METHODOLOGY

Research Design

To determine the role of biodiversity in psychological restoration, a quantitative survey in the form of a

questionnaire was collected on 23 November 2025 at Taiping Lake Garden, Perak. This study was conducted in Taiping, Perak as its status as one of Malaysia's oldest public gardens and adjacent to Bukit Larut rainforest, represents an ecologically rich urban green space. The urban parks have been chosen as size requirement of urban park which is 96.44 hectares as suggested in the hierarchy of open space by the National Planning Guidelines for Open Space and Recreation.

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 is at the urban park for any activities, and is about to leave the park to ensure that the answer reflects his or her immediate experiences. The total of respondents that collected was 51 respondents. The overall response rate was between 5 to 10 minutes for each respondent.

Study Site

The study was conducted at Taiping Lake Garden, Perak, a historic lake garden renowned for its rich ecological and cultural landscape. For research purposes, the park was divided into zones of varying biodiversity. The high biodiversity zones included the forest edge near Bukit Larut, the lake areas with aquatic plants and bird life, and the shaded groves of century-old rain trees that hosted diverse flora and fauna. In contrast, the low biodiversity zones consisted of manicured lawns and ornamental gardens which, while aesthetically appealing, supported fewer species. This spatial division allowed for a comparative analysis of how different levels of biodiversity within the same park influenced visitors' psychological restoration and perceptions of nature. Its diverse flora, fauna, and landscapes offer a valuable opportunity to investigate how biodiversity levels influence psychological restoration among visitors.

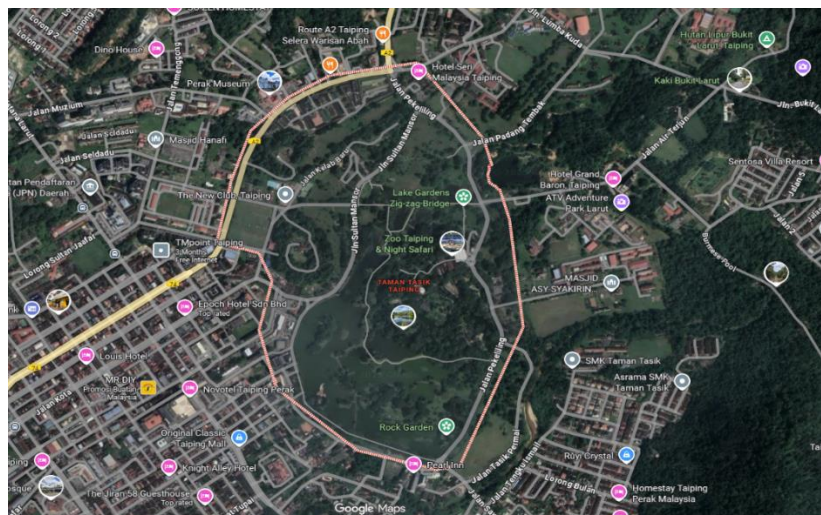


Figure 1: Maps of Taiping Lake Garden, Perak, Malaysia

Taiping Lake Garden, as a historical urban park embedded in rich tropical biodiversity, offers not only scenic beauty but also an immersive ecological experience. Its shaded rain trees, lotus-filled lakes, and the presence of monkeys and bird species create a biodiverse environment that supports both ecological value and psychological restoration for its visitors.

In Malaysia, and particularly in Taiping, cultural appreciation of nature is deeply tied to heritage, leisure,

and community identity. Taiping Lake Garden reflects this connection, as it serves as both a recreational space and a cultural landmark. The cultural backdrop enriches how visitors interpret biodiversity not only as ecological richness but also as part of a shared heritage, making the park a unique site where ecological diversity and cultural meaning converge to enhance psychological restoration.

Sampling & Participants

The sampling for this study focused on visitors aged 18 years and above at Taiping Lake Garden, Perak, with a target sample of approximately 51 respondents. 51 participants were surveyed in high biodiversity zones, such as forest edges, lake areas, and shaded tree zones and in low biodiversity zones, including manicured lawns and ornamental gardens. A random interception approach was employed, whereby visitors were approached at different times of the day on weekends to capture diverse usage patterns and experiences. This sampling strategy provided a comprehensive understanding of how visitors across different park zones perceived biodiversity and experienced psychological restoration.

Data Collection Instruments

The study used a structured survey divided into two main components. Part One collected demographic data, such as age, gender, and education level, to account for individual variation within the participant group. Part Two assessed the psychological impact of the environment using the Perception of Restorative Characteristics Questionnaire (PRCQ). The traditional dimension of Novelty, which focuses on the restorative power of experiencing an environment that is different or unique from the visitor's everyday environment. In addition to Novelty, this scale measures Presence, Attractiveness, and Compatibility, providing a comprehensive metric of how specific features of the environment support focused attention on psychological restoration.

RESULT

Demographic

A total of 51 respondents took part in the study (refer Table 1), according to the demographic analysis, with a higher percentage of female respondents (64.7%) than male respondents (35.3%). Most responders were young to middle-aged adults, especially those between the ages of 18 and 25 (29.4%) and 25 and 30 (27.5%), suggesting that younger, more economically active people were the park's primary users. 98.0% of the sample was Malay, which reflects the makeup of the local populace. The majority had postsecondary education, with the largest categories being those with a diploma (39.2%) and a bachelor's degree (33.3%). 52.9% of the respondents were married, compared to 43.1% who were not. Most respondents (49.0%) worked in the private sector, followed by the government sector (23.5%), with students accounting for a significant portion (13.7%). The largest group (25.5%) reported earning between RM 3170 and RM 3969 per month, while a sizable portion (19.6%), probably students, reported no income at all. Overall, the demographic profile shows a diversified population that is primarily young, educated, and employed, which makes it a good starting point for researching how people see biodiversity and psychological restoration.

