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New Ecological Paradigm: Testing the Environmental Concern Among Urban Middle Income Cebu City Household Heads

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Abstract - This study evaluates the level of environment concern among middle income Cebu City household heads using the 15-item New Ecological Paradigm (NEP) scale developed by Dunlap et al (2000). Environment concern as a pro-environmental attitudinal construct reflects a person's eco-centric orientation. The NEP scale is a globally accepted methodological assessment for pro-ecological worldview wherein the more an individual agrees with the NEP items, the more concerned (s)he is about the environment. Also investigated in the study are the underlying dimensions (subscales) of the NEP scores. The results of the study show the respondents' NEP scale items' average score as "unsure" indicating neither strong or weak environment concern. Using principal components analysis, three subscales were generated, explaining 77% of the variance, and are interpreted in this study as "disastrous consequence of ecological abuse," "delicate balance of nature," and "humans subject to law of nature." The study concludes that while respondents agree with the disastrous consequences attributed to ecological abuse, the NEP scores indicate low level of environment concern. The results of this study serve as reference to the recommendations raised intended to improve the ecological worldview among the respondents to favor the environment, particularly on education and information campaigns.

Keywords - new ecological paradigm, principal components analysis, environmental concern

INTRODUCTION

More than ever, expressed consciousness of the environment has never been as pervasive and ubiquitously manifested around the globe, including the Philippines. Discussions about ecology-related issues resound all over as humankind is witness to the fury of mother-nature's backlash to the unabated consumption behaviors characterized as unfriendly to the environment. These ecological discourses have taken center stage, some of which tackle on consumers' seemingly continuous and wanton disregard of their ecological footprint in their day to day economic activities.

There is no denying that consciousness or awareness of the ecological degeneration and the resultant consequences attributed to man's lack of concern about the environment is ever increasing. Yet, awareness about the environment is one thing, and care and concern for the environment is another. Some studies reveal that people's concern for the environment influences their propensity to engage in proenvironmental activities. Thus, knowledge on the respondents' level of environment concern will aid in determining implications on proenvironment behaviors.

In this study, concern for the environment among urban middle income household heads is measured using the New Ecological Paradigm (NEP) scale by Dunlap, Van Liere, Mertig and Jones, 2000. The NEP is a worldview used in social psychology which holds as its central theme the relationship between human activity and the biosphere. The NEP scale had been used in many other studies as a measure for environment concern. Some studies found the15-item NEP scale to have underlying dimensions. This study also investigates the dimensionality of the NEP scale scores of the respondents.

Tested in this study are two hypotheses, namely, (a) urban middle income Cebu City household heads are ecologically concerned, evidenced by high scores (agreement) on the NEP items; and, (b) the NEP scores of the urban middle income Cebu City household household heads have underlying dimension.

FRAMEWORK

Environmental Concern

According to Telesiene (2004), environmental consciousness is the interest in and awareness of the environment and its issues, having knowledge about the state of environment and close interdependency of social, political, economical, and environmental processes and attitudes towards nature and society relations. A person's concern for the natural environment reflects his or her values and influences the willingness to act on this value system (Bansal and Roth, 2000). A number of studies operationalized attitude towards the environment either as "environmental consciousness" (Schlegelmich and Bohen, 1996) or "environmental concern" (Stern and Dietz, 1994; Roberts, 1996; Roberts and Bacon, 1997; Straughan and Roberts, 1999).

Environmental Attitude

Social scientists Fishbein and Ajzen (1975) define attitude as a "learned disposition to respond in a consistently favorable or unfavorable manner with respect to a given object." Extending this concept to environmental attitude, it is presumed that people with positive attitude about the natural environment consider ecological care and preservation of environment quality. Schultz et al (2004) define environmental attitudes as "the collection of beliefs, affect, and behavioral intentions a person holds regarding environmentally related activities or issues." According to Corraliza and Berenguer (2000), pro-environmental attitudes are "peoples' disposition, relatively durable and relatively organized, to pay attention to, be concerned about, and ultimately, to act in the name of environmental protection."

