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**Applying The New Ecological Paradigm Scale in the Case of Environmental Education: Qualitative Analysis of the Ecological Worldview of Dutch Children**

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**Introduction**

Greater interest in environmental education or EE has emerged as even short educational programs were proved to stimulate environmental awareness in children (Manoli et al, 2007) and college students (Rideout, 2005). However, the efficacy of environmental education was rarely tested. While the measurements tackling environmental knowledge, attitudes and behaviour were developed in publications of the Journal of Environmental Education, Journal of Environmental Psychology, Environment and Behavior and Environmental Education Research, practically none have been applied to the case of environmental education. State-of-the-art in environmental education research is dominated by quantitative studies characterized by uniform, standardized models that do not take socio-cultural context in which education occurs into account.

Various scales were used for the study of environmental values and behavior, measuring what a person states he is willing to do regarding ecology and pollution issues (verbal commitment), what a person actually does do (actual commitment), how he feels about such issues (affect), and what relevant knowledge he has (knowledge) (Maloney and Ward, 1973; Maloney et al 1975). Other scales included Environmental Concern Scale (Wiegel and Wiegel, 1978); General Environmental Behavior scale (GEB) (Kaiser, 1998

and 2004; Kaiser & Biel, 2000); Scales based on translation from beliefs, attitudes, views and values to actual behavior based on the value–belief–norm (VBN) model of environmental concern and behavior (Stern et al., 1995 and 1998); Connectedness to nature, or ‘inclusion of nature in the self’ scale (INS) (Schultz, 2001); the implicit associations test (IAS) (Schultz et al. 2004); Connectedness to nature scale (CNS) (Mayer and Frantz, 2004:504); Behavior-based environmental attitude scale (Kaiser et al 2007).

One of the most popular measures of ecological beliefs in studies that use theoretical models predicting environmental attitudes and behaviors is the New Environmental Paradigm (NEP) Scale developed by Dunlap and Van Liere (1978). 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. The Dominant Social Paradigm (DSP), positing endless progress, growth, abundance and attitudes contributing to environmental degradation, is then opposed to the New Environmental Paradigm (NEP), which highlights the disruption of ecosystems caused by modern industrial production. In NEP, nature is seen as a limited resource, delicately balanced and subject to deleterious human interference.

However, none of these scales, including NEP, were consistently applied in the case of environmental education. With few exceptions (e. g. Rideout, 2005), very few of the environmental attitude and behaviour measures were focused on evaluation of EE, nor have there been longitudinal studies examining the influence of education on the environmental attitudes of children or students' knowledge. Given the diversity of approaches to EE as well as great variability of national context in which EE is presented, standard quantitative measurements, such as the aforementioned scales, might not always be best-suited for evaluating EE either. The goal of EE is to be defined in the formulation of the Belgrade Charter ‘To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones’ (UNESCO and UNEP, 1975) the measurement of the efficacy of environmental education programs takes on a new importance. Given the fact that NEP scale is one of the most popular measures of environmental beliefs and attitudes, the author proposes that it might be a good measure to address the efficacy of EE – if it can be shown to be sensitive to the socio-cultural contexts in which EE takes place.

The aim of this article is to complement the New Ecological Paradigm (NEP) scale developed by Dunlap and Van Liere by a more culturally sensitive model whereby the specifications of social and cultural contexts can serve as a starting point for evaluating the efficacy of EE. Arguing that disparate social and cultural contexts require equally distinct approaches towards EE, this article aims to produce a ‘social context-sensitive - NEP’. In this article, the author argues that if NEP scale could be combined with the more socio-culturally specific qualitative methodology, the useful evaluative tool for addressing the efficacy of EE programs could be developed. To heed the recent calls for a more qualitative approach to environmental education, qualitative approach to tackling environmental values and attitudes is advocated (Zarger, 2002 and 2010; Anderson, 2011; Baines and Zarger, 2011; Efird, 2011; Kopnina, 2011, 2011a and 2011b; Storksdieck et al 2011; Zanotti 2011).

