

Model of Psychological Factors Affecting to Global Warming Alleviation

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Abstract. The research objective was to develop a model of psychological factors affecting to global warming alleviation. The populations was 35, 010 undergraduate students of the first semester of academic year 2011 of Mahasarakham University. The simple random sampling was used to collect the sample for 450 undergraduate students with equivalent proportion according to fields of study. The methodology was survey research and questionnaire was employed as instrument for data collecting. LISREL was used for model verification. Results illustrated that the structural model, confirmatory factors of Psychological Trait (TRAIT) and Psychological State (STATE) were able to explain the variation of confirmatory factors of Inspiration of Public Consciousness to caused Environmental Behaviors for Global Warming Alleviation with 69.8 percents. Therefore, the equation can be written as following. $BEH = 0.35 MIND + 0.27 TRAIT + 0.38 STATE (1). (R^2=0.79)$

Keywords: Model, Psychological Factors, Affecting, Global Warming Alleviation

1. Introduction

Most scientists indicate that the warming in recent decades has been caused primarily by human activities that have increased the amount of greenhouse gases in the atmosphere such as deforestation and fossil fuel combustion (National Research Council of USA., 2010, and Thiengkamol, 2011e).

In Agenda 21 of global action plan mentioned that “Sustainable development is development which meets the needs of the presented without compromising the ability of future generations to meet their own needs.” (Volker, 2007 & Thiengkamol, 2011e).

The intent of psychologists tried to understand on human behavioral pattern, and then they had developed a large number of theories and models but they had the main focus on explanation how individual perceived and evaluated the stimulant before making decision to express his behavior. The findings revealed that psychological trait in terms of physical health, psychological health, self-confidence, mercy and kindness, achievement motivation, and goal of life were affecting through environmental behaviour (Thiengkamol, 2011f, Thiengkamol, 2011i, & Jumrearnsan, & Thiengkamol, 2012). Nevertheless, study on human behavior, it can't be neglected the psychological trait and states. The psychological state is a mental condition in which the qualities of a state are relatively constant even though the state itself may be dynamic but it contains certain characteristics that might be permanent for period of life. Especially, people is inspired for value of self-living, value of family living, attitude of sufficiency, religion belief, and environmental physical (Kassin, 2003, Pearson, 2006, Thiengkamol, 2009a, Thiengkamol, 2009b, Thiengkamol, 2011a, Thiengkamol, 2011e, Thiengkamol, 2011f, & Thiengkamol, 2011j).

The theories of human behavior on integration of mind and states were compiled together. The Interactionism model is a popular theory that was universal recognized including in Thailand because it helps the researchers to have a point of view on studying of causes of behavioral expression in different dimensions such as cause of mind, cause of state, and cause of co-influence or interaction between characteristics of mind and state of actor (Punthumnavin, 2008, & Magnusson, 2001).

Accordingly, Thiengkamol mentioned on public consciousness or public mind based on inspiration from insight but inspiration is different from motivation because inspiration needs no rewards. Inspiration of public consciousness or public mind, especially, for natural resources and environment conservation, one doesn't receive any reward, admiration or complement for ones act for natural resources and environment conservation. Inspiration of public consciousness might occur due to appreciation in a person as role model or idle, impressive events, notable situations, impressive environment, media perceived such as movies, book, magazine, and internet (Thiengkamol, 2009a, Thiengkamol, 2009b, Thiengkamol, 2011a, & Thiengkamol, 2011e).

1.1. Objective

The objective was to develop a model of psychological factors affecting to global warming alleviation.

2. Methodology

The research design was implemented in steps by step as follows:

1) The populations were 35,010 undergraduate students of the first semester in academic year 2011 of Mahasarakham University. The 450 simple random sampling was employed to collect data from different faculties of Mahasarakham University with the equivalent proportion.

2) The research instrument was the questionnaire and it was used for data collecting. The content and structural validity were determined by Item Objective Congruent (IOC) by 5 experts in the aspects of environmental education, psychology, social science and social research methodology. The reliability was done by collecting the sample group from 50 undergraduate students of Rajabhat Mahasarakham University which is nearby Mahasarakham University. The reliability was determined by Cronbach's Alpha. The reliability of psychological trait, psychological state, and inspiration of public consciousness, environmental behaviors, and the whole questionnaire were 0.838, 0.897, 0.805, 0.829 and 0.949 respectively.

3) The descriptive statistics used were frequency, percentage, mean and standard deviation. The inferential statistics used was LISREL by considering on Chi-Square value differs from zero with no statistical significant at .05 level or Chi-Square/df value with lesser or equal to 2, P-value with no statistical significant at .05 level and RMSEA (Root Mean Square Error Approximation) value with lesser than 0.05 including index level of model congruent value, GFI (Goodness of Fit Index) and index level of model congruent value, AGFI (Adjust Goodness of Fit Index) between 0.9-1.00.

3. Results

3.1. Confirmatory factors of Exogenous Variables

Results of Confirmatory Factor Analysis of Exogenous Variables of Psychological Trait affecting to environmental behaviors for global warming alleviation, were revealed as followings.

