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## **THE IMPACT OF PERSONALITY AND LIFESTYLE ON INTERACTION WITH NATURE**

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### **Abstract**

Awareness on the complex interdependent systems between individuals and their contexts is a fundamental understanding of sustainable well-being. Collectivist beliefs and biospheric values translate the normative behaviours when environmental decisions are being made. Issue: Existing research has limited empirical evidence on the impact of personality and lifestyle (PL) on interaction with nature (IN) for Malaysia. Purpose: This paper aims to verify the statistical predictability of IN based on PL. Approach: Multiple Correlation and Multiple Linear Regression were carried out to assess linear associations and parameters of linear equations to predict IN components based on PL items. Findings: IN components were predictable by the majority of the PL items and ‘feeling affected by the environmental loss of other countries’ was the strongest predictor of IN.

**Keyword:** interaction with nature, personality and lifestyle

## INTRODUCTION

Human interdependence with the environment (HIE) is one of the strong sources of subjective sustainable well-being (SSWB). Personality and lifestyle (PL) and interaction with nature (IN) are dimensions of HIE that mutually stimulate one another (Abu Bakar et al., 2017a, 2017b, 2017c, 2018). Human beings willingly influence their surroundings directly and indirectly. The direct influence is often demonstrated in the willingness to assist each other in pursuing worthy life goals by helping and nurturing others and being good role models. The indirect influence is revealed in contagious emotions, empathic resonance and imitation of empathy towards the surrounding environment. This paper assesses the statistical predictability of IN based on PL.

## LITERATURE REVIEW

Case studies based on articles from selected Asian Journals from the year 2011 onwards highlight conditional factors and potential determinants of Interaction with Nature (IN). Table 1 summarizes these findings.

**Table 1** Conditional Factors and Potential Determinants for Interaction with Nature

Conditional Factors	Potential Determinants	References
Unmaintained outdoor space: murky water that provides a place for mosquito breeding, too dense vegetation, and tall and bushy that blocked views.	Emotions and feelings (safety and security) induced in natural elements	(Maruthaveeran, 2012)
Motivation (to experience nature, to unwind) activities (appreciating nature, trekking and hill climbing, observing sunrise, observing hilltop scenery).	The urge to be in nature, knowledge and ability to cope with outdoors.	(Zainol et al., 2012)
Housing value depended on a variety of park elements, conceptual or design of the park, distance to the park, views towards the park, and active areas in the park facing the house.	The inclination to be close to natural or outdoor areas, the urge to spend time in the outdoor environment	(Shukur et al., 2011)
Health condition and availability of natural environmental, views and accessibility to outdoors	The need to be in natural environment	(Ghazali & Abbas, 2011)
Physical well-being (active living); cognitive well-being (comfort, relaxed, and calmness, sense of privacy); and social well-being (interaction)	Having pleasant experience in natural setting: relaxed, energetic and healthy	(Mansor et al., 2012)
Accessibility to natural environment correspond with health and behaviour	Health condition depends on outdoor environment	(Khotdee et al., 2012)
Stimulation of natural elements to encourage motivation (sense of connectedness to greeneries and flexibility of spaces and diversity of natural elements)	Sense of curiosity and feeling engaged, creative and active in natural setting	(Faizi et al., 2013)
Age, gender, health-related conditions (stamina, health issues) and facilities in outdoor areas	Physical health and capability in outdoor areas	(Inani et al., 2013)
The physical setting of outdoor space: characteristics of groundcovers, open spaces, and tree foliage.	Ability to adapt and adjust to natural surrounding	(Ngesan et al., 2013)
Uniqueness of natural features and distinct character of landscape elements	Curiosity of natural features (ability notice details)	(Mahidin & Maulan, 2012)

The findings from the case studies generate three significant components of IN: (i) Nature Attachment (INa), (ii) Knowledge and Capability (INb) and (iii) Inclination towards Nature (INc).

**Table 2** Components and Determinants of Interaction with Nature

Definition of IN	Components	Indicators	Code
The internal and external emotions and aptitudes towards the natural environment expressed in the contact between human and the ecological nature	Nature Attachment	outdoor environment determining own health and wellness	INa
		being able to recall experiences in the natural environment	
	Knowledge and Capability	being able to adapt to various outdoor surroundings	INb
		being able to see and hear what others usually miss in nature	
		being able to notice scientific details of nature	
	Inclination towards Nature	being able to cope with the outdoor environment	INc
		feeling the urge to spend time in the natural environment	
		tending to lose concentration without contact with nature	
		tending to have objects from the outdoors in personal space	
		spending time planting at home	

Personal Lifestyle (PL) manifests in the personal outlook and approach to life in relation to environmental consciousness (Abu Bakar et al., 2017a, 2017b, 2017c, 2018). Qualities adhere to PL include (i) moral stance in collectivistic values (Laurens, 2012; Clark et al., 2014; Caesar, 2016), (ii) commitment to modest and environmental choices (Horayangkura, 2012; Laurens, 2012; Khare, 2015; Ming et al., 2015), and (iii) environmental concerns through knowledge and awareness (Horayangkura, 2012; Ming et al., 2015).

