

# Cultural Differences in the Environmental Worldview of Children

**Jelle BOEVE-DE PAUW\***

*University of Antwerp, Belgium*

**Peter VAN PETEGEM**

*University of Antwerp, Belgium*

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## **Abstract**

The New Ecological Paradigm (NEP) is a popular measure of environmental concern and pro-environmental orientation of adults, which has recently been modified for use with children. For this paper, we have collected questionnaires from 1586 children from three different countries and continents (i.e. Zimbabwe, Belgium and Vietnam). In this paper we will present the NEP-scores and the search for dimensionality of the scales, across the different populations, by means of factor analyses. The results indicate that there is a clear and highly significant cultural influence on the environmental worldview of children, when developed and developing countries are compared. Such differences are important for those designing and evaluating environmental education initiatives because such initiatives need to be rooted in the local specific situation – both physically and attitudinally.

**Keywords:** Environmental worldview; new ecological paradigm; NEP scale for children; cross-cultural differences

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## **Introduction**

Children's environmental beliefs and attitudes have been studied extensively (e.g. Barazza, 1999; Bogner & Wilhelm, 1996; Connell et al., 1999; Fien et al., 2002; Loughland, Reid & Petocz, 2002; Wals, 1992; Tuncer, Ertepinar, Tekkaya & Sungur, 2005; overview in Rickinson, 2001) but with little methodological uniformity, resulting in evidence that is less robust than that for adults. In 2007, Manoli et al. modified the NEP scale for use with children (aged 10-12, that is ISCED1 and ISCED2 level: primary education and lower secondary education), thus creating an instrument that can be applied in a wide variety of context, making results from different studies comparable. Such uniform information on children's worldviews and pro-environmental beliefs can be of great interest for policymakers, developers of environmental learning programs, and researchers interested in the development of environmental attitudes in young people.

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\*  [jelle.boevedepauw@ua.ac.be](mailto:jelle.boevedepauw@ua.ac.be) University of Antwerp, Prinsstraat 13, 2000 Antwerp, Belgium.

Pirages and Ehrlich (1974), pointed out that the Dominant Social Paradigm (or DSP) had begun to be challenged by new beliefs and attitudes. The DSP underscores endless progress, growth and abundance of resources - beliefs that are accompanied by attitudes that contribute to the environmental degradation. In the new view, nature is seen as a limited resource, delicately balanced and subject to deleterious human inference: it challenges the DSP by rejecting the anthropocentric notion that nature exists only to serve human needs. In recent decades this new worldview has evolved from basic concerns on specific environmental problems to the recognition that humans are fundamentally altering the functioning of ecosystems and their constitution (i.e. biodiversity), resulting in unpredictable and irreversible changes. In 1978, Dunlap and Van Liere named this new social paradigm or worldview the New Environmental Paradigm (or NEP). At the same time, they constructed a scale to measure the proposed shift in people's worldviews at the level of human-environment interaction. After discussion on the multidimensionality of the scale and the nature of the terminology, it was revised by Dunlap et al. (2000), to become the New Ecological Paradigm (also NEP). Both the original scale, and the revised version have been popular measures of environmental concern and pro-environmental orientation of adults. Many researchers have used the scale in a wide range of contexts to assess adults' perceptions concerning the environment (e.g. Bechtel et al., 1999; Corral-Verdugo & Armendáriz, 2000; Johnson et al., 2004; Rideout et al., 2005; Schultz et al., 2000a, b; Vining & Ebreo, 1992). While Dunlap & Van Liere (1978) found that the NEP scale measured a single dimension, other authors have found that it measures up to four dimensions (e.g. Bechtel et al., 1999; Edgell & Nowel, 1989; Roberts & Bacon, 1997; Van Petegem & Blicck, 2006).

