A PARADOXICAL PROPOSITION OF CONNECTEDNESS TO NATURE, RECYCLING BEHAVIOUR AND PSYCHOLOGICAL RESTORATION RELATIONSHIP IN URBAN PARK CONTEXT: A PATH ANALYSIS EVIDENCE

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Abstract

About 29.2% of Malaysians have been diagnosed with psychological distress, especially young adults. The B40 low-income group is most afflicted due to financial restrictions and limiting access to medication. Therefore, urban parks' connectedness and pro-environmental behaviour towards psychological restoration are inexpensive ways to alleviate distress. This study examines the relationship between Connectedness to Nature (CN), Pro-Environmental Behaviour (PEB), and Psychological Restoration (PR). Three hypotheses were used to create a structural model to guide the cross-sectional methodology used for the study. A total of 161 students responded to the Google Form questionnaire. SPSS v21 and Smart-PLS 3.2.7 were used to examine the model relationship. The results showed that all hypotheses were supported by substantial statistical evidence. This study provides an important direction to motivate people to utilize urban parks for obtaining psychological restoration benefits cost-effectively. Green behaviour is also beneficial for humans and the environment in promoting healthy living.

Keywords: Connectedness to nature, pro-environmental behaviour, psychological restoration, urban park

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INTRODUCTION

Psychological Restoration (PR) is an appropriate initial preventive measure to alleviate psychological distress. Previous studies have proved that the natural environment can alleviate psychological distress in many ways (Schebella et al., 2020; Gao et al., 2019; Wang et al., 2020). Nevertheless, the relationship between urban parks and psychological benefits is still uncertain (Deng et al., 2020) especially in contemplative urban parks in Malaysia (Othman et al., 2020) related to natural connectedness. Connectedness to Nature (CN) is a mental state of an individual comprising emotional and cognitive bonding with the natural environment like the urban park. It starts when people interact with urban parks incidentally, intentionally, or non-directionally (Martin et al., 2020). However, the CN-PR association is seldom identified; moreover, it produces inconsistent results (Kryazh, 2019). Also, individuals with frequent urban park experiences have emotions concerning environmental belongingness and preservation (Martin et al., 2020) via Pro-Environmental Behaviour (PEB). PEB is a conception of protecting and preserving the natural environment like recycling. Recycling had a significant positive effect on improving psychological health (Hsiao et al., 2020; Joy, Ramachandran, & George, 2021; Sun & Trudel, 2017) and life satisfaction (Donnelly et al., 2017; Giovanis, 2014). This study argues that PEB has a similar impact on psychological restoration directly or indirectly. It is a seemingly paradoxical proposition that must be justified using scientific evidence. Hence, this study evaluates the relationship between CN, PEB, and PR using the path analysis approach.

