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## **ATTITUDES AND PRO-ENVIRONMENTAL BEHAVIOURS: DETERMINING FACTOR OF PERSONALITY AND LIFESTYLE**

**Aisyah Abu Bakar<sup>1</sup>, Mariana Mohamed Osman<sup>2</sup> & Mizan Hitam<sup>3</sup>**

<sup>1,2</sup>*Kulliyyah of Architecture and Environmental Design*  
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA  
<sup>3</sup>*Faculty of Architecture, Planning and Surveying*  
UNIVERSITI TEKNOLOGI MARA

### **Abstract**

Sustainability in well-being embodies the interconnecting course of how various systems influence each other. The more strongly individuals subscribe to values beyond their immediate interests, that is, prosocial, collectivistic and biospheric values, the more likely they are to engage in environmental behaviour. *Issue:* Existing research has limited evidence on specific values of Malaysian's personality and lifestyle (PL) that have significant impact on attitude and pro-environmental behaviour (AP). *Purpose:* This paper aims to verify the statistical predictability of AP based on PL. *Approach:* Multiple Correlation and Multiple Linear Regression were carried out to assess linear associations and parameters of linear equations to predict AP components based on PL items. *Findings:* AP components were moderately predictable by some of the PL items. Specifically, 'Urging media to raise environmental awareness' and 'being mindful about environmental destruction' were the two strongest predictors of AP.

**Keywords:** attitude and pro-environmental behaviour, personality and lifestyle

## INTRODUCTION

Human interdependence with the environment (HIE) is a valuable aspect of architectural psychology as it is an extended understanding towards improving the well-being aspects of architecture. HIE is one of the main causes of subjective sustainable well-being (SSWB). Personality and lifestyle (PL) and attitude and pro-environmental behaviours (AP) are interrelated dimensions of HIE (Abu Bakar et al., 2017a, 2017b, 2017c, 2018), yet the impact of specific PL items on AP has limited proofs. This paper assesses the statistical predictability of AP based on PL items of Malaysian respondents.

## 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 (AP). Table 1 summarizes these findings.

**Table 1** Conditional Factors and Potential Determinants for Environmental Behaviour

Conditional Factors	Potential Determinants	References
Cultural orientations – consumers with high collectivistic values and low materialistic values had higher recycling tendency	Recycling attitude and behaviours (the approach to reclaiming the purpose of used materials)	(Latif & Omar, 2012)
Policies implementation supporting environmental purchasing behaviours such as promotion of energy rating, labelling green appliances, banning hazardous items, rebate, and green procurement practices	Purchase energy-efficient, recycled packaging, and biodegradable products, and green detergents	(Harizan et al., 2013)
Concerns about environment, social influence, accessibility to environmental facilities, monetary motivation, and altruism.	Waste separation, practising buy-back centres and recycling and reusing household items	(Zena et al., 2014)
High income and education level favour the green movement and have concerns for food safety	Purchasing and consuming organic food	(Teng et al., 2011)
Concern on solid waste management and readiness to adjust to new practices	Bring reusable bag for shopping	(Zen et al., 2013)
Awareness (familiarity to energy-efficient labels), attitude (standpoint on energy-savings) and social norms (environmental lifestyles)	Purchasing energy-efficient products and appliances based on energy efficiency labels	(Zainudin et al., 2014)
Perceived consumer effectiveness (environment related past experience behaviour, environment-related intention-behaviour, willingness to pay, and regulatory support - separating household waste, being a member of environmental groups)	environmentally conscious consumer behaviour (purchasing biodegradable products, energy-saving products, and products that are less harmful to the environment)	(Ramly et al., 2012)
Environmental emotions, environmental cognition (well-informed, understanding and knowledge on green practices), environmental attitude (general sense of favourableness or unfavourableness for green behaviour)	Keeping materials out of the waste stream: reduce (minimising consumption), reuse (use again or repurpose used materials) and recycle	(Nameghi & Shadi, 2013)

The case studies generated three significant components of AP: (i) Energy Saving (APa), (ii) Waste Handling (APb) and (iii) Smart Consumer (APc).

