

## **Ecocentric and anthropocentric worldviews: Are they incompatible?**

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### **ABSTRACT**

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The dialectic between ecocentrism and anthropocentrism has become the central discussion around the growing ecological crisis we live and the purpose of environmental education. This study seeks to clarify the compatibility between these two worldviews and reflect on the extent to which they are in opposing camps on the concern about the ecological crisis. The New Ecological Paradigm Scale was applied to two previously published independent samples of Portuguese students (9th grade and higher education students') for which subscales for ecocentrism and anthropocentrism worldviews were selected through factor analysis. Our results show that more than 40% of those that agree with ecocentrism does not reject anthropocentrism, being mostly neutral to that worldview and some even agreeing with it. As so, anthropocentrism may be helpful, until a certain point, to the changes needed to tackle present ecological crisis. In face of this, we propose further studies on the different anthropocentric facets to selected those that may be included in environmental education effort to help, together with ecocentrism, to fight back ecological crisis.

**Keywords:** New ecological paradigm, environmental attitude, ecocentrism, Anthropocentrism, environmental education

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## INTRODUCTION

Since the 1970s, human resource consumption and pollution emissions have surpassed Earth's biocapacity, and a global ecological crisis has started to grow. Despite several warnings over the past decades, humanity has not been able to rebalance its activities within the limits of the planet, and its ecological footprint is growing rapidly and soon could be twice the Earth's biocapacity (Earth Overshoot Day, 2022). Consequently, several global imbalances currently affect the Planet, with climate change being at the forefront of this ecological crisis. Considered one of the worst threats that humanity ever faced, climate change is presently affecting humans and the global natural system, demanding for an urgent action in adaptation and mitigation considering its serious consequences (IPCC, 2023). Besides the need for efficient technologies and the control of human population growth, cultural change is crucial to overcome this ecological crisis (Plumwood, 2002). Drifting from present consumerism and anthropocentric cultures to most ecocentric and environmental cultures has been proposed to rebalance the relationship between human activities and the planet (Sessions, 1974; Black et al., 2017). To address these changes, hope has been put into environmental education efforts over the past decades. Environmental education has as its main goal to promote environmental literacy, a concept that includes, among others, environmental knowledges, attitudes, and behaviours (Hallfreðsdóttir, 2011; Krnel & Naglič, 2009; Igbokwe, 2012; McBeth & Volk, 2010; Kuhlemeier, et. al., 1999; Pe'er et. al., 2007). Promoting environmental attitudes among modern societies is crucial for the process of the cultural change needed to overcome the present ecological crisis (Gardner & Stern, 1996). Environmental attitude can be understood as a psychological tendency expressed by a favourable or unfavourable evaluation of the natural environment (Eagly & Chaiken, 1993; Milfont & Duckii, 2010). Although Yin (1999) considers it as people's orientation toward environmentally related objects structured in cognitive, affective, and evaluative dimensions, Albarracín et al. (2005) argue that the attitude concept should be reserved only for the evaluative dimension. Despite under debate, some authors have proposed a structure for environmental attitude with two main dimensions (Blaikie, 1992; Milbrath, 1984; Milfont & Duckitt, 2004). Wiseman and Bogner (2003) summarized this structure by identifying a dimension that captures the preservation of the environment (biocentric) and another that points to interest in nature utilization (anthropocentric). However, Wiseman and Bogner (2003) pointed out the inexistence of reasons to suppose that these two dimensions (ecocentric and anthropocentric) are always contrasting and may also be seen as complementary.

The New Ecological Paradigm (NEP) scale (Dunlap & Van Liere, 1978; Dunlap et al., 2000) has been used in the past decades to evaluate the prevalence of pro-environmental attitudes. First, the NEP scale (Dunlap & Van Liere, 1978) was a 12 items version instrument to evaluate the level of concern about environmental quality, but after a revision (Dunlop et al., 2000) it becomes a 15 items scale to measure two main worldviews: ecocentric (agreeing with a New Ecological Paradigm) and anthropocentric (agreeing with the Dominant Social Paradigm) (Kilbourne et al., 2002; Lundmark, 2007). After evaluating its dimensionality, Lopez-Bonilla and Lopez-Bonilla (2016) found that the NEP scale has two sides (ecocentrism and anthropocentrism) but criticized the maintenance of the two paradigms within the same scale.