Environmental Attitude Measures and the NEP

Different measurement instruments have been developed and implemented in various studies which examined concern for the environment. Maloney and Ward (1973) developed the Ecology Scale which measures attitudes, knowledge, emotion and behavior with regards to the environment. Weigel and Weigel (1973) designed the Environmental Concern Scale which measures attitudes towards more general environmental concern. Stone et al (1995) created the

scale which measures the level of environmental responsibility of an individual.

Sinkovics and Stottinger (1999) posit that "different instruments differ substantially with regard to the components of the construct 'environment consciousness.'" According to Schultz and Zelezny (1998), the New Environmental Paradigm (NEP) scale is used more often as a measure of general proenvironmental attitudes, and Stern, Dietz and Guagano (1995) claim that the NEP is "by far the most widely used and has been subject to the most methodological assessment."

Developed by Dunlap and VanLiere (1978), the NEP originally comprised 12 item statements and was developed to measure public acceptance about the then emerging worldview on issues on man's ability to control and manage the environment, the limits of industrial growth in relation to the environment's capacity, as well as on preserving and caring for the environment. The more concerned an individual is about the environment, the more an individual is inclined to approve the statements in the NEP scale.

Subsequently, the scale had been improved to what is currently a 15-item New Ecological Paradigm scale, now reflecting a perspective that recognizes the relationship between man, society and the environment. The new NEP scale was designed to "tap a wider range of facets of an ecological worldview, offers a balanced set of pro- and anti-NEP items, and it avoids outmoded terminology."(Dunlap et al, 2000). According to the proponents "a proecological orientation or 'seeing the world ecologically,' reflected by a high score on the NEP scale should lead to pro-environmental beliefs and attitudes."

Dimensions of NEP

The dimensionality of the NEP scale scores had been measured in some studies which utilized the 12-item NEP scale. Dunlap and VanLiere (1976), the original proponents of the NEP found their scale to be uni-dimensional. However, Albrecht et al (1982) found the NEP to be multidimensional, along the following themes, namely: (1) balance of nature, (2) limits to growth, and (3) man over nature. In yet another study, Scott and Willis (1994) found two underlying dimensions in the NEP scale, namely: (1) human with nature, and (2) balance with nature – limits to growth. On the other hand, Roberts

and Bacon (1997), in exploring the relationship between environment concern and ecologically conscious consumer behavior, found four dimensions, namely: (1) balance of nature, (2) God and nature, (3) limits to growth, and (4) adaptation before modification.

While different studies may have found varying dimensions of the NEP scales, Dunlap et al (2000) issued a caveat that the decision to take the NEP as a single variable or to reduce the scale into its underlying structure should depend on the results of the individual study.

OBJECTIVES

This study maps out the level of environment concern among urban middle income Cebu City household heads using the NEP scale. Specifically, the study aims to: (1) measure the extent of environment concern of the respondents; and, (2) find out the underlying dimensions of the respondents' NEP scale scores.

MATERIALS AND METHODS

For this study, a stratified random sampling survey was administered among urban upper-middle and lower-middle income household decision makers in the top ten most populated urban villages in Cebu City with the use of a structured questionnaire. The sample size of 500 respondents was determined using the formula for stratified random sampling, computing for the overall sample size and proportionally allocating among the SEC upper C and SEC lower C socioeconomic class stratification. The sample size was computed applying the two-step guidelines of Parel (1978) on proportional stratified sampling.

The sampling frame used was list of homeowners in the respective chosen subdivisions and residential areas. The survey instrument is composed of five sections, one of which is the NEP scale comprising fifteen statements on a five-point likert-type response category which is used to measure environment concern. The other sections of the questionnaire include the respondents' classification items, which include sex, age, education level and income.

