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Determining U.S. Citizens' Attitude Toward The Environment: An Econometric Analysis Of The New Environmental Paradigm (NEP)

Ralph L. Beauvoir
Southern Illinois University Carbondale, ralph.beauvoir@siu.edu

DETERMINING US CITIZENS' ATTITUDE TOWARD THE ENVIRONMENT: AN ECONOMETRIC ANALYSIS OF THE NEW ENVIRONMENTAL PARADIGM (NEP)

by

Ralph Beauvoir

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Submitted in Partial Fulfillment of the Requirements for the

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Approved by:

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TITLE: DETERMINING US CITIZENS' ATTITUDE TOWARD THE ENVIRONMENT: AN ECONOMETRIC ANALYSIS OF THE NEW ENVIRONMENTAL PARADIGM (NEP)

MAJOR PROFESSOR: Dr. Wanki Moon

This paper develops econometric models to address two objectives: (i) examining whether or not the demographic and socio-economic profiles play any role in explaining US citizens' attitude toward environmental/ecological state of our planet, and (ii) determining whether such attitudes are significantly related to economic, environmental and social behaviors. US citizens' attitudes toward ecological state of our planet are measured using the 15 questions from the New Ecological Paradigm (NEP). The level of agreement to the New Environmental Paradigm statements were measured by the Seven-Point-Likert scale. Incorporating various dimensions of our planet's ecological problems/issues, the NEP measures whether respondents are optimistic or pessimistic about our planet's ecological state. Findings of this research show how demographic and socio-economic variables do impact the US citizen's environmental attitude and also how such attitudes are related. Although further researches are needed in order to corroborate the results, the outcomes of this research might interest market researchers as green market is a growing segment and also it might be useful to policymakers for targeted environmental awareness campaigns.

Keywords: Environment, Attitude, New Ecological Paradigm, Seven-Point-Likert Scale.

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Introduction

Over the last four decades, there has been an increase of the scientific discussions about the environment. Numerous substantial articles have been published on this topic. This growing interest for environment is due to the recognition of the ecological threats that the world is going through. Human economic activities play an important role in the ecological crisis by trying to earn more profit and to reach high productivity, which has led to an irresponsible and unsustainable management of the nature. Environment is the primary source of natural resources for all kind of human activities. Consequently, it is their livelihood. Thus, its exploitation is inevitable and vital. Therefore, environmentalists has called for a change in people's basic values, principles and attitudes toward nature (La Trobe and Acott, 2000). The rise of the public awareness of environmental threats trends to a new way of thinking. People become more concerned about the environment and are interested in discovering the main problems. Being said, consumers' attitude is changing, they are more responsible about their purchases and they look carefully to the providers as well. Therefore a new market segment is emerging, the ecological market also called green market. Because of this fast growing segment, interest is now focused on the consumer profile characteristics that best define a respectful behavior toward the nature (Fraj and Martinez, 2006).

Most of the studies about environment focuses on either ecological behavior or environment attitude. In fact, La Trobe & Acott (2000) argue it is necessary to be able to validly and reliably measure people's belief and value system in order to gauge whether their attitudes toward nature are actually changing. Additionally, they claim that the measurement of social values is necessary to make environmental decisions that actually reflect public opinion and

concern. Subsequently, several measures methods of environmental attitude have been developed. Stern et al. (1995) agrees that the New Environmental Paradigm (NEP) of Dunlap, Van Liere is the most generally used. Fraj and Martinez (2006) identify three different perspectives that researchers are traditionally interested in understanding consumer behavior: the first studies consumers by means of demographic and socio-economic variables, the second considers the amount of information and knowledge that people have with regard to environmental problems and issues and the third viewpoint employs psychographic variables, including values, lifestyles, personality characteristics and attitudes.

The aim of this research is to show, through an empirical analysis of the NEP, the relationship between the demographic and the socio-economic variables and the US consumer's perception toward the current state of the environment. For the purpose of the research, econometric models have been developed to examine whether or not the demographic and socio-economic profiles play any role in explaining US citizens' attitude toward environmental/ecological state of our planet and whether such attitudes are significantly related to economic, environmental and social behaviors.

New Environmental Paradigm

Dunlap et al (2008) recognize that their New Environmental Paradigm (NEP) Scale, published in The Journal of Environmental Education in1978, has become the most widely used measure of environmental concern in the world and been employed in hundreds of studies in dozens of nations. Initially, the NEP scale were consisted of 12 items, but it was reviewed and revised to become a 15 items scale under the name of New Ecological Environment (Dunlap et

al. 2000). The NEP is elaborated in a way that odd-numbered statements reflect a concern toward the environment and the even-numbered statements denote a lack of worry environmental problems. Therefore, agreement with the odd-numbered items and disagreement with even-numbered items indicate a pro-ecological attitude.

Research Hypotheses

This research will test the following hypotheses in order to understand how the demographic and the socio-economic variables affect the perception of a person about the environment:

- Women are more likely to be concerned by the environment's current state than men are
- Age of the person has a positive relationship with his concern about the environment
- Education has a positive impact on concern about the environment
- The more money a person earns the more likely he is to be concerned about the environment
- The living place of a person affects his concern about the environment

Conceptual Models

In order to understand consumers attitude toward environment, researchers approach three different perspectives (Fraj and Martinez, 2006): the first considers the demographic and socio-economic situation of the consumer; the second is about the amount of knowledge that people have with regard of the environmental problems and issues; the last viewpoint refers to the psychographic variables, including values, lifestyles, personality and attitudes.

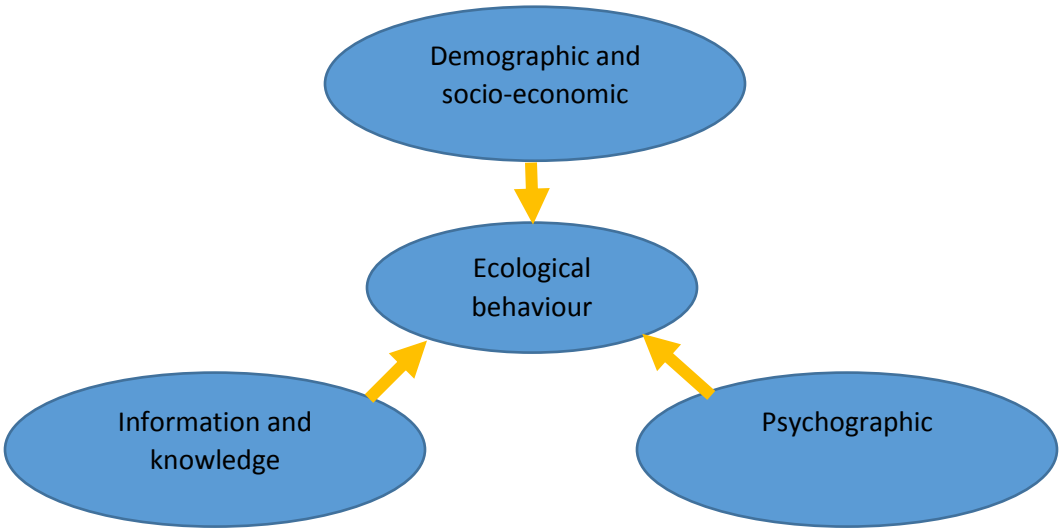


Figure. 1 Conceptual Framework

For our purposes, we consider the demographic and socio-economic situation of the consumer to determine his concern about the nature. The basic form of the model is:

ATTITUDE = F (AGE, GENDER, INCOME, EDUCATION, LOCATION)

Methodology

Survey Design and Data

The data for this study came from a previous research conducted by Dr. Wanki Moon. The survey remarkably represented the US Census in most of the demographics including household head's age, education, income and region. For the purpose of our research, we considered the responses to the New Environmental Paradigm that was inserted into the survey. The sample of this research is 1070 people from across the US. The software used for our statistical analysis is TSP Oxmetrics 6.

Measurement of Variables

To develop the regression models, we firstly create two indexes measuring the respondents' perception of the nature in accordance with NEP statements. The NEP statements are divided into two sets: one reflecting a pessimistic attitude and the other reflecting an optimistic attitude toward the environment. As the level of agreement to the NEP are measured via a seven-point-Likert scale varying from "*disagree completely*" to "*agree completely*". The survey's participants were also given the neutral option. The "*disagree completely*" in the scale is scored between 1 and 3 and the "*agree completely*" is scored between 5 and 7. Each index is then calculated by adding up the score for each statement according to the respondent's choice. The indexes are conceptualized as follows:

Pessimistic = Limit + consequences + abusing + right + abilities +spaceship+ balance + experience

Optimistic = needs + unlivable + resources + cope + humankind + rule + control

The words used above are part of the NEP statements that we used in order to simplify the models.