Table 1: Demographic Table of Respondent

Variable	Categories	Frequency (n)	Percentage (%)
Gender	Male	18	35.3
	Female	33	64.7

Age	18-25 years	15	29.4
	25-30 years	14	27.5
	31-40 years	10	19.6
	41-50 years	10	19.6
	51-60 years	2	3.9
Race	Malay	50	98.0
	Other please state:	1	2.0
Education level	Primary school	1	2.0
	Secondary School	5	9.8
	Certificate	5	9.8
	Diploma	20	39.2
	Bachelor's degree	17	33.3
	Master's degree	2	3.9
	Doctorate	1	2.0
Marital status	Single	22	43.1
	Married	27	52.9
	Divorced/Widow	2	3.9
Occupation	Government sector	12	23.5
	Private sector	25	49.0
	Self-employed	4	7.8
	Student	7	13.7
	Unemployed	3	5.9
Monthly income	RM2500 and below	8	15.7
	RM 2501 - RM 3169	4	7.8
	RM 3170 - RM 3969	13	25.5
	RM 3970 - RM 4849	8	15.7
	RM 4850 - RM 5879	3	5.9
	RM 5880 - RM 7099	2	3.9
	RM 10960 - RM 15039	1	2.0
	RM 15040 and above	2	3.9
	No income	10	19.6

Restorative quality of biodiversity

Fascination

For the fascination (refer Table 2) section question that have the highest mean which is "watching the movement of water and wildlife in the park feels engaging and refreshing" that achieved the highest mean of 4.41 and the lowest standard deviation (0.698), signifying the highest level of consensus and impact. And the lowest mean is 4.20 "I notice new and interesting details in nature every time I visit the park" it is because the area is maintaining the same natural biodiversity without any disturbance from human.

Table 2: Fascination

	N	Mean	Std. Deviation
The natural scenery in Taiping Lake Garden easily captures my attention	51	4.35	.844
The diversity of trees, flowers, and animals in the park keeps me interested	51	4.39	.723
I find myself effortlessly drawn to observe the natural surroundings here	51	4.25	.796
Watching the movement of water and wildlife in the park feels engaging and refreshing	51	4.41	.698
I notice new and interesting details in nature every time I visit the park	51	4.20	.775

The analysis of fascination responses shows that visitors were highly engaged with the park's natural features. The highest mean scores were for watching water and wildlife (M = 4.41) and observing the diversity of trees, flowers, and animals (M = 4.39), indicating that these dynamic and visually rich elements strongly captured attention. Even repeated visits revealed new details (M = 4.20), suggesting that the park consistently provided novel and interesting stimuli, effectively sustaining visitor interest and promoting effortless attention.

These findings are consistent with Kaplan and Kaplan's (1989) Attention Restoration Theory, which emphasizes fascination as a key component in cognitive restoration. Previous studies also support this relationship: Kevin Rozario et al. (2025) found that higher visible biodiversity enhances engagement and psychological well-being. Perceived biodiversity, not just actual species richness, significantly shapes restorative experiences. Overall, the results indicate that diverse, dynamic natural elements are essential for attracting attention and sustaining restorative benefits in urban green spaces.

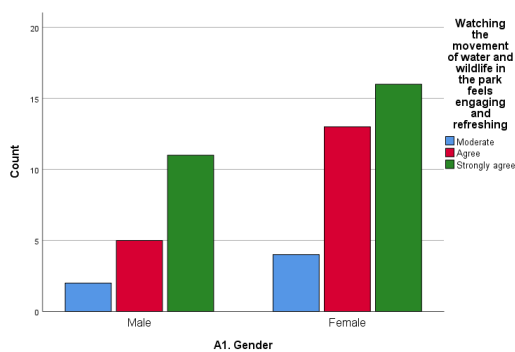
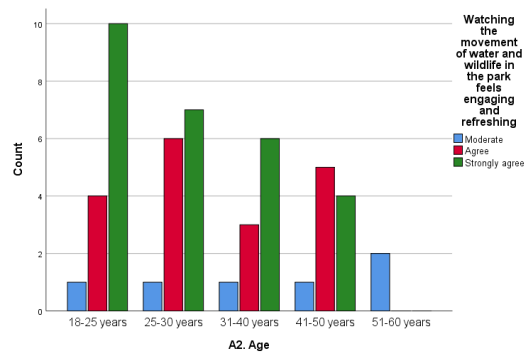
**Figure 1.** Gender**Figure 2.** Age

Figure 1 show both male and female respondents show positive perceptions toward watching wildlife movement in the park. However, female respondents record higher levels of Agree and Strongly Agree,

indicating that they find the experience more engaging and refreshing compared to males. Males still respond positively, but with fewer strong agreement responses. In examining the engagement levels reported, female respondents appear to demonstrate a higher inclination towards agreement with statements regarding the enjoyment and refreshment derived from wildlife observation compared to their male counterparts. This observation aligns with literature indicating that females tend to exhibit different engagement patterns in nature-based experiences. For instance, studies indicate that female respondents often participate more enthusiastically in wildlife-related activities and are more affected by socio-demographic factors, which contribute to higher engagement levels (Perry et al., 2018).

Conversely, while males also respond positively, the frequency of their "Strongly Agree" responses is lower than that of females. This gender-based difference suggests an underlying sociocultural dynamic where males might either engage less deeply with wildlife experiences or express their excitement with less intensity. It has been documented that male respondents generally show less enthusiasm in contexts perceived as predominantly social or emotional which may explain their comparatively subdued response levels.

Meanwhile, Figure 2 show positive responses are most evident among younger age groups, particularly those aged 18–25 and 25–30, where strong agreement is highest. As age increases, the level of strong agreement gradually declines, with older age groups showing more moderate but still positive responses. This result reflects the natural human tendency towards Biophilia, where dynamic elements such as water movement and wildlife manage to attract attention without tiring the mind (soft fascination), thus providing a high psychological recovery effect compared to static elements. The higher level of agreement among women and young people indicates differences in the way individuals process stress and express emotions; women may value aesthetics more for emotional relief, while young people who are often prone to digital fatigue find nature as a refreshing contrast. Although the score for nature detail ($M=4.20$) is slightly lower due to the factor of visitors' familiarity with the same landscape, overall, this data proves that the biodiversity at Taiping Lake Garden functions as an effective visual therapy in reducing human mental burden.