**Table 2** Components and Determinants of Attitude and Pro-Environmental Behaviour

Definition of AP	Components	Indicators	Code
The positive and responsible behaviours throughout everyday decisions and actions attempted to favour and safeguard the environment	Energy Saving	turning off fans and lights when they are switched on	APa
		turning off taps when brushing teeth	
	Waste Handling	throwing rubbish according to designated recycle bins	APb
		separating rubbish at home (metals, paper, glass, etc.)	
		reusing grocery bags/ jars/ bottles/ boxes/ cans, etc.	
	Smart Consumer	using towels instead of tissues	APc
		using water tumbler instead of purchasing water	
		purchasing refillable detergents	
		purchasing energy-savings appliance	
		purchasing products that are organically produced	

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; Masud et al., 2013; 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	favours 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 environmental awareness	PL10

According to theoretical fundamentals, the research hypothesize that AP components are predictable by PL. The following sections provide empirical evidence on the predictability of APa, APb and APc based on PL items.

## METHOD

A sample of 4315 was pooled and statistically assessed. An 11-point Likert scale was given to the Malaysian respondents to reply to questionnaire items which consist of the components of AP and the ten (10) PL items. Pearson correlation analyses were carried out to determine significant linear associations between the AP components and PL items. The significant correlations warrant for multiple linear regression analyses to estimate parameters of the linear equations in order to predict values of APa, APb and APc from PL items.

## RESULTS AND DISCUSSION

**Table 4** Multiple Correlations between PL items and APa, APb and APc

Correlation Strength Threshold (Dancey & Riley, 2004)											
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1
	zero	weak			moderate			strong			perfect
H <sub>0</sub>	There is no statistically significant correlation between APa and respective PL items										
H <sub>0</sub>	There is no statistically significant correlation between APb and respective PL items										
H <sub>0</sub>	There is no statistically significant correlation between APc and respective PL items										
DV	Stats	PL1	PL2	PL3	PL4	PL5	PL6	PL7	PL8	PL9	PL10
APa	r	.339**	.317**	.330**	.380**	.364**	.325**	.294**	.330**	.307**	.392**
	p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	4315	4315	4315	4315	4315	4315	4315	4315	4315	4315
APb	r	.261**	.259**	.284**	.305**	.302**	.278**	.277**	.301**	.254**	.267**
	p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	4315	4315	4315	4315	4315	4315	4315	4315	4315	4315
APc	r	.313**	.301**	.317**	.370**	.338**	.320**	.312**	.334**	.300**	.341**
	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											
APa	At 95% confidence level, there were statistically significant and weak correlations between APa and (i) PL1 (r =.339, p = .000); (ii) PL2 (r =.317, p = .000); (iii) PL3 (r =.330, p = .000); (iv) PL4 (r =.380, p = .000); (v) PL5 (r =.364, p = .000); (vi) PL6 (r =.325, p = .000); (vii) PL7 (r =.294, p = .000); (viii) PL8 (r =.330, p = .000); (ix) PL9 (r =.307, p = .000); and (x) PL10 (r =.392, p = .000).										
APb	At 95% confidence level, there were statistically significant and weak correlations between APb and (i) PL1 (r =.261, p = .000); (ii) PL2 (r =.259, p = .000); (iii) PL3 (r =.284, p = .000); (iv) PL4 (r =.305, p = .000); (v) PL5 (r =.302, p = .000); (vi) PL6 (r =.278, p = .000); (vii) PL7 (r =.277, p = .000); (viii) PL8 (r =.301, p = .000); (ix) PL9 (r =.254, p = .000); and (x) PL10 (r =.267, p = .000).										
APc	At 95% confidence level, there were statistically significant and weak correlations between APc and (i) PL1 (r =.313, p = .000); (ii) PL2 (r =.301, p = .000); (iii) PL3 (r =.317, p = .000); (iv) PL4 (r =.370, p = .000); (v) PL5 (r =.338, p = .000); (vi) PL6 (r =.320, p = .000); (vii) PL7 (r =.312, p = .000); (viii) PL8 (r =.334, p = .000); (ix) PL9 (r =.300, p = .000); and (x) PL10 (r =.341, p = .000).										

