

Environmental Risk Perception, Attitudes, and Behaviors and Educational Strategies to Shape Friendly Environmentally Behavior

VALERIA LAZA*, LUCIA LOTREAN*,
AURELIA PINTEA**, ALEXANDRU ZEIC**

*Department of Environmental Health,
University of Medicine and Pharmacy,
Cluj-Napoca, 4-6 Pasteur St.
Romania

**Department of Environmental Higiene
Public Health Institute
Cluj-Napoca, 4-6 Pasteur St.
Romania

v_laza@yahoo.com; llorean@gmail.com; pinteaurelia@yahoo.com; a_zeic@yahoo.com

Abstract: - In a sample of 460 7-8 years children, a complex methodology implying antecedent and consequent (contingent) strategies for changing the responsible environmentally behaviors was applied. The originality of this program consists in the development and combination of the existing environmental education approaching (attitude and values change), with consequent strategies involving positive reinforcement techniques. It's a new and provocative approach of the environmental education that will change the negative message the preventive medicine has sent until now and will help children associate, in their mind, a pro-ecological act to a potential gain. In order to encouraging and modeling friendly environmentally behaviors, a close survey of children's perception of environmental risks, their knowledge, attitudes, values and behaviors as well as their social status was assessed.

Key-Words: - children, environment, risk perception, education approaching, behavior, attitudes,

1 Introduction

Risk is a topic of much interest nowadays [4]. Obviously, adult and children risk in many different ways in their every day life, according to the way they perceive risk [21]. The propensity of people to take a risk has to do with their perception of risk, the rewards, their accidents and their balancing behaviour [24]. There are four combinations of risk and culture, where any individual might belong: individualists, hierarchs, egalitarians, and fatalists [21].

Environmental problems and the accelerating changes in living conditions have become a fundamental part of the world in general. Earlier, environmental problems have been considered as technical and economic problems; while in the recent decades the social dimensions of environmental problems such as public attention and people's attitudes towards environment have become one of

the areas of environmental sociology and environmental psychology [13].

Environmental attitudes are conceptualized as an indicator and component of environmental behavior. There are many theoretical and empirical approaches to investigate attitude towards environment. Most of the studies related to this issue have been conducted since 1970 onwards when conceptualization of environmental attitudes as a scientific research concept gained closer attention by researchers [11]. Dimensionality was one of the most critical factors of environmental attitude studies. Initial researches looked at environmental attitudes as a uni-dimensional concept. Later, many studies explored the multi-dimensionality of environmental attitudes [12]. Albrecht [1] used factor analysis and found three dimensions; "balance of nature" "limits to growth" and "man over nature". Cluck [9] conceptualized environmental attitudes as a three dimensional concept, including "environmental worldview", "environmental concern" and

“environmental commitment”. Literatures indicate that most approaches identify environmental attitude and behavior as multi-dimensional phenomena. These studies reveal some factors that are consistently related to environmental behavior over time and across studies. The strongest and most consistent predictor of environmental behavior is age [7]. The relationship between gender and environmental concern also has been more carefully theorized than other structural variations in environmental concern [8]. Women are generally more concerned than men and the literature explores several possible mediating factors. One is gender differences in the experience and effects of parenthood. For men, parenthood leads to less environmental concern while, for women to greater concern [25]. Some other scholars such as Tarrant and Cordel [26], Stern [25] and Arcury [3] also discussed gender effects of environmental attitudes. Their findings have been contradictory to each other. Arcury [3] found that female respondents were less environmentally concerned than male respondents and Tarrant and Cordel [26] and Stern [25] reported that female had higher levels of environmentalism than male. Overall findings have indicated no clear gender difference on environmental attitudes. Because different researchers used different samples each research arrived to different result. Some studies also suggest a weak positive relationship with some measures of religious participation [14]. Antecedent factors such as social structural variables have been associated with value orientation, attitudes and environmental behaviors. Out of social structural variables, women, people with higher levels of education, younger individuals and those with a liberal political orientation support the principles of sustainable resource management [17]. Several studies have shown that a cognitive hierarchical framework consisting of basic values, general beliefs, specific attitudes and behavior provide a suitable basis for understanding environmentalism. General beliefs in turn, influence specific attitudes and actions or behaviors [27, 23]. Although the effect of knowledge is not conclusive, there have been several studies suggesting that knowledge plays an important role in enhancing the environmental attitude and behavior relationship by providing individuals with the ability to better formulate alternative views and present arguments to support their beliefs and behaviors [17]. The components of environmental behavior include “environmental attitudes”, behavioral tendencies to

act or “preparedness to act”, the cognitive components including attitudinal elements derived from “problem-based knowledge” and the emotional component of “feeling of stress”. The “environmental legislation” is also an important factor, which can affect environmental behavior. The literature indicated that age, education, gender, occupation, place of residence and income is the most explanatory variables related to environmental attitudes [19,29,2,10,28]. Education is a key variable on environmental attitudes. An understanding of modern environmental issues requires high level of environmental knowledge and likelihood of high environmental knowledge is correlated to high level of education [3].