Secondly, we used the indexes as our dependents variables. And the demographics and the socio-economic profiles as independent variables.

Empirical Models

For the purpose of this study, two methods of estimation are used: the Ordinary Least Squares (OLS) and the Ordered Probit. In the first estimation, we developed two multiple regression models. These regressions equations are designed to assess the impact of the demographic and socio-economic variables on both indexes.

For the need of the equations, two dummies variables are created for the gender and geographic regions. One for the gender, the second for the geographic regions

The independent variables description is as follows:

Gender: Male and Female, female is dropped

Income: in US dollars

Education: number of years after high school

Age: in years

Geographic regions: four (4) main regions: Neast, Midwest, South and West (dropped).

Consequently, we developed the following equation to test our hypotheses

Regression Equations:

1. Pessimistic = $\beta_0 + \beta_{1Gender} + \beta_{2Income} + \beta_{3Education} + \beta_{4Age} + \beta_{5Neast} + \beta_{6Midwest+} \beta_{7South} + \hat{e}$
2. Optimistic = $\beta_0 + \beta_{1Gender} + \beta_{2Income} + \beta_{3Education} + \beta_{4Age} + \beta_{5Neast} + \beta_{6Midwest+} \beta_{7South} + \hat{e}$

The second estimation will allow evaluating how the two indexes created impact people's responses to environmental issues questions. Two statements incorporated in the survey were used for this purpose:

- Government payments should be used to *support* environmental protection programs.
- There should be no environmental or developmental *restrictions* on the use of farmland.

To develop the equations, the first statement is noted as Support and the second one as Restrictions. Therefore the equations will be:

3. Support = $\beta_0 + \beta_{1Pessimistic\_Perc} + \beta_{2Optimistic\_Perc} + \hat{e}$
4. Restrictions = $\beta_0 + \beta_{1Pessimistic\_Perc} + \beta_{2Optimistic\_Perc} + \hat{e}$

Results

Demographic Profiles

Among the 1070 respondents to the survey 56% were male and 44% were female (Figure2). The youngest respondent was 18 years old and the oldest was 85 years old, most of the people were between 45-54 years old (Figure3). The majority of the respondents was from the south (Figure 4).

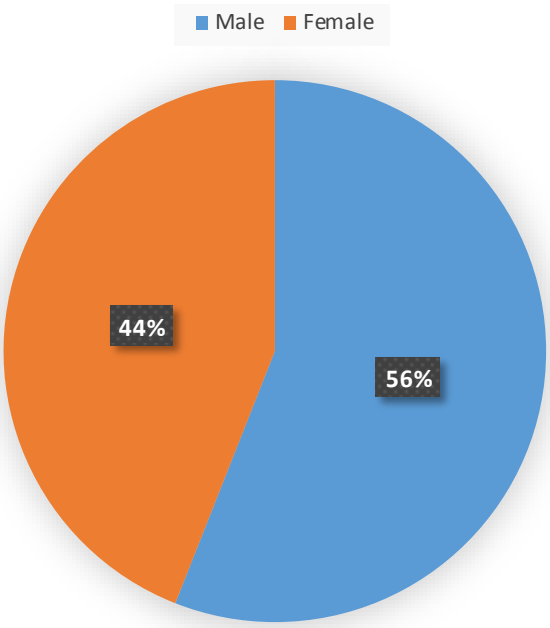


Figure 2. Gender Distribution of the Respondents

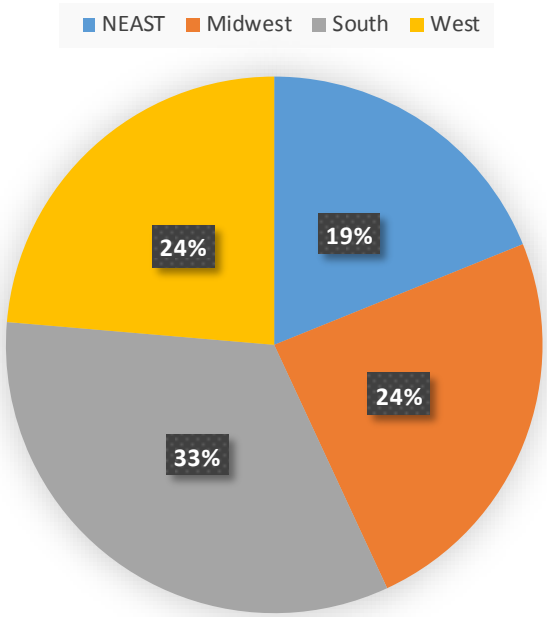


Figure 3. Region Distribution of the Respondents

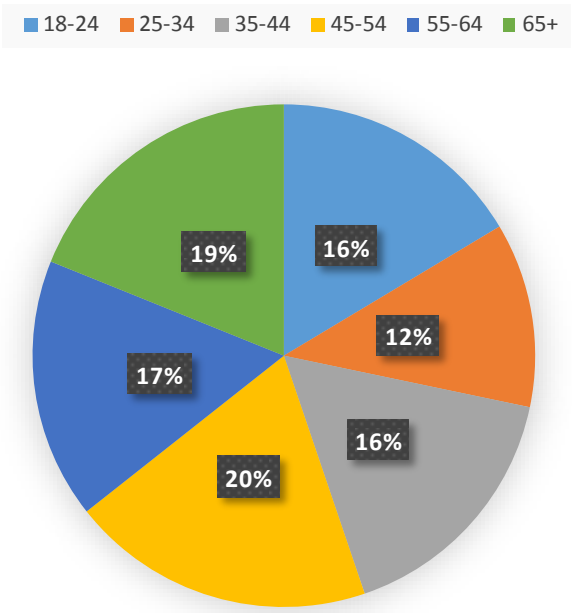
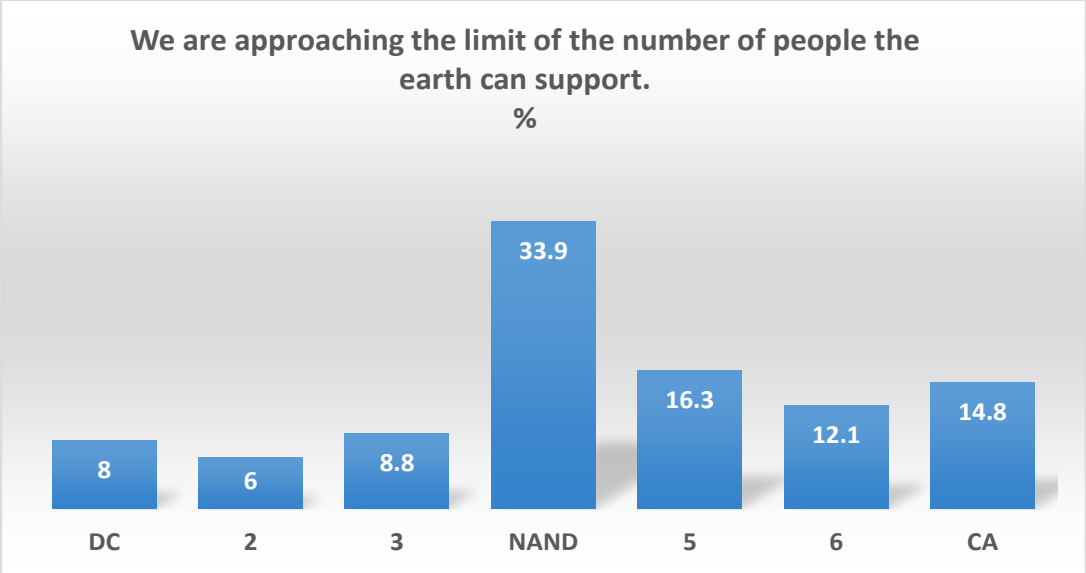


