



Alienation from Nature and Its Impact on Primary and Pre-Primary Education

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Abstract: *The alienation from nature has a major impact on the education of primary school pupils and pre-school children. In the review paper we focus on research into this phenomena. We chose 79 articles on Web of Science, 39 on Scopus, and two in the Czech database RIV. From this a total number of 21 articles were selected, analysed and presented to the readers in this article. It turned out that alienation from nature is a fuzzy concept. Many experts rely on it. But it is not precisely defined in the literature. Two main topics appeared in the articles that were considered: connectedness and relation to nature and fear of animals and disgust aroused by them. The main findings are: a) teachers and parents are already alienated, b) examples of good practice show ways of bringing nature closer to children, c) children's attitudes to nature are changing; they are more afraid of animals and disgusted by them, d) a certain degree of fear and disgust is useful, e) differences between the sexes appear only at an older age. This phenomenon needs to be studied further.*

Keywords: *pre-school pedagogy, primary school pedagogy, alienation from nature, generation alpha*

INTRODUCTION

The development of industry, science, and technology has had a major impact on human lifestyles in the last two centuries. Generations are changing rapidly. Sociologists have categorized generations of people with different lifestyles since the 19th century. They first call them by Latin letters and then use the Greek alphabet (cf. Posnick-Goodwin, 2010a, 2010b). Although we realize that the boundaries between generations are not sharp and are influenced by

differences between families, cultures, and states, this system helps to classify, typify, and follow certain trends in society. Alienation from nature is one of these trends.

Alienation from nature is defined as a phenomenon of Euro-American culture. Its beginning was associated with the Industrial Revolution. It gradually changed agriculture, industry, and, in close connection with these, the lifestyles of families. The modern lifestyle is pleasant; it has brought many positives, but it also has negative effects.



The French philosopher Jean-Jacques Rousseau drew attention to the risks of a new lifestyle in his most famous book “*Emil*” as early as 1762. Rousseau pointed out the negatives of the urban environment and recommended that children grow up in the countryside with the possibility of living in a natural environment, in contact with nature. He wrote that taking children out of a natural environment is a great risk (Rousseau, 1908).

The Austrian zoologist, ethologist, and Nobel Prize Winner Konrad Zacharias Lorenz was apparently the first to use the term “alienation from nature”. Lorenz wrote that people lose the ability to handle living systems and cease to understand them. He identified the cause of this phenomenon as a fundamental change in lifestyle, namely that people are more often in contact with artificial objects than with animals or plants (Lorenz, 1974).

Other experts have also pointed out the negative effects of these changes recently. Louv (2005) stated that alienation is accompanied by a “Nature Deficit Disorder” and began to look for ways to bring children closer to nature. Bakari (2014) and Huba (2015) identified alienation as one of the most serious issues of sustainable development.

The consequence of these observations is, among other things, an increase in research on the relationship between man and nature (cf. Restall & Conrad, 2015). The research in the field of environmental psychology, pedagogy, and health sciences has shown a number of positive effects of contact with nature on humans. Contact

with nature has a positive impact on the health (Kuo, 2015), well-being (Howell et al., 2011), and happiness (Nisbet, Zelenski, & Murphy, 2011; Zelenski & Nisbet, 2014) of humans. Simply put: “Those who are more connected to nature tended to experience more positive affect, vitality, and life satisfaction compared to those less connected to nature” (Capaldi, Dopko, & Zelenski, 2014).

Hand in hand with the growing number of research studies, the number of research tools used to measure the relationship between man and nature has also grown. The widely-used Nature Relatedness Scale (NRS) was developed by Nisbet, Zelenski, & Murphy (2009). Later, the authors simplified this scale to a shorter version, the NR-6 scale (Nisbet & Zelenski, 2013). The NRS was adapted into the Czech language by Franěk (2012) and used in several research studies that mostly focused on pre-service teachers (Kroufek, Janovec, & Chytrý, 2015; Kroufek, Chytrý, & Uhrinová, 2018). The NRS has also been used in various other countries, such as Turkey (Sarıçam & Şahin, 2015; Çakır et al., 2015), Singapore (Leong, Fischer, & McClure, 2014), or Switzerland and South Korea (Barthelmess et al., 2013). A similar approach to measuring the relationship between humans and nature is used by the Connectedness to Nature Scale (Mayer & Frantz, 2004) or the Love and Care for Nature Scale (Perkins, 2010). Another, and in terms of research on younger children, interesting approach is the single-item graphic research tool Nature in Self (Schultz, 2001).