Appendix A shows the 15-item NEP scale. The questionnaire

instruction was for the respondents to express their degree of agreement and disagreement with each of the 15 NEP statements with the following responses (SA = strongly agree, MA = mildly agree, U = unsure/neither agree nor disagree, MD = mildly disagree, SD = strongly disagree). Some statements (NEP items 6, 7, 8, 11, 13, 14 and 15) were stated in reverse (and thus scored in reverse). Disagreement with those NEP items and agreement with NEP items 1, 2, 3, 4, 5, 9, 10, and12 indicate eco-centric world view, and thus, concern for the environment.

To test the first hypotheses, descriptive analysis was applied. The respondents were asked to indicate their responses in a likert scale from "strongly disagree" to "strongly agree." Agreement with NEP items 1, 2, 3, 4, 5, 9, 10, and12 and disagreement with NEP items number 6, 7, 8, 11, 13, 14 and 15 indicate concern for the environment. Scores for the disagreement with NEP items were reversed. To test the second hypothesis, principal components analysis was used to explore the dimensionality of the NEP scale scores.

For each of the NEP scale items, a transmutation equivalent was designed, with an equal interval of 0.80, such that the resultant means of the NEP items may fall under the following categories: 1-1.80 – *Strongly Disagree*; 1.81-2.61 – *Mildly Disagree*; 2.62-3.42 – *Unsure*; 3.43-4.23 – *Mildly Agree*; and 4.24-5 – *Strongly Agree*.

RESULTS AND DISCUSSION

Respondent Classification

Descriptive frequency analysis was done to reduce the respondent classification data. Seventy one percent (71.2%) of the respondents were between 21 to 50 years old, and about seventeen percent (16.6%) were between 51 to 60 years. Fifty four percent (54%) were males, and the rest were female. Fifty percent (49.6%) finished college, while another 22% finished some college. Seventeen percent (17%) reached up to high school only. In terms of household monthly income, seventy eight percent (78.2%) were in the broad SEC C (PhP8,000 – PhP30,000) category, while the 22%were in the upper SEC C (PhP 30,001 – PhP 50,000). Figures 1 to 4 show the frequency distribution of the classification variables.

Hypothesis #1 Urban middle income Cebu City household heads are

ecologically concerned, evidenced by high scores (agreement) on the NEP items

Appendix A shows the mean scores of the NEP items, with the average NEP score of 3.2. The transmutation equivalent of this score suggests that the respondents are "unsure", that is, on the average they neither agree nor disagree with the NEP items.

Table 1 shows the NEP items with mean scores indicating high concern for the environment, while Table 2 shows the NEP Items with mean scores indicating challenged attitudes for the environment.

Table 1. NEP Items with mean scores indicating environment-friendly worldview

NEP No.	NEP Item	Mean Score	Std Dev
10	Despite our special abilities humans are still subject to the laws of nature.	4.46	.81
5	Humans are severely abusing the environment.	4.34	.97
12	Plants and animals have as much right as humans to exist.	4.31	1.05
9	If things continue on their present course, we will soon experience a major ecological catastrophe.	4.29	1.02
4	When humans interfere with nature, it often produces disastrous consequences.	4.16	1.10
3	The balance of nature is very delicate and easily upset.	3.93	1.11

1-1.80 – Strongly Disagree; 1.81-2.61 – Mildly Disagree; 2.62-3.42 – Unsure; 3.43-4.23 – Mildly Agree; and 4.24-5 – Strongly Agree

Table 2. NEP Items with mean scores indicating environment-unfriendly worldview

NEP No.	NEP Item	Mean Score	Std Dev
11	The earth has plenty of natural resources if we learn how to develop them. (reversed)	1.33	.73
6	Humans have the right to modify the natural environment to suit their needs. (reversed)	2.50	1.3
15	The so-called "ecological crisis" facing human kind has been greatly exaggerated. (reversed)	2.62	1.33

1-1.80 – Strongly Disagree; 1.81-2.61 – Mildly Disagree; 2.62-3.42 – Unsure; 3.43-4.23 – Mildly Agree; and 4.24-5 – Strongly Agree

Hypothesis #2 The NEP scores of the urban middle income Cebu City household heads manifest a multidimensional measure.