An intriguing field of research in which the Manoli et al. (2007) scale can be used is the cross-cultural comparison of children's environmental worldview. The study of cross-cultural differences in environmentalism is currently getting more and more attention (e.g. Duan & Fortner, 2010), and diverse instruments are applied in this context. For adults differences in the worldview, assessed with the NEP scale, have been shown by different researchers (e.g. Bechtel et al., 1999; Corral-Verdugo & Armendáriz, 2000). Van Petegem & Blicck (2006) were the first to find statistical differences between the worldview of children from different cultures, using the NEP scale for children.

In this article we investigate the worldview of Belgian, Vietnamese and Zimbabwean children, using Manoli et al.'s NEP scale for children. We examined if these children held beliefs consistent with (a) the DSP, which upholds human dominance over nature and faith that progress and technology will eventually be capable of solving all problems, including an ecological crisis, or (b) the NEP, based on humans as part of nature and on limitations to growth. We also examine the cross-cultural multidimensionality of the NEP scale for children, and compare the children's responses in relation to the different dimensions. In this context, it is also important to point out the position of the three studied countries on the United Nations Development Programme's 'Human Development Index' (or HDI) which is a comparative measure of life expectancy, literacy, education and standard of living for countries worldwide and especially child welfare: Belgium is at position 14, Vietnam at 101 and Zimbabwe at 150. The Vietnamese sample is taken from children in schools in the area of the capital city, whereas the majority of the Zimbabwean children in our sample are part of a rural community. This allows us to compare the NEP scores of children from an industrialised country (the Belgian sample), an urban community in a development country (the Vietnamese sample) and a rural community in a development country (the Zimbabwean sample). Such information is of particular interest for the designers and evaluators of environmental education initiatives (Wals, 1992). If worldviews differ across cultures, then such differences should be accounted for while developing these initiatives.

Also, initiatives cannot be transferred between cultures if the prevailing worldview on which they are based or which they intend to change differs between these cultures.

## Methods

The 15-item NEP scale, revised by Manoli et al. (2007) for use with children, consists of eight items assessing an ecological – man as part of nature – view and seven items assessing an anthropocentric – man as ruler over nature – view. For example “When humans disturb nature it often produces terrible results” is an ecological item and “Humans will someday learn enough about how nature works to be able to control it” is an anthropocentric item. The scale has a five-point Likert-type scale: strongly agree (5), agree (4), agree nor disagree (3), disagree (2), strongly disagree (1) and I don’t know (0). The value of the ‘I don’t know’ was regarded as a missing value and is not included in the analysis. The mean NEP score is calculated as the responses contributing to pro-ecological conceptions for each item: for ecological items this is the sum of the categories ‘strongly agree’ and ‘agree’, for anthropocentric items ‘disagree’ and ‘strongly disagree’. Due to this nature of the instrument, scoring high on any item contributes to a higher NEP score; scoring high on an ecological item means the studied group agrees with the item, whereas scoring high on an anthropocentric item means that it doesn’t. In general, a NEP score above 45 indicates pro-ecological conceptions.

The scale was administered class-wise in English to 524 pupils in Zimbabwe between 13 and 15 years old (280 girls and 242 boys – 2 unknown) and to 449 pupils in Vietnam between 13 and 14 years old (230 girls and 212 boys – 7 unknown). In Belgium, 613 children of 13 years old (347 girls and 246 boys – 20 unknown) filled out a Dutch version of the questionnaire. In total, nine schools of general and technical education were asked to take part in the research. The schools were chosen for reasons of attainableness and willingness to cooperate. The pupils were not in a specific environmental class or program. All classes correspond to ISCED2 level. The scale was originally designed for children aged 10 to 12, we used it for older children (between 13 and 15). In previous research we tested the comprehensibility and word difficulties of the scale for 13 to 15 year old children. No remarkable problems were reported.