2 Behavior modelling strategies

There are two types of strategies for modeling the responsible environmentally behaviors [5,6]: a) antecedent strategies (changing the attitudes and values, using the prompts and role models), and b) consequent or contingent strategies - that occur after the target behaviors are observed (reinforcement techniques, punishment and feedback).

In October 2007 we started a national project of encouraging some proecologically behaviors in children. Our project propose the elaboration and implementation of an encouraging environmental responsible behavior program amongst children, with the aim of improving the life conditions for the entire population.

The originality of this program consists in the development and combination of the existing environmental education approachings (attitude change, negative techniques of punishment the destructive behaviors), emphasizing the positive technologies, which encourage the environmentally friendly behaviors (rewards). This new and provocative approach of the environmental education will change the message the preventive medicine has sent until now, and will help children associate, in their mind, a pro-ecological act to a potential gain. In our research, the gain is fast, personal and touchable but, in time, it will become a common gain, and the effects will be visible in the future. Most of the people say that they have favorable attitudes towards the environment and that they are pro – environment. In fact, few of us act the way we think, partly because we have habits that are hard to give up, and partly because we are not aware of the harm our individual acts can do to the commons (the

environment). Therefore, approaching the environmental education in early childhood and insisting on the benefits of some individual acts on a personal and collective level, we can form an conscious population, with healthy values and attitudes, wich will shape correspondent behaviors [18,20].

3 Methods

A cross-sectional study was conducted among school students aged 7-9 years old from three schools of Cluj Napoca, Romania. Two of the schools (*A* and *B*) were situated in the center of the town, while the third one (*C*) was situated in a peripheral neighbourhood of the town. The consent to participate was received from school administration- the standard procedure in Romania. All second grade and third grade classes of the school were included in the study.

In the first year of the study (2007-2008) we have elaborate and applied complex questionnaires to identify: the presence amongst children of risk behaviors, the perception of environmental risks, and the presence of attitudes and values which need to be changed.

In the second year (2008-2009) we assessed the corespondence between attitudes/values and the children behavior, using a prospective method. Around these schools were placed collection points for scrap. The experiment last for one moth. At the end the scrap was inventoried and weighed, and the corespondence between attitude and behavior was evaluated. In the second part of the second year, the promotion and reinforcement of pro-ecologically behavior were tempted. In every school encouraging pro-ecologically behavior prompts were exposed, foccus group and debates about the importance of recycling took place, media examples about how the environment hurts because the human misconducts were commented and the children were awared that their personal actions might have long term consequences upon environmental factors. Then, different objects invisible marked were randomly dissipated around the schools. Based on their identification (in ultra-violet light), or after their weight, the children were rewarded by books, pencils, exercise-books.

At the end, the best school will be mentioned in the local newspaper and television. Besides, at the end, questionnaires will be elaborated and distributed to the personnel, the ones who daily face the children

and can appreciate the socio-ecologically impact of behavior changing. Partial results about the project were published [15,16] or will be published.

The anonymous questionnaires have evaluated children's environment related knowledge, attitudes and behaviours. All the students presented in the day of assessment filled in the questionnaire; no refusal of participation was recorded. The subjects indicated their demographic data (age, gender, grade level and their parents' education) on the first part of the questionnaire. Each of the 23 items of the questionnaire was read aloud to ensure comprehension. Children were encouraged to ask questions if they did not understand a particular item. Total time necessary to administer each survey was approximately 35-45 minutes. The questionnaire, based on several data from literature has highlighted attitudes and opinions regarding the environment, environmental risk perception, the existence of acceptable risk notion, environmental behaviors, modeling tendency, and the role of reward (positive reinforcement) in the process.