Czech scientists also deal with alienation from nature. The philosopher Erazim Kohák defined alienation as a blunting of the capability of compassion and the will to protect (Kohák, 2000). The eco-educator Aleš Máchal (2000) described two estrangements of man: 1. alienation from nature and 2. alienation from responsibility for its present and future. Emilie Strejčková initiated interdisciplinary research on alienation from nature in the Czech Republic at the beginning of the 21st century. Many examples of the alienation of man from nature have been documented in terms of knowledge, attitudes, and behaviour (Strejčková, 2005; Strejčková & Loubová, 2006). Vladimíra Spilková wrote that “alienation from nature, along with consumerism, the increase in violence, and increasing passivity, is seen as a global problem (Spilková, 2005). The sociologist Petr Sak (2006) pointed out that the phenomenon of human alienation from nature has two dimensions: a) the individual human dimension (i.e. impacts on individuals) and b) the social dimension (i.e. impacts on society).

We assume that this phenomenon also affects education. Children and pupils attending pre-primary and primary grades belong to the alpha generation. Strejčková (2005) spoke about them as “the third generation of children from a block of flats”. This is in line with sociologists’ assertion that these children were born to parents of generations X and Y after 2010. Computers, an internet connection, mobile phones, and tablets are a common

part of the household. Their parents spend a lot of time playing computer games or participating in social networking activities. They spent little time playing on the streets or in nature in childhood. From birth the children watched their parents manipulating technology and they themselves began to manipulate it soon. After all, the number of applications for children is growing (Krišová, 2015). There are fewer family activities in the countryside. Children of the alpha generation are often afraid of animals or romanticize and love them all, but without respect for their basic welfare needs. Some of them are also afraid of trees and forests. By the word “mouse” they imagine a computer mouse, not an animal (Jančaříková, 2019). Forecasters estimate that, at a later age, people of the alpha generation will be less respectful of teachers or bosses, will prefer sedentary jobs with the possibility of working from home, will be very cooperative, and will be very creative (White Wolf Consulting, 2009; Posnick-Goodwin, 2010b).

We decided to give a comprehensive overview of what preschool and primary education experts write about alienation from nature.

METHODOLOGY

In order to map the area of alienation from nature with regard to the objectives of this study, with the aim of the identification of research trends in this area, a systematic review (cf. Mareš, 2013) of research papers and literature published from 2000 to the present was conducted.



The papers and literature used in the review study were searched for in three ways. Keyword-based searches in the Web of Science Core Collection and Scopus databases were used to map foreign publications. To map work published by Czech authors, the texts were searched for in the same way in the Information Register of R&D results (RIV). The third way of obtaining texts was searching through Czech peer-reviewed journals with a focus on natural science and environmental education and pedagogy.

The texts from the given period were searched for in databases and RIV using the following combinations of keywords:

- Alienation from Nature
- Nature connectedness + pre-primary education/primary education
- Nature relatedness + pre-primary education/primary education
- Nature deficit disorder + pre-primary education/primary education

The keywords were chosen on the basis of the authors' experience with the topic under analysis so that as a key element it always reflects the relationship between humans and nature (nature-connectedness, nature-relatedness) and its possible problems (alienation from nature, nature deficit disorder). The type of text was restricted to papers in journals and conference proceedings. The keywords were searched for in the whole record of the published text. In order to search for relevant texts only, the keywords were searched for only as phrases.

Duplicate occurrences of the same text were excluded from the texts selected for analysis. Titles and abstracts were analysed in order to exclude texts not related to the topic under research. The remaining texts were subjected to a deeper analysis with regard to the objectives of the study.

More texts related to the topic of alienation from nature were searched for in Czech peer-reviewed professional journals. The search included all journals focusing on science and environmental education (the publisher is given in brackets): *Scientia in educatione* (Charles University, Faculty of Education), *Biologie-Chemie-Zeměpis [Biology-Chemistry-Geography]* (Charles University, Faculty of Education), *Enviogogika* (Charles University), and *Arnica* (University of West Bohemia, Faculty of Education). Other journals that were included were professional journals in general pedagogy that publish papers focusing on pre-primary and primary education: *e-Pedagogium* (Palacký University Olomouc), *Magister: reflexe primárního a preprimárního vzdělávání ve výzkumu* [Master: reflection on primary and pre-primary education in research] (Palacký University Olomouc), *Orbis scholae* (Charles University), *Paidagogos* (*Paidagogos – společnost pro filosofii, teorii a praxi výchovy a vzdělávání* [Paidagogos – Society for Philosophy, Theory, and Practice in Education]), *Pedagogická orientace* [Pedagogical Orientation] (Masaryk University), *Pedagogika* [Pedagogy] (Charles



University), and *Studia paedagogica* (Masaryk University).