At 95% confidence level, there were statistically significant positive correlations between (i) APa and each of PL items, (ii) APb and each of PL items, and (iii) APc and each of PL items. The null hypotheses claiming there are no statistically significant correlations between (i) APa and respective PL items, (ii) APb and respective PL items, and (iii) APc 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) APa, (ii) APb and (iii) APc 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 APa

H <sub>0</sub>							
There will be no significant prediction of APa by PL1, PL2, PL3, PL4, PL5, PL6, PL7, PL8, PL9 & PL10							
Model Summary							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson		
1	.456 <sup>a</sup>	.208	.206	1.69886	1.552		
ANOVA							
Model	Sum of Squares	df	Mean Square	F	Sig.		
Regression	3259.311	10	325.931	112.930	.000 <sup>b</sup>		
Residual	12421.954	4304	2.886				
Total	15681.265	4314					
Coefficients							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	β			Lower Bound	Upper Bound
(Constant)	3.151	.167		18.893	.000	2.824	3.477
PL1	.105	.025	.095	4.256	.000	.057	.153
PL2	.000	.027	.000	.007	<b>.994</b>	-.052	.052
PL3	.009	.029	.008	.320	<b>.749</b>	-.047	.065
PL4	.118	.028	.102	4.230	.000	.063	.173
PL5	.085	.027	.074	3.098	.002	.031	.139
PL6	.072	.024	.066	2.985	.003	.025	.120
PL7	-.002	.025	-.002	-.091	<b>.927</b>	-.051	.046
PL8	.029	.027	.024	1.060	<b>.289</b>	-.024	.082
PL9	-.014	.023	-.013	-.596	.551	-.059	.032
PL10	.223	.022	.211	10.273	.000	.181	.266

A multiple regression was generated to predict APa based on PL items. R value of .456 indicated an adequate level of prediction ( $R > 0.4$ ). The Durbin-Watson statistic was 1.552 which is greater than 1.0 and therefore the data was not autocorrelated. A significant regression equation was found,  $F(10, 4304) = 112.930$ ,  $p = .000$ , with an  $R^2$  of .208; indicating that the proportion of variance in APa that can be explained by PL items was 20.8%.

At 95% confidence level, PL1 ( $B = .105$ ,  $t = 4.256$ ,  $p = .000$ ); PL4 ( $B = .118$ ,  $t = 4.23$ ,  $p = .000$ ); PL5 ( $B = .085$ ,  $t = 3.098$ ,  $p = .002$ ); PL6 ( $B = .072$ ,  $t = 2.985$ ,  $p = .003$ ) and PL10 ( $B = .223$ ,  $t = 10.273$ ,  $p = .000$ ) were significant predictors of APa. On the contrary, it was found that PL2 ( $B = .000$ ,  $t = .007$ ,  $p = .994$ ); PL3 ( $B = .009$ ,  $t = .32$ ,  $p = .749$ ); PL7 ( $B = -.002$ ,  $t = -.091$ ,  $p = .927$ ); PL8 ( $B = .029$ ,  $t = 1.06$ ,  $p = .289$ ) and PL9 ( $B = -.014$ ,  $t = -.596$ ,  $p = .551$ ) were not significant predictors of APa.

Personality and Lifestyle (PL) items account for 20.8% of Energy Saving (APa). Five (5) of PL items were significant predictors of APa.

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

H <sub>0</sub>							
There will be no significant prediction of APb by PL1, PL2, PL3, PL4, PL5, PL6, PL7, PL8, PL9 & PL10							
Model Summary							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson		
1	.365 <sup>a</sup>	.133	.131	1.82230	1.542		
ANOVA							
Model	Sum of Squares	df	Mean Square	F	Sig.		
Regression	2190.153	10	219.015	65.953	.000 <sup>b</sup>		
Residual	14292.658	4304	3.321				
Total	16482.812	4314					
Coefficients							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std Error	β			Lower Bound	Upper Bound
(Constant)	3.110	.179		17.387	.000	2.759	3.461
PL1	.037	.026	.033	1.413	<b>.158</b>	-.014	.089
PL2	.008	.029	.007	.272	<b>.786</b>	-.048	.064
PL3	.065	.031	.052	2.122	.034	.005	.125
PL4	.083	.030	.070	2.780	.005	.025	.142
PL5	.065	.029	.056	2.224	.026	.008	.123
PL6	.059	.026	.053	2.292	.022	.009	.110
PL7	.050	.027	.042	1.879	<b>.060</b>	-.002	.102
PL8	.132	.029	.109	4.542	.000	.075	.189
PL9	-.002	.025	-.002	-.067	<b>.946</b>	-.050	.047
PL10	.044	.023	.041	1.890	<b>.059</b>	-.002	.090