Principal components analysis was applied in determining the underlying dimensions of the NEP scale scores. The initial Cronbach alpha (0.466) on all 15 NEP items showed a low level of item-correlation. Elimination of certain NEP items improved the Cronbach alpha (0.695) of the remaining NEP items, specifically, items 3, 4, 5, 9 and 10. Appendix A shows the Frequency Distribution and Item Total Correlations for the NEP Scale Items.

The principal components rotated factor generated three factors using the size of variance criterion with the cutoff greater than 0.70 based on Jolliffe's simulation studies, namely *factor 1* (NEP items 4,5), *factor 2* (NEP items 3, 9) and *factor 3* (NEP item 10). The high loading of the variables on the factor indicates commonality between the factors and the respective variables. These first three components are sufficient to describe NEP scale scores, which explain 76.77 % of the total variance of the original data set. Appendix B shows the eigenvalues of the generated factors. Table 3 shows the three factors with the NEP items 3, 4, 5, 9 and 10 that load highly on the factors, while Tables 4 to 6 shows the specific NEP items that significantly loaded on each of the factors.

Table 3. Rotated factor pattern

	Factor 1	*Factor 2*	*Factor 3*
NEP 3	0.10752	**0.90717**	0.00318
NEP 4	**0.80338**	0.28979	0.05941
NEP 5	**0.84687**	0.07101	0.21046
NEP 9	0.30455	**0.60082**	0.31850
NEP 10	0.16529	0.11487	**0.95601**

Table 4. NEP Factor 1: "Disastrous consequences of ecological abuse"

NEP Number	NEP Item
4	When humans interfere with nature, it often produces disastrous consequences
5	Humans are severely abusing the environment.

Table 5. NEP Factor 2: "Delicate balance of nature"

NEP Number	NEP Item
3	The balance of nature is very delicate and easily upset.
9	If things continue on their present course, we will soon experience a major ecological catastrophe.

Table 6. NEP Factor 3: "Humans subject to Laws of Nature"

NEP Number	NEP Item
10	Despite our special abilities humans are still subject to the laws of nature.

NEP Factor Description

The first two-item factor explains 45.43% of the total variance. This factor may be referred to as the awareness that humans are severely abusing the environment and the knowledge of the disastrous consequences of perpetuating this ecological abuse. The NEP items that loaded in this first factor are interpreted in this study as "*disastrous consequence of ecological abuse*," as indicated in Table 4.

The second two-item factor, explaining 16.62% of the total variance may be attributed to the anticipation that human kind is bound to experience a major ecological catastrophe if the current state of ecological abuse continues, aware that the balance of nature is very delicate and is easily upset. Table 5 shows the NEP items in this second factor which is referred to as "*delicate balance of nature*."

Finally, the single item third factor which explains 14.72% of the total variance suggests the respondents' belief acknowledging the supremacy of nature over man, and man being subject to the laws of nature despite man's inherent special abilities. Table 6 shows the single NEP item in this third factor is interpreted as "*humans subject to laws of nature*."

The NEP scale developed by Dunlap et al (2000) is used to measure how respondents see the world from an ecological lens, where "high scores on the NEP should lead to proenvironmental beliefs and attitudes." The more concerned an individual is about the environment, the more an individual is bent to express agreement or approval with the NEP items.

The results of the first hypothesis analysis indicate that on the average, the middle income Cebu City household heads straddle on "the-middle-of-the-road" in their ecological worldview, albeit strongly agreeing with four (4) NEP items as shown on Table 1. Their strong agreement on these items is suggestive of their knowledge on the supremacy of mother-nature over mankind and their awareness of the present state of ecological disrespect as well as the consequences of a major ecological catastrophe indifference towards the environment perpetuates.