CONCEPTUAL STRUCTURAL MODEL

Path analysis requires developing a structural equation model. This study formulated a conceptual structural model using three major domains, namely, Connectedness to Nature (CN), Pro-Environmental Behaviour (PEB), and Psychological Restoration (PR) as per Figure 1. This study also intends to contribute toward expanding the literature on the relationship of the highlighted domains. Most studies have employed more than one PEB type, whereas the present study uses recycling as a single measure. Also, to date, the role of PEB to enact PR remains fuzzy. Hence, three hypotheses have been proposed: H1-Connectedness to Nature (CN) has a significant positive relationship with Psychological Restoration (PR) (Schebella et al., 2019; Gao, Song, Zhu, & Qiu, 2019); H2-Connectedness to Nature (CN) has a significant positive relationship with Pro-Environmental Behaviour (PEB) (Barrera-Hernández et al., 2020; Sulphey & Faisal, 2021; Martin et al., 2020; Whitburn, Linklater, & Milfont, 2019); and H3-Pro-Environmental Behaviour (PEB) has a significant positive relationship with Psychological Restoration (PR) (Hsiao et al., 2020; Joy, Ramachandran, & George, 2021; Sun & Trudel, 2017; Donnelly et al., 2017).
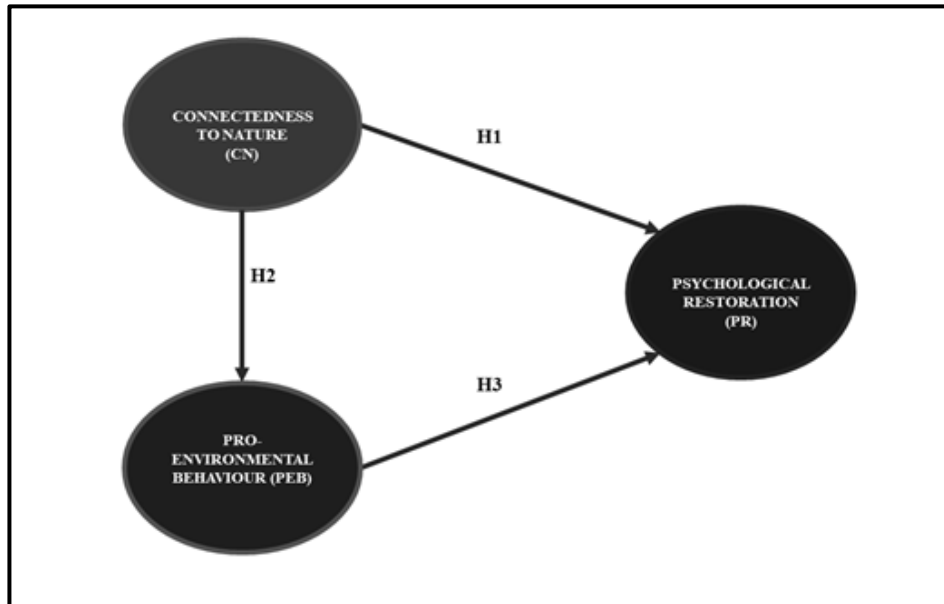
Figure 1: Conceptual Structural Model

METHOD

This study uses a deductive approach by testing the formulated hypotheses using a cross-sectional study conducted at Universiti Technology MARA (UiTM) Shah Alam, Selangor. UiTM is a public university for Bumiputera (Local citizens) to help low-income families (B40) pursue studies. Convenience sampling was used for sample selection. The urban park selected for this study is Taman Tasik Shah Alam, Selangor. The area integrates soft and hard landscapes to facilitate human-nature interaction (Malek & Nashar, 2020; Illia Ibrahim, Omar, & Hanita Nik Mohamad, 2018). However, studies on psychological impact in this context are infrequent. Hence, this study should assess the underestimated perceived restorative potential of the area. The measurement instrument comprises six items of Connectedness to Nature (five-point Likert scale), three items of Pro-Environmental Behaviour (five-point Likert scale), five items of Psychological Restoration (five-point Likert scale), and four items of Demographic Profile. The instrument was loaded onto digital platforms to use online surveys (Google Form) for data collection. Data analysis concerning this study involved descriptive analysis performed using IBM SPSS version 23 and inferential analysis performed using Smart-PLS 3.2.9 (Two stages: measurement model analysis and structural model analysis)

RESULT

Demographic Profile

This study comprised 161 respondents; 68.9% were female, while 31.1% were males. The majority comprised Malays (95.0%); the remaining 5.0% were Bumiputera. Most students belong to semesters five and six, comprising 51.6% of respondents. Other participation includes semester 7-8 (22.4%), 3-4 (19.2%), 1-2 (5.6%), and above semester 9 (1.2%). These individuals are from the B40 groups having four monthly income categories. There were 40.4% of respondents each from family income ranges: of less than RM2,500 and RM3,970-RM4,849. The remaining income distribution was RM2,501-RM3,169 (13.0%) and RM3,170-RM3,969 (6.2%).