## The NEP scale.

The original NEP scale consisted of three dimensions: the balance of nature, anthropocentrism, and limits to growth (Dunlap and Liere, 1978). The NEP scale was aimed to capture ‘... beliefs about humanity’s ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity’s right to rule over the rest of nature’ (Dunlap et al., 2000:427). The scale has been used by social psychologists (e.g. Stern, 2000), political scientists (e.g. Dalton *et al.*, 1999), sociologists (e.g. Albrecht *et al.*, 1982), and geographers (Lalonde and Jackson, 2002), and more recently anthropologists (Shoreman-Ouimet and Kopnina, 2011) generally indicating widespread acceptance of environmental attitudes and beliefs. Many revisions have followed, and New Environmental Paradigm was renamed New Ecological Paradigm (Dunlap et al., 2000). Additional elements were added to the scale, including human exemptionalism (the idea that human beings are exempt from constraints of nature), and ecocrisis (concerns about the occurrence of potentially catastrophic environmental changes (Dunlap, 2008). The 15-item NEP scale consisted of eight items assessing an ecological, and seven items assessing an anthropocentric view. The NEP scale was correlated with a wide range of national characteristics and national-level scores on several social-psychological characteristics obtained from prior cross-national studies (Hawcroft and Milfont, 2010).

Central aspects of NEP (adapted from Lundmark, 2007) included

### *Human domination over nature*

- \* Humans have the right to modify the natural environment to suit their needs DSP
- \* Plants and animals have as much right as humans to exist NEP
- \* Humans were meant to rule over the rest of nature DSP

### *Human exemptionalism*

- \* Human ingenuity will insure that we do NOT make the earth unliveable DSP
- \* Despite our special abilities humans are still subject to the laws of nature NEP
- \* Humans will eventually learn enough about how nature works to be able to control it DSP

### *Balance of nature*

- \* When humans interfere with nature it often produces disastrous consequences NEP
- \* The balance of nature is strong enough to cope with the impacts of modern industrial nations DSP
- \* The balance of nature is very delicate and easily upset NEP

### *The risk of an ecocrisis*

- \* Humans are severely abusing the environment NEP
- \* The so-called ‘ecological crisis’ facing humankind has been greatly exaggerated DSP
- \* If things continue on their present course, we will soon experience a major ecological catastrophe NEP

### *Limits to growth*

- \* We are approaching the limit of the number of people the earth can support NEP

\* The earth has plenty of natural resources if we just learn how to develop them DSP

### **Environmental education and NEP scale.**

None of these environmental or ecological scales, including NEP, were used consistently to measure the efficacy of environmental education programs. While environmental education or EE has become internationally prominent since the nineteen sixties, few efforts have been made to apply measurements of environmental attitudes, etc. to evaluate educational programs. EE, which was originally ‘aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution’ (Stapp et al, 1969) has rather been presented as a ‘given’, following the general prescriptions formulated in the Belgrade Charter (UNESCO–UNEP 1976) and later Agenda 21 (UNESCO 1992) without the support of either quantitative – or qualitative methods of addressing environmental attitudes, awareness, concern, knowledge developed.

Due to the fact that NEP is the most popular measure of environmental beliefs and attitudes, the author would like to propose that NEP scale needs to be critically examined as a possible measurement of the efficacy of environmental education programs. However, as the author has argued on the basis of a recent study of comprehension of NEP items in Dutch upper-elementary school children (Kopnina, 2011c), applicability of NEP scale first needs to be critically examined. Kopnina’s study also showed that qualitative test of comprehension of NEP scale is necessary in order to establish NEP’s applicability in a Dutch context.

This article will address the application of the NEP scale in children and will provide a reflection on cross-cultural applicability of the scale. The author will propose that qualitative testing of the scale is helpful and necessary if meaningful results of the measurements are expected. In the following section, the author will address application of the NEP scale in children, criticism of the NEP scale and will present the qualitative case study of comprehension of NEP scale items in the Dutch upper-elementary school children.

### **Applying NEP scale in children.**

Based on the adult NEP scale, Williams and McCrorie (1990) and Leeming and Dwyer (1995) developed the scale for measuring children’s behavioral commitments, affective states and knowledge about the environment. However, this scale was based on outdated notions of environmental issues and included that falls outside of children’s volitional control (e.g., for example, driving a car or choosing to take a bus) and might have difficulty comprehending (Evans et al, 2007: 638). Musser & Diamond (1999) have developed an assessment tool for young children that use drawings to supplement verbal probes. This NEP scale for children was further adapted by translating key themes of the NEP into games appropriate for first- and second-grade children (Evans et al., 2007). Evans and colleagues developed interactive games derived from dimensions of the NEP model and an adoption of Kaiser’s General Environmental Behavior (GEB) Scale for adults. These games included felt board construction, a board game, and an adjustable worry thermometer.