**Table 3** Determinants of Personal Lifestyle

Definition of PL	Indicators	Code
The personal orientation that portrays collectivistic worldviews, modesty and humility towards others as well as consciousness of environmental issues	favouring relationships with others over personal success	PL1
	choosing to disappointing self over disappointing family	PL2
	taking account others' opinions in making life decisions	PL3
	taking the pleasure of working with others	PL4
	practising moderation in purchasing and using resources	PL5
	feeling unconcerned if not being able to afford things	PL6
	believing that having many assets does not lead to happiness	PL7
	being mindful about environmental destruction	PL8
	feeling affected by the environmental loss of other countries	PL9
	urging media to raise more environmental awareness	PL10

According to theoretical fundamentals, the research hypothesizes that IN components are predictable by PL. The following sections provide empirical evidence on the predictability of INa, INb and INc based on PL items.

## METHOD

A sample of 4315 was pooled and analyzed. An 11-point Likert scale was given to the Malaysian respondents to reply to questionnaire items which include the components of IN and the ten (10) PL items. Pearson correlation analyses were carried out to determine significant linear associations between the IN components and PL items. After the correlation analyses, multiple linear regression analyses were executed to estimate parameters of the linear equations in order to predict values of INa, INb and INc from PL items.

## RESULTS AND DISCUSSION

**Table 4** Multiple Correlations between PL items and INa, INb and INc

Correlation Strength Threshold (Dancey & Riley, 2004)											
0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1	
zero	weak			moderate			strong			perfect	
DV	Stats	PL1	PL2	PL3	PL4	PL5	PL6	PL7	PL8	PL9	PL10
INa	r	.360**	.345**	.356**	.401**	.350**	.292**	.293**	.347**	.365**	.394**
	p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	4315	4315	4315	4315	4315	4315	4315	4315	4315	4315
INb	r	.321**	.325**	.343**	.366**	.349**	.314**	.323**	.372**	.357**	.337**
	p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	4315	4315	4315	4315	4315	4315	4315	4315	4315	4315
INc	r	.273**	.268**	.298**	.323**	.321**	.297**	.312**	.342**	.326**	.318**
	p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	4315	4315	4315	4315	4315	4315	4315	4315	4315	4315

### Statistical Interpretation of Multiple Correlation Analyses

INa	At 95% confidence level, there were statistically significant and moderate correlations between INa and (i) PL4 ( $r = .401$ , $p = .000$ ). Additionally, there were statistically significant and weak correlations between INa and (ii) PL1 ( $r = .360$ , $p = .000$ ); (iii) PL2 ( $r = .345$ , $p = .000$ ); (iv) PL3 ( $r = .356$ , $p = .000$ ); (v) PL5 ( $r = .350$ , $p = .000$ ); (vi) PL6 ( $r = .292$ , $p = .000$ ); (vii) PL7 ( $r = .293$ , $p = .000$ ); (viii) PL8 ( $r = .347$ , $p = .000$ ); (ix) PL9 ( $r = .365$ , $p = .000$ ); and (x) PL10 ( $r = .394$ , $p = .000$ ).
INb	At 95% confidence level, there were statistically significant and weak correlations between INb and (i) PL1 ( $r = .321$ , $p = .000$ ); (ii) PL2 ( $r = .325$ , $p = .000$ ); (iii) PL3 ( $r = .343$ , $p = .000$ ); (iv) PL4 ( $r = .366$ , $p = .000$ ); (v) PL5 ( $r = .349$ , $p = .000$ ); (vi) PL6 ( $r = .314$ , $p = .000$ ); (vii) PL7 ( $r = .323$ , $p = .000$ ); (viii) PL8 ( $r = .372$ , $p = .000$ ); (ix) PL9 ( $r = .357$ , $p = .000$ ); and (x) PL10 ( $r = .337$ , $p = .000$ ).
INc	At 95% confidence level, there were statistically significant and weak correlations between INc and (i) PL1 ( $r = .273$ , $p = .000$ ); (ii) PL2 ( $r = .268$ , $p = .000$ ); (iii) PL3 ( $r = .298$ , $p = .000$ ); (iv) PL4 ( $r = .323$ , $p = .000$ ); (v) PL5 ( $r = .321$ , $p = .000$ ); (vi) PL6 ( $r = .297$ , $p = .000$ ); (vii) PL7 ( $r = .312$ , $p = .000$ ); (viii) PL8 ( $r = .342$ , $p = .000$ ); (ix) PL9 ( $r = .326$ , $p = .000$ ); and (x) PL10 ( $r = .318$ , $p = .000$ ).

