

ENVIRONMENTALLY RESPONSIBLE BEHAVIOR AND SOME PSYCHOLOGICAL PREDICTORS¹

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Abstract: Two studies, using factor-analyzed multiple-item five-point scales, investigated some psychological correlates of self-reported environmentally responsible behavior in Japanese undergraduates. In Study I, “responsibility to future generations” and “power of execution” were significantly correlated with environmentally responsible behavior, but “perceived seriousness of environmental pollution and destruction” and “urban-rural orientation” were not. In Study II, “long-term perspective” and “human obedience to nature” were significantly correlated with environmentally responsible behavior, but “perceived seriousness of environmental pollution and destruction” and two other concepts of nature were not.

Key words: Environmentally responsible behavior, Proenvironmental behavior

Psychological predictors of self-reported proenvironmental behavior have been examined in recent investigations such as Scott and Willits (1994), De Young (1996), Karp (1996), Tarrant and Cordell (1997) and Schultz and Zelezny (1998). Demographic variables include age, sex, education, socioeconomic status and place of residence; psychological variables include values, beliefs, attitudes, etc. Some demographic variables are determinants of environmentally responsible behavior (ERB), but such variables are assumed to affect ERB primarily via psychological variables. So, in a sense, psychological variables are probably primary determinants of ERB.

Stern, Dietz, Kalof and Guagnano (1995) in-

vestigated the relationship between 1) beliefs about consequences of environmental conditions and 2) value orientation and willingness to take action. De Young (1996) investigated how “intrinsic motivation” and “competence motivation” reduce consumption. Steel (1996) investigated the relationship between 1) three attitudes (liberalism-conservatism, New Environmental Paradigm, and belief in citizen participation in environmental issues) and 2) two proenvironmental behaviors (environmental behavior and environmental political participation). Kaiser (1998) examined the relationship between 1) three readiness measures and 2) one willingness measure and general ecological behavior. Dietz, Stern, and Guagnano

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(1998) investigated the effect of some social psychological variables (e.g., liberalism, religious denomination, awareness of consequences, progress beliefs) on behavioral reports and intentions regarding environmental issues. Schultz and Zelezny (1998) examined the relationship of 1) values, 2) awareness of the consequences of environmental damage, and 3) ascribed responsibility and proenvironmental behavior. Seguin, Pelletier, and Hunsley (1998) proposed a model of environmental activism in which perceived psychological variables are important.

A variety of psychological variables associated with ERB have been investigated but many others have not been examined sufficiently. The following two studies investigated important psychological variables which had not yet received adequate attention.

Study I

Psychological variables such as “responsibility to future generations,” “perception of seriousness of environmental pollution and destruction,” “urban-rural orientation” and “power of execution” are probable correlates of ERB. When other variables are kept constant, stronger “responsibility to future generations,” stronger “perceived seriousness of environmental pollution and destruction,” stronger rural orientation and stronger “power of execution” are assumed to lead to stronger motivation of performing ERB. Thus this study examined whether or not these four variables correlates with ERB.

Method

Subjects One-hundred and fifty undergraduates participated in Study I and 141 of them provided complete data. Average age of those 141 subjects was 19.66 years and standard deviation was 4.44; 59 were male and 82 were female.

Questionnaires Questionnaires contained a 15-item five-point scale to measure ERB frequency. Subjects were asked to select the most appropriate response from five alternatives: “Do not do so”; Rarely do so”; Occasionally do so”; Frequently do so”; Almost always do so.” Higher scores were given to responses which represented high ERB frequency.

A 15-item five-point scale measured “responsibility to future generations”; a six-item five-point scale measured perceived seriousness of environmental pollution and destruction”; an eight-item five-point scale measured “urban-rural orientation”; a seven-item five-point scale measured “power of execution.” For all scales except the ERB scale, subjects were asked to read each statement carefully and indicate degree of agreement or disagreement. High scores represented high “responsibility to future generations,” high “perceived seriousness of environmental pollution and destruction,” weak “rural orientation” or strong “power of execution.”