Ecocentrism assumes that nature has value for itself and needs to be preserved, and anthropocentrism considers nature to be used and controlled by humans and for its own benefit.

The present study incorporates Lopez-Bonilla and Lopez-Bonilla (2016) considerations about the NEP scale and uses two different subscales (one for ecocentric worldview and another for anthropocentric) to assess Wiseman and Bogner (2003) conclusions, who stated that these two dimensions do not have to be incompatible. As such, the present study aims to assess to which extend ecocentrism and anthropocentrism are each other compatible. Considering Wiseman and Bogner (2003), our hypothesis is that ecocentrism is not incompatible with anthropocentrism.

## **METHOD**

To determine whether an ecocentric worldview is incompatible with anthropocentrism, we followed a new approach using the New Ecological Paradigm (NEP) scale (Dunlap and Van Liere, 1978; Dunlap et al., 2000) and data samples from two previously published studies: one with 9<sup>th</sup> grade students (459 samples) (Spínola, 2015) and another with higher education students (220 samples) (Spínola, 2023), both residents of Madeira Island (Portugal). Data were collected in April 2014 for the study Spínola (2023) and in May 2013 for Spínola (2015). The two data samples were chosen for reasons of convenience, firstly because the author has access to their base data, secondly because they refer to two different age groups and thirdly because they both originate from the same population. At the time data were collected, the University of Madeira had no Ethical Board, and the Spínola (2023) study approval was tacitly given by the rectorship when accepting to distribute the online and anonymous survey to all the students of the institution. The University of Madeira students who voluntarily accepted to participate in the study gave online informed consent. The Spínola (2015) study was conducted in five local schools and, in each one, the School Board had approved the anonymous questionnaire application to their 9<sup>th</sup> grade students, following their usual procedures of informing parents and obtaining their written consent.

Each of the two sample groups was analysed separately using the IBM SPSS Statistics software (version 27), under copyright license attributed to University of Madeira. Samples with missing data were excluded from the analysis, and for each of the NEP scale items, data were transformed into numeral scores (1-Strongly disagree, 2-Mildly disagree, 3-Unsure, 4-Mildly agree, and 5-Strongly agree). Factor analysis was performed to select the NEP items to be used in the construction of the ecocentrism and anthropocentrism scales. First, the Kaiser–Meyer–Olkin (KMO) measure (Kaiser, 1974) and Bartlett’s Test of Sphericity (Bartlett, 1954) were used to test data adequacy for factor analysis. After confirming that the Kaiser-Meyer-Olkin measure of the sampling adequacy index was higher than 0.6, and the significance of Bartlett’s test of sphericity, an Exploratory Factor Analysis (EFA) was conducted to define the NEP items to compose the ecocentric and anthropocentric subscales. First, EFA, using Principal Component Analysis with Varimax rotation and Kaiser normalization, was forced to extract only two components to fit our model. For each component extracted, items explaining more than 50% of the variance and showing negative or neutral factor loadings in the opposite

component were selected to compose the ecocentric and anthropocentric subscales. Both the subscales and for each sample group were tested for appropriateness for factor analysis through the KMO measure and Bartlett's Test of Sphericity. After confirming its appropriateness, Confirmatory Factor Analysis (CFA) was conducted for both subscales.

After defining the NEP subscales for ecocentric and anthropocentric worldviews, both were evaluated for reliability (Cronbach's alpha) and validity (Pearson correlations). To test our hypothesis that ecocentrism is not incompatible with anthropocentrism, we calculated the mean score for ecocentric and anthropocentric worldviews and then the prevalence of each profile that results from the combination of both worldviews. For each worldview (ecocentric and anthropocentric), mean scores lower than 2.5 was considered to have disagreeing, between 2.5 and 3.4 as neutral, and higher than 3.4 as agreeing.

## RESULTS

### *Sample Characterization*

The 9<sup>th</sup> grade students' samples (n=459) from five elementary schools located in Madeira Island (Portugal) had a mean age of 15 years, with males (51.3%) being slightly more prevalent than females (48.7%). Higher education students (n=220) from the University of Madeira had a mean age of 25 years, ranging from 18 to 60 years, with a higher prevalence of females (70%). Most of them were undergraduate (73.6%) and master's (20.9%) students, but some were attending technical (2.7%), doctoral (1.8%), or other (0.9%) course levels. In this research, the ethics committee approval notification document containing the eligibility decision for the research was received from the Center for Research in Education of the University of Madeira Ethic Committee (ethics approval number 71/CEUMA/2023).