At 95% confidence level, there were statistically significant positive correlations between (i) INa and each of PL items, (ii) INb and each of PL items, and (iii) INc and each of PL items. The null hypotheses claiming there are no statistically significant correlations between (i) INa and respective PL items, (ii) INb and respective PL items, and (iii) INc and respective PL items were all rejected.

Three (3) multiple regression analyses were carried out to predict the values of each of dependent variables (i) INa, (ii) INb and (iii) INc given the set of PL explanatory variables (PL1, PL2, PL3, PL4, PL5, PL6, PL7, PL8, PL9, and PL10).

**Table 5** Multiple Linear Regression – PL predicting INa

H <sub>0</sub>							
There will be no significant prediction of INa by PL1, PL2, PL3, PL4, PL5, PL6, PL7, PL8, PL9 and PL10							
Model Summary							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson		
1	.471 <sup>a</sup>	.222	.220	1.54620	1.648		
ANOVA							
Model	Sum of Squares	df	Mean Square	F	Sig.		
Regression	2934.876	10	293.488	122.761	.000 <sup>b</sup>		
Residual	10289.671	4304	2.391				
Total	13224.547	4314					
Coefficients							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std Error	β			Lower Bound	Upper Bound
(Constant)	3.253	.152		21.433	.000	2.955	3.550
PL1	.098	.022	.096	4.360	.000	.054	.142
PL2	.029	.024	.028	1.211	.226	-.018	.077
PL3	.020	.026	.018	.787	.431	-.030	.071
PL4	.153	.025	.143	6.027	.000	.103	.203
PL5	.043	.025	.041	1.717	.086	-.006	.092
PL6	-.009	.022	-.009	-.406	.685	-.052	.034
PL7	.014	.023	.013	.623	.533	-.030	.058
PL8	-.012	.025	-.011	-.481	.631	-.060	.036
PL9	.115	.021	.118	5.425	.000	.073	.156
PL10	.145	.020	.149	7.313	.000	.106	.183

A multiple regression was generated to predict INa based on PL items. R value of .471 indicated adequate level of prediction ( $R > 0.4$ ). The Durbin-Watson statistic was 1.648 which is greater than 1.0 and therefore the data was not autocorrelated. A significant regression equation was found,  $F(10, 4304) = 122.761$ ,  $p = .000$ , with an  $R^2$  of .222; indicating that the proportion of variance in INa that can be explained by PL items was 22.2%.

At 95% confidence level, PL1 ( $B = .098$ ,  $t = 4.36$ ,  $p = .000$ ); PL4 ( $B = .153$ ,  $t = 6.027$ ,  $p = .000$ ); PL9 ( $B = .115$ ,  $t = 5.425$ ,  $p = .000$ ); and PL10 ( $B = .145$ ,  $t = 7.313$ ,  $p = .000$ ) were significant predictors of INa. On the contrary, it was found that PL2 ( $B = .029$ ,  $t = 1.211$ ,  $p = .226$ ); PL3 ( $B = .020$ ,  $t = .787$ ,  $p = .431$ ); PL5 ( $B = .043$ ,  $t = 1.717$ ,  $p = .086$ ); PL6 ( $B = -.009$ ,  $t = -.406$ ,  $p = .685$ ); PL7 ( $B = .014$ ,  $t = .623$ ,  $p = .533$ ) and PL8 ( $B = -.012$ ,  $t = -.481$ ,  $p = .631$ ) were not significant predictors of INa.

Personality and Lifestyle (PL) items account for 22.2% of Nature Attachment (INa). Four (4) of PL items were significant predictors of INa.