Procedure Questionnaires were administered to 150 undergraduates in the first classes of two psychology courses at the University of Tokushima. Complete data provided by 141 undergraduates was used for later analysis. Statistical analyses were conducted by Statistica TM developed by StatSoft.

Results

For the 15-item ERB scale, analysis was carried out by principal factor method with a R^2 entered as a communality and with Varimax rotation used when necessary. Factors with eigenvalues of 1.000 or over were extracted. This procedure was repeated for factor analyses of other scales.

Analysis of the ERB scale produced one factor with an eigenvalue of 2.334 (see Table 1).

All items except Item 10 had .20 or higher positive loadings, so this factor seemed to represent ERB. Items 1, 2, 3, 11, 13 and 15 had loadings of .40 or over and were selected to measure ERB. The total score of these six items provided an ERB index. Cronbach's α coefficient was .700.

Analysis of the 15-item scale of "responsibility to future generations" produced two factors. Factor I contributed 30.1% and Factor II contributed 7.0 to the total variance. Most

Table 1

<u>Factor loadings without rotation for the scale of environmentally responsible behavior</u>		
<u>Items/Factor</u>	<u>I</u>	<u>\bar{X}(SD)</u>
1. I use new paper as little as possible.	.45	2.98(1.06)
2. I use recycled paper.	.49	2.84(0.84)
3. I buy paper products with a "green mark."	.57	2.12(0.91)
4. I use tissue paper to wipe stain off.	.24	2.13(1.06)
5. I wash my face with faucet water running.	.20	1.92(1.35)
6. I reuse hot water left in a bathtub to wash clothes.	.21	1.92(1.45)
7. I make efforts to save electricity when I air-condition in my home.	.27	3.52(1.25)
8. I leave my TV set turned on while I do something somewhere else.	.36	2.60(1.38)
9. I turn lights on or off frequently.	.23	3.38(1.21)
10. I use aerosols containing Freon gas.	.18	3.95(1.15)
11. When I buy articles, I pay attention to whether or not they contain toxic chemicals.	.48	2.58(1.16)
12. I give old newspaper to waste paper collectors for recycling.	.33	2.84(1.58)
13. I buy commodities with an "eco-mark."	.68	2.28(0.96)
14. I refuse to have articles that I buy put into a paper bag or a vinyl bag.	.25	1.90(1.10)
15. I avoid as much as possible vegetables treated by agricultural chemicals.	.53	2.68(1.20)
<u>Contribution(%)</u>	<u>15.6</u>	

items had positive and significant loadings on Factor I and the following 10 items had loadings of .40 or over: We should preserve comfortable environment for future generations (.74); We should be responsible for the well-being of future generations (.81); Only our generation should not enjoy affluent life (.53); We should strictly limit the use of natural resources for future generations (.53); It is not permissible for us to enjoy affluent life, leaving global environmental pollution and destruction and depletion of natural resources to future generations (.66); We are responsible to future generations (.82); Life of future generations has no bearing on us (.53); We should consider future generations (.68); We should do as much as possible for future generations (.61); Mass production and throw-away lifestyle are sinful to future generations (.44). An α coefficient of these ten items was .859. Factor I was interpreted to be "responsibility to future generations." The total score for these 10 items was used as an index of "responsibility to future generations."

Analysis of the six-item scale of "perceived seriousness of environmental pollution and destruction" produced one factor. The following six items had factor loadings of .40 or over and contributed 46.8% to the total variance: Global warming and destruction of the ozone layer will become serious enough to threaten human survival (.56); Pollution and destruction of global environment will have tragic consequences (.83); Environmental pollution and destruction will threaten human survival in the future (.79); Environmental pollution and destruction will produce serious food crises (.59); Agricultural chemicals will have

irreversible consequences to the future on humankind (.55); Various problems associated with global environment will bring forth serious crises to human survival (.73). Judging from high factor loadings, there might be appropriate internal consistency of these six items. The total score for these items was used as an index of "perceived seriousness of environmental pollution and destruction."

