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The environmental worldview of children: a cross-cultural perspective

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The authors' research investigated young people's environmental worldviews using the revised 'New Ecological Paradigm' scale for children. The scale is a widely used measure of people's shifting worldviews from a human dominant view to an ecological one, with humans as part of nature. However, the scale has not been used with children. By administering the scale to children aged 13–15 in Belgium and Zimbabwe, the authors found statistical differences between the two subgroups in their perspectives on human–environment interactions. Children in Zimbabwe and Belgium display ecological worldviews but differences occur at the human dominance dimension. Respondents in Belgium believe in human–nature equality, whereas Zimbabwean youngsters feel more dominant over nature and emphasize a utilitarian view of the environment.

Introduction

For the last 25 years, the 'New Ecological Paradigm' scale has been used successfully to investigate the ecological worldviews of adults (Dunlap & Van Liere, 1978; Dunlap *et al.*, 2000). Previous scales focused on environmental attitudes and concerns about specific problems, such as pollution and misuse of natural resources (see Iozzi, 1981). The Dominant Social Paradigm (DSP), positing endless progress, growth, abundance and attitudes contributing to environmental degradation, has been challenged though, because of growing recognition of the seriousness of environmental problems. The New Ecological Paradigm (NEP), which highlights the disruption of ecosystems caused by modern industrial societies exceeding environmental limits, provides an alternative worldview to the DSP (Dunlap & Van Liere, 1978). In this view, nature is seen as a limited resource, delicately balanced and subject to deleterious human interference. The NEP scale was constructed to take account of this wider view of the relationship between modern societies and the environment, and the scale acts as a measure of the proposed shift in people's worldviews at the level of human–environment interaction.

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Originally, Dunlap and Van Liere designed the NEP scale in 1978. Following discussion of the multidimensionality of the scale and the obsolete nature of the terminology, the scale was revised by Dunlap *et al.* (2000) to become the New Ecological Paradigm scale. The first scale and the revised version have been popular measures of environmental concern and pro-environmental orientation of adults. High scores on the NEP scale indicate environmentally protective attitudes. Researchers (Vining & Ebreo, 1992; Roberts & Bacon, 1997; Furman, 1998; Bechtel *et al.*, 1999; Corral-Verdugo & Armendáriz, 2000; Schultz *et al.*, 2000a, b; Olli *et al.*, 2001; Clark *et al.*, 2003; Johnson *et al.*, 2004; Poortinga *et al.*, 2004; Rideout *et al.*, 2005) have used the scale in differing contexts to assess adults' perceptions concerning the environment. The scale has been found reliable and valid for adults.

Young people's environmental concerns and attitudes have also been investigated intensively (for example: Wals, 1992; Bogner & Wilhelm, 1996; Barraza, 1999; Connell *et al.*, 1999; Fien *et al.*, 2002; Loughland *et al.*, 2002; Tuncer *et al.*, 2005; overview in Rickinson, 2001). There has been little methodological uniformity, however, which makes the base of evidence in this area not as robust as that for adults. A widely used scale, such as the NEP scale, would be a useful addition to the instruments available for studies investigating children's concerns. Information on children's worldviews and pro-environmental conceptions is crucial as these youngsters will be responsible for the conservation of the environment in the future. Researchers investigating the development of environmental behaviour are interested, therefore, in the NEP scores of young people, particularly since most environmental education programmes are designed for children, and policy-makers and designers of environmental learning programmes can benefit from such findings too in their work. A revised NEP scale has been developed for children aged 10 to 12 by Manoli *et al.* (2005), that is, children at ISCED2 level: primary education and lower secondary education. They examined children's comprehension of the scale through interviews. Words that the children didn't understand were replaced by easier and more familiar synonyms, and 672 children from Pennsylvania and Louisiana, USA, validated the revised NEP scale.