Mean scores and standard deviations were calculated for all the items described above. ANOVA variance analyses were used in order to compare children' knowledge, attitude and behaviour with respect to the environment based on their gender, school enrolment and educational level of their mother and father. In order to gain deeper insights into factors associated with environmental friendly behaviour of children linear regression analyses was also performed. The depended variable was one main environment related behaviour investigated in the study, namely the habit of not throwing away wastes on the street; the independent variables were socio-demographic items (gender, educational level of parents, school enrolment) as well as the items regarding knowledge and attitudes of students with respect to the environment.

4 Results

The final sample consisted of 446 students, 7-9 years old (55% boys and 45% girls). The results show that children, both boys and girls, have good knowledge regarding the environment. They received good scores with respect to their knowledge about what the environment is, what the wastes means and what kind of objects could be considered wastes. Girls' had higher knowledge than boys with respect to the definition of wastes ($p=.025$).

With respect to their attitudes regarding the environmental protection, generally children agreed that the environment must be clean, that people can do a lot of things in order to protect the Earth and that if the environment is not protected a lot of problems can appear into the future; no statistical significant differences were noticed between boys and girls with respect to this issues. Moreover, children declared that they know what should be done in order to protect the environment and again, similar results were obtained both for boys and girls. At the same time, many children and especially girls, considered that when somebody is throwing away rubbish this is a bad thing and disagree that they do not care about this. Nevertheless, fewer children declared they are really acting when somebody is throwing away rubbish by telling them that this is not good or by collecting the rubbish by themselves and dispose it in a proper way. Children, also receive high scores with respect to their declared ability in not following the bad example of a famous person who is not behaving correctly and throw away rubbish on the street. At the same time, many children recognized that if the school yard is clean this discourage them from throwing away rubbish; girls receive higher scores with respect to this issue. Children scored quite high their disponibility of behaving correctly in report to environmental protection if they would receive a prize/reward.

Children' behaviour with respect to environmental protection was also investigated. We notice that some behaviours such as not throwing away wastes is more incorporated into children' life, while other environmental friendly behaviours such as going to school by foot or by bicycle instead of going by car as well as water protection by taking a shower instead of a bath are less popular among Romanian children. No significant differences were noticed between boys and girls with respect to their behaviour.

Depending on their school affiliation there are several differences between children. Those from peripheric neighbourhood received higher scores with respect to their knowledge regarding the definition of wastes ($p < 0.001$), having negative attitude regarding the persons who throw away rubbish on the street as well as on acting by collecting this rubbish by themselves. The children from the peripheral neighbourhood also recognized higher confidence in their knowledge about how to protect the environment. They also received better scores with respect to one environmental friendly behaviour, namely going to

school with less poluting transport means ($p < 0.001$). Differences were noticed also between the two schools from the central neighbourhood and the main items discriminating the two groups were those which were mentioned previously ($p < 0.001$).

The comparison between children with respect to environmental knowledge, attitudes and behaviour, based on their mother and father education, shows that children of more educated mothers are more conscious about the dangers which could appear if the environment is not protected ($p < 0.005$). With regard to environmental friendly behaviours, children whose mothers are more educated take more often a shower instead of a bath ($p < 0.005$), but go more frequently to school using more poluting ways of transport ($p < 0.001$). The differences between children based on their fathers education is obvious for some items. With respect to their attitudes regarding people who throw away wastes the differences are not conclusive; children of more educated people received higher scores on two items: they do not care when somebody is throwing away things and, on the other hand, some of them declared that they involve themselves more in cleaning after these people. Children of more educated people seems to have lower confidence in resisting to the influences of famous people, but are less sensitive to prizes/awards.

The results of the linear regression analyses underlyne that the behaviour of children connected to not throwing away wastes was associated with three other variables: believe that environment must be clean (positive association; standirdezed beta = 0.12, $p = 0.01$), do not care when somebody is throwing away rubbish on the street (negative association; standirdezed beta = - 0.10, $p = 0.02$), have confidence in their ability of not following a bad example of a famous person who through away rubbish on the street (positive association; standirdezed beta = 0.11, $p = 0.02$).

5 Conclusions and discussions

In general, children in this sample, especially girls from higher social classes, demonstrated reasonably accurate knowledge about the environment and its risks. Nevertheless, incorrect or lack of information can still be detected.

Surprisingly, compared to children from central-located (the higher social-class schools), children from suburban lower social-class schools scored (significantly) higher on environmental awareness

tests (were able to show an increased environmental awareness). These results can be explained by the increased emphasis the suburban schools put on environmental education, suggesting the important role school plays in shaping environmentally friendly behavior and awareness.