Measurement Model Analysis

The normality test assessed the data distribution to help identify an appropriate data analysis technique. Study data were not normally distributed because cut-off values concerning Mardia's multivariate skewness (±3) and kurtosis (±20) test were exceeded (Hair et al., 2017). The WebPower application indicated that the study had a skewness of $\beta = 75.693$, $p< 0.01$ and a kurtosis value of $\beta = 324.170$, $p< 0.01$. Thus, non-parametric analysis using Smart-PLS was confirmed for this study. The first stage comprises measurement model analysis (Confirmatory Factor Analysis) consisting of reliability and validity tests. Table 1 indicates that all items representing every construct were reliable. These items were also in the threshold range specified. This study confirmed that the representative items were consistent with other studies concerning different contexts and samples.

Table 1: Measurement Model Analysis

Construct	Items	Loading	Mean	Composite Reliability	Average Variance Extracted
Connectedness to Nature	A3NC1	0.739	4.69	0.924	0.670
	A3NC2	0.775	4.60		
	A3NC3	0.881	4.67		
	A3NC4	0.766	4.40		
	A3NC5	0.863	4.65		
	A3NC6	0.877	4.40		
Pro-Environmental Behaviour (Recycling)	PEBt1	0.785	3.24	0.829	0.619
	PEBt2	0.835	3.42		
	PEBt3	0.738	3.47		
Psychological Restoration	PR1	0.806	4.22	0.918	0.692
	PR2	0.868	4.10		
	PR3	0.797	4.03		
	PR4	0.842	4.12		
	PR5	0.843	4.10		

Source: Author

Tables 2 and 3 show that all items were valid in representing the three primary constructs in this study. In Table 3, all construct values are higher than the construct's highest squared correlation values (Chin, 1998; Fornell & Larcker, 1981). The HTMT ratio in Table 4 also meets the threshold value of less than 0.85 or 0.95 (Darlington & Hayes, 2017). Thus, the measurement model analysis was fulfilled with substantive evidence for the next stage, i.e., structural model analysis.

Table 2: Fornell-Larcker Criterion

	1	2	3
1. CN	0.819		
2. PEB	0.300	0.787	
3. PR	0.551	0.306	0.832

Source: Author

Table 3: Heterotrait-Monotrait Ratio (HTMT)

|	1	2	3
1. CN			
2. PEB	0.375		5666
3. PR	0.602	0.374	

Source: Author

Structural Model Analysis

The second stage comprises structural model analysis using a bootstrapping procedure with a subsample of 5000 to generate a model relationship (Hair et al., 2017). Before this process, the Goodness of Fit (GoF) should be determined to ascertain model fitness criteria. In this study, the value of GoF was 0.457 (Large) and considered an acceptable fit (Wetzels et al. 2009). According to Hair et al. (2017), path coefficient (t-value), coefficient of determination (R^2), effect size, and predictive relevance criteria must be tested. Figure 2 and Table 4 below specify all the criteria. The results showed that all proposed hypotheses were supported, for instance, CN and PR ($\beta = 0.505$, $p < 0.01$), CN and PEB ($\beta = 0.300$, $p < 0.01$), and PEB and PR ($\beta = 0.155$, $p < 0.05$). Furthermore, the R^2 values for PEB were 0.090 (weak) and 0.326 (substantial) (Cohen, 1989). The effect size values (f^2) of this study were 0.344 (moderate), 0.090 (weak), and 0.032 (weak) (Cohen, 1989). This study also recognized predictive relevance (Q^2) using the blindfolding technique. Blindfolding is a sample reuse strategy in which data points are systematically deleted, and their original values are predicted (Stone,