The NEP is by far the instrument that has been used the most widely to study EV. A diverse array of scientists has resorted to the NEP: sociologists (e.g. Albrecht et al., 1982), psychologists (e.g. Stern, 2000), geographers (e.g. Lalonde & Jackson, 2002) and political scientists (e.g. Dalton et al., 1999) have shown the scale to be valid and useful in both the USA and in Europe (e.g. Nooney et al., 2003; Sato & James, 1999). The scale is also increasingly finding its way into African, South-American and Asian contexts (e.g. Bechtel, 1999; Corral Verdugo & Armandáriz, 2000; Korhonen & Lappalainen, 2004; Tuncer et al. 2005). These studies have shown the NEP to be a reliable and valid measurement instrument.

## Results

First we present the response frequency distribution of the responding Belgian, Zimbabwean and Vietnamese children, including the percentage agreement with the NEP perspective, i.e. the NEP scores. Secondly we will present the results of our search for dimensionality of the NEP scale, by means of factor analysis. Finally, the mean responses over the different dimensions found are compared. The fact that the scale doesn’t measure one single dimension, as Dunlap and Van Liere (1978) assumed, shows that there is an underlying consistency between different items from the instrument, explaining the same

aspect of the total variance. This means that there is more to the scale than just the NEP score at itself. But to make (future) comparison possible with other research we do present and discuss the NEP scores.

#### *Children's worldviews*

Table 1 shows the response frequency distribution in terms of percentage of children choosing each response and the total NEP score for all three data sets. It is clear that the Belgian children are more in favour of the NEP worldview (mean NEP score 63.2) than the children in Vietnam (mean NEP score 58.9) and in Zimbabwe (mean NEP score 51.4), indicating that Belgian children display pro-ecological conceptions more than children from Vietnam, and that children from both countries display pro-ecological conceptions more than children in Zimbabwe (all  $p < .001$ )

Belgian responding children score high on both types of items (mean ecological 73.3 – mean anthropocentric 56.8). Vietnamese children in our sample have a comparable ecological score (73.5) but score lower on the anthropocentric items (39.4). The Zimbabwean group scores lowest both on ecological (65.7) and anthropocentric (32.5) items.

#### *Dimensionality of the scale*

We used a principal-components factor analysis (PCA) with varimax rotation, showing three dimensions. This three-factor model explained a total of 37.30% of the variance in results obtained. We also used a principal axis factoring method (PAF), showing the same three dimensions, although less profound, loading less items and explaining only 22,10% of variance. In table 2 we present the results of both methods. The three dimensions arising from the analysis are: 'Limits to growth' (LIM), 'Balance of nature' (BAL) and 'Man above nature' (MAN). Using the PCA, four items (NEP 1, 9, 10 and 11) load heavily on the first component. Five items (NEP 3, 5, 7, 13 and 15) loaded on the second and five (NEP 2, 4, 8, 12 and 14) loaded on the third component. Based on the content of the items and in line with literature, we named the components limits to growth, balance of nature, and man over nature.

Table 2. *Factor Loadings in the Principal Component Analysis (PCA) of the NEP Items*

	Dimensions					
	Limits to growth		Balance of nature		Man over nature	
	PCA	PAF	PCA	PAF	PCA	PAF
NEP 1	<b>.523</b>	<b>.344</b>	.090	.111	-.017	-.018
NEP 9	<b>-.538</b>	<b>-.416</b>	.438	.343	.223	.182
NEP 10	<b>.626</b>	<b>.473</b>	.130	.140	.143	.113
NEP 11	<b>.650</b>	<b>.528</b>	.259	.251	-.080	-.065
NEP 3	.292	.257	<b>.507</b>	<b>.376</b>	.075	.008
NEP 5	-.174	-.058	<b>.515</b>	<b>.315</b>	-.001	.065
NEP 7	.127	.125	<b>.498</b>	<b>.349</b>	-.020	-.015
NEP 13	.055	.085	<b>.478</b>	<b>.314</b>	-.090	-.061
NEP 15	.167	.158	<b>.627</b>	<b>.542</b>	-.085	-.076
NEP 2	-.067	-.047	.013	.007	<b>.528</b>	.386
NEP 4	.311	.215	-.041	-.005	<b>.546</b>	<b>.412</b>
NEP 8	.024	.022	-.109	-.090	<b>.675</b>	<b>.555</b>
NEP 12	-.329	-.296	-.036	-.024	<b>.666</b>	<b>.598</b>
NEP 14	.016	.002	.027	.036	<b>.567</b>	<b>.418</b>
NEP 6	.176	.121	.333	.268	.299	.207