Figure 4. Age Distribution of the Respondents

NEP Statements

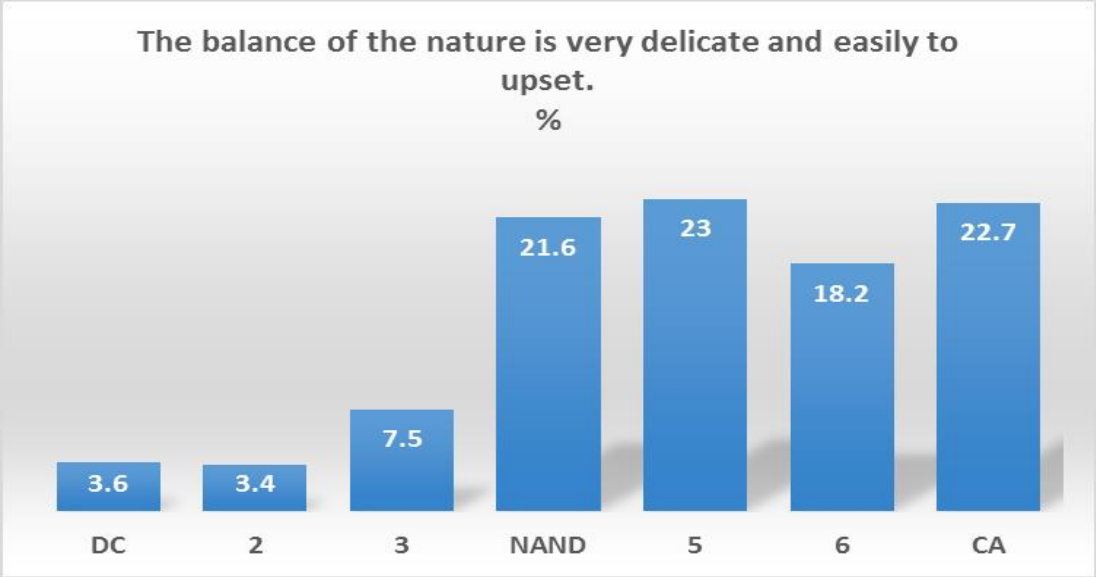
Below are the graphs for the distributions of eight out of the fifteen statements.

Pro-Ecological Statements



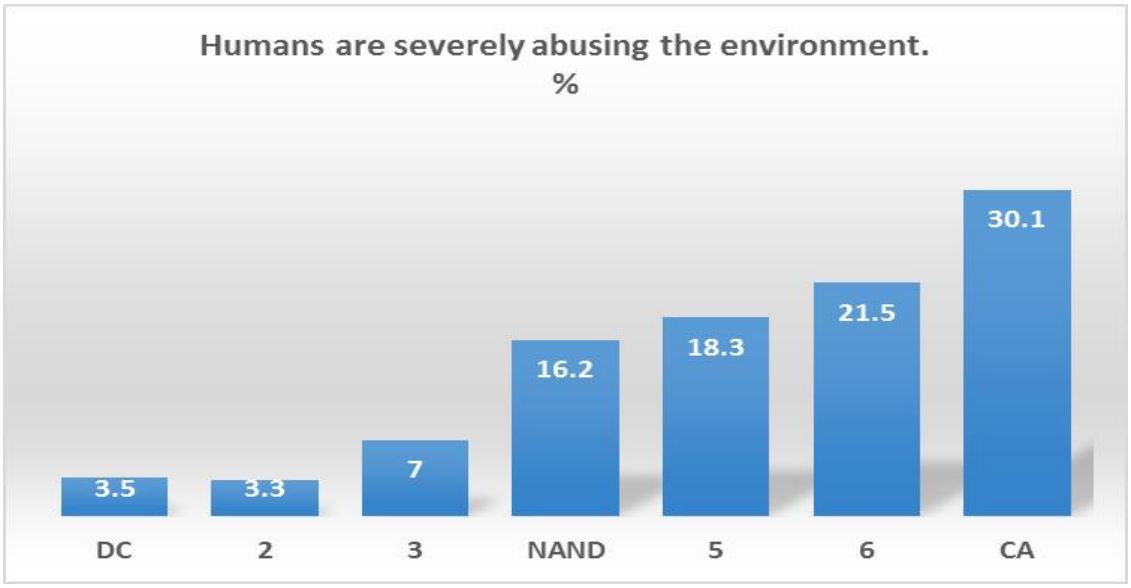
Note: DC = Disagree Completely, NAND = Neither Agree or Disagree, CA = Completely Agree

Figure 5.- Statement #1



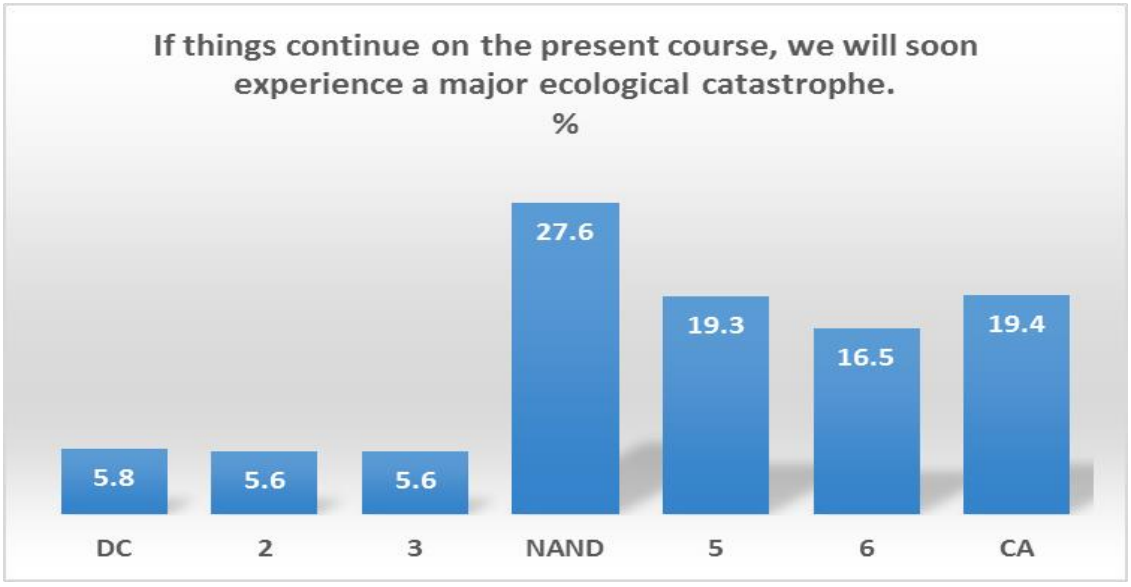
Note: DC = Disagree Completely, NAND = Neither Agree or Disagree, CA = Completely Agree

Figure 6.- Statement #9



Note: DC = Disagree Completely, NAND = Neither Agree or Disagree, CA = Completely Agree

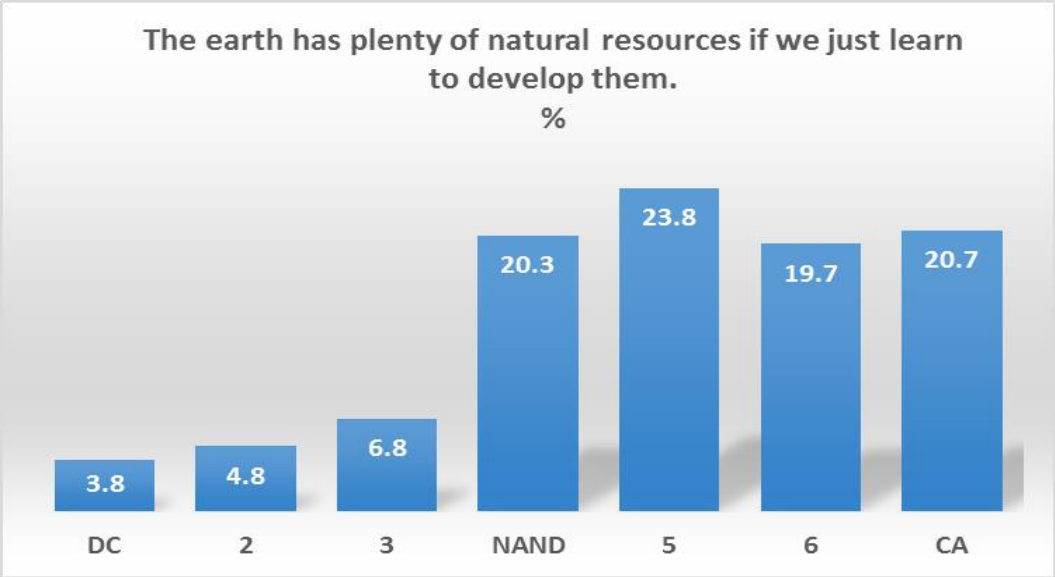
Figure 7.- Statement #13



Note: DC = Disagree Completely, NAND = Neither Agree or Disagree, CA = Completely Agree