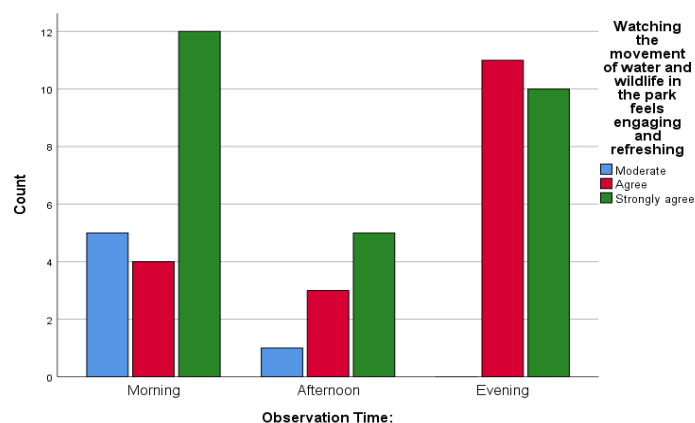


Figure 3. Observation time

The survey results for observation time analysis (refer Figure 3) indicate a strong positive reception to the park's water and wildlife, with the highest levels of enthusiasm occurring in the morning, where "Strongly

Agree" responses peak at 12. While the afternoon sees a significant dip in both total visitors and engagement intensity, the evening maintains a high volume of positive sentiment, split almost evenly between "Agree" and "Strongly Agree." Notably, the "Moderate" sentiment vanishes entirely by the evening, suggesting that as the day winds down, the park's natural movements become more universally refreshing and engaging for all observers present.

The findings suggest that the daily cycle influences people's perceptions of the enjoyment of nature, with mornings recording the highest levels of excitement (12 "Strongly Agree" responses) due to more active wildlife and fresh air, consistent with the human need to restore mental energy before starting the daily routine. The sharp drop in midday was not only due to the lack of visitors, but also to physical factors such as hot weather that reduced comfort and faunal activity, causing engagement levels to be the lowest of the day. In contrast, the evenings showed a more even resurgence of positive sentiments with no "Moderate" responses, reflecting the park's function as a universal space for unwinding where the movement of water and nature becomes more soothing as the day gradually calms down.

Novelty

For the "Novelty" dimension in Taiping Lake Garden, Table 3 indicate that visitors perceive a consistently high level of new and stimulating experiences, with all five survey items exhibiting high mean scores clustered tightly between 4.08 and 4.18 (out of a likely 5-point scale). The strongest driver of Novelty is the biodiversity in the park, which provides a "fresh and stimulating experience" (Mean = 4.18, Std. Dev. = 0.740). The lowest mean scores (4.08) belong to items relating to the uniqueness of species compared to other places and encountering elements not seen in daily life, suggesting that while the park is fresh and stimulating, its novelty is primarily derived from its rich variety and the general act of exploring, rather than from encountering highly rare or previously unseen species.

Table 3: Novelty

	N	Mean	Std. Deviation
The variety of plant and animal species in Taiping Lake Garden feels unique compared to other places I visit.	51	4.08	.891
Exploring different parts of the park gives me a sense of discover	51	4.10	.831
I encounter natural elements here that I do not usually see in my daily life	51	4.08	.771
The biodiversity in the park provides me with a fresh and stimulating experience	51	4.18	.740
Visiting this park makes me feel like I am experiencing something new	51	4.16	.758

The analysis shows that visitors consistently felt a sense of discovery and stimulation in the park. The highest mean scores were for experiencing a "fresh and stimulating experience" (M = 4.18) and feeling they were "experiencing something new" (M = 4.16), while exploring different areas of the park also gave a strong sense of discovery (M = 4.10). These results suggest that the park's diverse species and spatial variety effectively provided novel and engaging experiences.

This aligns with Kaplan and Kaplan's (1989) Attention Restoration Theory, which states that new and intriguing stimuli support cognitive restoration. Previous studies also show that higher biodiversity and environmental complexity enhance novelty and engagement, contributing to psychological well-being, while perceived encounters with unusual species play a key role in shaping restorative experiences (Dallimer et al., 2012)

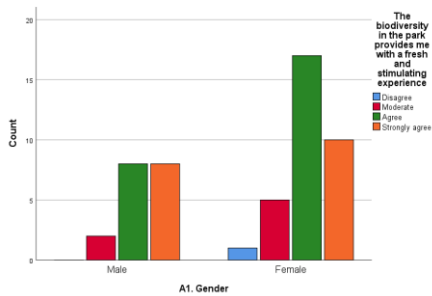


Figure 4. Gender

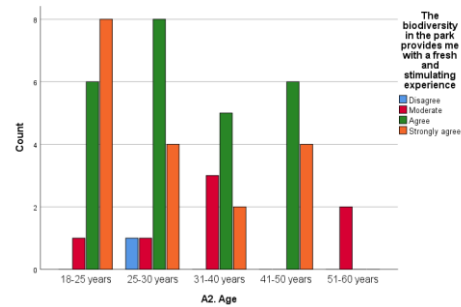


Figure 5. Age

Female respondents show much higher participation (refer Figure 4), with 27 total positive responses (Agree and Strongly Agree) compared to 16 for males. While females represent the majority of the "Agree" count (17), males show an even split between "Agree" and "Strongly Agree," with no "Disagree" or "Moderate" responses reported.

This result indicates a high level of novelty as the biodiversity and landscape diversity in Taiping Lake Park successfully provided visual stimulation and a unique experience that was different from the daily routine of visitors. The highest mean score on the "fresh and stimulating experience" aspect (4.18) proves that the natural elements that are rarely found in the city can trigger curiosity and excitement, in line with the Attention Recovery Theory (ART) which states that new environments can help restore mental fatigue. From a gender perspective, the higher participation of women in giving positive feedback may indicate their greater tendency towards nature-based recreational activities for the purpose of psychological well-being.

Meanwhile, in terms of age (refer Figure 5), the 18–25 group reports the highest level of enthusiasm with 8 "Strongly Agree" responses. Positive sentiment remains high through the 25–50 age range, but engagement drops off significantly in the 51–60 category, which consists entirely of "Moderate" responses (refer Figure 5).

These results indicate that Taiping Lake Garden successfully provided a high "Novelty" element because its biodiversity and unique landscape were able to stimulate visitors' curiosity, in line with Attention Restoration Theory. The high mean scores across all items proved that the park environment was not just an ordinary green area but rather offered a fresh cognitive experience that was different from the daily routine. Younger people (18–25 years old) showed the highest excitement, possibly because they were more active in exploring and appreciating visual diversity, while the decreased response in the 51–60-year-old age group may have been influenced by the frequency of visits that made the elements feel familiar to them.