Manoli, Johnson, & Dunlap (2007) suggested that a 3-dimensional modified NEP Scale for the use with children aged 10-12 years. These items, listed in Manoli et al (2007:9) were:

1. Plants and animals have as much right as people to live.
2. There are too many (or almost too many) people on earth.
3. People are clever enough to keep from ruining the earth.
4. People must still obey the laws of nature.
5. When people mess with nature it has bad results.
6. Nature is strong enough to handle the bad effects of our modern lifestyle.
7. People are supposed to rule over the rest of nature.
8. People are treating nature badly.
9. People will someday know enough about how nature works to be able to control it.
10. If things don't change, we will have a big disaster in the environment soon.

In investigating cross-cultural environmental worldviews in children, Van Petegem and Blicck (2006) used the revised NEP scale for children aged 13-15. By administering the scale to children in Belgium and Zimbabwe, the authors found statistical differences between the two subgroups in their perspectives on human-environment interactions. While in the study applying revised NEP scale for children aged 10 to 12, Manoli et al. (2007), examined children's comprehension of the scale through interviews (words that the children didn't understand were replaced by easier and more familiar synonyms, with 672 American children validating the revised NEP scale), no such rigorous validation occurred for this study. Van Petegem and Blicck, having conducted the study among 613 Belgian and 524 Zimbabwean pupils, have only tested the comprehensibility of the scale 'with only a few children', reflecting that in future research this should be validated more widely (Van Petegem and Blicck, 2006:629).

In Van Petegem and Blicck's study, respondents in Belgium believe in human-nature equality, whereas Zimbabwean youngsters feel more dominant over nature and emphasize a utilitarian view of the environment. Unlike the Belgians, the Zimbabwean respondents displayed faith in the problem-solving abilities of science and technology and in the strength of nature to recover from human interference. Van Petegem and Blicck consider no theories about the influence of social context (the influence on children's world views of parents, peer groups) or political and institutional context (the role of the government-sponsored information, media, and the education itself).

Relating this to the case study of the West European children, most of which grew up in a country that lost most of the original forest hundreds of years ago due to agricultural developments, we would expect that their environmental values and attitudes will be low. We may speculate that the developed-country children grow up with a very different kind of environmentalism, based on distant knowledge, rather than experience:

As a boy, I was unaware that my woods were ecologically connected with any other forests. Nobody in the 1950s talked about acid rain or holes in the ozone layer or global warming. But I knew my woods and my fields; I knew every bend in the creek and dip in the beaten dirt paths. I wandered those woods even in my dreams. A kid today can likely tell you about the Amazon rain forest—but not about the last time he or she



explored the woods in solitude, or lay in a field listening to the wind and watching the clouds move (Louv, 2005:1).

The lack of contextual and cultural analysis of the differences in NEP scale responses in children is particularly surprising because the differences in perceptions between West European and African nation can be very large (Korhonen and Lappalainen, 2004). Deeper ethnographic study focusing on socio-cultural factors influencing the children's comprehension of the items scale as well as analysis of the NEP scale itself seem warranted.

### **Criticism of NEP**

Critics asserted that NEP is a poor predictor of environmental behaviors (Scott and Willits, 1994) and that the NEP Scale were overly simplistic and outdated (Lalonde and Jackson, 2002). NEP was also criticized for measuring cognitive beliefs based on learned facts rather than affective experience, based on emotional bond with nature (Mayer and Franz, 2004:505). Additionally, NEP was criticized for the lack of unidimensionality as the NEP Scale produced three distinct dimensions consisting of the balance of nature, limits to growth, and anti-anthropocentrism items (Nooney et al, 2003). In retort, Dunlap has argued that sets of 12 to 15 items will nearly always yield more than one factor—factors that are often sample specific—and a more realistic measure of a scale's utility is its degree of internal consistency (Dunlap et al., 2000).