1974; Geisser, 1974). This study has acceptable Q^2 values: 0.049 (PEB) and 0.213 (PR); both values exceed zero, as required (Hair et al., 2017).
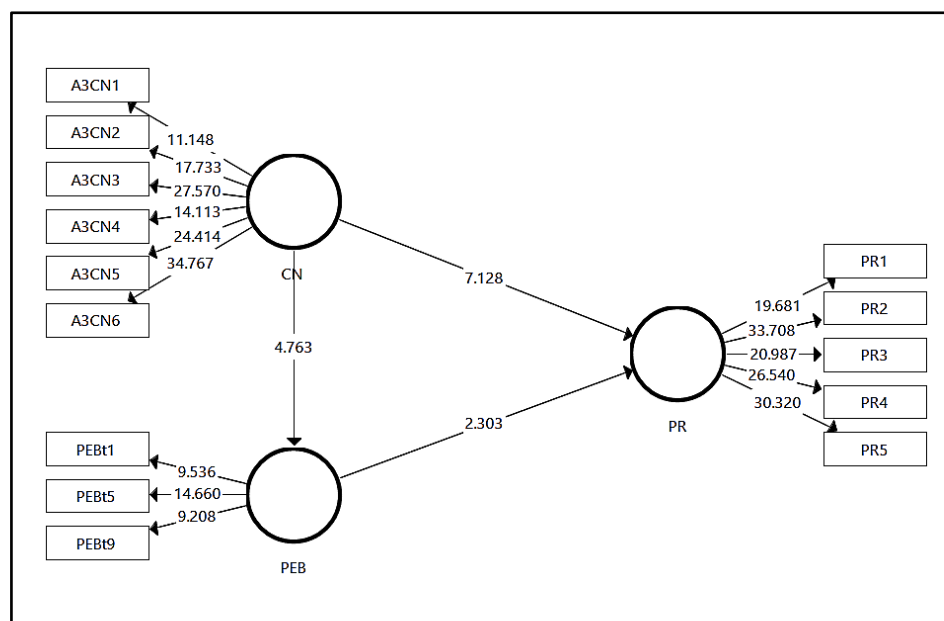
Figure 2: Structural Model Relationship
Source: Author

Table 4: Hypothesis Testing Results

	Std. Beta	Std Error	p-value	t-value	Decision	5.0%	95.0%	R^2	Q^2	f^2
CN > PR	0.505	0.071	0.000	7.128**	Supported	0.386	0.619	-	-	0.344
CN > PEB	0.300	0.063	0.000	4.763**	Supported	0.209	0.414	0.090	0.049	0.099
PEB > PR	0.155	0.067	0.011	2.303*	Supported	0.055	0.275	0.326	0.213	0.032

Source: Author

DISCUSSION

Connectedness to Nature (CN) has a significant positive relationship with Psychological Restoration (PR)-H1

This study found that H1 was supported. It indicates that an individual bonding with nature experiences restorative emotions. The context and type of natural existence differ and arouse feelings of well-being (Schebella et al., 2019); however, natural settings like urban parks are still emotionally restoring resources. Previous studies focus only on natural environment settings like forests than urban parks; hence, the role is still unclear (Deng et al., 2020; Wang et al., 2016). Therefore, this study helps justify the argument based on the biodiversity attributes of urban parks. For instance, biodiversity attributes like vegetation richness substantially impact individual psychological restoration and stress reduction (Schebella et al., 2019; Gao, Song, Zhu, & Qiu, 2019). Besides, water body attributes provide a tranquil gaze for emotional serenity (Gao, Song, Zhu, & Qiu, 2019). Hence, the assertion that individuals remain close to nature for well-being is significant because of the mentioned advantages. Scale representations for both domains were verified. This study's short versions of the Nature Relatedness Scale (NRS-6) and Perceived Restorative Scale (PRS-5) were reliable and valid in this context. This study found that the composite reliability of CN (0.924) paralleled with a previous study (0.920) (Martin et al., 2020). For PR, reliability, and validity values of 0.918 and 0.700 are higher than the previous study (Panno et al., 2020). In this regard, the concept of model parsimony was highlighted in the study. Furthermore, this study found that the perceptive evaluation of CN towards PR was substantiated.