On the other hand, the respondents strongly disagree on three NEP items as shown on Table 2. A strong disagreement (score reversed) on

NEP item 11 (*The earth has plenty of natural resources if we learn how to develop them*) projects the respondents' understanding of man's ability to utilize the natural resources and their lack of knowledge of the finite state of the natural resources. The same thinking dominates their mild disagreement (score reversed) on NEP item 6 (*Humans have the right to modify the natural environment to suit their needs*). Finally, the disagreement (score reversed) on NEP item 15 (*The so-called "ecological crisis" facing human kind has been greatly exaggerated*) reinforces the respondents' lack of appreciation of the earth's capacity and its limited natural resources, and their cynicism of the ecological crisis propaganda.

The respondents' disagreement (score reversed) on the above three NEP items reveals an anthropocentric stance, with their belief that the earth has plenty of natural resources and that humans are the masters entitled to modify the natural environment. With the backdrop of today's current state and rate of material consumerism, respondents who may be unaware about the limits of the earth's carrying capacity and its finite resources, may keep on believing that the earth has plenty of natural resources and that humans have the right to modify the natural environment to suit their needs.

This study's results serve as knowledge base for government policy makers, implementers of the law, as well as green-oriented business organizations and advocates when clarifying to the middle income consumers the issue on the earth's carrying capacity and its limits. Advocacy groups and the academe may complement and collaborate with government entities, together with the industries in ensuring that the consumers are made aware about the sustainable utilization of the earth's resources and primarily making these consumers understand about the earth's carrying capacity limits.

Bansal and Roth (2000) assert that a person's concern for the natural environment reflects his or her values and influences the willingness to act on this value system. Thus, a country whose people manifest a high concern for the natural environment is expected to have its citizens behave in a manner that cares for the natural ecology. In turn, the country benefits from the efficient implementation of statutes and programs that favor the environment.

That the respondents further disagreed (score reversed) that the *"ecological crisis" facing human has been greatly exaggerated* deserves closer attention. This state of denial seems to be a disconnect from the respondents' agreeing that a potential major ecological catastrophe may ensue due to man's abuse of the natural environment. For as long as these respondents consider that the ecological crisis has been exaggerated, convincing them to care for the environment as well as to practice ecologically sound consumption behaviors shall remain to be an uphill climb.

The results of testing the second hypothesis through the principal components analysis yielded three statistically significant and meaningful factors, albeit only five NEP items have remained after elimination in order to improve the NEP scale reliability. Extant literature (Roberts and Bacon, 1997) generated four thematic NEP factors, namely, (1) God and nature; (2) balance of nature; (3) limits to growth and (4) adaptation before modification. In this study, only the "balance of nature" seems to be consistent with Roberts and Bacon (1997). The dominant dimensions of this study namely (1) disastrous consequences of ecological abuse; (2) delicate balance of nature;" and, (3) humans subject to laws of nature" seem to reveal the respondents' belief on the supremacy of nature and the disastrous consequences of the present state of human exploitation of the natural environment cognizant of the delicate balance of nature.

Having extracted these three themes should help identify and simplify the communication points to these consumers, particularly when reinforcing or even modifying their attitudes to favor the environment. Leveraging along these themes, education and information campaigns may focus on strategies in support of these consumers' concern of the environment. For example, in the case of implementing the Ecological Solid Waste Management Law at the household level, the message directed to the consumers may emphasize that by appropriately segregating their household waste, ecological disaster may be averted. Likewise, the benefits of maintaining the balance of nature may be stressed when persuading consumers to prefer eco-friendly products.

CONCLUSIONS

This study investigated the level of environment concern and mapped out the ecological worldview among Cebu City middle income household heads through the use of the New Ecological Paradigm (NEP) scale. Using principal components analysis, the study also explored the underlying dimensions of the NEP scale scores of these respondents.