3.1.1. Confirmatory Factor Analysis of Psychological Trait (TRAIT)

Confirmatory Factor Analysis of Psychological Trait (TRAIT) had Bartlett's test of Sphericity of 591.807 statistically significant level ($p < .01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.782. This indicated that components of TRAIT aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 1.

Table 1 Results of Analysis of Confirmatory factors of Psychological Trait

Confirmatory factors of Psychological Trait		Weight	SE	t	R ²
X1	Physical Health	0.24	0.035	6.94**	0.20
X2	Psychological Health	0.43	0.028	15.14**	0.57
X3	Self-Confidence	0.39	0.029	13.71**	0.46
X4	Mercy and Kindness	0.36	0.037	9.71**	0.25
X5	Achievement Motivation	0.25	0.031	8.02**	0.17
X6	Goal of Life	0.46	0.040	11.45**	0.34

Chi-square = 10.20 df = 7 P = .17745
GFI = 0.99 AGFI = 0.98 RMSEA = 0.035 RMR = .032

** Statistically significant level of .01

From Table 1, results of analysis of confirmatory factors of TRAIT from 6 observed variables were revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equaled to 0.99 and Adjust Goodness of Fit Index (AGFI) equaled to 0.98 2) Root Mean Square Error of Approximation (RMSEA) equaled to 0.035 (RMSEA < 0.05) and 3) Chi-Square value had no statistically significant at level of .01 and degree of freedom was lesser than or equaled to .05.

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.24 to 0.46 and had covariate to model of Psychological Trait with 17.0 to 57.0 percents.

3.1.2. Confirmatory Factor Analysis of Psychological State (STATE)

Confirmatory Factor Analysis of Psychological State (STATE) had Bartlett's test of Sphericity of 751.823 statistically significant level ($p < .01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.769. This indicated that components of TRAIT aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 2.

Table 2 Results of Analysis of Confirmatory factors of Psychological State

Confirmatory factors of Psychological State		Weight	SE	t	R^2
X7	Value of Self-Living	0.46	0.028	12.02**	0.39
X8	Value of Family Living	0.45	0.035	11.56**	0.47
X9	Attitude of Sufficiency	0.47	0.037	15.58**	0.49
X10	Religion Belief	0.71	0.038	17.96**	0.88
X11	Environmental Physical	0.45	0.039	11.01**	0.46

Chi-Square=0.236, df=2, P-value=0.75428
 GFI = 1.00 AGFI = 1.00 RMSEA = 0.001 RMR = .012

** Statistically significant level of .01

From Table 2, results of analysis of confirmatory factors of TRAIT from 5 observed variables were revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equaled to 1.00 and Adjust Goodness of Fit Index (AGFI) equaled to 1.00 2) Root Mean Square Error of Approximation (RMSEA) equaled to 0.001 ($RMSEA < 0.05$) and 3) Chi- Square value had no statistically significant at level of .01 and degree of freedom was lesser than or equaled to .05.

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.45 to 0.71 and had covariate to model of Psychological State with 39.0 to 88.0 percents.

3.2. Confirmatory Factor Analysis of Endogenous Variables

Results of Confirmatory Factor Analysis of Endogenous Variables of Inspiration of Public Consciousness influencing to environmental behaviors for global warming alleviation, was revealed as followings.

3.2.1. Confirmatory Factor Analysis of Endogenous Variables of Inspiration of Public Consciousness (MIND)

Confirmatory Factor Analysis of Endogenous Variables of Inspiration of Public Consciousness (MIND) had Bartlett's test of Sphericity of 579.995 statistically significant level ($p < .01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.658. This indicated that components of MIND aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 3.

Table 3 Results of Analysis of Confirmatory factors of Inspiration of Public Consciousness

Confirmatory factors of Inspiration of Public Consciousness		Weight	SE	t	R^2
Y7	Person as Role Model	0.63	0.069	8.41**	0.52
Y8	Impressive Event	0.32	0.045	6.04**	0.14
Y9	Impressive Environment	0.80	0.088	8.72**	0.99
Y10	Public Mind Performance	0.33	0.046	6.98**	0.23

Chi-square = 0.123 df = 1 P = 0.9990
 GFI = 1.00 AGFI = 1.00 RMSEA = 0.0001 RMR = .0001

** Statistically significant level of .01

From Table 3, results of analysis of confirmatory factors of MIND from 4 observed variables was revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equalled to 1.00 and Adjust Goodness of Fit Index (AGFI) equalled to 1.00 2) Root Mean Square Error of Approximation (RMSEA) equalled to 0.000 ($RMSEA < 0.05$) and 3) Chi- Square value had no statistically significant at level of .01 and degree of freedom was lesser than or equalled to .05 and .

Considering on loading weight of observe variables in model, it was revealed that observe variables had loading weight with 0.32 to 0.80 and had covariate to model of Inspiration of Public Consciousness with 14.0 to 99.8 percents.