### *Appropriateness for Factor Analysis*

Data from both samples, 9<sup>th</sup> grade students and higher education students, had a normal distribution and were appropriate for factor analysis since the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.75, and Bartlett's Test of Sphericity was significant ( $p < 0.001$ ). The first Exploratory Factor Analysis with data from 9<sup>th</sup> grade students selected nine NEP items that fit the model of two dimensions, five items for the ecocentric subscale, and four for the anthropocentric subscale. These nine NEP items were appropriate for factor analysis (KMO measure 0.80, and significance on Bartlett's Test of Sphericity,  $p < 0.001$ ).

### *Ecocentric and Anthropocentric Subscales*

A Confirmatory Factor Analysis with these nine items extracted 45% of the total variance on two factors: one for ecocentric items (32% of variance) and another for anthropocentric items (13% of variance) (Table 1). For higher education students, 11 NEP items were selected to fit the two-dimensional model after an Exploratory Factor Analysis, six items constituting the ecocentric subscale and five the anthropocentric. These 11 NEP items were appropriate for factor analysis scoring 0.77 for the KMO measure, and significant for Bartlett’s Test of Sphericity ( $p < 0.001$ ). A Confirmatory Factor Analysis with these 11 items extracted 44.6% of the total variance on two factors, one for ecocentric items (29.7% of variance) and another for anthropocentric items (14.9% of variance) (Table 2).

**Table 1.** Madeira Island 9<sup>th</sup> grade students. Factor loadings for NEP scale obtained from Principal Component Analysis with Varimax rotation after removing items that do not fit to the proposed model of a two-dimensional structure (ecocentric and anthropocentric).

NEP Items↓ Eigenvalues→	Factor loadings		Worldview classification
	1	2	
	2.89	1.17	
Q3• When humans interfere with nature, it often produces disastrous consequences.	0.63	-0.29	Ecocentric
Q5• Humans are severely abusing the environment.	0.70	-0.16	Ecocentric
Q7• Plants and animals have as much right as humans to exist.	0.69	-0.01	Ecocentric
Q9• Despite our special abilities, humans are still subject to the laws of nature.	0.59	-0.16	Ecocentric
Q15• If things continue their present course, we will soon experience a major ecological catastrophe.	0.62	-0.08	Ecocentric
Q2• Humans have the right to modify the natural environment to suit their needs.	-0.15	0.64	Anthropocentric
Q4• Human ingenuity will ensure that we do not make the Earth unliveable.	-0.03	0.63	Anthropocentric
Q12• Humans were meant to rule over the rest of nature.	-0.34	0.60	Anthropocentric
Q14• Humans will eventually learn enough about how nature works to be able to control it.	-0.10	0.72	Anthropocentric
Variance accounted by each factor	32%	13%	

**Table 2.** Higher education students. Factor loadings for NEP scale obtained from Principal Component Analysis with Varimax rotation after removing items that do not fit to the proposed model of a two-dimensional structure (ecocentric and anthropocentric).

NEP Items↓ Eigenvalues→	Factor loadings		Worldview classification
	1	2	
Q3• When humans interfere with nature, it often produces disastrous consequences.	0.66	-0.13	Ecocentric
Q5• Humans are severely abusing the environment.	0.78	-0.19	Ecocentric
Q7• Plants and animals have as much right as humans to exist.	0.59	0.03	Ecocentric
Q9• Despite our special abilities, humans are still subject to the laws of nature.	0.72	-0.12	Ecocentric
Q11• The Earth is like a spaceship with very limited room and resources.	0.58	-0.01	Ecocentric
Q15• If things continue their present course, we will soon experience a major ecological catastrophe.	0.69	-0.16	Ecocentric
Q2• Humans have the right to modify the natural environment to suit their needs.	0.06	0.60	Anthropocentric
Q4• Human ingenuity will ensure that we do not make the Earth unliveable.	0.001	0.64	Anthropocentric
Q8• The balance of nature is strong enough to cope with the impacts of modern industrial nations.	-0.21	0.54	Anthropocentric
Q12• Humans were meant to rule over the rest of nature.	-0.27	0.56	Anthropocentric
Q14• Humans will eventually learn enough about how nature works to be able to control it.	-0.09	0.75	Anthropocentric
Variance accounted by each factor	29.7%	14.9%	