**Table 6** Multiple Linear Regression – PL predicting INb

H <sub>0</sub>							
There will be no significant prediction of INb by PL1, PL2, PL3, PL4, PL5, PL6, PL7, PL8, PL9 and PL10							
Model Summary							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson		
1	.445 <sup>a</sup>	.198	.196	1.44301	1.671		
ANOVA							
Model	Sum of Squares	df	Mean Square	F	Sig.		
Regression	2210.859	10	221.086	106.176	.000 <sup>b</sup>		
Residual	8962.079	4304	2.082				
Total	11172.937	4314					
Coefficients							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std Error	$\beta$			Lower Bound	Upper Bound
(Constant)	3.188	.142		22.505	.000	2.910	3.465
PL1	.036	.021	.039	1.721	.085	-.005	.077
PL2	.037	.023	.039	1.652	.099	-.007	.082
PL3	.050	.024	.049	2.054	.040	.002	.097
PL4	.083	.024	.085	3.518	.000	.037	.130
PL5	.044	.023	.046	1.895	.058	-.002	.090
PL6	.032	.021	.034	1.542	.123	-.009	.072
PL7	.038	.021	.038	1.785	.074	-.004	.079
PL8	.093	.023	.094	4.037	.000	.048	.138
PL9	.097	.020	.109	4.916	.000	.058	.136
PL10	.033	.018	.037	1.796	.073	-.003	.069

A multiple regression was generated to predict INb based on PL items. R value of .445 indicated an adequate level of prediction ( $R > 0.4$ ). The Durbin-Watson statistic was 1.671 which is greater than 1.0 and therefore the data was not autocorrelated. A significant regression equation was found,  $F(10, 4304) = 106.176$ ,  $p = .000$ , with an  $R^2$  of .198; indicating that the proportion of variance in INb that can be explained by PL items was 19.8%.

At 95% confidence level, PL3 ( $B = .050$ ,  $t = 2.054$ ,  $p = .040$ ); PL4 ( $B = .083$ ,  $t = 3.518$ ,  $p = .000$ ); PL8 ( $B = .093$ ,  $t = 4.037$ ,  $p = .000$ ) and PL9 ( $B = .097$ ,  $t = 4.916$ ,  $p = .000$ ) were significant predictors of INb. On the contrary, it was found that PL1 ( $B = .036$ ,  $t = 1.721$ ,  $p = .085$ ); PL2 ( $B = .037$ ,  $t = 1.652$ ,  $p = .099$ ); PL5 ( $B = .044$ ,  $t = 1.895$ ,  $p = .058$ ); PL6 ( $B = .032$ ,  $t = 1.542$ ,  $p = .123$ ); PL7 ( $B = .038$ ,  $t = 1.785$ ,  $p = .074$ ) and PL10 ( $B = .033$ ,  $t = 1.796$ ,  $p = .073$ ) were not significant predictors of INb.

Personality and Lifestyle (PL) items account for 19.8% of Knowledge and Capability (INb). Four (4) of PL items were significant predictors of INb.

**Table 7 Multiple Linear Regression – PL predicting INc**

H <sub>0</sub>							
There will be no significant prediction of INc by PL1, PL2, PL3, PL4, PL5, PL6, PL7, PL8, PL9 and PL10							
Model Summary							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson		
1	.405 <sup>a</sup>	.164	.162	1.67223	1.604		
ANOVA							
Model	Sum of Squares	df	Mean Square	F	Sig.		
Regression	2367.393	10	236.739	84.660	.000 <sup>b</sup>		
Residual	12035.522	4304	2.796				
Total	14402.915	4314					
Coefficients							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std Error	β			Lower Bound	Upper Bound
(Constant)	3.081	.164		18.769	.000	2.759	3.403
PL1	.030	.024	.028	1.218	.223	-.018	.077
PL2	-.010	.026	-.009	-.382	.702	-.062	.041
PL3	.054	.028	.047	1.925	.054	-.001	.109
PL4	.074	.027	.067	2.709	.007	.021	.128
PL5	.044	.027	.041	1.646	.100	-.009	.097
PL6	.042	.024	.040	1.778	.076	-.004	.089
PL7	.079	.024	.070	3.225	.001	.031	.127
PL8	.094	.027	.083	3.518	.000	.042	.146
PL9	.086	.023	.085	3.747	.000	.041	.130
PL10	.067	.021	.066	3.125	.002	.025	.109

A multiple regression was generated to predict INa based on PL items. R value of .405 indicated an adequate level of prediction ( $R > 0.4$ ). The Durbin-Watson statistic was 1.604 which is greater than 1.0 and therefore the data was not autocorrelated. A significant regression equation was found,  $F(10, 4304) = 84.660$ ,  $p = .000$ , with an  $R^2$  of .164; indicating that the proportion of variance in INc that can be explained by PL items was 16.4%.