3.2.2. Confirmatory Factor Analysis of Endogenous Variables of Environmental Behaviors for Global Warming Alleviation (BEH)

Confirmatory Factor Analysis of Endogenous Variables of Environmental Behaviors for Global Warming Alleviation (BEH) had Bartlett's test of Sphericity of 834.235 statistically significant level ($p < .01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.832. This indicated that components of BEH aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 4.

Table 4 Results of Analysis of Confirmatory factors of Environmental Behaviors for Global Warming Alleviation

Confirmatory factors of Environmental Behaviors for Global Warming Alleviation		Weight	SE	t	R ²
Y1	Consumption Behavior	0.62	0.029	20.65**	0.70
Y2	Energy Conservation	0.45	0.031	12.99**	0.35
Y3	Waste Management	0.32	0.029	9.45**	0.19
Y4	Travelling Behavior	0.35	0.039	10.56**	0.22
Y5	Recycling Behavior	0.76	0.045	17.47**	0.66
Y6	Knowledge Transferring and Supporting for Environmental Conservation	0.64	0.030	19.89**	0.64

Chi-square = 11.55 df = 7 P = 0.15482
 GFI = 1.00 AGFI = 0.99 RMSEA = 0.000 RMR = 0.0355

From Table 4, results of analysis of confirmatory factors of BEH from 6 observed variables were revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equalled to 1.00 and Adjust Goodness of Fit Index (AGFI) equalled to 0.99 2) Root Mean Square Error of Approximation (RMSEA) equalled to 0.000 (RMSEA < 0.05) and 3) Chi-Square value had no statistically significant at level of .01 and degree of freedom was lesser than or equalled to .05.

Considering on loading weight of observe variables in model, it was revealed that observe variables had loading weight with 0.32 to 0.76 and had covariate to model of Inspiration of Public Consciousness with 22.0 to 70.0 percents.

3.3. Results of Effect among Variables in Model in Terms of Direct Effect

3.3.1. Confirmatory factors of Psychological Trait (TRAIT)

Confirmatory factors of Psychological Trait (TRAIT) had direct effect to Inspiration of Public Consciousness (MIND) and Environmental Behaviors for Global Warming Alleviation (BEH) with statistically significant at level of .01 with effect of 0.54 and 0.27. Additionally, confirmatory factors of Psychological Trait (TRAIT) had indirect effect to Environmental Behaviors for Global Warming Alleviation (BEH) with statistically significant at level of .01 with .14.

3.3.2. Confirmatory factors of Psychological State (STATE)

Confirmatory factors of Psychological State (STATE) had direct effect to Inspiration of Public Consciousness (MIND) and Environmental Behaviors for Global Warming Alleviation (BEH) with statistically significant at level of .01 with effect of 0.56 and 0.35. Additionally, confirmatory factors of Psychological State (STATE) had indirect effect to Environmental Behaviors for Global Warming Alleviation (BEH) with statistically significant at level of .01 with .19.

3.3.3. Confirmatory factors of Inspiration of Public Consciousness (MIND)

Confirmatory factors of Inspiration of Public Consciousness (MIND) had direct effect to and Environmental Behaviors for Global Warming Alleviation (BEH) with statistically significant at level of .01 with effect of 0.28.

Considering on structural model, confirmatory factors of Psychological Trait (TRAIT) and Psychological State (STATE) were able to explain the variation of confirmatory factors of Inspiration of Public

Consciousness to caused Environmental Behaviors for Global Warming Alleviation with 79.0 percents. Therefore, the equation can be written as following.

$$\text{BEH} = 0.35 \text{ MIND} + 0.27 \text{ TRAIT} + 0.38 \text{ STATE} \quad (1)$$

$$(\text{R}^2 = 79.0)$$

Equation (1) factors that had the most effect to Environmental Behaviors for Global Warming Alleviation (BEH) was Psychological State (STATE), subsequences were Inspiration of Public Consciousness (MIND) and Psychological Trait (TRAIT). These were able to explained the variation of Environmental Behaviors for Global Warming Alleviation (BEH) with 79.0 percents.

$$\text{MIND} = 0.54 \text{ TRAIT} + 0.56 \text{ STATE} \quad (2)$$

$$(\text{R}^2 = 90.0)$$

Equation (2) factors that had the most effect to Inspiration of Public Consciousness (MIND) was Psychological State (STATE), subsequences were and Psychological Trait (TRAIT) and these were able to explained the variation of Environmental Inspiration of Public Consciousness with 90.0 percents.

4. Discussion

It might be concluded that psychological trait and psychological state play very important roles to affect through inspiration of public consciousness to create the environmental behavior of consumption behavior, energy conservation, waste management, travelling behavior, recycling behavior, and knowledge transferring and supporting for environmental conservation. Additionally, inspiration of public consciousness in aspects of person as role model, impressive event, impressive environment, and public mind performance should be paid attentions, particularly, in aspect of role model, the parents and teacher or even though movie stars or political men should act as role model and express their public consciousness to inspire their children, students, and young generations. The results of this study were congruent to various studies of Thiengkamol, (2005a, & 2010b) and the concept proposed by Thiengkamol, (2009a, 2009b, 2011e, 2011f, 2011i & 2011j).

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