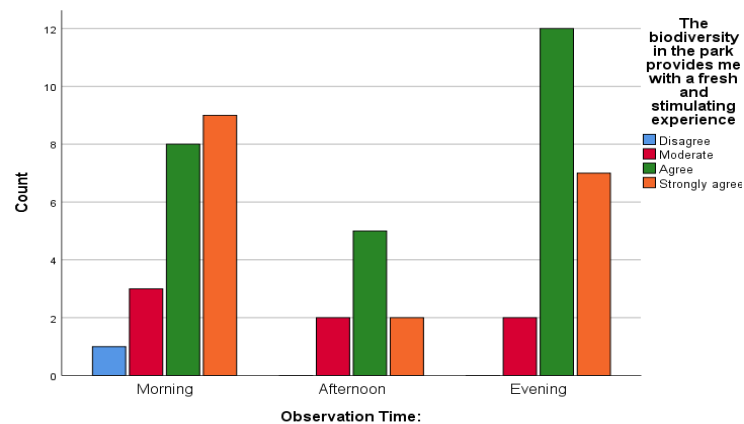


Figure 6. Observation Time

The survey data from Figure 6, indicates that the park's biodiversity is most stimulating for females and younger visitors, particularly during the morning and evening hours. While female respondents provide the highest volume of positive feedback with 27 total "Agree" or "Strongly Agree" responses, the 18–25 age group shows the most intense enthusiasm with 8 "Strongly Agree" marks. This sense of refreshment peaks in the morning, which sees 9 "Strongly Agree" responses, and remains high in the evening with 12 "Agree" responses, whereas interest and participation dip significantly during the afternoon and among the 51–60 age demographic.

The results of the study showed that the level of stimulation towards the park's biodiversity peaked in the morning and afternoon, with the morning recording the highest "Strongly Agree" responses (9 responses) while the afternoon dominated with 12 "Agree" responses. This trend is likely due to the cooler and more comfortable weather conditions at that time of day making it easier for visitors to actively appreciate nature. Conversely, interest and participation decreased significantly in the afternoon, which may be due to the hot weather factor that reduced the comfort of visitors to explore the park.

Escape (Being Away)

For escape, (refer Table 4), the item with the highest mean score is "Spending time here makes me forget about my worries for a while" (Mean = 4.33, Std. Dev. = 0.739), suggesting that the park excels as a setting for temporary cognitive relief. The lowest mean scores (4.27) were recorded for escaping routines/responsibilities and getting a break from urban demands, but these are still very high. The consistently strong agreement and low standard deviations (ranging from 0.739 to 0.836) confirm that the park is highly successful in providing visitors with a restorative sense of freedom, being far removed from daily pressures, and offering a mental escape.

Table 4: Escape (Being Away)

	N	Mean	Std. Deviation
Being in Taiping Lake Garden makes me feel far removed from daily pressures	51	4.31	.836
The park allows me to mentally escape from my routines and responsibilities	51	4.27	.750

Spending time here makes me forget about my worries for a while	51	4.33	.739
The natural environment provides me with a sense of freedom from my usual surroundings.	51	4.31	.787
Visiting the park gives me a break from the demands of urban life	51	4.27	.827

The results in Table 4 show that Taiping Lake Garden is highly effective in providing a sense of "Escape," with all mean scores exceeding 4.27. The highest mean (4.33) suggests the park is most valued for helping visitors forget their worries. These high scores and low standard deviations indicate a strong consensus that the park consistently serves as a mental refuge, successfully distancing visitors from daily routines and urban pressures.

These findings align with Kaplan’s (1995) Attention Restoration Theory, which identifies "Being Away" as a critical component for psychological recovery from mental fatigue. Natural settings provide a "soft fascination" that allows the mind to rest. Furthermore, studies by Ulrich et al. (1991) support that green spaces facilitate rapid stress recovery, validating why respondents perceive the park as an essential break from the demands of modern life.

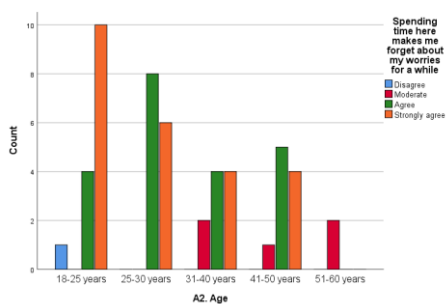


Figure 7. Age

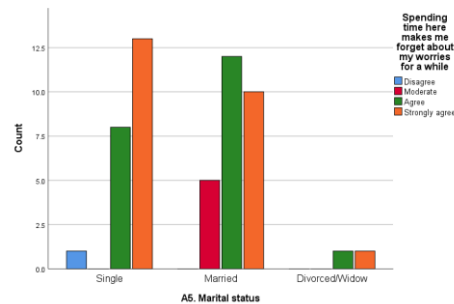


Figure 8. Marital status

The park seems to be a powerful "escape" for younger visitors, particularly those between 18 and 30 years old (refer Figure 7). This group shows the highest intensity of agreement, with many strongly agreeing that spending time at Taiping Lake Garden helps them forget their worries for a while. While there are fewer responses from older age groups, the sentiment remains positive across the board, suggesting that the park’s ability to provide cognitive relief is a universal benefit that spans generations

Taiping Lake Garden was most effective as an "escape" for young people aged 18 to 30, who scored the highest "Strongly Agree" in forgetting worries. This suggests that the natural environment of the park meets the mental recovery needs of this group who may be burdened by the early pressures of career or studies, although the cognitive benefits are still felt positively by all age groups.

When looking at marital status, both single and married visitors find the park to be a highly effective place to unplug (refer Figure 8). Single individuals show a very high level of "Strongly Agree" responses, while married visitors provide the highest overall "Agree" count in this category. This indicates that whether someone is looking for a solo retreat or a peaceful place to spend time with a partner, the park successfully offers that much-needed break from the demands of urban life.

Whether single or married, visitors see the park as a great place to de-stress. Singles tend to respond, “Strongly Agree” (seeking solitude), while marrieds show a high number of “Agree” (seeking space with their partner). This proves that the park successfully functions as a flexible escape destination to meet different social and emotional needs.