Using the PAF, the items that load on the different factors are: LIM= NEP 9, 10 and 11; BAL= NEP 15; MAN= NEP 4, 8, 12 and 14. Although PAF might be a better method to analyse

the dimensionality of the scale (since it assumes that there are more variables causing bias than included in the model), the results of this analysis are weaker and less interpretable than the PCA analysis, which at its turn explains a larger amount of the variability and has higher factor loadings (all above 0.4). Since both methods reveal the same three dimensions and to facilitate comparison between our results and those found by other authors who also use PCA to analyse the factors (e.g.: Dunlap & Van Liere, 2000; Furman, 1998; Gambro, 1995; Rideout et al., 2005), we will base our discussion on the PCA. Item six 'The earth has plenty of natural resources if we just learn how to use them' (6) was disregarded from the NEP scores, as it didn't load sufficiently on any of the components in the factor analysis in our research. This result is in line with the findings of previous research (Dunlap et al., 2000; Rideout et al., 2005). We agree with Rideout et al. (2005) that NEP item 6 is probably misinterpreted by respondents. Cronbach alpha's were calculated for each dimension within each culture, all ranged between .65 and .87 and can constructs can thus be considered reliable measures for environmental concern.

Table 3. Mean Comparison Between the Belgian, Vietnamese and Zimbabwean Children for the Three Dimensions. Bold Marks Significant.

Dimension	Mean ± Std. Error	Compared to	Mean Difference ± Std. Error	Sig.
Limits to growth	<b>ZIM</b> 3.66 ± 0.73	BEL	<b>.13</b> ± .042	.006
		VN	<b>.14</b> ± .045	.005
	<b>BEL</b> 3.53 ± 0.77	ZIM	<b>-.13</b> ± .042	.006
		VN	.01 ± .044	1.000
	<b>VN</b> 3.57 ± 0.71	ZIM	<b>-.14</b> ± .045	.005
		BEL	-.02 ± .044	1.000
Man over Nature	<b>ZIM</b> 2.65 ± 0.73	BEL	<b>-.98</b> ± .044	.000
		VN	<b>-.71</b> ± .048	.000
	<b>BEL</b> 3.63 ± 0.72	ZIM	<b>.98</b> ± .044	.000
		VN	<b>.27</b> ± .046	.000
	<b>VN</b> 3.37 ± 0.79	ZIM	<b>.71</b> ± .048	.000
		BEL	<b>-.26</b> ± .046	.000
Balance of Nature	<b>ZIM</b> 3.71 ± 0.74	BEL	<b>-.33</b> ± .040	.000
		VN	<b>-.45</b> ± .043	.000
	<b>BEL</b> 4.04 ± 0.62	ZIM	<b>.33</b> ± .040	.000
		VN	<b>-.12</b> ± .041	.014
	<b>VN</b> 4.16 ± 0.64	ZIM	<b>.45</b> ± .043	.000
		BEL	<b>.12</b> ± .041	.014

The total NEP score was then defined as the sum of the scores of the other 14 items. To make comparison possible between the answers of the children, with regard to the dimensions, the directionality of the anthropocentric items was changed, and the score per group per dimension was calculated as the mean of all individual ecological and reversed anthropocentric items (see figure 1). The results of an ANOVA shows that there are significant differences between all countries for all dimensions:  $F(\text{BAL})= 61.6, p < .001$ ;  $F(\text{LIM})= 6.5, p= .002$ ;  $F(\text{MAN})= 256.7, p < .001$ . Post-hoc tests (table 3) show that all groups differ significantly from each other for all dimensions (all  $p < .015$ ), except Belgium and Vietnam for the LIM dimension (both  $p= 1.00$ ).

