

Greek students' Environmental Attitude based on the Theory of Ecological Attitude

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Abstract

Climate change has become manifest nowadays. Greenhouse gases, waste, industrial and nuclear, the burning of fossil fuels, etc. have changed the climate to an extreme degree and with adverse consequences for life on Earth. Human activities contributing to climate change have implications for ecosystems and natural resources, catches, agriculture and animal husbandry, health, nutrition and food, biodiversity, climate, clean water and reserves, clean atmosphere, the economy and society as a whole. The aim of this paper is to investigate Greek students' Environmental Attitude based on the Theory of Ecological Attitude. 369 students participated in the study. They filled in two research instruments named 2-MEN Scale and the New Ecological Paradigm (NEP) Scale. Data was analyzed using Principal Components Analysis (PCA), and Confirmatory Factor Analysis (CFA). The findings of the survey show that the use of the two scales highlighted seven primary factors: Intent of support, Care with resources, Enjoyment of nature, Dominance, Altering nature, Preservation, Utilization in the sense of nature exploitation. The structure of the factors of the two models was confirmed. Students may have either a biocentric (pre-environmental) or a human-centered (anti-environmental) perception but not at the same time. Yet another group of students treat biocentrism (Preservation) and anthropocentrism (Utilization) as separate and not necessarily relevant features of environmental perception. The NEP scale places respondents consistently from a biocentric (NEP) to a human-centered (DSP) global perspective. It was found that the attitudes of the girls were statistically higher for the Preservation, factor and lower for the Utilization factor.

Keywords

Greek students, Environmental, Attitude, Preservation, Utilization

1. Introduction

Climate change is more than obvious today. Greenhouse gases, waste, industrial and nuclear, the burning of fossil fuels, etc. have changed the climate to an extreme degree and with adverse consequences for life on Earth. Its immediate effects include melting ice in Antarctica, rising temperatures, extreme weather and floods, and rising ocean levels. Human activities contributing to climate change have implications for ecosystems and natural resources, catches, agriculture and animal husbandry, health, nutrition and food, biodiversity, climate, clean water and reserves, clean atmosphere, the economy and society as a whole.

There are international actions, environmental movements, theories and policies which strive to offer solutions or, better, to prevent further climate change and possibly render possible a return of climate conditions to their prior state. The Paris Accord is an agreement within the United Nations Framework Convention focusing on Climate Change. It focuses on emissions reduction and the long-term

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stabilization of rising temperatures on the global level with the threshold being one and a half to two degrees below current levels on the Celsius scale, in order to thus minimize the effects of climate change. It includes the commitment by EU nations to make the first climatically neutral economy feasible by 2050, while pursuing the maximization of the capacities of involved partners to overcome the negative impact of climate change and aspiring to render economic activities in harmony with the mandate resulting from the need to shift to low carbon dioxide and greenhouse gases emissions [1].

2. Literature Review

However, a theory or theories for environmental ethics is needed, which could constitute the basis for a shift in culture in order to render possible the development of a behaviour distinguished by altruist motives with respect to human interventions on the environment, which nowadays reflect an extremely egotistical and arrogant behavior. The inordinate egocentricity is clearly the culprit here, which stands its ground and becomes consolidated based on human rights [2], while allowing man's speculative behaviour. Moreover, it is man who takes decisions on the management of the natural environment, nature and their functions and it is thus man who must act thereupon. It is also man who intervenes in ecosystems, who is perpetrator, who alters the natural environment in order to create culture [3], industrial development and economic prosperity. A key role is played by the dominant world-view on nature, which is conceptually shaped by man himself, while what man perceives and conceives about nature is both a nature which is conceptually processed, as well as a "nature" for man [3]. Wilson's [4] claim is not mere happenstance, according to which man's behaviour and attitude is distinguished by egotism and altruism. Dawkins [5] adopts a similar viewpoint in his work "The Selfish Game", where it is stressed that man's attitude is determined by egotistical and not altruistic motives, while the egotistical behaviour is determined by genes and not social components.

It is worth noting at this point that egotistical behaviour constitutes a dominant element which activates the forces moving the markets and for this reason the resolution of many environmental problems is left to the operation of such markets [6]. The flourishing of human and non-human life on earth has an intrinsic value. Besides, the value of non-human life forms is independent from the utility for human purposes of the non-human world [7]. Naess is considered to be the father of deep ecology and adopts the so-called intrinsic value of all beings which he is in harmony, with respect to this issue, with Leopold's Land Ethic [8], who stressed the intrinsic value of the entire ecosystem and man's obligation to respect its members as a whole.