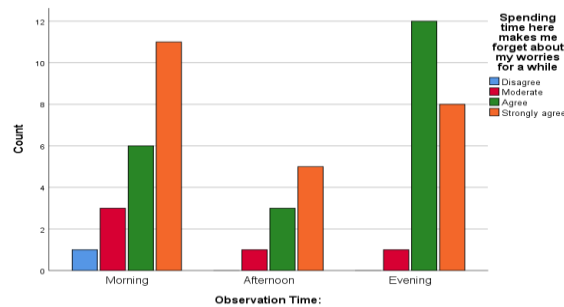


Figure 9. Observation time

The feeling of "being away" is strong throughout the day, but it peaks at different intensities (refer Figure 9). The morning hours bring out the strongest feelings of escape, with the highest number of "Strongly Agree" responses. By the evening, the volume of visitors seeking a mental break increase, leading to a peak in general "Agree" responses. Even during the quieter afternoon, visitors still feel that the park is a successful sanctuary, reinforcing the high mean score of 4.33 for this dimension.

Based on Figure 9, the feeling of “being away” changes over time due to the different environmental quality and visitor density throughout the day. Mornings recorded the highest “Strongly Agree” levels as the calmer atmosphere and fresh air provided the strongest mental restorative effects. Towards evening, the number of visitors seeking mental rest increased drastically, leading to a spike in “Agree” responses, while the quieter afternoons remained recognized as successful refuges, supporting a high average score of 4.33 for this dimension.

Coherence

The highest mean score for coherence (refer Table 5) is "I find it easy to make sense of the natural setting in Taiping Lake Garden" (Mean = 4.31, Std. Dev. = 0.735), showing that the layout is highly legible and understandable to visitors. All other items, including the harmony of the layout, the unified fit of elements (trees, lakes, walkways), and the balanced environment, also received means above 4.20. The consistently high agreement and relatively low standard deviations (ranging from 0.702 to 0.821) it shows that the park is perceived as a logical, well-organized, and complete environment that supports a sense of calm and relaxation.

Table 5: Coherence

	N	Mean	Std. Deviation
The park’s layout and natural features feel harmonious and well-organized	51	4.22	.702

The different elements of the park (trees, lakes, walkways) fit together in a natural way	51	4.25	.796
Biodiversity here creates a balanced and unified environment.	51	4.27	.777
I find it easy to make sense of the natural setting in Taiping Lake Garden.	51	4.31	.735
The park feels like a complete and coherent environment that supports relaxation	51	4.25	.821

Table 5 shows that visitors perceive Taiping Lake Garden as a highly coherent environment, with mean scores ranging from 4.22 to 4.31. The highest mean (4.31) indicates that respondents find it particularly easy to "make sense" of the natural setting. This suggests that the park's organization and the way its biodiversity, walkways, and lakes fit together create a unified atmosphere that effectively supports relaxation.

These results are consistent with the Environmental Preference Matrix by Kaplan and Kaplan (1989), which defines "Coherence" as the degree to which a scene is organized and easy to visually process. According to Stamps (2004), environments with high coherence reduce cognitive load, allowing visitors to feel more comfortable and secure. Furthermore, Malaysian urban parks highlights that well-structured landscape features are essential for creating a "legible" environment that enhances the overall restorative experience for the public.

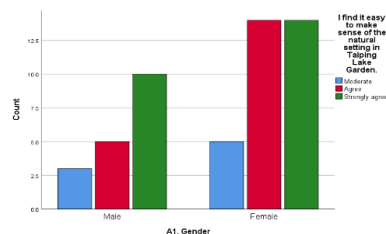


Figure 10. Gender

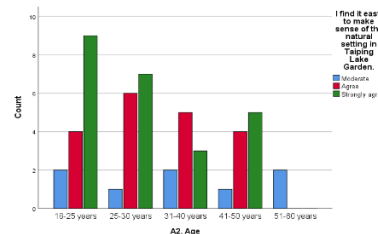


Figure 11. Age

Both men and women find the park's layout very intuitive, with women showing a particularly strong level of agreement (refer Figure 10). This clarity supports the high mean score of 4.31, proving that the park's natural setting "makes sense" to visitors regardless of gender. It's a space where everyone feels they can easily find their way around.

The results for the gender graph show that both men and women agree that the park's layout is intuitive and easy to understand. However, the female group gave a higher level of agreement (more prominent "Strongly Agree" scores) than the male group. This reflects that the landscape design, biodiversity elements, and walkways in the park successfully created an environment that provided a sense of safety and tranquillity for all genders, consistent with the highest mean score of 4.31 which indicated that visitors found it easy to "make sense" of the park's environment.

The park's organization really hits home with the 18–30 age group, who provided the most "Strongly

Agree" and "Agree" responses (refer Figure age). It seems the younger generation finds the environment particularly easy to navigate and understand. While there are fewer responses from older visitors, the sentiment remains consistently positive across all ages.

As for the age graph, the youth group between 18 and 30 years old showed the strongest level of support, with the highest number of "Strongly Agree" and "Agree" responses. This shows that the younger generation found the physical organization of the park very effective for their navigation and leisure activities. Although the number of respondents among senior citizens (51 years and above) was smaller, the trend of their answers remained positive. Overall, this data proves that the organized structure of the park can reduce the cognitive load of visitors of all ages, making their experience in the park more satisfying.

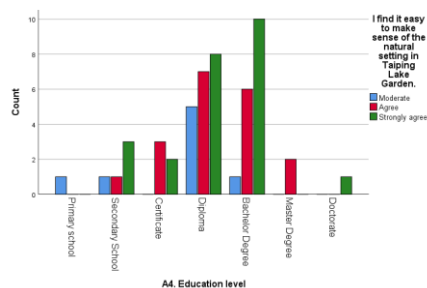


Figure 12. Educational level

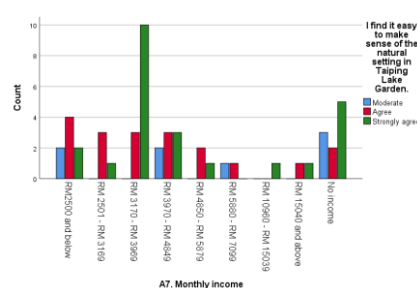


Figure 13. Monthly income

Visitors with bachelor's Degrees and Diplomas are the most vocal about how well the park is laid out (refer Figure 12). The Bachelor's group gave the highest number of "Strongly Agree" marks, suggesting that the logical flow of the park's walkways and natural features is very clear to them. This reinforces that the design is seen as logical and well-structured.