All issues of the above-listed journals published from 2000 to the present were searched through. All papers discussing alienation from nature from a broader perspective were included, even if the term 'alienation from nature' was not used explicitly. Papers focusing on the following areas were included in the systematic review:

- The phenomenon of alienation from nature and its manifestations
- Socio-culturally conditioned decline of scientific knowledge
- Attitudes to nature and perception of its value
- The influence of scientific knowledge and attitudes on decision-making processes in everyday life
- Changes in lifestyle and human health in relation to nature and natural laws

The procedure for searching for all the texts included in the systematic review and their selection for analysis is summarized in Figure 1.

All the texts included in the systematic review were read. Papers that did not correspond to the purpose of the study were excluded. The remaining texts were analysed qualitatively. The following aspects were monitored: in which journal or conference proceedings they were published, what type of text they are, how the concept of alienation from nature is perceived in the text, and how it is dealt with in the text. In the case of research papers, the research methods and findings were monitored.

RESULTS

Quantitative overview of the analysed articles

According to the research design, more than two-thirds of the articles that were analysed (15) used a quantitative approach, five of them used a qualitative approach, and only one article had a mixed design. The papers that investigated the connection to nature frequently used well-known scales such as the Connectedness to Nature Scale (Mayer & Frantz, 2004), Nature Relatedness Scale (Nisbet et al., 2009) or the one-item Nature in Self tool (Schultz, 2002). The rest of the quantitatively-oriented research used newly-created research tools.

One of the key questions is how the authors use the concept of alienation from nature. For two of the articles that were analysed, this concept is a starting point from which the authors continue. Five of the texts use alienation from nature as a key concept and the subject of research. The rest of the texts use the observed concept only marginally, while their research interest is wider (connection to nature, preconceptions, knowledge of natural phenomena, attitudes towards nature, especially fear and disgust aroused by animals).

The observed articles were published in a wide range of journals. Only two of them appear in the list more than once, the Czech journal *Envigogika*, with two texts by the leading Czech scholar Jan Činčera, and *Environmental Education*