There are several theories and approaches to environmental ethics and ecology (deep and shallow), anthropocentricity, biocentricity, eco-feminism, the ethics of Care and more. An anthropocentric approach focuses on the value of biodiversity for humans to enjoy, or to experience by participating in it, or to benefit from it in various ways. On the contrary, the non-anthropocentric approach refers to the value of biodiversity in itself [9]. Ecocentrism is the view based on which non-human beings, things and nature in its entirety have "intrinsic value" and this "intrinsic value" of a thing does not contribute to the value of any other thing [10].

The value of care is brought to prominence as the panacea for the protection of the natural environment. Gilligan's theory of moral development is based on relations and more specifically the "relation with one's self" which is directly connected to the feminine gender and its development [11]. Women are forced by the social scheme of things to develop the relations they can by themselves, and which are none other than the social ones, by staying at home with their mothers, and their decisions are borne out of emotions and their logic does not have rights, but, rather, responsibility as its reference point. People may oblige one another to show mutual respect and, in addition to this, treat others as "be-all end-all", or "all-important elements" and not simply as a "means". Consequently, the principle of the systemic or pointless harm emerges with respect to the environment, for which we must care, as well as with respect to natural systems, where it rests on the regulative dimension of justice [13], and to the other, non-human, life forms. Besides, the moral dignity of human nature is mandated by care for nature in its entirety [13]. Kant's ethics, as well as other systems, have unavoidable anthropocentric starting points [14].

The Theory of Ecological Attitudes suggests that individual that appear to share Preservation attitudes in the framework of biocentric attitudes do not inevitably share anemic Utilization in the

framework of anthropocentric attitudes. According to this theory people that are placed in one put of four quadrants than on each end of a continuum. A high score regarding Preservation and a low score regarding Utilization would be anticipated of a robust environmentalist, an individual with deep worry about conservation [15]. Likewise, a low score on Preservation and at the same time a high score on Utilization would be anticipated of an individual characterized by apathy regarding conservation matters and a point of view of nature as a supplier of natural resources that human development can used it for its own benefit and profit. Still, an individual could have a high score regarding Preservation and a high score regarding Utilization at the same time and showing a deep need connected with environment protection as well as need to be benefit using the environment [15].

Due to the fact that a new theory for environmental ethics has been deemed necessary, it is imperative that we explore the environmental attitudes of young people. Thus, this survey attempts to investigate Greek students' Environmental Attitude based on the Theory of Ecological Attitude.

3. Methodology

3.1. Research Instruments

The literature analysis that identified previously established and tested scales was used to legislation and policy for operationalizing the constructs. All constructs were assessed using multi-item measures.

3.1.1. 2-MEV Scale

The well-known 2-MEV Scale was used to legislation and policy for operationalizing the constructs [15]. All 2-MEV Scale conceptual constructs named Preservation and Utilization were assessed using multi-item measures. Preservation construct is conceptualized in the following sub-scales named Intent of support, Care with resources, Enjoyment of nature. Utilization construct is conceptualized in the following sub-scales named Altering nature and Dominance. Intent of support sub-scale consist of 3 items (i.e. If I ever have extra money, I will give some to help protect nature, I would help raise money to protect nature, I try to tell others that nature is important). Care with resources sub-scale consist of 3 items (i.e. To save energy in the winter, I make sure the heat in my room is not on too high, I always turn off the light when I do not need it anymore, I try to save water by taking shorter showers of by turning off the water when I brush my teeth). Enjoyment of nature sub-scale consist of 3 items (i.e. I would like to sit by a pond and watch dragonflies, I like to go on trips to place like forests away from cities, I like the quite of nature). Altering nature sub-scale consist of 4 items (i.e. People have the right to change the environment (nature)*, I like a grass lawn more than a place where flowers grow on their own*, To feed people, nature must be cleared to grow food*, Weeds should be killed because they take up space from plants, we need*). Dominance sub-scale consist of 3 items (i.e. Building new roads is so important the trees should be cut down*, Because mosquitoes live in swamps, we should drain the swamps and use the land for farming*, People are supported to rule over the rest of nature*). The components of the 2-MEV Scale were scored on a 5-point Linkert scale, with 1 indicating "Strongly Disagree" and 5 indicating "Strongly Agree." All items with * were reversed for data analysis purposes.