Analysis of the eight-item scale of urban-rural orientation produced one factor which contributed 35.3% to the total variance. The following six items had loadings of .40 or over: I like stimulating towns (.76); Urban freedom of life is attractive (.67); I want to live in towns (.68); I like the countryside where nature abounds (.54); Cities make me feel excited (.62); I prefer rural scenery to urban landscape (.61). Again, due to high factor loadings, internal consistency of these six items seemed to be secured. The total score for the six items was used as an index of the "strength of urban orientation."

Analysis of the seven-item scale of "power of execution" produced one factor. Five items had loadings of .40 or over on this factor, contributing 29.6% to the total variance: I am the type of person who acts according to my words (.47); I tend to act immediately after deciding that action is desirable (.74); I think that I have power to take action (.70); I think that I am rather indecisive (.50); I tend to do what I think is right without hesitation (.69). Because of high loadings, internal consistency of these items appeared to be confirmed. The total score for these items was used as an index of the strength of "power of execution."

Scores were analyzed by multiple regression

Table 2

<u>Multiple regression on environmentally responsible behavior</u>	
<u>Predictors</u>	<u>Betas</u>
Responsibility to future generations	.27*
Perceived seriousness of environmental pollution and destruction	.10
Urban-rural orientation	.11
<u>Power of execution</u>	<u>.25*</u>

* $p < .01$

applied to ERB. Four predictors were entered simultaneously: “responsibility to future generations,” “perceived seriousness of environmental pollution and destruction,” “urban-rural orientation” and “power of execution” (see Table 2). Two predictors had significant betas and strong “responsibility to future generations” and strong “power of execution” were correlated with high ERB frequency. Other predictors did not correlate with ERB.

Discussion

Of the four proposed predictors of ERB, only “responsibility to future generations” and “power of execution” significantly correlated with ERB. Supposedly, environmental pollution and destruction have long-term effects on humankind and the effects become more serious year after year. So, human behavior to check or restrain environmental pollution and destruction needs “long-term perspective.” “Responsibility to future generations” and ERB have “long-term perspective,” possibly producing significant beta between the two. “Power of execution” is assumed to be a driving force for a variety of behavior, so a

significant beta between “power of execution” and ERB is reasonable.

“Perceived seriousness of environmental pollution and destruction” and “urban-rural orientation” have no significant beta. This perceived seriousness represents perception or judgment and does not necessarily lead to overt behavior, providing one possible reason why there is no significant beta between the perceived seriousness and ERB. “Urban-rural orientation” includes preference for nature or orientation toward nature, and is assumed to be associated with ERB. However, such preference or orientation is only one component of “urban-rural orientation” and so there is probably no significant beta between “urban-rural orientation” and ERB.

A multiple correlation coefficient of ERB is moderate ($R = .40$), so other promising correlates of ERB deserve further investigation.

Study II

Study II examined three predictors of ERB: “Perceived seriousness of environmental pollution and destruction,” “long-term perspective” and “attitudes toward nature.” “Perceived

seriousness of environmental pollution and destruction” was measured in Study II by statements of items differing from those in Study I. “Long-term perspective” and “attitudes toward nature” had not previously been studied as probable correlates of ERB. People with positive “attitudes toward nature” are assumed to act more proenvironmentally than people with less positive “attitudes toward nature.” People with “long-term perspective” are assumed to act more proenvironmentally than people with short-term perspective. This study intended to investigate whether or not the three predictors correlate with ERB.

Method

Subjects One hundred and sixty-one undergraduates at the University of Tokushima participated in Study II, 63 males and 98 females. Average age was 19.45 years and standard deviation was 1.45.