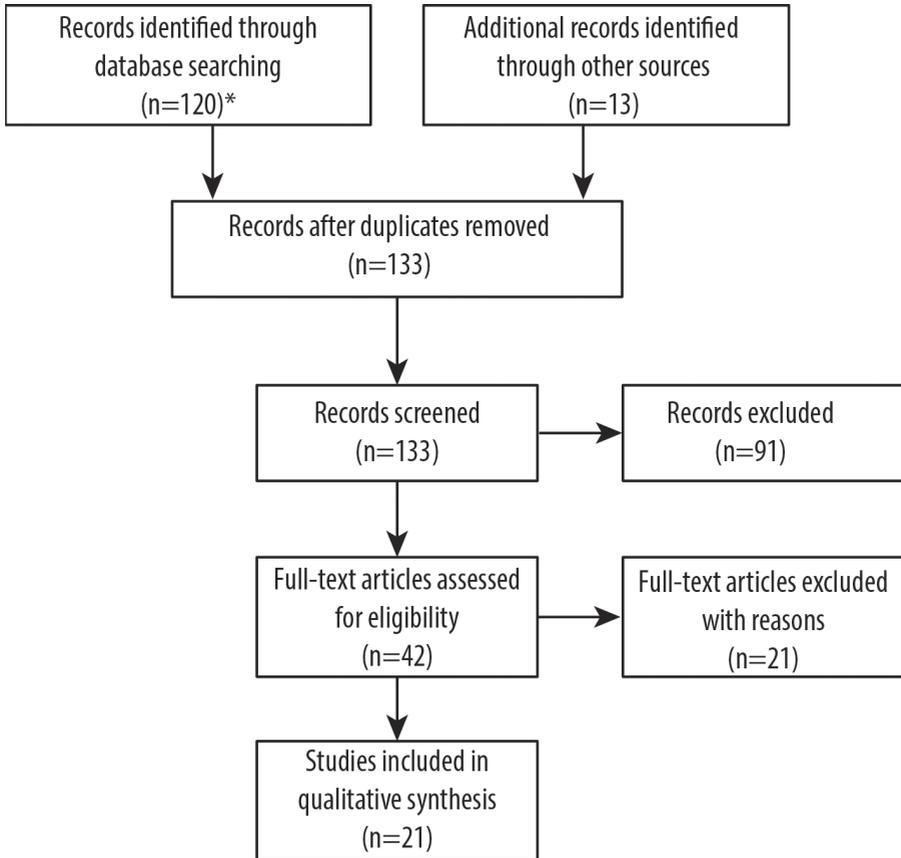


Figure 1 Prisma Flow Diagram (Moher et al., 2009)

* The number of texts searched for in databases by keywords was as follows: Web of Science – 79, SCOPUS – 39, RIV – 2.

Research, the leading journal in the field of environmental education. Six of the articles that were analysed were published in this journal. The rest of the journals were education-oriented ones, with the exception of the German-based ecology-

oriented journal *Naturschutz und Landschaftsplanung*.

Just as there is a wide range of journals, there is a wide range of nationalities of the authors of the articles that were analysed. Five of the teams of authors were from the Czech Re-



public, four from the United States, three from Turkey, two from Germany, as well as from the United Kingdom, and the rest of the authors or teams of authors were from Brazil, South Korea, Slovakia, Switzerland, and Uruguay.

Out of 21 papers that were analysed we found six articles that focused on teachers. Four of them focused on primary teachers and two focused on pre-primary teachers. Two papers dealt with the parents of pre-school and primary school pupils.

Considering the year of publication of the articles, there is a rising tendency towards the present (see Fig. 2).

Qualitative

Several papers are focused on general connectedness and the relationship to na-

ture. They are aimed at both pupils and pre-service teachers. While some of the researchers used previously developed instruments (Nature Relatedness Scale, Nature in Self, Connectedness to Nature Scale), others, mainly the qualitative ones, developed their own approaches (using pictures, photographs, storytelling, etc.).

The following papers explored the participants' actual level of connectedness to nature without any experimental interventions. They work mainly with previous life experience from early childhood to university age.

The paper of Ahmetoğlu (2017) deals with the pupils' family background and its influence on pupils' connectedness to nature. The connectedness is represented by the biophilia of pupils explored by means

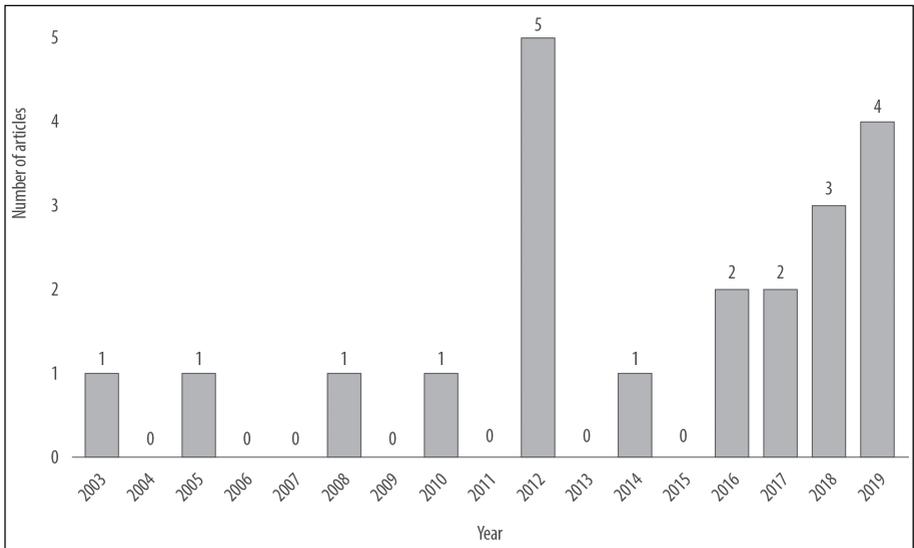


Figure 2 The number of articles dealing with the concept under study published in different years



of the Biophilia interview designed by Rice and Torquati (2013). The biophilia score gained by each of 238 children who were interviewed was compared with demographic information and the children's experience with nature retrieved from parent questionnaires. The results revealed that the children's biophilia scores did not differ significantly between boys and girls. The children of parents with a high school degree scored lower biophilia levels than the children of parents with a college degree. The children's experience with nature or the outdoors followed the same trend. While the children's biophilia scores did not vary significantly with regard to their parents' income, the parents with low incomes reported lower levels of experience with nature in their children than the parents with medium and higher incomes (Ahmetoğlu, 2017).