In this article we investigate the worldviews of young people in Belgium and Zimbabwe, using Manoli *et al.*'s revised NEP scale for children. We examined whether children held beliefs consistent with: (a) the DSP, which upholds human dominance over nature and faith in progress and technology to solve all problems, including an ecological crisis; or (b) the NEP, based on humans as part of nature and on limitations to growth. We also looked for possible differences in perspective on human–environment interactions between Belgian and Zimbabwean children as past research suggests that culture plays an important role in this respect (Bechtel *et al.*, 1999; Corral-Verdugo & Armendáriz, 2000; Schultz *et al.*, 2000a; Nooney *et al.*, 2003).

Method

The 15-item NEP scale, revised by Manoli *et al.* (2005) for use with children, consists of eight items assessing an ecological—'humans as part of nature'—view, and seven

items assessing an anthropocentric—'humans as rulers over nature'—view. For example 'humans are greatly mistreating the environment' 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, scored as: strongly agree (5), agree (4), neither agree or disagree (3), disagree (2), strongly disagree (1) and I don't know (0). The value of the 'I don't know' answer was regarded as a missing value and is not included in the NEP scores.

An English-language version of the scale was administered class-wise to 524 pupils in Zimbabwe between 13 and 15 years old (ISCED2 level, 242 boys and 280 girls—two unknown). In Belgium, 613 children, 13 years old and also ISCED2 level (246 boys and 347 girls—20 unknown), filled out a Dutch version of the questionnaire. In total, six schools of general and technical education were asked to take part in the research. The schools were chosen for reasons of access and willingness to cooperate. The pupils were not in a specific environmental class or programme.

The scale was designed for children at ISCED2; we used it with slightly older children (aged between 13 and 15). We tested the comprehensibility of the scale for 13 to 15 year olds with only a few children. In future research this should be validated more widely, as children at this age are exiting ISCED2 and entering ISCED3, upper secondary level.

Results

We used a principal components factor analysis (PCA) with varimax rotation, showing three dimensions. The factor analysis was unconstrained, and the primary factors explained a total of 36% of the variance in results obtained. We also used a principal axis factoring method, showing the same three dimensions, although less profound, explaining 21% of variance. We present findings from both methods. To facilitate comparison between our results and those found by other authors who have also used PCA (e.g. Gambro, 1995; Furman, 1998; Dunlap *et al.*, 2000; Rideout *et al.*, 2005), we only discuss the results of the PCA. It is however important to emphasize that 64% of the variance in our results remains unexplained by the PCA.

We then present the response frequency distribution of the responding Belgian and Zimbabwean children, including the percentage agreement with the NEP perspective: the NEP scores, to make (future) comparison possible with other research on children's worldviews. The score is calculated as the sum of positive responses for each item: strongly agree plus agree. As the directionality of the anthropocentric items was reversed, the NEP score of these items was adjusted. A high NEP score indicates a pro-NEP perspective. The boundary between a pro-ecological perspective and a human–dominance perspective is generally held to be a NEP score of 45 (Rideout *et al.*, 2005). People scoring below 45 tend to be more in favour of the DSP worldview, whereas those with scores higher than 45 tend to be more in favour of the NEP worldview.

Following that, the mean responses over the three dimensions are compared.

Principal component analysis

Many researchers have analysed the dimensionality of the adult NEP scale. Considerable inconsistency in the number of dimensions has been found, ranging from one dimension to up to four dimensions (Dunlap *et al.*, 2000, p. 430). In our research, the PCA and the examination of a scree plot supported the three dimensions model described in previous research (Albrecht *et al.*, 1982; Noe & Snow, 1990; Schetzer *et al.*, 1991; Gambro, 1995; Bechtel *et al.*, 1999). The three dimensions are: 'Balance of nature', 'Limits to growth' and 'Humans over nature' (see Table 1). The variance explained by the dimensions amounts to 36%. Items 1, 9, 11 loaded heavily on the 'Limits to growth' component. Five items (3, 5, 7, 13, 15) loaded on the 'Balance of nature' component and items 2, 4, 8, 10, 12, 14 loaded on the 'Humans over nature' component. Item 6, 'The earth has plenty of natural resources if we just learn how to use them' (NEP 6), was disregarded from the NEP scores, as it had the lowest loading in the components 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.* that NEP item 6 is probably misinterpreted by respondents.