Table 1. Frequency distributions for the NEP scale for all groups. ( $N_{BEL} = 613$ ,  $N_{ZIM} = 524$ ,  $N_{VN} = 449$ , in percentages, frequency between brackets). SA = strongly agree, A = agree, AnD = agree nor disagree, D = disagree, SD = strongly disagree, ? = I don't know. BEL = Belgium, ZIM = Zimbabwe, VN = Vietnam

Item	Country	SA	A	AnD	D	SD	?	NEP-score*
1. We are getting close to having too many people on earth	BEL	15.7 (74)	26.7 (126)	32.8 (155)	14.0 (66)	10.8 (51)	21.7 (133)	42.4
	ZIM	42.0 (206)	25.5 (125)	13.9 (68)	9.6 (47)	9.0 (44)	6.1 (32)	67.5
	VN	54.1 (243)	29.8 (134)	5.1 (23)	2.4 (11)	2.0 (9)	6.5 (29)	84.0
2. Humans have the right to change the natural environment to fit their needs.	BEL	6.8 (38)	14.6 (82)	27.0 (151)	30.2 (169)	21.4 (120)	7.3 (45)	51.6
	ZIM	26.5 (132)	21.0 (105)	11.0 (55)	21.0 (105)	20.4 (102)	4.6 (24)	41.5
	VN	12.2 (55)	16.9 (76)	12.7 (57)	24.5 (110)	30.1 (135)	3.6 (16)	54.6
3. When humans disturb nature it often produces terrible results.	BEL	38.3 (220)	37.6 (216)	19.8 (114)	3.3 (19)	1.0 (6)	5.7 (35)	75.9
	ZIM	34.2 (161)	29.3 (138)	16.3 (77)	10.8 (51)	9.3 (44)	9.4 (49)	63.5
	VN	57.5 (258)	27.2 (122)	6.9 (31)	1.8 (8)	3.3 (15)	3.3 (15)	84.6
4. Human cleverness and skill will make sure that we do NOT ruin the earth.	BEL	8.9 (45)	16.1 (81)	32.2 (162)	24.7 (124)	18.1 (91)	16.6 (102)	42.8
	ZIM	24.1 (111)	22.2 (102)	18.7 (86)	20.4 (94)	14.6 (67)	11.5 (60)	35.0
	VN	24.9 (112)	23.4 (105)	18.9 (85)	18.0 (81)	6.7 (30)	8.0 (36)	24.7
5. Humans are greatly mistreating the environment.	BEL	29.6 (173)	31.7 (185)	29.8 (174)	6.5 (38)	2.4 (14)	3.3 (20)	61.3
	ZIM	33.4 (160)	29.2 (140)	12.9 (62)	14.2 (68)	10.2 (49)	7.3 (38)	62.6
	VN	32.5 (146)	36.3 (163)	12.0 (54)	8.5 (38)	7.6 (34)	3.1 (14)	68.8
7. Plants and animals have as much right as humans to live.	BEL	62.4 (362)	21.6 (125)	11.4 (66)	3.3 (19)	1.4 (8)	2.9 (18)	84.0
	ZIM	50.5 (257)	26.1 (133)	8.1 (41)	8.6 (44)	6.7 (34)	2.3 (12)	76.6
	VN	55.9 (251)	31.8 (143)	4.0 (18)	1.8 (8)	2.2 (10)	4.2 (19)	87.8
8. Nature is strong enough to handle the bad effects of modern developed countries.	BEL	2.4 (13)	5.8 (31)	14.7 (79)	36.6 (197)	40.5 (218)	11.4 (70)	77.1
	ZIM	13.7 (59)	28.0 (121)	22.0 (95)	19.9 (86)	16.4 (71)	16.6 (87)	36.3