A multiple regression was generated to predict APb based on PL items. R value of .365 indicated slightly a weak level of prediction ( $R < 0.4$ ). The Durbin-Watson statistic was 1.542 which is greater than 1.0 and therefore the data was not autocorrelated. A significant regression equation was found,  $F(10, 4304) = 65.953$ ,  $p = .000$ , with an  $R^2$  of .133; indicating that the proportion of variance in APb that can be explained by PL items was 13.3%.

At 95% confidence level, PL3 ( $B = .065$ ,  $t = 2.122$ ,  $p = .034$ ); PL4 ( $B = .083$ ,  $t = 2.78$ ,  $p = .005$ ); PL5 ( $B = .065$ ,  $t = 2.224$ ,  $p = .026$ ); PL6 ( $B = .059$ ,  $t = 2.292$ ,  $p = .022$ ) and PL8 ( $B = .132$ ,  $t = 4.542$ ,  $p = .000$ ) were significant predictors of APb. On the contrary, it was found that PL1 ( $B = .037$ ,  $t = 1.413$ ,  $p = .158$ ); PL2 ( $B = .008$ ,  $t = .272$ ,  $p = .786$ ); PL7 ( $B = .050$ ,  $t = 1.879$ ,  $p = .060$ ); PL9 ( $B = -.002$ ,  $t = -.067$ ,  $p = .946$ ) and PL10 ( $B = .044$ ,  $t = 1.89$ ,  $p = .059$ ) were not significant predictors of APb.

Personality and Lifestyle (PL) items account for 13.3% of Waste Handling (APb). Five (5) of PL items were significant predictors of APb.

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

H <sub>0</sub>							
There will be no significant prediction of APc by PL1, PL2, PL3, PL4, PL5, PL6, PL7, PL8, PL9 & PL10							
Model Summary							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson		
1	.428 <sup>a</sup>	.183	.181	1.56634	1.532		
ANOVA							
Model	Sum of Squares	df	Mean Square	F	Sig.		
Regression	2363.151	10	236.315	96.321	.000 <sup>b</sup>		
Residual	10559.512	4304	2.453				
Total	12922.663	4314					
Coefficients							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std Error	β			Lower Bound	Upper Bound
(Constant)	3.181	.154		20.690	.000	2.880	3.482
PL1	.066	.023	.066	2.896	.004	.021	.110
PL2	.000	.025	.000	.009	.993	-.048	.048
PL3	.007	.026	.006	.270	.787	-.044	.059
PL4	.154	.026	.146	6.005	.000	.104	.205
PL5	.012	.025	.011	.463	.643	-.038	.061
PL6	.075	.022	.075	3.344	.001	.031	.118
PL7	.053	.023	.050	2.333	.020	.009	.098
PL8	.070	.025	.065	2.787	.005	.021	.119
PL9	.007	.021	.008	.349	.727	-.034	.049
PL10	.109	.020	.113	5.426	.000	.069	.148

A multiple regression was generated to predict APa based on PL items. R value of .428 indicated an adequate level of prediction ( $R > 0.4$ ). The Durbin-Watson statistic was 1.532 which is greater than 1.0 and therefore the data was not autocorrelated. A significant regression equation was found,  $F(10, 4304) = 96.321$ ,  $p = .000$ , with an  $R^2$  of .183; indicating that the proportion of variance in APc that can be explained by PL items was 18.3%.