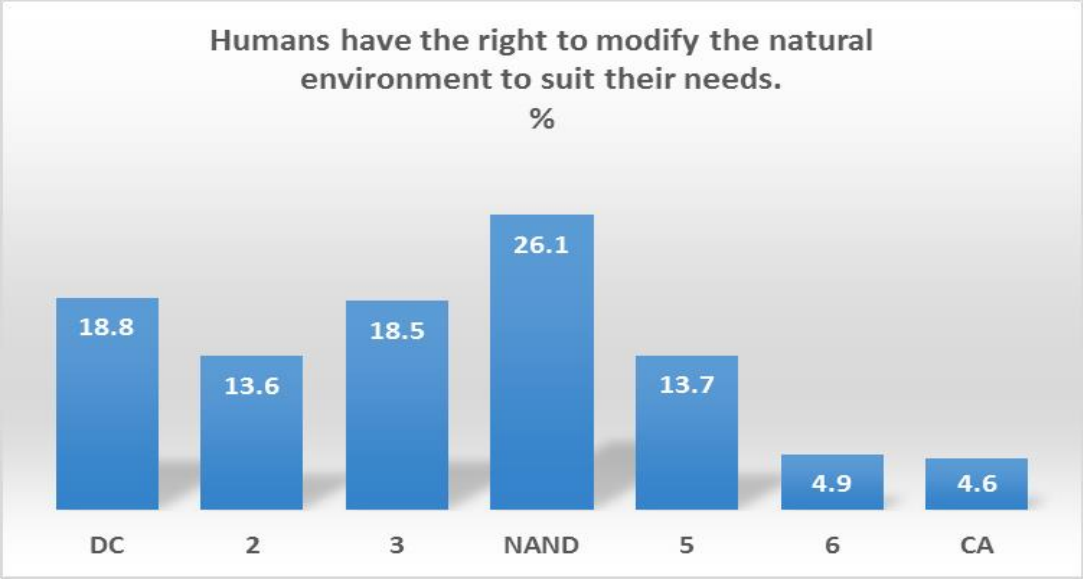
Figure 8.- Statement #15

Anti-Ecological Statements



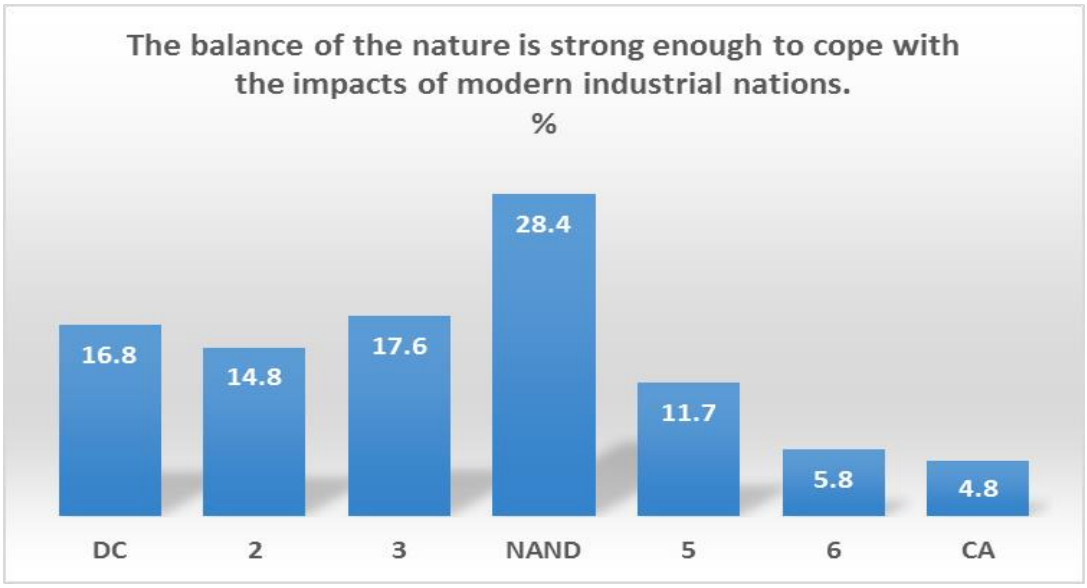
Note: DC = Disagree Completely, NAND = Neither Agree or Disagree, CA = Completely Agree

Figure 9.- Statement #2



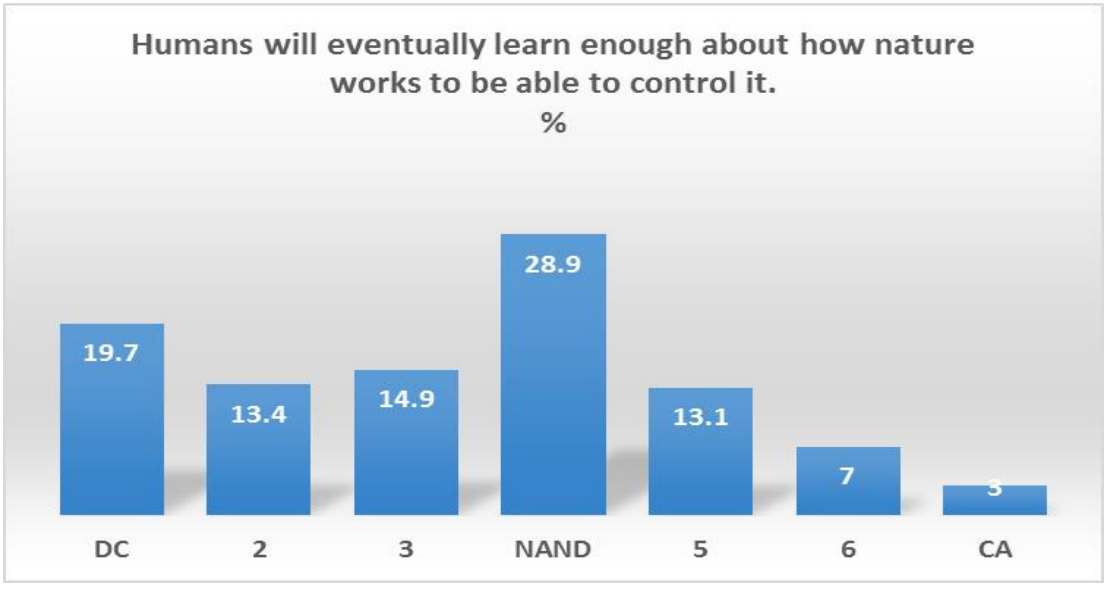
Note: DC = Disagree Completely, NAND = Neither Agree or Disagree, CA = Completely Agree

Figure 10.- Statement #4



Note: DC = Disagree Completely, NAND = Neither Agree or Disagree, CA = Completely Agree

Figure 11.- Statement #8



Note: DC = Disagree Completely, NAND = Neither Agree or Disagree, CA = Completely Agree

Figure 12.- Statement #12

As the table 1 shows below, the New Environmental Paradigm (NEP) is composed of 15 items. The NEP is developed in a way that 8 items reflect the concern about the environment and the 7 other a lack of worry about environmental issues. Table 2 provides summary statistic (i.e., sample mean and standard deviations) for all items in the New Environmental Paradigm. It shows an NEP mean score of 4.21 and standard deviation of 1.69.

Table 1. - NEP Statements

1. We are approaching the limit of the number of people the earth can support.
2. The earth has plenty of natural resources if we just learn to develop them
3. The earth is like a spaceship with only room and resources.
4. Humans have the right to modify the natural environment to suit their needs.
5. Plants and animals have as much right as humans to exist.
6. Humans were meant to rule over nature
7. When humans interfere with nature it often produces disastrous consequences.
8. The balance of the nature is strong enough to cope with the impacts of modern industrial nations.
9. The balance of nature is very delicate and easily to upset.
10. Human ingenuity will ensure that we do not make the earth unlivable.
11. Despite our special abilities humans are still subject to the laws of nature.
12. Humans will eventually learn enough about how nature works to be able to control it.
13. Humans are severely abusing the environment.
14. The so-called ‘ecological crisis’ facing humankind has been greatly exaggerated.
15. If things continue on the present course, we will soon experience a major ecological catastrophe.