	VN	8.7 (39)	9.8 (44)	13.6 (61)	19.4 (87)	36.5 (164)	12.0 (54)	55.9
9. Even with our special abilities humans must still obey the laws of nature.	BEL	34.1 (183)	45.8 (246)	16.6 (89)	3.0 (16)	0.6 (3)	11.4 (70)	79.9
	ZIM	58.2 (292)	26.5 (133)	7.0 (35)	3.2 (16)	5.2 (26)	3.6 (19)	84.7
	VN	14.0 (63)	24.1 (108)	25.8 (116)	18.0 (81)	4.9 (22)	13.1 (59)	38.1
10. The so-called "environmental crisis" facing humans has been blown out of proportion (exaggerated).	BEL	3.8 (17)	9.1 (41)	30.2 (136)	34.6 (156)	22.4 (101)	25.0 (153)	57.0
	ZIM	11.3 (41)	21.3 (77)	27.9 (101)	22.4 (81)	17.1 (62)	30.5 (160)	39.5
	VN	37.4 (168)	33.0 (148)	14.0 (63)	4.7 (21)	2.4 (11)	8.5 (38)	7.1
11. The earth is like a spaceship with very limited room and resources.	BEL	12.9 (52)	32.5 (131)	33.7 (136)	10.9 (44)	9.9 (40)	32.6 (200)	45.4
	ZIM	21.6 (101)	25.9 (121)	16.9 (79)	16.0 (75)	19.7 (92)	9.9 (52)	47.5
	VN	57.7 (259)	24.7 (111)	5.1 (23)	4.7 (21)	2.4 (11)	5.3 (24)	82.4
12. Humans were meant to rule over the rest of nature.	BEL	2.3 (13)	3.4 (19)	12.4 (69)	29.0 (162)	52.9 (295)	7.0 (43)	81.9
	ZIM	33.8 (161)	20.0 (95)	17.0 (81)	16.6 (79)	12.6 (60)	7.1 (37)	29.2
	VN	4.5 (20)	6.5 (29)	7.8 (35)	23.4 (105)	51.0 (229)	6.9 (31)	74.4
13. Nature is very delicate and easily harmed.	BEL	39.2 (224)	37.8 (216)	15.9 (91)	5.4 (31)	1.6 (9)	5.5 (34)	77.0
	ZIM	25.4 (117)	28.0 (129)	17.4 (80)	16.3 (75)	13.0 (60)	10.5 (55)	53.4
	VN	20.0 (90)	38.3 (172)	11.6 (52)	9.1 (41)	5.1 (23)	15.8 (71)	58.4
14. Humans will someday learn enough about how nature works to be able to control it.	BEL	12.4 (55)	24.2 (107)	33.0 (146)	19.2 (85)	11.3 (50)	26.6 (163)	30.5
	ZIM	37.8 (188)	36.2 (180)	12.7 (63)	6.0 (30)	7.2 (36)	4.6 (24)	13.3
	VN	10.7 (48)	23.8 (107)	16.5 (74)	13.8 (62)	5.8 (26)	29.4 (132)	19.6
15. If things continue as they are going, we will soon experience a major environmental disaster.	BEL	45.6 (227)	32.1 (160)	18.7 (93)	3.2 (16)	0.4 (2)	17.9 (110)	77.7
	ZIM	46.6 (219)	23.0 (108)	10.4 (49)	8.7 (41)	11.3 (53)	10.1 (53)	69.6
	VN	63.0 (283)	21.4 (96)	4.7 (21)	2.4 (11)	3.1 (14)	5.3 (24)	84.4

The NEP-score was calculated as the summary positive response frequency for each item:

'SA' + 'A' for the ecological items (1, 3, 5, 7, 9, 11, 13, 15)

'D' + 'SD' for the anthropocentric items (2, 4, 8, 10, 12, 14)