At 95% confidence level, PL4 ( $B = .074$ ,  $t = 2.709$ ,  $p = .007$ ); PL7 ( $B = .079$ ,  $t = 3.225$ ,  $p = .001$ ); PL8 ( $B = .094$ ,  $t = 3.518$ ,  $p = .000$ ); PL9 ( $B = .086$ ,  $t = 3.747$ ,  $p = .000$ ) and PL10 ( $B = .067$ ,  $t = 3.125$ ,  $p = .002$ ) were significant predictors of INc. On the contrary, it was found that PL1 ( $B = .030$ ,  $t = 1.218$ ,  $p = .223$ ); PL2 ( $B = -.010$ ,  $t = -.382$ ,  $p = .702$ ); PL3 ( $B = .054$ ,  $t = 1.925$ ,  $p = .054$ ); PL5 ( $B = .044$ ,  $t = 1.646$ ,  $p = .100$ ) and PL6 ( $B = .042$ ,  $t = 1.778$ ,  $p = .076$ ) were not significant predictors of INc.

Personality and Lifestyle (PL) items account for 16.4% of Collaborative Engagement (INc). Five (5) of PL items were significant predictors of INc.

**Table 8 Summary of Findings**

		IV (Predictor Variables) - $\beta$									
		PL1	PL2	PL3	PL4	PL5	PL6	PL7	PL8	PL9	PL10
DV (Outcome Variables)	INa	.096 ✓	.028 ✗	.018 ✗	.143 ✓	.041 ✗	-.009 ✗	.013 ✗	-.011 ✗	.118 ✓	.149 ✓
	INb	.039 ✗	.039 ✗	.049 ✓	.085 ✓	.046 ✗	.034 ✗	.038 ✗	.094 ✓	.109 ✓	.037 ✗
	INc	.028 ✗	-.009 ✗	.047 ✗	.067 ✓	.041 ✗	.04 ✗	.070 ✓	.083 ✓	.085 ✓	.066 ✓

✓ = statistically significant predictor; ✗ = not statistically significant predictor

DV	Indicators	IV	Top 3 Strongest Predictors	$\beta$
INa Nature Attachment	<ul style="list-style-type: none"> <li>outdoor environment determining own health and wellness</li> <li>being able to recall experiences in the natural environment</li> </ul>	PL10	urging media to raise more environmental awareness	.149
		PL4	taking the pleasure of working with others	.143
		<b>PL9</b>	<b>feeling affected by the environmental loss of other countries</b>	<b>.118</b>
INb Knowledge and Capability	<ul style="list-style-type: none"> <li>being able to adapt to various outdoor surroundings</li> <li>being able to see and hear what others usually miss in nature</li> <li>being able to notice scientific details of nature</li> <li>being able to cope with the outdoor environment</li> </ul>	<b>PL9</b>	<b>feeling affected by the environmental loss of other countries</b>	<b>.109</b>
		PL8	being mindful about environmental destruction	.094
		PL4	taking the pleasure of working with others	.085
		<b>PL9</b>	<b>feeling affected by the environmental loss of other countries</b>	<b>.085</b>
INc Inclination towards Nature	<ul style="list-style-type: none"> <li>feeling the urge to spend time in the natural environment</li> <li>tending to lose concentration without contact with nature</li> <li>tending to have objects from the outdoors in personal space</li> <li>spending time planting at home</li> </ul>	PL8	being mindful about environmental destruction	.083
		PL7	believing that having many assets does not lead to happiness	.070
		<b>PL9</b>	<b>feeling affected by the environmental loss of other countries</b>	<b>.085</b>

The findings revealed that some of the PL items significantly account for INa, INb and INc. PL9, designating ‘*feeling affected by the environmental loss of other countries*’ was in the top three strongest predictors across IN components. The sense of moral responsibilities and concerns on global environmental problems implicitly and profoundly translate into emotions towards and aptitudes in the natural environment. Reaching out to people in different countries to inform on environmental issues are difficult due to language barriers, illiteracy and cultural differences. Local outreach, media outlets and classroom education can ease the communication barriers, spread messages and foster sense of proactive citizenships hence deepen shared empathy towards the natural surroundings.

## CONCLUSION

HIE in SSWB promotes the idea the ways humans interact with nature originates from their collectivist backgrounds and biospheric values. This paper evidence that IN is predictable through PL. Statistical modelling on the constructs elaborated in this paper is warranted for future research.



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