Table 2. Frequency Distribution of NEP Statements

NEP Statements	DC	2	3	NAND	5	6	CA	M	SD
				%					
1. We are approaching the limit of the number of people the earth can support.	8.0	6.0	8.8	33.9	16.3	12.1	14.8	**4.40**	**1.69**
2. The earth has plenty of natural resources if we just learn to develop them	3.8	4.8	6.8	20.3	23.8	19.7	20.7	**4.97**	**1.59**
3. The earth is like a spaceship with only room and resources.	5.5	4.9	5.4	25.3	21.8	19.7	20.7	**4.84**	**1.66**
4. Humans have the right to modify the natural environment to suit their needs.	18.8	13.6	18.5	26.1	13.7	4.9	4.6	**3.35**	**1.65**
5. Plants and animals have as much right as humans to exist.	4.0	4.0	6.6	19.9	18.4	16.4	30.5	**5.16**	**1.68**
6. Humans were meant to rule over nature	20.7	12.2	13.2	27.5	11.3	6.9	8	**3.49**	**1.82**
7. When humans interfere with nature it often produces disastrous consequences.	2.2	2.1	5.9	20.3	23.9	20.1	25.5	**5.23**	**1.46**
8. The balance of the nature is strong enough to cope with the impacts of modern industrial nations.	16.8	14.8	17.6	28.4	11.7	5.8	4.8	**3.39**	**1.64**
9. The balance of nature is very delicate and easily to upset.	3.6	3.4	7.5	21.6	23.0	18.2	22.7	**5.02**	**1.57**
10. Human ingenuity will ensure that we do not make the earth unlivable.	9.2	10.3	13.7	31.6	16.9	10.1	8.2	**4.00**	**1.63**
11. Despite our special abilities humans are still subject to the laws of nature.	1.2	0.2	1.4	13.8	20.4	23.3	39.6	**5.80**	**1.25**
12. Humans will eventually learn enough about how nature works to be able to control it.	19.7	13.4	14.9	28.9	13.1	7.0	3.0	**3.35**	**1.64**
13. Humans are severely abusing the environment.	3.5	3.3	7.0	16.2	18.3	21.5	30.1	**5.27**	**1.62**
14. The so-called 'ecological crisis' facing humankind has been greatly exaggerated.	19.4	13.7	13.1	25.3	12.1	6.4	9.8	**3.55**	**1.87**
15. If things continue on the present course, we will soon experience a major ecological catastrophe.	5.8	5.6	5.6	27.6	19.3	16.5	19.4	**4.76**	**1.68**
Total	-	-	-	-	-	-	-	**4.21**	**1.63**

Note: N = 1070. DC = Disagree Completely, NAND = Neither Agree Nor Disagree, AC = Agree Completely, M = Mean, SD = Standard Deviation.

Parameters Estimation

In the first equation, which represents the pessimism toward the state of the environment, the estimated coefficient “GENDER” (male) is highly significant and shows a negative (-) sign, which indicates that Gender is reversely related to the dependent variable ‘Pessimistic’. Inversely, the second equation ‘Optimistic’ shows a positive coefficient ‘Gender’ Comparing to the Female variable that was dropped for the purpose of the equation, Male is less likely to be worried and concerned about the current state of the planet.

Estimation results for US households’ incomes as presented in table 3 show a negative impact on the pessimistic attitude which means that the increase of the income corresponds to a decrease of the index score of the ‘Pessimistic’ attitude. Expectedly, the income positively impacts the optimistic attitude of individual (table 3).

Despite the Age parameter presenting a low level of significance in explaining the pessimistic attitude, it is worth noting that it positively impacts it. However, the Age parameter reveals of being insignificant in explaining the optimistic attitude with a P-Val. much greater than 0.1.

The level of education plays a role in determining the attitude of the individual toward the environment. The education positively affects the pessimistic attitude which means the higher the education is, the more pro-ecological the individual is. And, inversely, less education reflects an unconcernedness toward the nature.

The geographic location within the US does not show any impact on the indexes. All the regions but the NEAST present high P-Values and low T-Statistic and no level of significance in

explaining the attitude of a person about the environment. The NEAST region is negatively related to the optimistic attitude.

In Equations 3 and 4, we used the indexes as factors that can explain the participants' responses to questions related to environment. As expected the pessimistic index is positively related to the pro-ecological statement while the optimistic index negatively impacts it. On the other hand, the optimistic index positively affects the statement that is not in favor of the environment and the pessimistic index negatively impacts it (Table 4). The consideration of these indexes as factors to explain the responses of the participants is limited due to the fact that there were only two statements.

Table 3. Estimation Results for Equation 1

Variable	Coefficient	Error	t-statistic	P-value
C	41.0013	1.32708	30.8958	[.000]
GENDER	-2.30069	0.565259	-4.07015	[.000]
HHINCOME	-0.085374	0.044656	-1.91181	[.056]
PMAGE	0.032736	0.017419	1.87931	[.060]
PMED	0.108437	0.133473	0.812427	[.417]
NEAST	-0.236556	0.860256	-0.274983	[.783]
MIDWEST	-0.843833	0.807839	-1.04456	[.296]
SOUTH	0.19327	0.750039	0.25768	[.797]

Table 4. Estimation Results for Equation 2

Variable	Coefficient	Error	t-statistic	P-value
C	27.1675	1.12896	24.0641	[.000]
GENDER	1.24703	0.480872	2.59326	[.010]
HHINCOME	0.085404	0.03799	2.2481	[.025]
PMAGE	-0.015226	0.014819	-1.02749	[.304]
PMED	-0.317962	0.113547	-2.80027	[.005]
NEAST	-1.49267	0.731829	-2.03964	[.042]
MIDWEST	-1.10938	0.687237	-1.61426	[.107]
SOUTH	-0.311735	0.638066	-0.488562	[.625]

Table 5. Estimation Results for Equation 3 & 4

Support				
Parameter	Estimate	Error	t-statistic	P-value
C	-0.0271	0.245765	-0.110269	[.912]
NEG_PERC	0.054006	4.09E-03	13.2116	[.000]
POS_PERC	-0.013919	4.65E-03	-2.99505	[.003]
Restrictions				
C	-0.082677	0.244694	-0.337881	[.735]
NEG_PERC	-5.67E-03	3.96E-03	-1.43339	[.152]
POS_PERC	0.048508	4.77E-03	10.1761	[.000]

Conclusion and Discussion

Although the NEP mean score of 4.21 indicates that the respondents are likely to be indifferent to the state of the environment, the outcomes of this research suggest that Gender, Income, Age and Education are significantly related to the US citizen's attitude toward the environment. The results show that gender and income were negatively related to the concernedness of the environment, which means a male were less pro-ecological that a female, and that the more income you have the less worry you would be about the environment. On the other hand, Age and Education had a positive relationship with the concern of the environment. The location factor was not able to explain such relationship due to their high P-Values. The reliability of our methodology needs to be tested with more studies. Our findings does not consider the degree of impact of the variables because that was not the sought objectives of this study. However, the degrees of impact of the variables can be useful in comparing the variables between them or in comparing this research to other studies to assess the changes overtime or across different populations. Market researchers might have a particular interest into the methodology of this research to study the evolution of the green markets within the US. Policymakers might also find this study useful when they are developing targeted environmental awareness campaigns.

REFERENCES

Denis, Hodis D., and Luis N. Pereira. "Measuring the level of endorsement of the New Environmental Paradigm: a transnational study." Dos Algarves: A Multidisciplinary E-Journal no. 23 (January 2014): 4-26. Academic Search Complete, EBSCOhost (accessed April 7, 2015)

Dunlap, Riley E. "The New Environmental Paradigm Scale: From Marginality to Worldwide Use." Journal Of Environmental Education 40, no. 1 (Fall2008 2008): 3. MasterFILE Premier, EBSCOhost (accessed April 7, 2015).

Dunlap, Riley E., et al. "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." Journal Of Social Issues 56, no. 3 (September 2000): 425-442. Academic Search Complete, EBSCOhost (accessed April 7, 2015).

Fraj, E., & Martinez, E. (2006). Environmental values and lifestyles as determining factors of ecological consumer behaviour: an empirical analysis. Journal Of Consumer Marketing, 23(3), 133-144.

Fraj, E., & Martinez, E. (2007). Ecological consumer behaviour: an empirical analysis. International Journal Of Consumer Studies, 31(1), 26-33. doi:10.1111/j.1470-6431.2006.00565.x

Hanson, C. B. (2013). Environmental concern, attitude toward green corporate practices, and green consumer behavior in the United States and Canada. Asbbs ejournal, 9(1), 62-70.