A positive correlation has been found between both parents' and especially mother's education level and the child's environmental risk perception. Moreover, risk tolerance is among school-aged children significantly low, particularly for risks associated with their own health. The word "dangerous" associated with various risks seems to play an important role in influencing the children's judgment of the level of risk. The results show that school-aged children are able to quantitatively assess the level of risk, based on the amount of harmful substance that is present at a certain time in the environment.

According to Schlottmann [22] children accept risk more easily than adults. Moreover, children care more about the „win-lose” process than „how big is the reward” in the winning process.

Abstract thinking and ability to “see the bigger picture” seems to be present in more than 90% of school-aged children; only a few of the children, most of them from lower socio-economic classes, argued that humans can not influence the planet's future (3rd grade school-girls).

Although environmentally friendly water consumption recommends taking a shower rather than a bath, the decision between the two does not always rely on environmental conscience. More than half of the school-children have responded that they would prefer having a bath. This preference might be traced back to cultural factors and traditions in the Romanian society.

Regarding transportation, most children are brought to school by car (especially children from higher socio-economic classes), a smaller number use public transport and an even smaller number walk to school. The number of children that walk to school starts to increase by age (3rd grade children). A very low preference is found for bicycle use, which could be explained by the high risk associated in Cluj-Napoca, with bicycle riding due to the lack of bicycle-lanes and the very dense car traffic.

Environmentally harmful behavior (throwing papers down) is more pronounced in A school and boys and is negatively correlated with parents' level of education.

The influence role-models exercise on children's behavior, positive as well as negative, is not to be

neglected. Children tend to imitate especially admired characters, such as a beloved actor or a favorite athlete. This study found that although children state that negative behavior performed by a public, well-known person should not be repeated, 2.2% of 2nd graders (mostly from A and B) believe that it is ok to repeat a negative behavior performed by a public person. The percentage is lower among 3rd graders from the same central school and has been registered exclusively in children from a lower socio-economic group.

The setting might also play an important role in motivating environmentally conscious behavior. Most people would hesitate more in littering a clean place than in littering an already dirty, untidy one. Twenty % of the children in the study (mostly boys and most of them from school A) stated, nevertheless, that they wouldn't hesitate being the first to litter a tidy, clean place. This trend is found to be positively correlated with age in both sexes which implies the importance of introducing environmental education already from early ages. The study found that also with respect to littering behavior, children from school C and higher socio-economic groups demonstrated a more aware environmental attitude.

Children from all three schools seem to respond positively to rewarding of environmentally positive behavior. This gives an impulse to continue the initiated project which aims to encourage environmental friendly behaviors by offering material rewarding.

Pro-environmental education is therefore necessary, for children, as they represent a very malleable segment of the population, assimilating much of the received information, and the appropriation of environmental friendly behaviors has the chance to establish permanently.

The risk perception in children depends on the prior conceptions acting as decoding filters, however it can be influenced by a targeted education to the environment, correcting the false perceptions and helping the children (who are, generally, very opened to the environmental issues, very malleable and very avid for knowledge) to create a set of perennial values and adopt healthy behaviors.

It is obvious that education plays an important role in enhancing the environmental attitude and behavior relationship by providing individuals with the ability to better formulate alternate views and present arguments to support their beliefs and behaviors. It is emerged from the present study that education and positive reinforcement technologies can change

environmental attitude and increase feeling of stress of children towards environment. These changes in turn improve preparedness to act friendly with the environment, particularly with the help of rewards. All these can change behavior to preserve environment.

Acknowledgements

The study was based on a research project IDEI 156/2007 ("Encouraging some friendly environmentally behaviors") financially supported by the CNCSIS Bucharest, Romania, which is highly appreciated.

References :