At 95% confidence level, PL1 ( $B = .066$ ,  $t = 2.896$ ,  $p = .004$ ); PL4 ( $B = .154$ ,  $t = 6.005$ ,  $p = .000$ ); PL6 ( $B = .075$ ,  $t = 3.344$ ,  $p = .001$ ); PL7 ( $B = .053$ ,  $t = 2.333$ ,  $p = .020$ ); PL8 ( $B = .070$ ,  $t = 2.787$ ,  $p = .005$ ) and PL10 ( $B = .109$ ,  $t = 5.426$ ,  $p = .000$ ) were significant predictors of APc. On the contrary, it was found that PL2 ( $B = .000$ ,  $t = .009$ ,  $p = .993$ ); PL3 ( $B = .007$ ,  $t = .27$ ,  $p = .787$ ); PL5 ( $B = .012$ ,  $t = .463$ ,  $p = .643$ ) and PL9 ( $B = .007$ ,  $t = .349$ ,  $p = .727$ ) were not significant predictors of APc.

Personality and Lifestyle (PL) items account for 18.3% of Smart Consumer (APc). Six (6) of PL items were significant predictors of APc.

**Table 8 Summary of Findings**

		IV (Predictor Variables) - $\beta$									
		PL1	PL2	PL3	PL4	PL5	PL6	PL7	PL8	PL9	PL10
DV (Outcome Variables)	APa	<b>.095</b> ✓	.000 ✗	.008 ✗	<b>.102</b> ✓	.074 ✓	.066 ✓	-.002 ✗	.024 ✗	-.013 ✗	<b>.211</b> ✓
	APb	.033 ✗	.007 ✗	.052 ✓	<b>.070</b> ✓	<b>.056</b> ✓	.053 ✓	.042 ✗	<b>.109</b> ✓	-.002 ✗	.041 ✗
	APc	<b>.066</b> ✓	.000 ✗	.006 ✗	.146 ✓	.011 ✗	<b>.075</b> ✓	.050 ✓	.065 ✓	.008 ✗	<b>.113</b> ✓
✓ = statistically significant predictor; ✗ = not statistically significant predictor											
DV	Indicators	IV			Top 3 Strongest Predictors			$\beta$			
APa Energy Saving	<ul style="list-style-type: none"> <li>turning off fans and lights when they are switched on</li> <li>turning off taps when brushing teeth</li> </ul>	<b>PL10</b>	<b>urging media to raise environmental awareness</b>			<b>.211</b>					
		PL4	taking the pleasure of working with others			.102					
		PL1	favouring relationships with others over personal success			.095					
APb Waste Handling	<ul style="list-style-type: none"> <li>throwing rubbish according to designated recycle bins</li> <li>separating rubbish at home (metals, paper, glass, etc.)</li> <li>reusing grocery bags/ jars/ bottles/ boxes/ cans, etc.</li> <li>using towels instead of tissues</li> </ul>	<b>PL8</b>	<b>being mindful about environmental destruction</b>			<b>.109</b>					
		PL4	taking the pleasure of working with others			.070					
		PL5	practising moderation in purchasing and using resources			.056					
		PL10	<b>urging media to raise environmental awareness</b>			<b>.113</b>					
APc Smart Consumer	<ul style="list-style-type: none"> <li>using water tumbler instead of purchasing water</li> <li>purchasing refillable detergents</li> <li>purchasing energy-savings appliance</li> <li>purchasing products that are organically produced</li> </ul>	PL1	favouring relationships with others over personal success			.075					
		PL6	feeling unconcerned if not being able to afford things			.066					
		PL10	<b>urging media to raise environmental awareness</b>			<b>.113</b>					

Findings show that PL10, designating ‘*urging media to raise more environmental awareness*’ was the strongest predictors of APa and APc. PL8, denoting ‘*being mindful about environmental destruction*’ was the strongest predictor for APb. Environmental concerns through mindfulness, awareness and responsiveness are influential in determining environmentally responsible behaviours. On this basis, environmental education that allows individuals to delve into environmental issues, learn to resolve environmental challenges, and take action independently and collectively to improve the environment is crucial. Exposure from the education develops the skills, commitment and eventually habits of making informed and responsible decisions for the environment.

## CONCLUSION

HIE in SSWB suggests that moral concerns explain environmental behaviours. This paper evidence that AP is moderately predictable by PL. In future work, statistical modelling on the constructs elaborated in this paper, along with cultural and economic background intervention, shall prove the research’s importance.



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