The total NEP score was then defined as the sum of the scores of the other 14 items.

Children's worldviews

Tables 2 and 3 show the response frequency distribution in terms of the percentage of children choosing each response and the total NEP score for both data-sets,

Table 1. Factor loadings in the principal component analysis (PCA) and the principal axis factoring method (PAF) of the revised NEP items with varimax rotation

	Dimensions					
	Limits to growth		Balance of nature		Humans over nature	
	PCA	PAF	PCA	PAF	PCA	PAF
NEP 1	**.665**	.332	–.197	–.063	–0.27	–.003
NEP 9	**.494**	**.418**	.243	.162	.142	.117
NEP 11	**.582**	.308	.149	.159	–.002	.016
NEP 3	–.137	–.117	**.685**	**.618**	.098	.091
NEP 5	–.178	–.008	**.508**	.270	.056	.041
NEP 7	.183	.137	**.506**	.362	–.060	–.037
NEP 13	.253	.142	**.382**	.272	–.082	–.047
NEP 15	.250	.290	**.597**	**.412**	–.057	–.050
NEP 2	–.065	.152	–.065	.006	**.475**	**.380**
NEP 4	–.006	.031	–.006	.021	**.608**	**.495**
NEP 8	.012	–.133	.012	.026	**.681**	**.600**
NEP 10	–.036	–.103	–.036	–.027	**.517**	**.398**
NEP 12	–.032	.164	–.032	–.047	**.707**	**.635**
NEP 14	.048	.074	.048	.025	**.581**	**.461**
NEP 6	*.266*	*.261*	*.264*	*.177*	*.359*	*.275*

Table 2. Frequency distributions for the revised NEP scale for children for the Belgian data-set (N = 613; frequency displayed in percentages, counts noted in brackets)

	Item	SA	A	Neither A or D	D	SD	?	NEP score*
1.	We are getting close to having too many people on earth.	15.7 (74)	26.7 (126)	32.8 (155)	14 (66)	10.8 (51)	21.7 (133)	42.4
2.	Humans have the right to change the natural environment to fit their needs.	6.8 (38)	14.6 (82)	27 (151)	30.2 (169)	21.4 (120)	7.3 (45)	51.6
3.	When humans disturb nature it often produces terrible results.	38.3 (220)	37.6 (216)	19.8 (114)	3.3 (19)	1.0 (6)	5.7 (35)	75.9
4.	Human cleverness and skill will make sure that we do NOT ruin the earth.	8.9 (45)	16.1 (81)	32.2 (162)	24.7 (124)	18.1 (91)	16.6 (102)	42.8
5.	Humans are greatly mistreating the environment.	29.6 (173)	31.7 (185)	29.8 (174)	6.5 (38)	2.4 (14)	3.3 (20)	61.3
7.	Plants and animals have as much right as humans to live.	62.4 (362)	21.6 (125)	11.4 (66)	3.3 (19)	1.4 (8)	2.9 (18)	84
8.	Nature is strong enough to handle the bad effects of modern developed countries.	2.4 (13)	5.8 (31)	14.7 (79)	36.6 (197)	40.5 (218)	11.4 (70)	77.1
9.	Even with our special abilities humans must still obey the laws of nature.	34.1 (183)	45.8 (246)	16.6 (89)	3 (16)	0.6 (3)	11.4 (70)	79.9
10.	The so-called 'environmental crisis' facing humans has been blown out of proportion (exaggerated).	3.8 (17)	9.1 (41)	30.2 (136)	34.6 (156)	22.4 (101)	25 (153)	57.0
11.	The earth is like a spaceship with very limited room and resources.	12.9 (52)	32.5 (131)	33.7 (136)	10.9 (44)	9.9 (40)	32.6 (200)	45.4
12.	Humans were meant to rule over the rest of nature.	2.3 (13)	3.4 (19)	12.4 (69)	29 (162)	52.9 (295)	7 (43)	81.9
13.	Nature is very delicate and easily harmed.	39.2 (224)	37.8 (216)	15.9 (91)	5.4 (31)	1.6 (9)	5.5 (34)	77.0
14.	Humans will someday learn enough about how nature works to be able to control it.	12.4 (55)	24.2 (107)	33 (146)	19.2 (85)	11.3 (50)	26.6 (163)	30.5
15.	If things continue as they are going, we will soon experience a major environmental disaster.	45.6 (227)	32.1 (160)	18.7 (93)	3.2 (16)	0.4 (2)	17.9 (110)	77.7
Mean Total Pro-NEP %								**63.18**