Kaiser, Florian G., and Mark Wilson. "Assessing People's General Ecological Behavior: A Cross-Cultural Measure." Journal Of Applied Social Psychology 30, no. 5 (May 2000): 952. Publisher Provided Full Text Searching File, EBSCOhost (accessed April 7, 2015).Kaiser, F.G.,

Wolfing S., & Fuhrer U. (1999). Environmental attitude and ecological behaviour. Journal of Environmental Pyschology 19, 1-19

La Trobe, Helen L., and Tim G. Acott. "A Modified NEP/DSP Environmental Attitudes Scale." Journal Of Environmental Education 32, no. 1 (Fall2000 2000): 12. MasterFILE Premier, EBSCOhost (accessed April 7, 2015).

Stern, P. C., & Dietz, T. (1995). The new ecological paradigm in social-psychological context. Environment & Behavior, 27(6), 723.

Appendix

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                               07/25/14 1:45 PM
               In case of questions or problems, see your local TSP
               consultant or send a description of the problem and the
               associated TSP output to:
                               TSP International
                                P.O. Box 61015
                               Palo Alto, CA 94306
                                      USA
         PROGRAM
COMMAND  ******************************************************************
1  options memory=64;
2  TITLE '2008 Multifunctionality Ipsos Project';
3
3  READ(file='C:\Users\RalphL\Desktop\Database.xls')
3
3  responseid idnumber pmarital hhsize hhincome agepres
3  pmgender pmage pmemp censusrg mktsize DMA usstate country pctype
3  conntype race hispanic pmoccd groupnum jobnum runnum test flang
3  pmed isp relat_t hhkids region soho MSA fips ihours1 ihours2
3  iexper iloc iyear pin active added PGS rent brow VipBonus MktSizeC
3  grouptest qs1 qs2
3  q1a q1b q1c q1d q1e q1f q1g q1h q1i q1j
3  q2a q2b q2c q2d q2e q2f
3  q3a q3b q3c q3d
3  q4a q4b q4c q4d q4e
3  q5a q5b q5c
3  q6a q6b q6c q6d q6e q6f q6g q6h q6i q6j q6k q6l q6m q6n q6o qprice
   qprice2
3  q7a q7b
3  q8a q8b q8c q8d q8e
3  q9 q10
3  q11a q11b q11c q11d q11e q11f q11g;
4
4
4  ?ECOLOGICAL PERCEPTION
4  Neg_perc= q6a + q6c + q6e + q6g + q6i + q6k + q6m + q6o;
5  Pos_perc= q6b + q6d + q6f + q6h + q6j + q6l + q6n;
6
```

```
6
6
6  ?Gender
6  Gender = (pmgender=1)*1 + (pmgender=2)*0;
7
7  ?Education
7  Edu = (pmed=1)*1 + (pmed=2)*2 + (pmed=3)*3 + (pmed=4)*4 +
7  (pmed=5)*5 + (pmed=6)*6 + (pmed=7)*7 + (pmed=8)*8 +
7   (pmed=9)*3 + (pmed=11)*3 + (pmed=12)*3;
8
8
8
8  ?Geographic region
8  Neast=(region=1)*1 + (region=2)*0 + (region=3)*0 + (region=4)*0;
9  Midwest=(region=1)*0 + (region=2)*1 + (region=3)*0 + (region=4)*0;
10  South=(region=1)*0 + (region=2)*0 + (region=3)*1 + (region=4)*0;
11  West=(region=1)*0 + (region=2)*0 + (region=3)*0 + (region=4)*1;
12
12
12
12  MSD Neg_perc;
13  MSD Pos_perc;
14
14  OLSQ Neg_perc c Gender;
15  OLSQ Pos_perc c Gender;
16  OLSQ Neg_perc c hhincome;
17  OLSQ Pos_perc c hhincome;
18  OLSQ Neg_perc c pmage;
19  OLSQ Pos_perc c pmage;
20  OLSQ Neg_perc c pmed;
21  OLSQ Pos_perc c pmed;
22  OLSQ Neg_perc c Neast Midwest South;
23  OLSQ Pos_perc c Neast Midwest South;
24  OLSQ Neg_perc c Gender hhincome pmage pmed Neast Midwest South;
25  OLSQ Pos_perc c Gender hhincome pmage pmed Neast Midwest South;
26
26  ORDPROB q1j c Neg_perc Pos_perc;
27  ORDPROB q3a c Neg_perc Pos_perc;
28  ORDPROB q3b c Neg_perc Pos_perc;
29  ORDPROB q3c c Neg_perc Pos_perc;
30
30
30
30
30  End;
         EXECUTION
*************************************************************************
*****
0
```

2008 Multifunctionality Ipsos Project
==========

```
Current sample:  1 to 1070

                            Univariate statistics
                            =====================

Number of Observations: 1070

                  Mean       Std Dev       Minimum       Maximum
NEG_PERC      40.52056       9.17184       8.00000      56.00000


                   Sum      Variance      Skewness      Kurtosis
NEG_PERC   43357.00000      84.12259      -0.42510       0.12261

                            Univariate statistics
                            =====================

Number of Observations: 1070

                  Mean       Std Dev       Minimum       Maximum
POS_PERC      26.13178       7.78875       7.00000      49.00000


                   Sum      Variance      Skewness      Kurtosis
POS_PERC   27961.00000      60.66456       0.10871       0.28144


                                  Equation   1
                                  ============

                     Method of estimation = Ordinary Least Squares


Dependent variable: NEG_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 40.5206      LM het. test = 14.5682 [.000]
  Std. dev. of dep. var. = 9.17184     Durbin-Watson = 1.97656 [<.362]
Sum of squared residuals = 88250.8  Jarque-Bera test = 24.2852 [.000]
   Variance of residuals = 82.6318   Ramsey's RESET2 = .850706E+38 [.000]
Std. error of regression = 9.09021   F (zero slopes) = 20.2858 [.000]
              R-squared = .018640    Schwarz B.I.C. = 3885.94
      Adjusted R-squared = .017721    Log likelihood = -3878.96

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         41.9321       .418855       100.111       [.000]
GENDER    -2.52137      .559811       -4.50397      [.000]
```

Equation 2
==========

Method of estimation = Ordinary Least Squares

Dependent variable: POS_PERC
Current sample: 1 to 1070
Number of observations: 1070

Mean of dep. var. = 26.1318	LM het. test = 4.31096 [.038]
Std. dev. of dep. var. = 7.78875	Durbin-Watson = 1.99804 [<.499]
Sum of squared residuals = 64288.1	Jarque-Bera test = 3.79794 [.150]
Variance of residuals = 60.1948	Ramsey's RESET2 = .850706E+38 [.000]
Std. error of regression = 7.75853	F (zero slopes) = 9.34218 [.002]
R-squared = .867150E-02	Schwarz B.I.C. = 3716.45
Adjusted R-squared = .774329E-02	Log likelihood = -3709.47

Variable	Estimated Coefficient	Standard Error	t-statistic	P-value
C	25.3142	.357494	70.8102	[.000]
GENDER	1.46040	.477802	3.05650	[.002]

Equation 3
==========

Method of estimation = Ordinary Least Squares

Dependent variable: NEG_PERC
Current sample: 1 to 1070
Number of observations: 1070

Mean of dep. var. = 40.5206	LM het. test = .084840 [.771]
Std. dev. of dep. var. = 9.17184	Durbin-Watson = 1.98070 [<.387]
Sum of squared residuals = 89492.0	Jarque-Bera test = 32.4241 [.000]
Variance of residuals = 83.7940	Ramsey's RESET2 = 4.70231 [.030]
Std. error of regression = 9.15391	F (zero slopes) = 5.19157 [.023]
R-squared = .483750E-02	Schwarz B.I.C. = 3893.41
Adjusted R-squared = .390570E-02	Log likelihood = -3886.44

Variable	Estimated Coefficient	Standard Error	t-statistic	P-value
C	41.7969	.626190	66.7480	[.000]
HHINCOME	-.099037	.043466	-2.27850	[.023]

Equation 4
==========

Method of estimation = Ordinary Least Squares

```
Dependent variable: POS_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 26.1318          LM het. test = 1.01982 [.313]
  Std. dev. of dep. var. = 7.78875         Durbin-Watson = 1.98420 [<.410]
Sum of squared residuals = 64610.2      Jarque-Bera test = 5.22214 [.073]
   Variance of residuals = 60.4965       Ramsey's RESET2 = 4.76381 [.029]
Std. error of regression = 7.77795       F (zero slopes) = 3.97010 [.047]
               R-squared = .370356E-02    Schwarz B.I.C. = 3719.12
      Adjusted R-squared = .277070E-02    Log likelihood = -3712.15