3.1.2. NEP Scale

The well-known NEP scale was used to legislation and policy for operationalizing the constructs [16]. All 2-MEV Scale conceptual constructs named Preservation and Utilization were assessed using multi-item measures. Preservation' conceptual construct is constructed by 10 items (It upsets me to see countryside taken over by building sites, I enjoy trips to the countryside, Humankind will die out if we do not live in tune with nature, Society will continue to solve even the biggest environmental problems, Sitting at the edge of a pond watching dragonflies in fling is enjoyable, I save water by taking a shower instead of a bath (in order to spare water), I always switch the light off when I do not need it, We must set aside areas to protect endangered species, It is interesting to know what kinds of creatures live in ponds or rivers and Dirty industrial smoke from chimneys makes me angry). Utilization' conceptual construct is constructed by 10 items (i.e. Worrying about the environment often holds up development

projects, We need to clear forests in order to grow crops*, Our planet has unlimited resources*, Nature is always able to restore itself*.

We must build more roads so people can travel to the countryside, Only plants and animals of economic importance need to be protected, Humans have the right to change nature as they see fit, People worry too much about pollution, Human beings are more important than other creatures and We should remove garden weeds to help beautiful flowers grow). The components of the NEP Scale were scored on a 5-point Likert scale, with 1 indicating "Strongly Disagree" and 5 indicating "Strongly Agree." All items with * were reversed for data analysis purposes.

3.2. Research Sample

369 students participated in the study. 174 out of 369 students were males and 195 females.

3.3. Statistical Hypotheses

The current paper examines the following statistical hypotheses.

Ho1: 2-MEN Scale, is a second order model

Ho2: NEP Scale, is a first order model

Ho3: Students attitudes are strongly correlated with biocentric (pre-environmental) attitude

Ho4: Students attitudes are strongly correlated with human-centered (anti-environmental) attitudes.

Ho5: Females students have statistically higher perceptions for the Preservation attitude than males.

Ho6: Females students have statistically higher perceptions for the Utilization attitude than males

4. Analysis and Discussion

4.1. Confirmatory Factor Analysis (CFA)

2-MEV Scale was examined whether is a first or second order model scale.

For the evaluation of the factor structure of the model of the two measurement scales the good fit index χ^2 / df was used which was less than 2, the Comparative fit index (CFI), the GFI (Goodness of Fit), the AGFI (Comparative Fit Index) the and RMSEA (RMSEA = root mean-square error of approximation) and were all satisfactory, which satisfied the structure of the exported factor model resulting from the use of the 2-MEN and NEP scale.

The results for a first order factor model related 2-MEN Scale were: $\chi^2/df=2.17$, CFI=0.94, GFI=0.93, RMSEA=0.06, AGFI=0.90, IFI=0.95, indicating an unacceptable model [17] [18].

The results for a second order factor model related 2-MEN Scale were: $\chi^2/df=1.86$, CFI=0.94, GFI=0.93, RMSEA=0.04, AGFI=0.90, IFI=0.95 (Table 1).

The results which satisfied the structure of the exported second factor model resulting from the use of the 2-MEN Scale, two first order factors or conceptual constructs named Preservation and Utilization and five second order factors or conceptual constructs named Intent of support, Care with resources, Enjoyment of nature, Dominance, Altering nature.

The results for a first order factor model related 2-MEN Scale were: $\chi^2/df=1.96$, CFI=0.95, GFI=0.92, RMSEA=0.04, AGFI=0.90, IFI=0.95 [17] [18] (Table 2).

The results which satisfied the structure of the exported first model resulting from the use of the NEP scale. Thus, NEP scale was a first order factor model related to two factors or conceptual constructs named Preservation, Utilization.

4.2. Principal Components Analysis (PCA)

2-MEV Scale as well as NEP scale reliability was estimated by Cronbach alpha coefficient (α) as well as Composite Reliability (CR) and Average Variance Extracted (AVE).

Cronbach' alpha coefficient for 2-MEV Scale counts for 0.987. Its conceptual constructs named Preservation and Utilization' Cronbach alpha coefficient is above the cutoff point of 0.70. Cronbach

alpha for Preservation and Utilization equals to 0.814 and 0.865 respectively, values greater than the cutoff point of 0.70 that are considered as very satisfactory [19] [20] [21] [22] [23] [24] [25]).

Cronbach' alpha coefficient for Preservation' subcategories named Intent of support, Care with resources, Enjoyment of nature equals to 0.840, 0.703 and 0.735, values greater than the cutoff point of 0.70 that are considered as satisfactory respectively ([26] [27] [28] [29]) (Table 1).

Cronbach' alpha coefficient for Utilization' subcategories named Dominance Altering nature equals to 0.930 and 0.777 values greater than the cutoff point of 0.70 that are considered as satisfactory respectively [30].