**Mean Total Pro-NEP %**  
 Belgium **63.2**  
 Zimbabwe **51.4**  
 Vietnam **58.9**

## Discussion

The objective of this study was to examine and compare the environmental worldview of children in Belgium, Vietnam and Zimbabwe. The results of this study reveal clear differences between ecological conceptions of the responding children from these countries. Belgian children in our study score highest of all three groups on Manoli et al.'s revised NEP scale for children (2005). The Zimbabwean children score lowest but still their NEP score indicates pro-ecological conceptions. The children in the Vietnamese subgroup have a score between the Belgian and Zimbabwean. Belgian responding children score high on both types of items (ecological and anthropocentric). Vietnamese children in our sample have a comparable ecological score but score lower on the anthropocentric items. The Zimbabwean group scores lowest both on ecological and anthropocentric items. Given that Belgium is a highly urbanised and developed country (HDI 14), and that Vietnam (HDI 101) and Zimbabwe (HDI 150) are both countries in development, these results suggest that children from western countries are more concerned about environmental problems than children from countries in development. In this view, the degree of development is positively correlated to pro-ecological conceptions. We might think of the basis of such a model in terms of Maslow's (1943) 'hierarchy of needs', according to which as one kind of need is satisfied another kind arises. For people in development countries the natural environment is essential for the satisfaction of survival needs. For people in western, industrialized countries it becomes a means to feelings of self-expression and accomplishment. To those whose needs lie between these two extremes the perceived significance of the natural environment might be low. Scott et al. (2003) make a similar suggestion on the differences in the relation to the environment between the rich, the poor, and those in between.

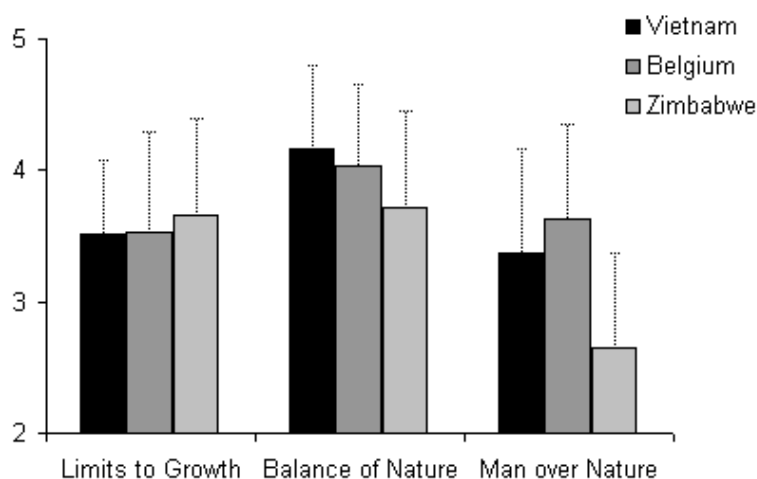


Figure 1. Comparison of groups per dimension. A high score indicates pro-ecological conceptions.

Knowing that the Vietnamese sample was taken from children in the area of the capital city and that the Zimbabwean respondents are part of a rural community, we could go further and suggest that in countries in development, children from urban communities have conceptions that are more environmentally orientated than those of children from rural communities. This has already been shown by Bogner & Wiseman (1997) for children in a western country (Germany). This hypothesis, which seems to be supported by the results



of our analysis of the children's answers to the questions in the NEP scale, is however too simplified and could create a negative image of the environmental worldview of children in countries in development. This observation, and the fact that more developed nations leave the deepest ecological footprints and are the driving forces behind the resource extraction and manufacturing around the world (McKeown et al., 2002), urged us to submit our comparative data to a dimensionality analysis, looking differences at a deeper level of the scale.