Visitors with higher education backgrounds such as Bachelor's and Diplomas gave the most positive feedback as they tended to have a higher awareness of the importance of systematic environmental planning. The Bachelor's group gave the highest "Strongly Agree" scores, indicating that they could appreciate the logical flow of walkways and the clearly structured natural features of the park. The higher level of literacy made it easier for them to understand and appreciate planned and structured landscape design.

The park feels coherent and well-organized to everyone, but it resonates most strongly with middle-income earners (RM 3170 – RM 3969) and students (the "No Income" group) (refer Figure 13). Both groups find it very easy to make sense of the natural setting, highlighting that the park's design is inclusive and welcoming for people from all financial backgrounds.

The results show that the design of this park is inclusive as it is well received by various economic strata, especially the middle-income group (RM 3170 – RM 3969) and the student or no-income group. For the middle-income group, the park becomes a high-quality yet easily accessible recreational space. Meanwhile, for the "No Income" group, the coherent layout of the park provides them with a user-friendly public space at no cost, proving that the clarity of the park design can be enjoyed by all regardless of financial background.

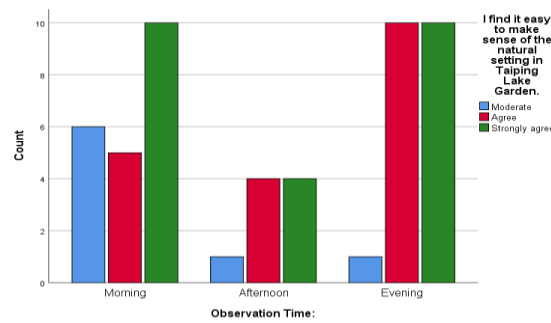


Figure 14. Observation time

The park's design remains clear and easy to navigate from sunrise to sunset (refer Figure 14). Both morning and evening visitors reported high levels of agreement, showing that the setting is just as intuitive in the early light as it is at dusk. Even during the quieter afternoon, the lack of confusion among visitors proves the park is a consistently logical and restorative environment all day long.

The design of the park proved to remain logical and easy to navigate from sunrise to sunset. The high levels of agreement in the morning and evening hours indicated that natural lighting at these peak times enhanced the visual clarity of the park's elements. Even during the quieter afternoon hours, the lack of confusion among visitors demonstrated that the physical structure of the park was consistent and provided a restorative experience throughout the day, regardless of the time of day.

Compatibility

The descriptive statistics for the "Compatibility" dimension at Taiping Lake Garden show the strongest measure of compatibility is the feeling of comfort in engaging in preferred activities within the natural space (Mean = 4.33, Std. Dev. = 0.739), closely followed by the setting supporting personal goals such as exercise, reflection, or leisure (Mean = 4.31, Std. Dev. = 0.678) (refer Table 6). Even the lowest means, which concerns the biodiversity and design fitting well with enjoyed activities (Mean = 4.20), still indicates high agreement. The consistently high means and relatively low standard deviations (the lowest being 0.678) suggest a high consensus that the park is an appropriate, supportive, and restorative setting that matches visitors' expectations and needs for relaxation and recreation.

Table 6: Compatibility

	N	Mean	Std. Deviation
The park provides an environment that matches my needs for relaxation	51	4.25	.771
The biodiversity and design of the park fit well with the activities I enjoy	51	4.20	.800
The setting here supports my personal goals, such as exercise, reflection, or leisure.	51	4.31	.678
I feel comfortable engaging in my preferred activities within this natural space	51	4.33	.739
The park's atmosphere is compatible with my idea of a restorative place	51	4.24	.737

The results in Table 6 show that Taiping Lake Garden is highly compatible with visitor needs, with all mean scores above 4.20. The highest mean (4.33) indicates that visitors feel exceptionally comfortable engaging in their preferred activities, while the score of 4.31 confirms the park effectively supports personal goals like exercise and reflection. These high values and low standard deviations suggest that the park's design consistently matches the functional requirements of its users.

This strong "fit" aligns with Kaplan's (1995) concept of Compatibility, which states that restoration occurs most effectively when an environment supports an individual's intentions without struggle. According to Hartig (2004), high compatibility prevents the drain of directed attention, as the environment provides what the user requires for their tasks. Furthermore, Peschardt and Stigsdotter (2013) argue that such alignment is a prerequisite for stress recovery in urban green spaces, validating the park's role as a successful restorative setting.

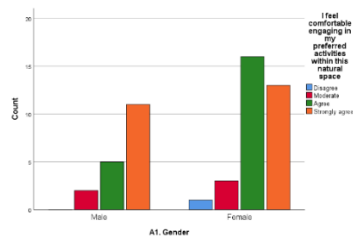


Figure 15. Gender

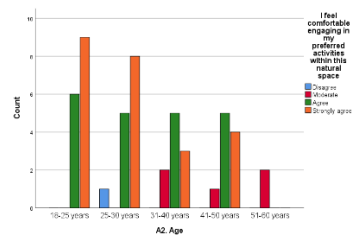


Figure 16. Age

Both genders show high levels of comfort (refer Figure 15), with females providing the highest "Agree" count and males leaning strongly toward "Strongly Agree." The near absence of "Disagree" or "Moderate" responses across both groups reinforces the high mean score of 4.33, indicating the park is universally compatible with the activity needs of all visitors regardless of gender.

The results showed that both genders felt comfortable with the park's inclusive and safe design. For women, a high "Agree" score reflected a sense of safety and a family-friendly environment, while men who tended to "Strongly Agree" may see the park as a great location for more intense physical activity or a particular hobby. This compatibility occurred because the park's facilities did not Favor one gender but instead provided a balanced space for the recreational needs of all parties.