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         25.1834       .532065       47.3314       [.000]
HHINCOME  .073588       .036932       1.99251       [.047]


                                    Equation   5
                                    ============

                     Method of estimation = Ordinary Least Squares


Dependent variable: NEG_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 40.5206          LM het. test = 4.51917 [.034]
  Std. dev. of dep. var. = 9.17184         Durbin-Watson = 1.98052 [<.386]
Sum of squared residuals = 89530.9      Jarque-Bera test = 30.0114 [.000]
   Variance of residuals = 83.8304       Ramsey's RESET2 = 5.21760 [.023]
Std. error of regression = 9.15589       F (zero slopes) = 4.72594 [.030]
               R-squared = .440554E-02    Schwarz B.I.C. = 3893.64
      Adjusted R-squared = .347334E-02    Log likelihood = -3886.67

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         38.6582       .901253       42.8938       [.000]
PMAGE     .038039       .017498       2.17392       [.030]


                                    Equation   6
                                    ============

                     Method of estimation = Ordinary Least Squares


Dependent variable: POS_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 26.1318          LM het. test = 3.94802 [.047]
```

```
  Std. dev. of dep. var. = 7.78875         Durbin-Watson = 1.99249 [<.463]
Sum of squared residuals = 64739.2      Jarque-Bera test = 4.50468 [.105]
   Variance of residuals = 60.6173       Ramsey's RESET2 = 6.54884 [.011]
Std. error of regression = 7.78571       F (zero slopes) = 1.83409 [.176]
              R-squared = .171437E-02    Schwarz B.I.C. = 3720.19
      Adjusted R-squared = .779643E-03    Log likelihood = -3713.21

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         27.1183       .766380       35.3850       [.000]
PMAGE     -.020151      .014879       -1.35429      [.176]


                                    Equation   7
                                    ============

                    Method of estimation = Ordinary Least Squares


Dependent variable: NEG_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 40.5206           LM het. test = .448198E-02
[.947]
  Std. dev. of dep. var. = 9.17184          Durbin-Watson = 1.98748
[<.431]
Sum of squared residuals = 89892.9       Jarque-Bera test = 32.7565 [.000]
   Variance of residuals = 84.1694        Ramsey's RESET2 = .518930 [.471]
Std. error of regression = 9.17439        F (zero slopes) = .405432 [.524]
              R-squared = .379474E-03     Schwarz B.I.C. = 3895.80
      Adjusted R-squared = -.556501E-03    Log likelihood = -3888.83

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         40.1469       .650353       61.7310       [.000]
PMED      .082785       .130015       .636735       [.524]


                                    Equation   8
                                    ============

                    Method of estimation = Ordinary Least Squares


Dependent variable: POS_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 26.1318          LM het. test = .370311 [.543]
  Std. dev. of dep. var. = 7.78875         Durbin-Watson = 1.99796 [<.499]
Sum of squared residuals = 64540.5      Jarque-Bera test = 5.83895 [.054]
   Variance of residuals = 60.4311       Ramsey's RESET2 = .487991 [.485]
Std. error of regression = 7.77375       F (zero slopes) = 5.12925 [.024]
```

```
              R-squared = .477971E-02    Schwarz B.I.C. = 3718.54
      Adjusted R-squared = .384786E-02    Log likelihood = -3711.57

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         27.2578       .551064       49.4639       [.000]
PMED      -.249501      .110165       -2.26478      [.024]
```

Equation 9

Method of estimation = Ordinary Least Squares

```
Dependent variable: NEG_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 40.5206           LM het. test = .431645E-03
[.983]
  Std. dev. of dep. var. = 9.17184          Durbin-Watson = 1.98490
[<.449]
Sum of squared residuals = 89740.4       Jarque-Bera test = 32.8866 [.000]
   Variance of residuals = 84.1842        Ramsey's RESET2 = .850706E+38
[.000]
Std. error of regression = 9.17520        F (zero slopes) = .739100 [.529]
              R-squared = .207570E-02     Schwarz B.I.C. = 3901.87
      Adjusted R-squared = -.732716E-03    Log likelihood = -3887.92

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         40.7549       .576840       70.6521       [.000]
NEAST     -.225238      .865735       -.260169      [.795]
MIDWEST   -.944130      .811036       -1.16410      [.245]
SOUTH     .110228       .754464       .146101       [.884]
```

Equation 10

Method of estimation = Ordinary Least Squares

```
Dependent variable: POS_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 26.1318          LM het. test = 2.01098 [.156]
  Std. dev. of dep. var. = 7.78875         Durbin-Watson = 1.99099 [<.489]
Sum of squared residuals = 64553.0      Jarque-Bera test = 5.58841 [.061]
   Variance of residuals = 60.5563       Ramsey's RESET2 = .850706E+38
[.000]
Std. error of regression = 7.78179       F (zero slopes) = 1.63724 [.179]
```

```
              R-squared = .458647E-02    Schwarz B.I.C. = 3725.62
      Adjusted R-squared = .178512E-02    Log likelihood = -3711.67

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         26.6482       .489237       54.4689       [.000]
NEAST     -1.35119      .734259       -1.84021      [.066]
MIDWEST   -.895326      .687867       -1.30160      [.193]
SOUTH     -.134176      .639887       -.209688      [.834]
```

Equation 11

Method of estimation = Ordinary Least Squares

```
Dependent variable: NEG_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 40.5206      LM het. test = 13.4155 [.000]
  Std. dev. of dep. var. = 9.17184     Durbin-Watson = 1.97599 [<.463]
Sum of squared residuals = 87458.5  Jarque-Bera test = 23.1464 [.000]
   Variance of residuals = 82.3526   Ramsey's RESET2 = 1.88124 [.170]
Std. error of regression = 9.07483   F (zero slopes) = 4.28224 [.000]
              R-squared = .027451    Schwarz B.I.C. = 3902.04
      Adjusted R-squared = .021040    Log likelihood = -3874.14

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         41.0013       1.32708       30.8958       [.000]
GENDER    -2.30069      .565259       -4.07015      [.000]
HHINCOME  -.085374      .044656       -1.91181      [.056]
PMAGE     .032736       .017419       1.87931       [.060]
PMED      .108437       .133473       .812427       [.417]
NEAST     -.236556      .860256       -.274983      [.783]
MIDWEST   -.843833      .807839       -1.04456      [.296]
SOUTH     .193270       .750039       .257680       [.797]
```

Equation 12

Method of estimation = Ordinary Least Squares

```
Dependent variable: POS_PERC
Current sample:  1 to 1070
Number of observations:  1070

       Mean of dep. var. = 26.1318      LM het. test = 3.12284 [.077]
  Std. dev. of dep. var. = 7.78875     Durbin-Watson = 1.99659 [<.597]
Sum of squared residuals = 63294.3  Jarque-Bera test = 3.41651 [.181]
```

```
   Variance of residuals = 59.5992   Ramsey's RESET2 = 6.76229 [.009]
Std. error of regression = 7.72005   F (zero slopes) = 3.72988 [.001]
              R-squared = .023995    Schwarz B.I.C. = 3729.04
      Adjusted R-squared = .017562    Log likelihood = -3701.14

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         27.1675       1.12896       24.0641       [.000]
GENDER    1.24703       .480872       2.59326       [.010]
HHINCOME  .085404       .037990       2.24810       [.025]
PMAGE     -.015226      .014819       -1.02749      [.304]
PMED      -.317962      .113547       -2.80027      [.005]
NEAST     -1.49267      .731829       -2.03964      [.042]
MIDWEST   -1.10938      .687237       -1.61426      [.107]
SOUTH     -.311735      .638066       -.488562      [.625]


                                    Equation  13
                                    ============

                                    Ordered Probit estimation

Choice     Frequency  Fraction
1                 61   0.0570
2                 56   0.0523
3                 78   0.0729
4                265   0.2477
5                265   0.2477
6                192   0.1794
7                153   0.1430
Working space used: 18473
                                STARTING VALUES

                     C      NEG_PERC      POS_PERC           MU3
VALUE          1.58039       0.00000       0.00000       0.35037


                   MU4           MU5           MU6           MU7
VALUE          0.67353       1.40377       2.04130       2.64736

F= 1911.3336923  FNEW= 1779.3261882  ISQZ=  0 STEP= 1.       CRIT= 259.88
F= 1779.3261882  FNEW= 1779.1727553  ISQZ=  0 STEP= 1.       CRIT= .30553
F= 1779.1727553  FNEW= 1779.1727461  ISQZ=  0 STEP= 1.       CRIT=
.18324E-04
F= 1779.1727461  FNEW= 1779.1727461  ISQZ=  0 STEP= 1.       CRIT=
.20354E-12

CONVERGENCE ACHIEVED AFTER   4 ITERATIONS
```

```
    8 FUNCTION EVALUATIONS.