Another criticism of the NEP scale is related to NEP's compatibility with the general environmental ethics theories. Lundmark's study (2007) showed that the NEP scale is insufficient in addressing the fundamentals in human–nature relationships and in elaborating upon ways to deal with the environmental situation that follow from shallower or deeper variants of present-day environmental ethics. While pronounced forms of anthropocentrism are well captured by the scale, the environmental position is 'shallow' rather than 'deep green' and misses crucial elements of the contemporary environmental ethics debate (Lundmark, 2007:343).

Another critique stems from the cross-cultural applicability of the NEP scale as the conceptualization of ecological worldviews may not be applicable outside of the developed nations (e.g., Chatterjee, 2008). While some studies supported cross-cultural validity of NEP scale (Kahn, 1999; Bechtel, et al 1999 and 2006; Vikan, et al 2007; Hawcroft and Milfont, 2010), others seem to suggest that the items are not always 'translatable' outside of Western countries. A number of studies in Eastern European nations (Gooch, 1995) and Latin American nations (e.g., Schultz & Zelezny, 1998) have found lower levels of internal consistency and more difficulty with respondents' understanding of some items than have studies in the United States and western European nations.

In the case of NEP scale for children, Manoli and colleagues concluded that NEP results cannot be generalized until other researchers have conducted further studies with children from other backgrounds and in other locations (Manoli et al, 2007:11). Dunlap (2008) eloquently responded to these criticisms by asserting that many other researchers have demonstrated the utility of analyzing the dimensionality of the NEP cross-culturally (e.g. Bechtel, et al 1999 and 2006), and that the belief-systems approach

regards the potential multidimensionality of the NEP not as a problem but as a means of documenting variation in the structure and coherence of an ecological worldview across cultures.

However, the essential problem of interpretation of items on the NEP scale, taking cultural context into account, has not been discussed. Another issue is that despite the great political and academic interest in the efficacy of environmental education (EE) programs, no adequate measure of the success of EE has been developed. As the author will argue, since it is the most popular scale of environmental beliefs up to date, the NEP scale could be used for zero-measurement (at the start of EE program) and consequent measurement (after the EE program has been completed) of environmental attitudes in children. In the context of EE, applicability of NEP scale cross-nationally takes up a new importance.

### **Environmental education in The Netherlands.**

In the Netherlands, we may distinguish between international, European Union, and national levels of environmental education guidelines. For example, there are teachers guides that are used for broad preparation of educators for the task of teaching EE (milieu educatie) in general that combine both international, EU and national initiatives (<http://www.leraar24.nl/dossier/286>). There are three professional organisations focusing almost exclusively on environmental education (Deursen et al 2003) and more recently on education for sustainable development (Wagenaar, 2007). EE educators at the school level normally have a background in natural science, and in higher education, in general education and communication (Broens 1999; Wesselink and Wals, 2011). Dutch school curriculum typically involves a number of nation-wide ‘nature activities’, such as ‘bosweek’ (‘forest week’ when pupils are camping and performing scouting activities) or ‘schooltuinen’ (‘school gardens’ when pupils are allocated small plots of land to learn basic gardening) (Thijssen, 2002; Kopnina 2011, 2011a).

In the report published by the Netherlands National Commission for UNESCO and the Dutch Institute for Vocational and Adult Education (CINOP), ‘Learning for Sustainable Development: Exploring learning Strategies across the lifespan’ (Heideveld and Cornelissen 2009) define ESD aim in the Dutch context as ‘learning to change: contribute to a sustainable world’ (p. 19) and the development of vision and purpose directed at the three pillars of sustainable development: economic, social, ecological’ (p.28). The Dutch Program Learning for Sustainable Development is the focal point of the UN Decade on Education for Sustainable Development (DESD) in the Netherlands.

In practice, education for sustainable development (ESD) programs in The Netherlands at show a great amount of variability and flexible pedagogical tools and strategies are used. UNESCO-initiated programs, for example, include selection of the so-called UNESCO schools with special curriculum addressing SD (school profile documents) or extending general recommendations on ESD to local curriculum at Dutch schools (<http://www.duurzamepabo.nl/>). EE or ESD programs are not necessarily structured according to one or other type of guideline but happen somewhat ad hoc, as in the sample for the present study, where educators are free to structure their own curriculum around science and nature education, as well as more specific ESD related to for example history programs (Kopnina, 2011). While many education professionals decry



the lack of consistent evaluation tools of the efficacy of EE programs in raising pupils' environmental awareness, NEP scale could provide a way of measuring such awareness. But first, applicability of the NEP's scale items in the Dutch context needs to be tested.