The diminutive average NEP score (3.2, "unsure") of the respondents indicates a lukewarm environment concern. However, increasing this level of concern is not without hope. An understanding of the underlying dimensions of the NEP statements may serve as entry points when improving the consumers' ecological worldview. The underlying NEP dimensions have been interpreted in this study as (1) disastrous consequences of ecological abuse; (2) delicate balance of nature;" and, (3) humans subject to laws of nature." Awareness of these dimensions simplifies and makes straightforward the communications strategies to these respondents.

Policy makers may strengthen consumers' current eco-centric beliefs and target possible modification of their anthropocentric affect through communication and education campaigns. When attempting to deepen this level of environment concern through education, information and awareness advocacies, policy makers, project managers and advocates may begin by focusing on these NEP underlying themes.

With the current state of environmental abuse and degradation and the consequences of man's disregard to the natural ecology, a citizenry that espouses a favorable environmental worldview is crucial. In the words of Corraliza and Berenguer (2000), people with pro-environmental attitudes" pay attention to, be concerned about, and ultimately, act in the name of environmental protection."

Limitations

The NEP originally had been designed by its proponents as a measure of ecological worldview. As in other studies across various samples around the world that used the NEP scale, readers must be made aware of the use of a "worldview" instrument for an attitudinal

measure. It is prudent to assess the validity of the constructs "worldview" and "attitude." Future related studies may utilize other environmental attitude scales to validate this study's results.

Also, the weak inter-item correlations of the 15 items of the NEP limit the robustness of the analysis. Only five items remained as the other scales items had to be eliminated in order to reach statistical significance. Thus, future studies utilizing the NEP must ensure that respondents clearly take a stand on the NEP statements, i.e, the respondents must undoubtedly understand each of the NEP items and avoid yielding in to socially desirable responses.