*The NEP score was calculated as the sum of the positive response frequencies for each item:
SA plus A for the ecological items (1, 3, 5, 7, 9, 11, 13, 15)
D plus SD for the anthopocentric items (2, 4, 8, 10 ,12, 14)

Table 3. Frequency distributions for the revised NEP scale for children for the Zimbabwean data-set (N = 524; frequency displayed in percentages, counts noted in brackets)

	Item	SA	A	Neither A or D	D	SD	?	NEP score*
1.	We are getting close to having too many people on earth.	42 (206)	25.5 (125)	13.9 (68)	9.6 (47)	9 (44)	6.1 (32)	67.5
2.	Humans have the right to change the natural environment to fit their needs.	26.5 (132)	21 (105)	11 (55)	21 (105)	20.4 (102)	4.6 (24)	41.5
3.	When humans disturb nature it often produces terrible results.	34.2 (161)	29.3 (138)	16.3 (77)	10.8 (51)	9.3 (44)	9.4 (49)	63.5
4.	Human cleverness and skill will make sure that we do NOT ruin the earth.	24.1 (111)	22.2 (102)	18.7 (86)	20.4 (94)	14.6 (67)	11.5 (60)	35
5.	Humans are greatly mistreating the environment.	33.4 (160)	29.2 (140)	12.9 (62)	14.2 (68)	10.2 (49)	7.3 (38)	62.6
7.	Plants and animals have as much right as humans to live.	50.5 (257)	26.1 (133)	8.1 (41)	8.6 (44)	6.7 (34)	2.3 (12)	76.6
8.	Nature is strong enough to handle the bad effects of modern developed countries.	13.7 (59)	28 (121)	22 (95)	19.9 (86)	16.4 (71)	16.6 (87)	36.3
9.	Even with our special abilities humans must still obey the laws of nature.	58.2 (292)	26.5 (133)	7.0 (35)	3.2 (16)	5.2 (26)	3.6 (19)	84.7
10.	The so-called 'environmental crisis' facing humans has been blown out of proportion (exaggerated).	11.3 (41)	21.3 (77)	27.9 (101)	22.4 (81)	17.1 (62)	30.5 (160)	39.5
11.	The earth is like a spaceship with very limited room and resources.	21.6 (101)	25.9 (121)	16.9 (79)	16 (75)	19.7 (92)	9.9 (52)	47.5
12.	Humans were meant to rule over the rest of nature.	33.8 (161)	20 (95)	17 (81)	16.6 (79)	12.6 (60)	7.1 (37)	29.2
13.	Nature is very delicate and easily harmed.	25.4 (117)	28 (129)	17.4 (80)	16.3 (75)	13 (60)	10.5 (55)	53.4
14.	Humans will someday learn enough about how nature works to be able to control it.	37.8 (188)	36.2 (180)	12.7 (63)	6 (30)	7.2 (36)	4.6 (24)	13.3
15.	If things continue as they are going, we will soon experience a major environmental disaster.	46.6 (219)	23 (108)	10.4 (49)	8.7 (41)	11.3 (53)	10.1 (53)	69.6
Mean Total Pro-NEP %								**51.44**

*The NEP score was calculated as the sum of the positive response frequencies for each item:
SA plus A for the ecological items (1, 3, 5, 7, 9, 11, 13, 15)
D plus SD for the anthopocentric items (2, 4, 8, 10 ,12, 14)

respectively. It becomes clear that the Belgian children are more in favour of the NEP worldview (mean NEP score of 63.18) than the children in Zimbabwe (mean NEP score of 51.44) indicating that the Belgian children display pro-ecological conceptions more than the children in Zimbabwe. The Zimbabwean youngsters in our sample score low on the anthropocentric items in comparison with the Belgian youngsters. Although the Zimbabwean children show concern for the environment and accept the ideas embedded in the NEP, the results suggest they also feel dominant and entitled to use nature for their personal needs, which lowers their NEP scores.