### **Discussing Item 6. Nature is strong enough to handle the bad effects of our modern lifestyle.**

The study was conducted among 59 students between the ages 10 and 12 recruited at two select schools in Amsterdam area between April and June 2010. The focal question of the focus groups and interviews was comprehension and discussion about 10 items of the NEP scale, presented above. The items were read out one by one by the discussion leader. In group discussions, having explained the goal of an exercise, the researcher herself stayed 'away' from discussion and just recorded the speakers. The goal of the discussion was, in the case of focus group, to generate peer-group dynamic and discover common as well as divergent views; in the case of interviews individual differences in perceptions were sought. During the interview, the interviewer took a more active role, specifically focusing on the question of how does the child himself (thinks) to arrive at certain opinions. In this article, shall discuss only one item, as anthropological notes are beyond the scope of this article. Selected item was chosen because they are representative of the various attitudinal/affective sub-themes supposedly evoked by the scale. Preliminary results of this study are reported in the recent article (Kopnina, 2011c), reporting on discussion of items 2 and 4 of the scale. In this article, the author will present abridged qualitative data and discuss the implications of discussion of item 6 of the NEP scale.

Item 6, is originally formulated as 'The balance of nature is strong enough to cope with the impacts of modern industrial nations' and adopted for children to be phrased 'Nature is strong enough to handle the bad effects of our modern lifestyle'. This item is related to two separate notions. One is that of the 'impact of modern industrial nations' or 'effects of our modern lifestyle' (both perceived to have a negative effect on the environment). Another notion is that of nature being 'strong enough' to cope with or handle these negative effects. Below, excerpts from focus group discussion and interviews are presented.

#### **Extract from the focus group discussion, 8 children:**

[Suzanna, 11]: We pollute nature, we through garbage out, it cannot be good...

[Max, 11]: Also factories, all the bad air....

[Joost, 10]: Nature is used for our... technology and... to make things...

[FGM]: But is the nature strong enough to handle all this?

[Joost]: Yes!

[Tijn, 10]: No. Look at all the mess!...

[Joost]: What mess, nature's handling it!...

[Tijn]: No, we are handling it, people are handling it, nature is just... polluted.

[FMG]: Can nature handle all this without our help?

[Suzanna]: No.

[Joost]: What do you mean [addressing FMG]?

[Tijn]: She means can nature handle pollution...

[FMG]: I need to clarify: the question was not just about pollution, but about the bad effects of our modern lifestyle.

[Joost]: But pollution is part of our modern lifestyle... Right?  
 [Max]: Pollution IS our modern lifestyle.  
 [Tijn]: Ah, smart guy, you are the professor now....  
 [FMG, addressing the two children that haven't spoken yet]: What do you think is 'modern lifestyle'? What relationship does it have to nature?  
 [Nova, 12]: I don't know.  
 [Sanne, 12]: I think it depends... Depends on where we live...  
 [Joost]: You mean, if you live in Rotterdam you have a different lifestyle?  
 [Sanne]: I mean, if you live in a poor country you don't use that much electricity and other things. Modern lifestyle is things like cars and mobile phones, but you don't have them everywhere...  
 [Joost]: In which country there are no phones?  
 [Sanne]: That's not the point. [FMG] asked about modern lifestyle, what it is, I say it's not the same everywhere. So the influence on nature isn't the same everywhere.  
 [Tijn]: Nature's also not the same everywhere...  
 [Tijn]: Look, if you live in a desert and have your... I don't know, car or whatever, that's different from in Amsterdam. I mean, if you have just desert, sand....  
 [Joost]: She's [FMG] asking about nature in general, right? Nature on earth. I think it doesn't matter where you drive or what you do, because it's one earth, and it's not just here and there... Nature can handle something here and something there, but if it's too much... If it becomes too much that the whole planet is... endangered.