The strongest sense of comfort is concentrated in the younger demographics, specifically those aged 18–30 (refer Figure 16). These groups dominate the "Strongly Agree" and "Agree" categories, suggesting that the park's design and biodiversity are particularly well-aligned with the recreational goals of young adults. While participation is lower in older age groups, their sentiment remains consistently positive.

The 18–30 age group showed the highest level of agreement because the park offers an "aesthetic" element and a social space that caters to the lifestyle of modern youth. Young people often seek a place that can provide mental peace (restoration) from the pressures of study or work, as well as a suitable space for fitness activities. Although participation decreased among seniors, sentiment remained positive because the park provides flat, shaded walking paths, which are very important to support the mobility and health needs of veterans.

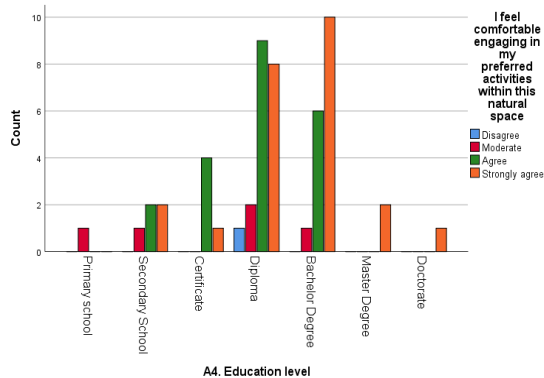


Figure 17. Educational level

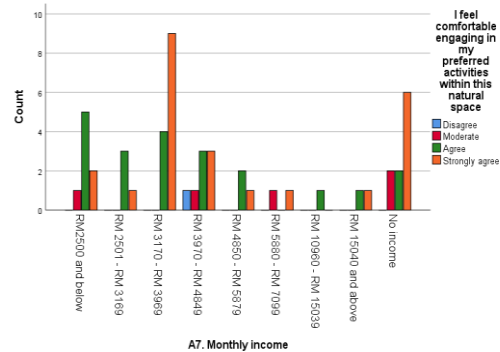


Figure 18. Monthly income

High comfort levels are most prominent among visitors with Diplomas and bachelor's Degrees, who contribute the most to the "Agree" and "Strongly Agree" columns (refer Figure 17). This indicates that the park's atmosphere successfully meets the restorative expectations of highly educated individuals. The positive trend across all education levels demonstrates the park's broad appeal as a functional public space.

Individuals with Diploma and bachelor's degrees show the highest level of comfort as they tend to have a deeper awareness of the benefits of ecosystems and biodiversity to mental well-being. The highly educated often seek a quiet environment as an escape from the high cognitive load of the workplace. Taiping Lake Park, rich in historical and natural values, meets their intellectual and aesthetic expectations of what is defined as a quality "restorative space".

The data shows that the RM 3170 – RM 3969 bracket and the "No Income" group (likely students) feel the most comfortable engaging in activities at the park. This suggests that the park serves as a vital, accessible resource for both middle-income professionals and students (refer Figure 18). The consistent agreement across various income levels highlights the park's success in being a socioeconomically inclusive environment.

The results show that the park functions as a democratic public space. Middle-income earners (RM 3170 – RM 3969) and students (no income) feel most comfortable as the park provides high-quality recreational facilities without any entry fees. This makes it a top choice over expensive private recreation centres. The balance across various income levels proves that the quality of the park's environment can bridge the socio-economic gap, where all levels of society can enjoy the same facilities in a harmonious atmosphere.

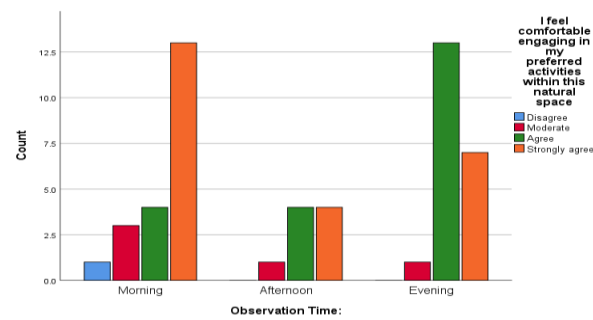
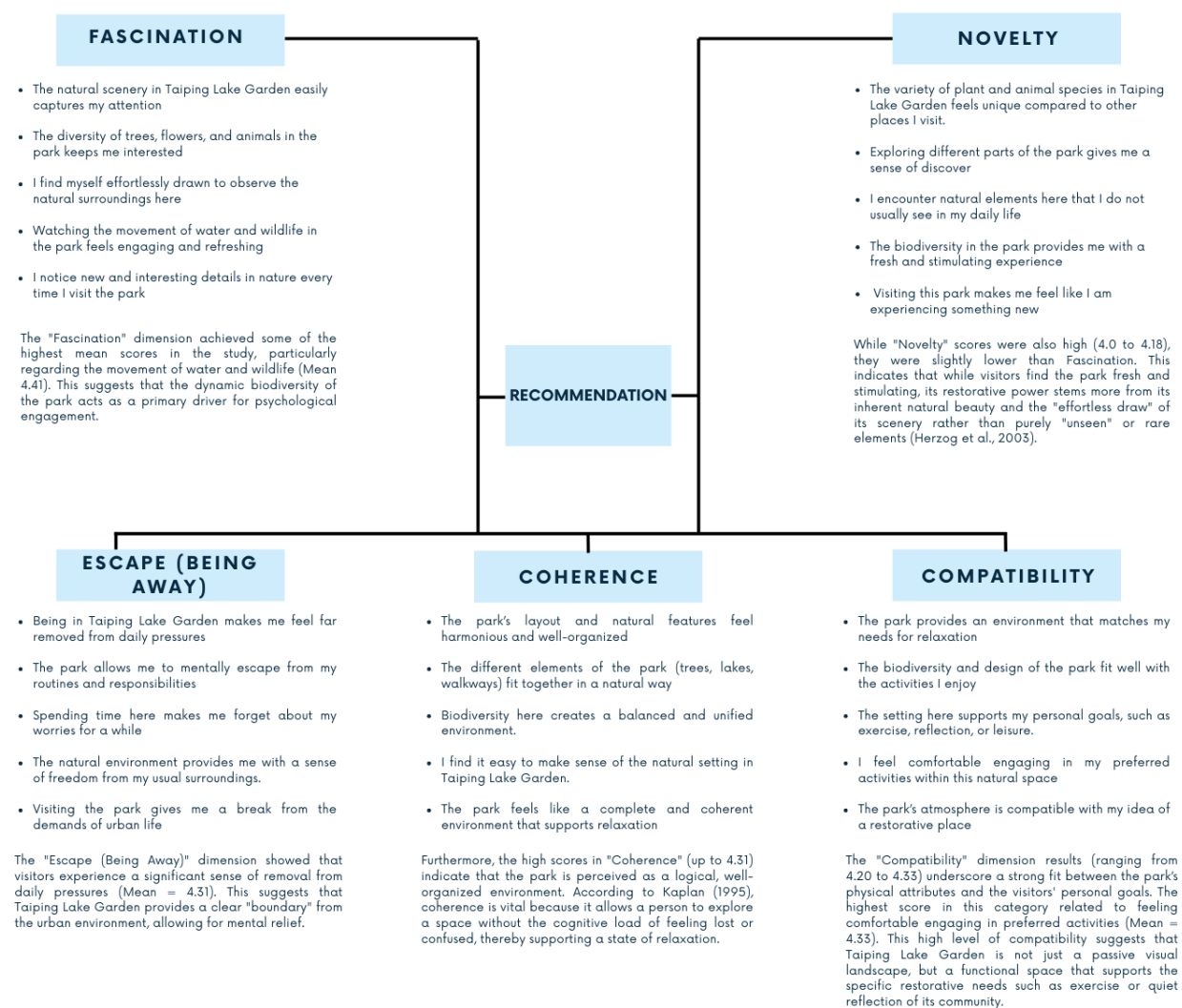