     Dependent variable: Q1J

Number of observations = 1070     LR (zero slopes) = 264.322 [.000]
     Mean of dep. var. = 4.68692    Schwarz B.I.C. = 1807.07
Std. dev. of dep. var. = 1.60568    Log likelihood = -1779.17
      Scaled R-squared = .225847

                         Standard
Parameter  Estimate        Error       t-statistic   P-value
C          -.027100      .245765       -.110269      [.912]
NEG_PERC   .054006       .408772E-02   13.2116       [.000]
POS_PERC   -.013919      .464741E-02   -2.99505      [.003]
MU3        .400318       .050798       7.88052       [.000]
MU4        .761927       .060876       12.5161       [.000]
MU5        1.59527       .070660       22.5767       [.000]
MU6        2.33396       .076692       30.4328       [.000]
MU7        3.01817       .084265       35.8174       [.000]

Standard Errors computed from analytic second derivatives (Newton)


                                    Equation  14
                                    ============

                                    Ordered Probit estimation

Choice     Frequency  Fraction
1                 16   0.0150
2                 12   0.0112
3                 30   0.0280
4                218   0.2037
5                257   0.2402
6                230   0.2150
7                307   0.2869
Working space used: 18473
                                STARTING VALUES

                     C      NEG_PERC      POS_PERC          MU3
VALUE          2.17133       0.00000       0.00000       0.23097


                   MU4           MU5           MU6           MU7
VALUE          0.56595       1.52163       2.16664       2.73374

F= 1678.6437045  FNEW= 1574.2386584  ISQZ=  0 STEP= 1.       CRIT= 205.70
F= 1574.2386584  FNEW= 1574.1180038  ISQZ=  0 STEP= 1.       CRIT= .24052
F= 1574.1180038  FNEW= 1574.1179991  ISQZ=  0 STEP= 1.       CRIT=
.93770E-05
F= 1574.1179991  FNEW= 1574.1179991  ISQZ=  0 STEP= 1.       CRIT=
.13853E-12

CONVERGENCE ACHIEVED AFTER   4 ITERATIONS
```

```
    8 FUNCTION EVALUATIONS.

     Dependent variable: Q3A

Number of observations = 1070     LR (zero slopes) = 209.051 [.000]
     Mean of dep. var. = 5.43551    Schwarz B.I.C. = 1602.02
Std. dev. of dep. var. = 1.35304    Log likelihood = -1574.12
      Scaled R-squared = .182679

                         Standard
Parameter  Estimate        Error       t-statistic   P-value
C          -.089793      .265311       -.338444      [.735]
NEG_PERC   .056709       .424315E-02   13.3649       [.000]
POS_PERC   .760848E-02   .486807E-02   1.56294       [.118]
MU3        .253876       .071548       3.54831       [.000]
MU4        .616393       .092387       6.67183       [.000]
MU5        1.68034       .106710       15.7467       [.000]
MU6        2.40480       .109922       21.8772       [.000]
MU7        3.03599       .112986       26.8705       [.000]

Standard Errors computed from analytic second derivatives (Newton)


                                    Equation  15
                                    ============

                                    Ordered Probit estimation

Choice     Frequency  Fraction
1                201   0.1879
2                164   0.1533
3                188   0.1757
4                278   0.2598
5                124   0.1159
6                 41   0.0383
7                 74   0.0692
Working space used: 18473
                                STARTING VALUES

                     C      NEG_PERC      POS_PERC           MU3
VALUE          0.88585       0.00000       0.00000       0.47644


                   MU4           MU5           MU6           MU7
VALUE          0.92803       1.64672       2.12591       2.36793

F= 1943.9485773  FNEW= 1870.4486884  ISQZ=  0 STEP= 1.       CRIT= 145.55
F= 1870.4486884  FNEW= 1870.4251000  ISQZ=  0 STEP= 1.       CRIT= .04715
F= 1870.4251000  FNEW= 1870.4250999  ISQZ=  0 STEP= 1.       CRIT=
.11239E-06

CONVERGENCE ACHIEVED AFTER   3 ITERATIONS
```

```
    6 FUNCTION EVALUATIONS.

     Dependent variable: Q3B

Number of observations = 1070     LR (zero slopes) = 147.047 [.000]
     Mean of dep. var. = 3.35421    Schwarz B.I.C. = 1898.33
Std. dev. of dep. var. = 1.71952    Log likelihood = -1870.43
      Scaled R-squared = .130723

                         Standard
Parameter  Estimate        Error       t-statistic   P-value
C          -.082677      .244694       -.337881      [.735]
NEG_PERC   -.567068E-02  .395613E-02   -1.43339      [.152]
POS_PERC   .048508       .476684E-02   10.1761       [.000]
MU3        .518341       .037298       13.8972       [.000]
MU4        1.00666       .046489       21.6538       [.000]
MU5        1.77778       .057067       31.1525       [.000]
MU6        2.28712       .066328       34.4821       [.000]
MU7        2.54105       .072993       34.8121       [.000]

Standard Errors computed from analytic second derivatives (Newton)


                                     Equation  16
                                     ============

                                     Ordered Probit estimation

Choice     Frequency  Fraction
1                 43   0.0402
2                 25   0.0234
3                 79   0.0738
4                274   0.2561
5                329   0.3075
6                170   0.1589
7                150   0.1402
Working space used: 18473
                                STARTING VALUES

                     C      NEG_PERC      POS_PERC           MU3
VALUE          1.74852       0.00000       0.00000       0.22289


                   MU4           MU5           MU6           MU7
VALUE          0.65637       1.47820       2.27561       2.82800

F= 1806.7218919  FNEW= 1743.3804922  ISQZ=  0 STEP= 1.       CRIT= 125.18
F= 1743.3804922  FNEW= 1743.3420073  ISQZ=  0 STEP= 1.       CRIT= .07687
F= 1743.3420073  FNEW= 1743.3420071  ISQZ=  0 STEP= 1.       CRIT=
.37096E-06

CONVERGENCE ACHIEVED AFTER   3 ITERATIONS
```

```
    6 FUNCTION EVALUATIONS.

     Dependent variable: Q3C

Number of observations = 1070     LR (zero slopes) = 126.760 [.000]
     Mean of dep. var. = 4.80467    Schwarz B.I.C. = 1771.24
Std. dev. of dep. var. = 1.44503    Log likelihood = -1743.34
      Scaled R-squared = .113607

                         Standard
Parameter  Estimate        Error       t-statistic   P-value
C          -.408639      .250861       -1.62895      [.103]
NEG_PERC   .044811       .407030E-02   11.0092       [.000]
POS_PERC   .016688       .469365E-02   3.55552       [.000]
MU3        .228551       .044339       5.15459       [.000]
MU4        .678836       .062631       10.8386       [.000]
MU5        1.54802       .072831       21.2550       [.000]
MU6        2.40185       .078640       30.5423       [.000]
MU7        2.99678       .084916       35.2909       [.000]

Standard Errors computed from analytic second derivatives (Newton)

********************************************************************************
*****

END OF OUTPUT.

  MEMORY USAGE:    ITEM:    DATA ARRAY  TOTAL MEMORY
                  UNITS:  (4-BYTE WORDS) (MEGABYTES)
  MEMORY ALLOCATED         :  15500000      64.0
  MEMORY ACTUALLY REQUIRED :    352371       3.5
  CURRENT VARIABLE STORAGE :    129887
```

Vita

Graduate School
Southern Illinois University

Ralph L. Beauvoir

ralph-luckens.beauvoir@fulbrightmail.org

Universite Episcopale d'Haiti
Bachelor of Science, Agricultural Science, 2012

Special Honors and Awards: Fulbright Scholarship, 2013

Research Paper Title:
Determining US Citizens' Attitude toward the Environment: an Econometric Analysis of the New Environmental Paradigm (NEP)

Major Professor: Dr. Wanki Moon