The Cronbach’s Alpha scores were 0.68 and 0.77 for the ecocentric subscales with 9<sup>th</sup> grade students and higher education students, respectively, and 0.59 and 0.63 for the anthropocentric subscales. These reliability scores were not high, particularly for the anthropocentric subscales, but they were acceptable because the number of items in each subscale was low (Taber, 2018). The validity of the subscales was confirmed for all items since they showed positive and significant ( $p < 0.01$ ) Pearson correlations.

### *Ecocentric and Anthropocentric worldviews*

The concordance with the ecocentric worldview and disagreement with anthropocentrism was high in both samples, but significantly better for higher education students (Table 3). In contrast, disagreement with ecocentrism and agreement with anthropocentrism was residual for both groups, except for the anthropocentric view among 9<sup>th</sup> grade students that reached 12.2%. The neutral attitude was lower for ecocentrism than anthropocentrism in both groups, but significantly higher for both worldviews in 9<sup>th</sup> grade students. When evaluating the mean score in each subscale, it is also evident the clear support of an ecocentric view in both groups (Ecocentric subscale: 9<sup>th</sup> grade students 4.1 s.d.± 0.6; higher education students 4.3 s.d.± 0.6)

but a lower level of rejection for the anthropocentrism among 9<sup>th</sup> grade students (Anthropocentric subscale: 9<sup>th</sup> grade students 2.5 s.d.± 0.72; higher education students 2.1 s.d.± 0.58).

**Table 3.** Ecocentric and Anthropocentric concordance levels for 9<sup>th</sup> grade and higher education students.

Worldview	Concordance (score)	9 <sup>th</sup> grade students (n=459)	Higher education students (n=220)
Ecocentric	Agree (>3.4)	86.4%	92.6%
	Disagree (<2.5)	1%	1.9%
	Neutral (2.5-3.4)	12.6%	5.5%
Anthropocentric	Agree (>3.4)	12.2%	1.9%
	Disagree (<2.5)	41.8%	72.7%
	Neutral (2.5-3.4)	46%	25.4%

Significant results between both groups are bold marked (p<0.05).

Table 4 shows the prevalence of the Ecocentric/Anthropocentric profiles and reveals that Agree/Disagree was the most prevalent for both sample groups but was significantly higher for higher education students. In concordance with the results shown in Table 3, the Agree/Neutral profile was the second most prevalent and significantly higher for 9<sup>th</sup> grade students.

**Table 4.** Ecocentric and Anthropocentric mean scores profile prevalence for 9<sup>th</sup> grade and higher education students.

Ecocentric/Anthropocentric Profiles	9 <sup>th</sup> grade students n=459	Higher education students n=220
Agree/Agree (AA)	9.4%	1.8%
Agree/Disagree (AD)	40.5%	70%
Agree/Neutral (AN)	36.4%	20.9%
Disagree/Agree (DA)	0.2%	0%
Disagree/Disagree (DD)	0%	1.8%
Disagree/Neutral (DN)	0.9%	0%
Neutral/Agree (NA)	2.2%	0%
Neutral/Disagree (ND)	1.1%	0.9%
Neutral/Neutral (NN)	9.4%	4.5%

Significant results between both groups are bold marked (p<0.05).

Considering the purpose of the present study, to clarify if agreeing with an ecocentric worldview implies rejecting anthropocentrism, we need to take into consideration the prevalence of the following profiles, which agree with ecocentrism and do not reject anthropocentrism: Agree/Agree and Agree/Neutral. From Table 4, we can see that these two profiles together have a prevalence of 45.8% and 22.7% in 9<sup>th</sup> grade and higher education students, respectively. Of the 396 students (86.4%) from the 9<sup>th</sup> grade that agreed with ecocentrism, 53% did not reject anthropocentrism, being neutral (42%), or agreeing with it (11%). Among the 204 higher education students (92.7%) who agreed with ecocentrism, 24.5% did not reject

anthropocentrism, most of them being neutral (22.5%). In addition, considering both sample groups together, among the 600 students who agreed to an ecocentric worldview, 43.3% (260 students) did not reject anthropocentrism. Our data strongly suggest that it is possible to be ecocentric without rejecting anthropocentrism, and even agree with it.