Questionnaires The scale of ERB used in Study I was also used in Study II. A six-item five-point scale measured “perceived seriousness of environmental pollution and destruction”; a six-item five-point scale measured “long-term perspective”; a 19-item five-point scale measured “attitudes toward nature.” For these three scales, subjects were asked to read each statement carefully and to show the degree of agreement or disagreement.

Procedure Questionnaires were administered in the first classes of three psychology courses. Data was analyzed by Statistica™ developed by StatSoft.

Results

Analysis was performed by principal factor method with a R^2 entered as a communality and with Varimax rotation used when necessary. For each of the three scales, factors with eigenvalues of 1.000 or over were extracted.

Analysis of the ERB scale produced one factor with an eigenvalue of 3.169. This eigenvalue was greater than that obtained in Study I (see Table 3). Items 1, 2, 3, 7, 11, 13, 14 and 15 had loadings of .44 or over, suggesting appropriate internal consistency. The total score for these items was used as an index of ERB.

Analysis of the six-item scale of “perceived seriousness of environmental pollution and destruction” produced one factor, contributing 36.8% to the total variance. The following five items had factor loadings of .40 or over: If environmental pollution and destruction become serious, even countries with economic power cannot survive (.58); An extremely large number of organisms will be annihilated by global environmental pollution and destruction (.64); The use of agricultural chemicals is very dangerous to human survival (.58); Global environmental pollution and destruction will bring serious crises in food production (.69); Influences caused by global environmental pollution and destruction are immeasurable (.72). Higher factor loadings suggested appropriate internal consistency of these five items, so the total score for the five items was used as an index of “perceived seriousness of environmental pollution and destruction.”

Analysis of the six-item scale of “long-term perspective” produced one factor, contributing

Table 3

Factor loadings without rotation for the scale of environmentally responsible behavior

<u>Items/Factor</u>	<u>I</u>	<u>\bar{X}(SD)</u>
1. I use new paper as little as possible.	.50	2.86(0.97)
2. I use recycled paper.	.66	2.78(0.86)
3. I buy paper products with a "green mark."	.72	2.05(0.87)
4. I use tissue paper to wipe stain off.	.20	2.29(1.10)
5. I wash my face with faucet water running.	.17	2.11(1.34)
6. I reuse hot water left in a bathtub to wash clothes.	.22	1.89(1.34)
7. I make efforts to save electricity when I air-condition in my home.	.44	3.41(1.23)
8. I leave my TV set turned on while I do something somewhere else.	.23	2.68(1.31)
9. I turn lights on or off frequently.	.34	3.27(1.15)
10. I use aerosols containing Freon gas.	.07	3.88(1.09)
11. When I buy articles, I pay attention to whether or not they contain toxic chemicals.	.60	2.59(1.16)
12. I give old newspaper to waste paper collectors for recycling.	.29	2.73(1.47)
13. I buy commodities with an "eco-mark."	.66	2.22(0.92)
14. I refuse to have articles that I buy put into a paper bag or a vinyl bag.	.53	1.84(1.00)
15. I avoid as much as possible vegetables treated by <u>agricultural chemicals.</u>	.57	2.57(1.18)
<u>Contribution(%)</u>	21.1	

41.6% to the total variance. Five items had factor loadings of .39 or over: The future after my death is as important to me as the present is (.39); I tend to put things off (.77); I decide my present behavior while considering the future (.85); I always have some goals, even if they are small (.63); I tend to look at things from a long-term perspective (.75). These high loadings suggested that internal consistency is secured, so the total score for these five items produced an index of "long-term perspec-

tive."