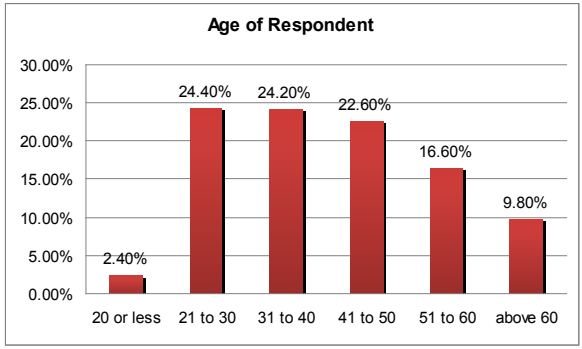

Figure 1. Age distribution of respondents

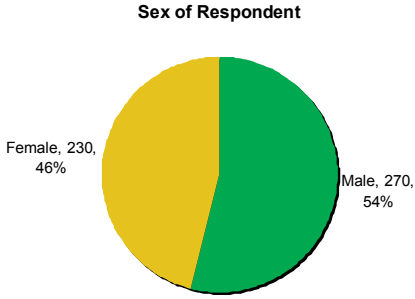

Figure 2. Sex distribution of respondents

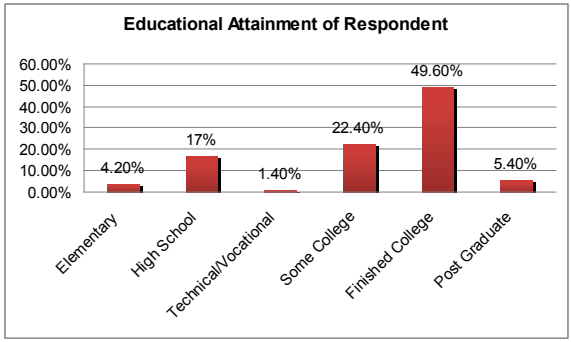

Figure 3. Educational attainment distribution of respondents

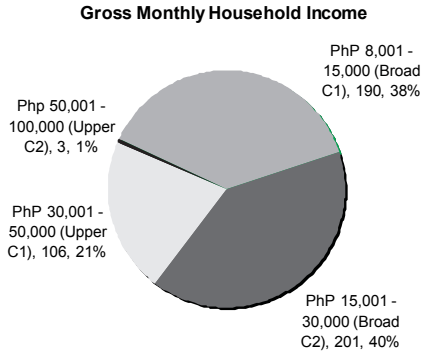

Figure 4. Gross monthly household income distribution of respondents

Appendix A

New Ecological Paradigm Scale

Frequency Distribution and Item Total Correlations for the NEP Scale Items

Scale Items	%									
	SA	MA	U	MD	SD	Total	Mean	Std. Dev	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. We are approaching the limit of the number of people the earth can support.	11	17.4	11.6	32.6	27.4	100	3.48	1.35	0.306	0.405
2. The earth is like a spaceship with very limited room and resources.	19	23	6.8	25	26.2	100	3.16	1.51	0.263	0.461
3. The balance of nature is very delicate and easily upset.	3.8	11	8.8	41	35.4	100	3.93	1.11	0.355	0.401
4. When humans interfere with nature, it often produces disastrous consequences.	3.4	9	6.6	30.6	50.4	100	4.16	1.10	0.333	0.407
5. Humans are severely abusing the environment.	2	6.8	3	31.4	56.8	100	4.34	0.97	0.294	0.421
6. Humans have the right to modify the natural environment to suit their needs.	23.6	40.4	8.4	17.6	10	100	2.50	1.30	0.119	0.459
7. Humans were meant to rule over the rest of nature.	16.4	31	11.8	22.4	18.4	100	2.95	1.39	0.199	0.437
8. Human ingenuity will insure that we will not make the earth unlivable	20.4	33.2	14.6	21.2	10.6	100	2.68	1.30	-0.057	0.506
9. If things continue on their present course, we will soon experience a major ecological catastrophe.	3.8	4.4	5.2	32	54.6	100	4.29	1.02	0.287	0.421

10. Despite our special abilities humans are still subject to the laws of nature.	1.4	3.2	2.4	33.8	59.2	100	4.46	0.81	0.185	0.446
11. The earth has plenty of natural resources if we learn how to develop them.	76.8	18.8	0.8	2.2	1.4	100	1.33	0.73	-0.211	0.506
12. Plants and animals have as much right as humans to exist.	3.2	6.8	5	26	59	100	4.31	1.05	0.114	0.459
13. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	17	38	14.2	20.4	10.4	100	2.69	1.26	0.155	0.449
14. Humans will eventually learn enough about how nature works to be able o control it.	4.4	10.4	11	49	25.2	100	3.80	1.07	-0.120	0.508
15. The so-called "ecological crisis" facing human kind has been greatly exaggerated.	21.4	37.8	10.2	18.2	12.4	100	2.62	1.33	0.128	0.458
Total						**AVE**	**3.20**	**1.04**		

[a] The questionnaire stated: "*For each statement below, please check your answer on the appropriate column at the right.*"

[b] SA = strongly agree, MA = mildly agree, U = unsure/neither agree nor disagree, MD = mildly disagree, SD = strongly disagree

[a] Disagreement with question items number 6, 7, 8, 11, 13, 14 and 15 indicate concern for the enviroment

[a] Item-total correlations reflect the correlation between the single item and the total score of the scale excluding itself.

Appendix B

Eigenvalues of the Correlation Matrix

	Eigenvalue	*Difference*	*Proportion*	*Cumulative*
1	2.27147185	1.44029791	0.4543	0.4543
2	0.83117393	0.09526682	0.1662	0.6205
3	0.73590711	0.08526692	0.1472	0.7677
4	0.655064019	0.13983327	0.1301	0.8978
5	0.51080692		0.1022	1.0000

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