Connectedness to Nature (CN) has a significant positive relationship with Pro-Environmental Behaviour (PEB)-H2

This study argues that individuals better connected with nature tend to undertake PEB. The H2 association in this study was significant (Barrera-Hernández et al., 2020; Sulphey & Faisal, 2021; Martin et al., 2020; Whitburn, Linklater, & Milfont, 2019). However, this study used only a single PEB (recycling), rarely applied in previous works. Advantages can help identify CN-influenced PEB types. Connection to nature plays an essential role in explaining environmental concerns, including recycling behaviour. It is a nature-conserving behaviour used commonly as a primary PEB in previous studies (Barrera-Hernández et al., 2020; Sulphey & Faisal, 2021; Martin et al., 2020; Whitburn, Linklater and Milfont, 2019). The present study has superior reliability and validity values than previous studies. For instance, previous studies recorded 0.780 reliability (Barrera-Hernández et al., 2020; Ibáñez-Rueda et al., 2020), compared to 0.829 for the present study. Besides, this study has distinctive loading values of 0.738-0.835 compared to 0.60 (Martin et al., 2020). In conclusion, individuals who care about

the environment through subjective connectedness are expected to preserve the environment using simple actions like recycling.

Pro-Environmental Behaviour (PEB) has a significant positive relationship with Psychological Restoration (PR)-H3

In general, the relationship between recycling behaviour and life satisfaction is widely stated (Hsiao et al., 2020; Joy, Ramachandran, & George, 2021; Sun & Trudel, 2017; Donnelly et al., 2017) compared to psychological restoration itself. This study justified the paradoxical proposition of the direct and bidirectional relationship between PEB and PR (Whitburn et al., 2019). However, this study used recycling as the PEB type than tree-planting behaviour. The PR relationship remains direct and bidirectional. It shows that actions (like recycling) towards conserving the natural environment are profitable for humans and nature; the benefits manifest as high happiness levels, reduced negative emotions, and less waste deposited in landfills (Hsiao et al., 2020). Psychological restoration depends on the quality of the restorative environment. For instance, one of the leading PR attributes is the fascination elicited by artistically attractive settings (Rita & Giuseppe, 2017). Littering rampant in urban parks will affect the restorative environment. Steps can be taken to transform recyclable waste into aesthetic sculptures to improve the scenery. In other words, recycling is also part of nature-conserving behaviour. It helps preserve the aesthetic quality of the environment and serves restorative experiences. Consequently, such steps can reduce waste disposal, reduce natural resource use, and reduce environmental challenges.

CONCLUSION

It is possible to alleviate psychological distress using a connection with nature. This study postulates a new proposition for promoting mental health by integrating Pro-Environmental Behaviour (PEB). Remarkably, the results revealed that a single PEB item has significant direct and indirect effects on Psychological Restoration (PR). The PEB-PR proposition having a bidirectional relationship is paradoxical. It suggests that humans protect and preserve urban natural aspects to benefit from perceived restorativeness. The correlations between CN, PEB, and PR were provided concerning relationships than establishing causality. Due to a new proposition in the literature, this study attempted first to identify significant compatibility between model constructs. However, there is room for enriching future studies by incorporating exposure and experience levels concerning CN, internal and external stimuli concerning PEB, and inserting stimulant images about PR when administering the survey. Besides, a cross-sectional study can be transformed into a longitudinal study to assess causality. In conclusion, rapid transformation for preserving urban nature

needs to be intensified to benefit urban communities, including low-income groups (B40). The authorities and agencies can be provided with a progressive plan to promote restorative environments in urban areas and encourage direct preservation by citizens. This study provides an essential direction for people to connect with the urban natural environment to gain psychological restoration benefits. Subsequently, they should maintain urban settings to help with the benefits of restorative experiences. In essence, both movements can create a harmonious atmosphere to preserve the natural environment and increase the well-being of urban communities.

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