**Extract from the interview, Sarah, 11.**

I think nature can handle almost anything... It can take a lot of time though. Like with some trash you throw out. Like plastic, that can take a long time to... disintegrate... But other things can be – like... absorbed by nature, like paper. If you throw away newspaper it will eventually become earth. It doesn't take that long. [...]  
 I heard that here [in Holland] a lot of trash gets burned. This is not so good for nature because nothing is going back to the ground... Burning makes for bad air... How you call it? Pesticides? No, pollution, parts of the air, like particles... But this burning can also be used for making energy, like electricity that we use... So it can be useful...

**Reflection.**

We have mentioned that item 6 is related to two separate notions, one of the negative 'effects of our modern lifestyle'; and another is that of nature being 'strong enough' to cope with or handle these negative effects. In both cases, closer examination of the Dutch context, particularly the educational curriculum addressing the knowledge of facts about the human effect on environment as well as the ability of certain elements in this environment to absorb or resist certain 'shocks' might be crucial in order to interpret children's responses. Another contextual factor could be the influence of the parents, peers and the media in formation of Dutch children's knowledge and attitudes towards nature. It would be interesting to know, for example, how and where Sarah learned about incinerating garbage and generation of energy in the Netherlands, and how her beliefs about nature' ability to absorb garbage are formed.

It seems that the definitions of 'nature' and 'modern lifestyle' are contested in the group. In this particular fragment modern lifestyle was equated with pollution and consumption of global items like cars or telephones. In the focus group fragment a question of scale is

raised – whether the effects of ‘modern lifestyle’ are local or global, whether the ‘modern lifestyle’ itself extends to the whole planet or to specific localities, and whether nature has the uniform or differential capacity to ‘handle’ the bad effects of the modern lifestyle. Depending on what the children learned at school during the EE programs, or from their peers, or at home from parents or television, interpretation of the effects of ‘modern lifestyle’ and indeed the belief in the strength or resilience of nature might be very different. Furthermore, in line with Lundmark’s (2007) critique of NEP as an inadequate tool of addressing core debates in environmental ethics, particularly the division between anthropocentric and ecocentric approaches, belief about the strength of nature is not necessarily related to the case of the intrinsic value of nature vis a vis humans. Moreover, the notion of nature’s strength or weakness does not address the children’s effective state or emotional bond with nature.

Both the knowledge of scientific facts and their effective interpretation appears ambiguous in Dutch children. Quantitative tools for eliciting and evaluating environmental attitudes like NEP can be somewhat reductive and confusing unless supported by in-depth ethnographic, context specific studies. However, when strengthened by qualitative studies, NEP can be a crucial starting point for deeper understanding of environmental attitudes in children in general and for developing educational programs that could strengthen the development of environmental values.

In line with the recent anthropological work on environmental education (Zarger, 2010; Anderson, 2011; Baines and Zarger, 2011; Efirid, 2011; Kopnina, 2011 and 2011b; Zanotti 2011), the author needs to stress the need for qualitative methodology sensitive to socio-cultural contexts in order to complement standardized quantitative measurement scales of environmental attitudes, beliefs and knowledge.

## **Conclusion.**

In this article, the author has argued that very few of the environmental scales, including NEP, were consistently applied to evaluate the efficacy of environmental education. It has been argued that given the great variability of the socio-cultural contexts in which EE is presented, standard quantitative measurements, might not always be best-suited for evaluating EE either. Instead, the author proposed that a socio-culturally sensitive evaluative tool, based on the Given the most popular measures of environmental beliefs and attitudes, NEP scale, needs to be developed in order to address the efficacy of environmental education.

In the study described in this article, and based on the study results presented in other publication (Kopnin 2011c), interpretation of the NEP scale can be shown to be sensitive to the socio-cultural contexts. So while NEP scale might be a good standard tool for measuring general environmental beliefs and attitudes, it needs yet to be adapted to serve socio-culturally specific settings in which environmental education programs occur.

In order to develop the socio-culturally sensitive NEP scale, theories about the influence of social context (the influence on children’s world views of parents, peer groups) or political and institutional context (the role of the government-sponsored information, media, and the education itself) need to be further addressed. Qualitative approach,

probing children's beliefs as well as socio-cultural context in which such beliefs are being formed, including sources of knowledge, may add a great deal of depth to the NEP scale.

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