Comparing the Zimbabwean and Belgian children's answers concerning the three dimensions given by the factor analysis (Table 4), there is a statistically significant difference on these three components ($p < 0.05$). Profound differences can be seen in the 'humans over nature' dimension (Figure 1). The children in Zimbabwe appear to be more convinced than the Belgian children that economic growth and population growth are limited and that humans dominate nature, and less convinced in the importance of nature being in balance. On the other hand, they are more in favour of limited growth than the Belgian youngsters. The children in Zimbabwe emphasize human dominance and the right to use natural resources to fit human needs. In contrast to the Belgian respondents, the Zimbabwean children responded more strongly that nature can withstand modern industry, which suggests a DSP worldview. However the Zimbabwean children also appear to support an NEP worldview as their responses maintain that humans must obey the laws of nature instead of mistreating the environment. The Belgian children share this view and appear equally aware of the dangers involved in human interference.

Discussion

The objective of this study was to examine the environmental worldviews of young children in Belgium and Zimbabwe. Our results indicate clear differences in the perception of the human–nature interrelationship between the two subgroups. Responding children in Belgium score higher on the NEP scale than respondents in Zimbabwe, indicating more environmentally protective attitudes amongst the Belgian children. This difference in NEP acceptance could be explained by distinct experiences of the natural world acquired in early childhood as these influence environmental concern (Korhonen & Lappalainen, 2004), although complementary

Table 4. Mean comparison between the answers of Zimbabwean and Belgian children for the three components

Component	ZIM	SD	BEL	SD	t-value	df	sig.
Limits to growth	3.77	0.84	3.58	0.81	3.97	1123	< 0.001
Balance of nature	3.71	0.74	4.10	0.57	–9.78	968	< 0.001
Humans over nature	3.28	0.68	2.37	0.68	22.54	1134	< 0.001