Analysis of the 19-item scale of "attitudes toward nature" produced three factors after Varimax rotation. Factor I contributed 12.7%, factor II contributed 7.9% and Factor III contributed 9.2% to the total variance. The following six items had loadings of .40 or over on Factor I: Nature is mystical (.61); The functions of nature are wonderful (.58); Nature is gigantic (.67); All organisms in the natural world have complicated relationships with others

Table 4

<u>Multiple regression on environmentally responsible behavior</u>	
<u>Predictors</u>	<u>Betas</u>
Perceived seriousness of environmental pollution and destruction	.10
Long-term perspective	.27*
Greatness and ingenuity of nature	-.02
Human obedience to nature	.21*
<u>Alleviation of stress</u>	<u>-.03</u>

* $p < .01$

(.51); The natural world is well-balanced (.47); Nature gives us abundant blessings (.53). The total score for these six items produced an index of Factor I, “greatness and ingenuity of nature.” The following three items had loadings of .40 or over on Factor II: We had better not go against nature (.59); We should leave human birth and longevity in the hands of nature (.46); Nature is a base for human life (.46); The total score for these three items was used as an index of Factor II, “human obedience to nature.” Three items had loadings of .40 or over on Factor III: Nature is of no value if it loses its beauty (.42); Nature heals our wounded heart (.68); Nature is necessary for people as a place to escape from stress caused by daily life (.69). The total score for these three items was used as an index of Factor III, “alleviation of stress.”

Using the total scores mentioned above, analysis of multiple regression was conducted on ERB with the following predictors entered simultaneously: “perceived seriousness of environmental pollution and destruction,” “long-term perspective,” “greatness and ingenuity of nature,” “human obedience to nature,” and

“alleviation of stress.” (see Table 4)

“Long-term perspective” and “human obedience to nature” had significant betas, suggesting that people with “long-term perspective” or a strong concept of “human obedience to nature” engaged in ERB more frequently than people with short-term perspective or a weak concept of “human obedience to nature.” “Perceived seriousness of environmental pollution and destruction” and two other attitudes toward nature did not correlate with ERB.

Discussion

Although statements of items in Study II differ from those in Study I, results from both studies indicate that “perceived seriousness of environmental pollution and destruction” does not correlate with ERB. This implies that “perceived seriousness of environmental pollution and destruction” does not necessarily lead to ERB.

“Long-term perspective” is correlated with ERB in Study II. Effects of environmental pollution and destruction on humans are assumed to be more serious in the long-term

than in the short term. So those having “long-term perspective” are more likely to engage in ERB than those having short-term perspective. But this interpretation is tentative at present.

Three factors of “attitudes toward nature” are obtained in Study II, but only “human obedience to nature” correlates with ERB. “Human obedience to nature” means prioritizing nature over people or having positive attitude toward nature.

So those having strong attitude of “human obedience to nature” are supposed to be more likely to engage in ERB than those having weak attitude of “human obedience to nature.” But this interpretation is also tentative at present. Two attitudes toward nature, “greatness and ingenuity of nature” and “alleviation of stress” represent perceptual measures. And perception does not necessarily lead to behavior. This may be a reason why these attitudes do not correlate with ERB.

Findings of this study seem to suggest that “long-term perspective” and “human obedience to nature” may encourage ERB, but further investigations are essential to validate this. In addition, analysis of multiple regression produces only a small multiple correlation coefficient ($R=.36$). Further investigation is necessary to explore other ERB predictors.

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環境に対する責任ある行動と心理的予測要因

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概 要

因子分析を実施した複数項目の5段階評定尺度を用いて、2つの研究で日本人大学生における自己報告による「環境に対する責任ある行動」の心理的相関要因について検討した。研究Ⅰでは、「将来世代に対する責任」と「実行力」が「環境に対する責任ある行動」と有意に関連していたが、「環境の汚染と破壊の認知された深刻さ」と「都会－田舎志向」は有意に関連していなかった。研究Ⅱでは、「長期的視野」と「人間の自然への服従」は「環境に対する責任ある行動」と有意に関連していたが、「環境の汚染と破壊の認知された深刻さ」と他の2つの自然観には有意な関連が認められなかった。