- [1] Albrechet, D. et al. Measuring environmental concern: The new environmental paradigm scale, *J. Environ. Edu.*, Vol.13, 1992, pp. 39-43.
- [2] Arcury, T.A. and T.P. Johnson, Public environmental knowledge: A statewide survey, *J. Environ. Edu.*, Vol.18, 1995, pp. 31-37.
- [3] Arcury, T.A., Environmental attitude and environmental knowledge, *Human Organ.*, Vol.49, 2000, pp. 300-304.
- [4] Bamberg, S., How does environmental concern influence specific environmentally related behaviors? A new answer to an old question, *J. Environ. Psychol.*, Vol.23, 2003, pp. 21-23.
- [5] Baron, R. A. & Byrne, D., *Social psychology* (9th ed.). Boston: Allyn and Bacon, 2000.
- [6] Bell, P. A., Greene, T. C., Fisher, J. D., Baum, A., *Environmental Psychology*, Fifth edition, Thomson, Wadsworth, 2001.
- [7] Buttel, F. and P. Taylor, *Environmental sociology and global environmental change: A critical assessment*, Ed: M. Redclift and T. Bemtpm/ Social Theory and the Global Environment. Routledge, London, 1999.
- [8] Caiazza, A. and A. Barrett, *Engaging women in environmental activism: recommendations for Rachel's network*. Institute for Women's Policy Research, IWPR Publication, Washington, Dc, 2003.
- [9] Cluck, R. et al., Attitudes towards and commitment to environmentalism: A multidimensional conceptualization. Paper presented at the *60th Meeting of the Rural Sociological Society*, Toronto, Canada, 1997.
- [10] Cottrell, S.P. and A.R. Graefe, Testing a conceptual framework of responsible environmental behavior, *The J. Environ. Edu.*, Vol.29, 2002, pp. 17-27.
- [11] Dunlap, R.E. et al., The new environmental paradigm, *J. Environ. Edu.*, Vol.9, 1998, pp. 19-40.
- [12] Dunlap, R. E. et al, Measuring endorsement of the New Ecological Paradigm: A revised NEP scale, *Journal of Social Issues*, Vol.56, 2000, pp. 28-35.
- [13] Hines, J.M. et al., An analysis and synthesis of research on responsible environmental behavior, *The J. Environ. Edu.*, Vol.18, 1987, pp. 1-8.
- [14] Howard, G. S., Adapting human lifestyle for the twenty-first century, *American Psychologist*, Vol.55, 2000, pp. 509-514.
- [15] Laza Valeria, Lotrean Lucia-Maria, Unhealthy Behaviours of School Children, *Applied Medical Informatics Original Research*, Vol. 23, No.3-4, 2008, pp. 19-24.
- [16] Laza Valeria, Encouraging some healthy behaviors in children, *Palestic of the Third Millenium – Civilization and sports*, Vol.X, Nr.1(35), 2009, pp. 27-32.
- [17] McFarlanc, B. and P. Boxall, The role of social psychological and social structural variables in environmental activism: An example of the forest sector, *J. Environ. Psychol.*, Vol.35, 2003, pp. 79-87.
- [18] McKenzie-Mohr, D., Fostering sustainable behavior through community-based social marketing, *American Psychologist*, vol.55, 2000, pp. 531-537.
- [19] Mohai, P. et al., Age and environmentalism: An elaboration of the Buttel model using national survey evidence, *Social Sciences Quarterly*, Vol.28, 1987, pp. 47-56.
- [20] Oskamp, S., Psychology for a sustainable society, *American Psychologist*, Vol.55, 2000, pp. 496-508.
- [21] Pange Jenny, Literature survey and children's perception on risk, *ZDM*, Vol.35, No.4, 2003, pp. 182-186.
- [22] Schlottmann, A., Children's probability intuitions: Understanding the expected value of complex games, *Child Development*, Vol.72, No.1, 2001, pp. 103-122.
- [23] Schultz, P.W. and L.C. Zelezny, Value as predictors of environmental attitudes: Evidence for consistency across cultures, *J. Environ. Psychol.*, Vol.19, 1999, pp. 255-265.
- [24] Stern, P. C., Psychology, sustainability, and the science of human-environment interactions, *American Psychologist*, Vol.55, 2000, pp.523-530.

- [25] Stern, P. et al., Value orientations, gender and environmental concern, *Environ. Behav.*, Vol.25, 1998, pp. 22-348.
- [26] Tarrant, M. and K. Cordell, The effects of respondent characteristics on environmental attitude-behavior correspondence, *The J. Environ. Edu.*, Vol.29, 1997, pp. 618-637.
- [27] Taylor, D. E., The rise of the environmental justice paradigm – Injustice framing and the social construction of environmental discourses, *American Behavioral Scientist*, Vol.43, 2000, pp. 508-580.
- [28] The European Opinion Research Group (EORG), *The attitudes of Europeans towards the environment*. The European Opinion Research Group, 2002.
- [29] Vogel, S., *Environmental attitudes and behavior in the agricultural sector as empirically determined by use of an attitude model*, Institut Fur Wirtschaft, Politik and Recht, Universitat, Bodenkultur Wien, 1994.