## DISCUSSION

Much of the literature that discusses the underlying causes of the present ecological crisis assumes the anthropocentric worldview to be the main responsible (Dunlap 2008; Shoreman-Ouimet and Kopnina 2016; Stern and Dietz 1994; Stern 2000;). In this view, intensive resource exploitation and mass pollution emissions are undertaken because humans see themselves as being high above nature and feel legitimated to manage it to fulfil their needs and desires. To tackle the ecological crisis and rebalance human activities within the limits of the planet, a shift in human vision has been proposed: abandoning anthropocentrism and embracing an ecocentric worldview (Kortenkamp and Moore 2001; Kopnina 2015; Thompson and Barton 1994). In contrast, some authors argue that humans' self-interest in maintaining a natural balance for their own sake gives the same result as an effort done because of natural intrinsic values (Hayward, 1997; Norton, 1984; Weston, 1985). This means that, at the end of the day, anthropocentrism will demand nature protection, since humans depend on it.

Present study shows clearly, as stated by Wiseman and Bogner (2003), that supporting an ecocentric worldview doesn't mean necessarily an anthropocentrism rejection (Table 4). In fact, considering both sample groups, more than 43% of ecocentrism supporters do not reject anthropocentrism, being mostly neutral to that worldview, and with a minority agreeing with it. Despite the controversy regarding the compatibility between ecocentrism and anthropocentrism (Kopnina et al., 2018), our results show a scenario in which a high prevalence of the ecocentric worldview is intermingled with, as Norton (1984) calls it, 'weak anthropocentrism'. Although the majority of ecocentrist supporters reject anthropocentrism (56.7%), our results ask for a reformulation of this dualistic vision to better discriminate between those attitudes that support environmental protection from those that oppose it.

First, we need to consider that our results could have been influenced by the research instrument that we chose to use, the NEP scale (Dunlap et al., 2000), which means we need to validate them with a future study using an alternative scale that can discriminate between ecocentric and anthropocentric worldviews. For this purpose, the Ecocentric and Anthropocentric Attitudes Toward the Environment (EAATE) scale (Thompson and Barton, 1994) could be used. Meanwhile, after analysing the items selected from the NEP scale to set up the anthropocentric subscale, it seems to us that none can discriminate between an anthropocentrism that rejects the care for nature and another that supports sake of humans. As such, the overlap between ecocentrism and anthropocentrism that we found in our results could be the effect of a belief in humans' ability to ensure that we will not 'make the Earth unliveable' (Q4) and that we will be able to fully understand nature and control our negative impacts (Q14). In fact, less than half of the respondents rejected these two anthropocentric statements, in contrast to the other



statements that only considered the acceptance of human pressure and dominance over nature (Q2, Q8, and Q12), to which high levels of rejection were found (about two-thirds) (data not shown). We believe that this partial compatibility between an ecocentric worldview and anthropocentrism could correspond to an anthropocentric facet that supports the belief that humans can overcome the present ecological crisis. In fact, this profile was also found in previous studies (Atav, et al., 2015; Castro and Lima, 2001; Denis and Pereira, 2014; Ntanos, et al., 2019; Spínola, 2015; Vidal et al., 2022) and it can mean faith in the human ability to rebalance himself with the limits of the planet. As such, it may be seen as a constructive hope that could help to engage in positive environmental behaviors (Ojala, 2012 and 2017), and, as such, could be perfectly compatible with an ecocentric worldview.

Thus, the need to study the anthropocentric worldview better becomes evident, discriminating between the one whose utilitarian interest in nature leads to its destruction from the one that requires and promotes its preservation. Future studies with adequate research instruments should clarify which facets of anthropocentrism may be promoted through environmental education, alongside an ecocentric worldview, to help fight present ecological crisis.

## DECLARATIONS

**Ethical Considerations:** In this research, the ethics committee approval notification document containing the eligibility decision for the research was received from the Center for Research in Education of the University of Madeira Ethic Committee (ethics approval number 71/CEUMA/2023).

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