Figure 19. Observation time

Looking at the observation times on Figure 19, it's clear that visitors feel a strong sense of comfort regardless of when they visit, which perfectly aligns with the high average score of 4.33 noted in Table 6. The morning seems to be a favourite for many, hitting a peak in "Strongly Agree" responses, suggesting that the early hours offer a particularly restorative experience. By the evening, while the intensity shifts slightly from "Strongly Agree" to "Agree," the overall sentiment remains overwhelmingly positive. Even during the quieter afternoon hours, the lack of "Disagree" responses shows that the park remains a reliable and welcoming space throughout the entire day.

The consistent level of comfort throughout the day, especially in the morning, is due to the quality of the park's microclimate. Mornings recorded high "Strongly Agree" ratings because the cool temperature and fresh air provided the most restorative effect for visitors. Although the afternoons were quieter and the evenings experienced a shift in intensity, the absence of "Disagree" responses indicated that the park's lighting, security, and landscape design managed to maintain its functionality and appeal from morning to night regardless of the time of day.

RECOMMENDATION FOR RESTORATIVE BIODIVERSITY DESIGN IN PUBLIC PARK



SUMMARY OF RECOMMENDATION

The core finding is that Taiping Lake Garden serves as a highly effective restorative environment, primarily driven by its Fascination and Compatibility factors. The "Fascination" dimension received the highest scores, particularly regarding the movement of water and wildlife, suggesting that the park's dynamic biodiversity is the main driver for visitor engagement. This is supported by high "Compatibility" scores, which indicate a strong fit between the park's physical design and the personal goals of its visitors to do such as exercise, reflection, and leisure, making it a functional space rather than just a visual one.

Furthermore, the park excels in providing a sense of Escape (Being Away) and Coherence. Visitors feel a clear "boundary" from urban life and daily pressures, allowing for significant mental relief. The "Coherence" of the landscape by how well the trees, lakes, and walkways fit together to reduces cognitive load and prevents feelings of confusion, thereby supporting a deep state of relaxation. While Novelty scores were also high, the data suggests that the park's restorative power stems more from its inherent natural beauty and effortless draw than from a need for rare or unseen elements.

LIMITATION OF THE STUDY

While this research provides valuable insights into the role of biodiversity in psychological restoration at Taiping Lake Garden, it is constrained by several factors. First, the sample size was relatively small, consisting of only 51 respondents, which may limit the generalizability of the findings to a broader population. Second, the study focused on a single geographical location in Perak, Malaysia; therefore, the results may reflect specific local cultural and ecological contexts that might not apply to other urban park settings. The demographic profile of the participants was also skewed, with a significant majority being female (64.7%) and of Malay ethnicity (98.0%), potentially overlooking the diverse perspectives of other ethnic groups and genders. Furthermore, the study relied on self-reported data and subjective perceptions of biodiversity rather than objective ecological measurements, which can be influenced by individual familiarity with the landscape. Lastly, the time of data conducted on a single day in November means the findings may not account for seasonal variations in biodiversity or weather-related impacts on visitor engagement.

FUTURE RESEARCH

To deepen the understanding of nature-based psychological recovery, future research should prioritize several key expansions and methodological shifts. First, studies should move beyond localized data by conducting larger-scale investigations across diverse urban parks and regions, allowing for a comparison of how different tropical ecosystems and urban layouts influence restorative outcomes. There is also a critical need to bridge the gap between human perception and ecological reality; by integrating objective ecological assessments, such as actual species richness counts with psychological surveys, researchers can begin to identify the specific biodiversity thresholds required to trigger mental health benefits.

Furthermore, shifting toward longitudinal research designs will be essential for capturing seasonal fluctuations and understanding how nature contributes to long-term emotional resilience rather than just immediate, short-term recovery. This approach should be coupled with a more inclusive demographic focus, specifically exploring how cultural backgrounds and age groups, such as the elderly (51–60 years), uniquely perceive and interact with biodiverse landscapes. Finally, future studies must account for environmental variables, investigating how weather conditions and faunal activity at different times of day affect human comfort. Collectively, these advancements will provide the nuanced data necessary for more effective, evidence-based urban park management.

CONCLUSION

Practically, the study offers valuable insights for Malaysian urban planners and landscape architects, particularly in the design and management of biodiversity-rich parks. Findings from Taiping Lake Garden can demonstrate how integrating diverse vegetation, water bodies, and wildlife not only supports ecological health but also enhances public mental well-being. This evidence can inform future park development and rejuvenation projects across Malaysia, encouraging the preservation of biodiversity as a functional design element rather than just an aesthetic consideration.

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