Composite reliability (CR) for Preservation' subcategories named Intent of support, Care with resources, Enjoyment of nature equals to 0.790, 0.702 and 0.729 respectively. These values are larger than the cutoff point of 0.7 and they indicate internal consistency [17] [31] [32]. Average Variance Extracted (AVE) is equal to 0.556, 0.440, and 0.478 for Intent of support, Care with resources, Enjoyment of nature respectively. AVE' Values greater than the cutoff point of 0.5 are considered as satisfactory [17] [33] [31] (Table 1).

Composite reliability (CR) for Preservation' subcategories named Utilization' subcategories named Dominance and Altering nature equals to 0.912, and 0.852 respectively. These values are larger than the cutoff point of 0.7 and they indicate internal consistency ([17][34][32]). Average Variance Extracted (AVE) is equal to 0.843, and 0.580 for Dominance and Altering respectively. AVE' Values greater than the cutoff point of 0.5 are considered as satisfactory ([17] [33]) (Table 1). The following indices named Eigenvalue, %Variance, Loadings and Communalities are acceptable and revealed the constructed validity of 2-MEV Scale [35] (Table 1).

The measurement model fits the observed data (X2/df=1.86, CFI=0.94, GFI=0.93, RMSEA=0.04, AGFI=0.90, IFI=0.95) ([36] [37] [38]).

Table 1
2-MEV Scale

Construct	Eigen value	Variance %	Loadings	Communalities	Cronbach's a	CR	AVE	M	DV
2-MEV Scale									
Preservation					.814				
Intent of support	2.699	29.983			.840	.790	.556		
If I ever have extra money, I will give some to help protect nature			.759	.715				4.44	.777
I would help raise money to protect nature			.752	.743				4.27	.946
I try to tell others that nature is important			.725	.749				4.38	.841
Care with resources	1.847	20.526			.703	.702	.440		
To save energy in the winter, I make sure the heat in my room is not on too high			.672	.471				4.22	1.010
I always turn off the light when I do not need it anymore			.663	.794				3.73	1.218
I try to save water by taking shorter showers of by turning off the water when I brush my teeth.			.655	.766				3.01	1.395
Enjoyment of nature	1.795	19.941			.735	.729	.478		
I would like to sit by a pond and watch dragonflies			.613	.279				3.63	1.096
I like to go on trips to place like forests away from cities			.614	.912				4.49	.747
I like the quite of nature			.826	.912				4.57	.703
Utilization					.865	.912	.843		
Dominance					.930				
Building new roads is so important the trees should be cut down*			.933	.898				2.99	1.232
Because swamps, we should drain the swamps and use the land for farming			.928	.910				3.04	1.275
People are supported to rule over the rest of nature			.893	.827				2.74	1.318
Altering nature					.777	.852	.580		
People have the right to change the environment (nature)			.827	.698				4.44	.751
like a grass lawn more than a place where flowers grow on their own			.799	.662				4.02	1.014

Construct	Eigen value	Variance %	Loadings	Communalities	Cronbach's a	CR	AVE	M	DV
To feed people, nature must be cleared to grow food			.755	.500				4.18	1.097
Weeds should be killed because they take up space from plants, we need			.685	.601				4.11	.916

X²/df=1.86, CFI=0.94, GFI=0.93, RMSEA=0.04, AGFI=0.90, IFI=0.95

Cronbach' alpha coefficient for NEP scale counts for 0.901. Its conceptual constructs named Preservation and Utilization have Cronbach alpha coefficient above the cutoff point of 0.70. Cronbach alpha coefficient for Preservation and Utilization equals to 0.927 and 0.766 [19] [20] [21] [22] [23] [26] [27] (Table 2). Composite reliability (CR) for Preservation and Utilization equals to 0.921 and 0.884 respectively. These values are larger than the cutoff point of 0.7 and they indicate internal consistency ([19] [30] Anastasiadou et al., 2011). Average Variance Extracted (AVE) is equal to 0.521 and 0.347 for Preservation and Utilization respectively. AVE' Values greater than the cutoff point of 0.5 are considered as satisfactory [17] [32] [28] [29](Table 2).

The following indices named Eigenvalue, % Variance, Loadings and Communalities are acceptable and revealed the constructed validity of Service Quality scale [35] [36] [37] [38] (Table 2). The measurement model fits the observed data (X²/df=1.96, CFI=0.95, GFI=0.92, RMSEA=0.04, AGFI=0.90, IFI=0.95) [39] [40] [41] [42] (Table 2).