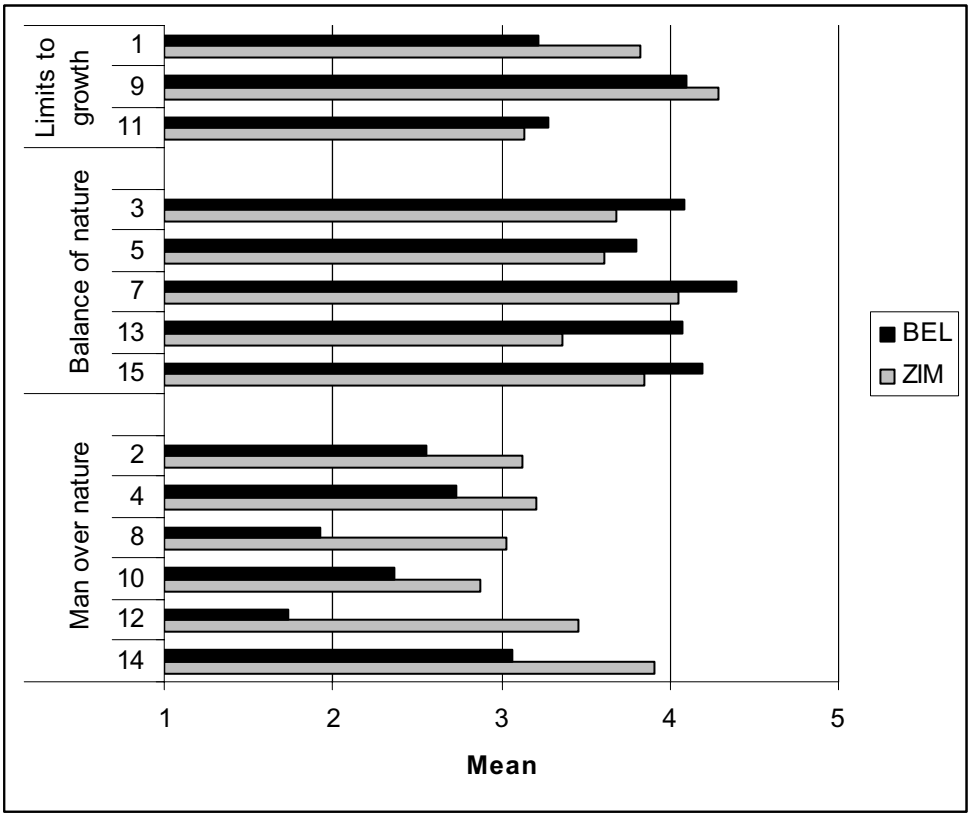

Figure 1. Comparison of means by item on the revised NEP for children for the Belgian and Zimbabwean data-sets

work has not been carried out to confirm this. When we consider the three different dimensions of the NEP scale arising from our analysis, it becomes clear that there could be more at stake though. The answers of the subgroups in Zimbabwe and Belgium indicate a shared ecological perspective in which they are aware of the negative impact humankind has on nature. The Zimbabwean respondents, however, also feel dominant over nature and believe they have the right to use nature for their needs. They display faith in the problem-solving abilities of science and technology and in the strength of nature to recover from human interference. The Belgian children in the research do not share this human dominance view. Only the responding children in Zimbabwe have both an ecological and a utilitarian view of the environment. This dualism was also found in a Mexican and Brazilian community (Bechtel *et al.*, 1999; Corral-Verdugo & Armendáriz, 2000). The authors 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 of the

human–environment relationship. Caldwell (1990) and Chokor (1993), for example, suggest that indigenous, non-industrialized societies tend to believe in the profound connection between humanity and nature. They find compatibility between natural balance and the needs of humans in using natural resources. In our Zimbabwean sample, children are concerned with the negative human impact on ecological systems and, at the same time, their responses suggest they believe in limited human usage of nature, perhaps because of their nature-extractive tradition. In fact, belief in the need to balance between protecting the environment and satisfying human needs fits well with many definitions of sustainable development (Goodland, 1995; Corral-Verdugo & Armendáriz, 2000).

In conclusion, both subgroups in Zimbabwe and Belgium are (moderately) environmentally conscious, but differences between them occur in the anthropocentric dimension. Our research and that of Fien *et al.* (2002) suggest that some children have made a significant shift towards the frame of thinking needed for the solution of environmental problems. However, ongoing educational support is necessary to prepare young people to explore ways to support sustainability and to understand the nature of environmental problems and solutions for the conservation of the remaining environment. For example, outdoor education experiences of sufficient duration are found to influence adolescents' preferences towards the environment and nature usage (Bogner, 2002), and future research might consider the effects of cultural context on this and children's worldviews.

The present report is a small part of our ongoing studies of environmental beliefs of children in developing and developed countries. It is important to note the limitations of this research design. First, the random samples are relatively small, as is the amount of variance we were able to explain in our analysis. Second, principal axis factoring method is arguably a more appropriate form of analysis, as being based on a common factor model rather than a full component model, it assumes that the variables will seldom be calculable from the common factors alone, for each variable will be influenced by sources independent of the other variables. These sources may be legitimate causal influences that are not affecting the other variables, systematic distortions in the scores (usually called bias) or random error from inaccuracies of measurement. The full component model, conversely, assumes that the variables can be directly calculated from the factors by applying weights. The existence of a set of factor scores that produce the original variables exactly is assumed. Any observed error is a reflection of the inaccuracy of the model in that particular sample. Third, oblique rotation of the factors may also suggest other factors that are allowed to become correlated—rather than assume they necessarily are, as in an orthogonal rotation—and thus offers a more parsimonious description of the vector configuration. Despite these limitations, our results provide an intriguing insight into cultural differences in children's worldviews. In further research, it would be interesting to explore other cultures and contexts besides those of Belgium and Zimbabwe, including the effects of personality on worldviews, as well as social and ethnic background, and educational activities.

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