Three different dimensions arose from the factor analyses we performed. Our model (with all factor loadings above 0.4 and explaining 37.30% of the observed variance) for the dimensionality of the NEP scale supports models described in previous research (Albrecht et al., 1982; Noe & Snow, 1990; Shetzer et al., 1991; Gambro, 1995; Bechtel et al., 1999; Van Petegem & Blicke, 2006). When these dimensions are included in the interpretation of the answers of the responding children, it becomes clear that there is more at hand. The answers of all three countries indicate a shared ecological perspective in which they are aware of the negative impact humankind has on nature. The Zimbabwean and Vietnamese respondents, however, also feel dominant over nature and believe they have the right to use nature for their needs. This conception is strongest in Zimbabwean children. They have faith in the problem-solving abilities of science and technology and in the strength of nature to recover from human interference. Vietnamese children display comparable environmental conceptions as Zimbabwean children, but they do believe that the earth has limited resources. The Belgian children in our research, do not share the human-dominance view. Our results suggest that responding children in the (studied) countries in development have both an ecological and a utilitarian view of the environment. This dualism was also found (for adults) in Mexican and Brazilian communities (Bechtel et al., 1999; Corral-Verdugo & Armendáriz, 2000), and is strongest in the Zimbabwean sample. Corral-Verdugo & Armendáriz (2000) suggest that in industrialized societies, acceptance of the NEP implies a clear rejection of the anthropocentric views of the DSP. Whereas, in less industrialized societies, the distinction between the two worldviews may not be as clear cut, implicating a holistic view on the human-environment relationship. The results of our research clearly support their hypothesis.

Caldwell (1990) and Chokor (1993) suggest that indigenous, non-industrialised societies tend to believe in the profound connection between humanity and nature. They find compatibility between the natural balance and the needs of humans in using natural resources. This is clearest in our Zimbabwean sample, where children are concerned with the negative human impact on the ecological systems and at the same time believe in humankind's usage of nature. The majority of the population in Zimbabwe (65%) live in rural areas where they rely directly on natural resources for their livelihoods (Chenje et al., 1998). This strong reliance on natural resources might explain the combined ecological and utilitarian view of the environment in the Zimbabwean sample. In fact, believe in the need to balance between protecting the environment and satisfying human needs fits well with many definitions of sustainable development (e.g. Goodland, 1995; Corral-Verdugo & Armendáriz, 2000).

In conclusion, our results indicate that there is a clear and highly significant cultural influence on the environmental worldview of children. This difference in NEP acceptance at the level of human-nature interaction could be explained by distinct experiences of the natural world acquired in early childhood as these significantly influence environmental concern (Korhonen & Lappalainen, 2004). Our results suggest that the degree of development (for example measured by the HDI) of a community might be positively correlated to pro-ecological conception, but also that the rejection of the DSP by the NEP is



a phenomenon that could well only be present in western societies, whereas in less industrialised societies the NEP and DSP could coexist in a holistic paradigm.

Therefore, the model proposed above should be nuanced. Furthermore, the results of this study stress the importance of analysing the dimensionality of the NEP scale when it is used to research and compare environmental worldviews. As our research clearly indicates, cross-cultural differences in the environmental worldview of children are too subtle to be measured by the a one-dimensional NEP scale. In doing so, one might create an over-simplified and even incorrect image of the ecological conceptions of the studied group(s).

Our study has shown that environmental worldviews differ across cultures. Such differences should be accounted for while developing these initiatives. Also, initiatives cannot be transferred between cultures if the prevailing worldview on which they are based or which they intend to change differs between these cultures.

The present study is only a small part of ongoing studies in environmental conceptions of children. In further research it would be interesting to explore other cultures and contexts, as well as social and ethnic background, and educational activities.



### Biographical Statements

**Jelle Boeve-de Pauw** has PhD in Educational sciences. He has worked as a communicator and educator in the environmental and science area. He currently works as postdoctoral researcher in environmental education at the University of Antwerp's Institute for Education and Information Sciences.

**Peter Van Petegem** has a doctoral degree in pedagogical sciences. He is full professor at the University of Antwerp, where he leads the EduBRON research unit and the Centre for Expertise in Higher Education.

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