Table 2
NEP scale

Construct	Eigen value	Variance %	Loadings	Communalities	Cronbach's a	CR	AVE	M	SD
NEP scale					0.901				
Preservation	7.928	37.755			.814	.921	.540		
It upsets me to see countryside taken over by building sites*			.795	.488				2.58	1.262
I enjoy trips to the countryside			.698	.644				3.15	1.319
Human kind will die out if we do not live in tune with nature*			.723	.526				2.59	1.371
Society will continue to solve even the biggest environmental problems			.580	.404				3.72	1.183
Sitting at the edge of a pond watching dragonflies in fling is enjoyable			.704	.576				3.42	1.266
I save water by taking a shower instead of a bath (in order to spare water)			.652	.494				3.69	1.187
I always switch the light off when I do not need it			.784	.647				3.15	1.341
We must set aside areas to protect endangered species			.735	.574				2.76	1.323
It is interesting to know what kinds of creatures live in ponds or rivers			.820	.688				2.76	1.354
Dirty industrial smoke from chimneys makes me angry			.820	.596				2.92	1.421
Utilization	2.031	29.872			.766	.844	.357		
Worrying about the environment often holds up development projects			.585	.709				3.92	1.159
We need to clear forests in order to grow crops*			.672	.344				3.35	1.271
Our planet has unlimited resources*			.755	.462				3.78	1.116
Nature is always able to restore itself			.644	.481				2.26	1.236
We must build more roads so people can travel to the countryside			.547	.467				3.62	1.241
Only plants and animals of economical importance need to be protected			.371	.317				2.15	1.199
Humans have the right to change nature as they see fit			.645	.449				3.77	1.234
People worry too much about pollution			.536	.453				3.79	1.121
Human beings are more important than other creatures			.526	.313				3.09	1.271
We should remove garden weeds to help beautiful flowers grow			.615	.380				4.21	1.010

The study also examined whether gender differs for Utilization and Preservation factors by t-test. It was found that the attitudes of the girls were statistically higher for the Preservation, factor ($t=1.08$, $df=367$, $p<0.05$) related to 2-MEV Scale and ($t=2.78$, $df=367$, $p<0.05$) and related to NEP scale and lower for the Utilization factor ($t=1.64$, $df=367$, $p<0.05$) related to 2-MEV Scale and $t=0.46$, $df=367$, $p<0.05$) related to NEP scale.

5. Conclusions and Implications

Students may have either a biocentric (pre-environmental) or a human-centered (anti-environmental) perception but not at the same time. Still, students treat biocentrism (Preservation) and anthropocentrism (Utilization) as separate and not necessarily relevant features of environmental perception. The NEP scale places respondents consistently from a biocentric (NEP) to a human-centered (DSP) global perspective. In this case students who may have either a biocentric (pre-environmental) or anthropocentric (anti-environmental) perspective but not both. Students also believed that although it is certainly understandable that one could have a high rating for conservation, indicating a strong desire to protect the environment, but at the same time claimed that the primary purpose of the environment is to benefit people, also resulting in a high score in Utilization factor.

The study also examined whether gender differs for Utilization and Preservation factors. It was found that the attitudes of the girls were statistically higher for the Preservation, factor and lower for the Utilization factor. The values of the protection of life, of non-harm and distributive justice, the responsibility towards future generations with respect to environmental issues are of paramount importance, precisely due to the fact that impact of resource exploitation, natural disasters and atmospheric pollution have been elevated to the status of being enormous and massive problems faced by the planet, while their treatment presupposes the posing of a moral social framework for personal and collective responsibility and action.

The theory of eco-feminism, the theory of the ethics of care and taking account also of Kantian ethics with respect to the treatment of animals may be combined to possibly shape a multilevel and multidimensional framework by means of which sentient beings could analyze and perhaps offer solutions to the complex issues relating to human life, non-human life and the natural environment and to shape a culture of love for nature and an ethics of care, account being also taken of the agenda set by the Principles for Viable Development. There are indirect duties for people to have with respect to animals and plants, which renders well-being and not rights to them, and which in addition include extensive aspects of nature, various rare and not so rare species, and biotopes, while also taking biodiversity into account [14].

Future research may expand the aim of the issue to other countries and differ cultures, different environmental policies, different industrial and more especially tourism and hotel industrial development etc. Big Data applications, pipeline Dynamic Scheduling of Big Data Streams and algorithms can offer an assist to gather and analyse a large amount of data related to Tertiary University students [43] [44] [45] [46] [47] [48] [49].

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