Jan Činčera (2012a) from the Czech Republic analysed the interpretation of 'forest' by 106 fourth-grade pupils. His qualitative analysis used a technique of mental mapping. The research showed inconsistencies in the pupils' interpretation of a forest. Pupils perceive the human impact on forests negatively but they also attribute a mainly economic meaning to forests. The destructive impact of humans on forests was mentioned in 56 to 79% of their responses (depending on the school). On the contrary, in the field of the meaning of forests for mankind, the economic benefits lead (31-64%), followed by social benefits (32-63%), leaving the environmental benefits as the least frequent (6-56%). Neither do the pupils understand

the systemic nature of a forest; they interpret it as a space filled by individual entities. The occurrence of forest entities in mental maps was two to four times higher than the occurrence of processes taking place in forests (36-73% to 6-29%) (Činčera, 2012a).

The qualitatively-oriented work of Sue Waite, Alice Goodenough, Victoria Norris, and Nigel Puttick (2016) was also situated in the forest environment. Their study, aimed at 11- to 15-year-old pupils, examines longer-term perspectives on well-being and looks at the possible benefits of environmental action (planting trees) for happiness and positive functioning. From survey responses and subsequent discussion groups exploring such memories, a deeper understanding of what well-being and connectedness to nature mean to young people is explained. Connectedness to nature is represented by positive feelings originating in "doing something for the environment/nature" and also as a part of negotiating climatic change.

Albert Zeyer and Stefanie Kägi (2010) carried out an interesting mixed-design study, using grounded theory-based research in Switzerland. They gave the children the task of drawing their environment. Drawings from 408 pupils aged 11-13 were evaluated with the help of questionnaires (following up on the Relevance of Science Education project – ROSE), the analysis of drawings, and interviews, in which they used a narrative approach. It turned out that the children drew natural elements with coloured crayons and grey shades were chosen to illus-



trate the human-based elements. The conclusion was that children of this age long for nature and idealize it. Civilization is identified (more by girls) with asphalt, skyscrapers, waste gases, and factories. This side of the picture is greyed out and the commentary speaks of “grey suffering”. Nature, on the other hand, is colourful and green dominates.

The article of Jerônimo de Oliveira Loureiro and Rossano André Dal-Farra (2018) was written in Brazil and is set in the context of the declining tropical rainforest (the authors state that only 7% of the original area remains). It does not pay much attention to alienation; it rather takes it as a starting point with the concept of alienation in the sense of “reducing opportunities to interact with the natural environment”. It is also focused on botany, the knowledge of plants, and its deterioration. A total of 65 students aged six to 12 (first to fifth grades of primary school) was divided into three groups with different levels of support for their activities (Loureiro & Dal-Farra, 2018).

Two important studies of the relationship to nature of pre-service teachers have been conducted in Turkey. Both use the Nature Relatedness Scale (NRS) developed by Nisbet et al. (2009).

Ferhat Karakaya, Sakine Serap Avgın, Elif Gömlek, and Merve Balık (2017) from Turkey compared the relationship to nature of pre-service primary school and science teachers (363) at Kahramanmaraş Sütçü İmam University in the 2015-2016 academic year. Their research findings indicate a difference among the participants’

relationship to nature with regard to gender, education, and grade level. However, no significant effect of attending the environmental science lessons, membership of natural organizations, and participation in natural activities was found (Karakaya et al., 2017).

The scores for the relationship to nature were higher for the female students than for the males. Students in the science department showed a greater affinity for nature than students in the primary education department.

Elvan Sahin and Sule Alici (2019) focused on Turkish pre-service early childhood teachers. The participants were 402 students attending an Early Childhood Teacher Education Programme at one of the two public universities in the capital of Turkey. Although these pre-service teachers showed favourable feelings and thoughts about their personal connection to nature, as seen from the high level of agreement with statements from the NRS such as “I am not separate from nature, but a part of nature” (79.2%), “My relationship to nature is an important part of who I am” (69.3%), and “I feel very connected to all living things and the earth” (70.7%), the results indicate that they prefer not to be out in natural surroundings (Sahin & Alici, 2019).

Erica Blatt and Patricia Patrick (2014) from the USA watched 148 undergraduate pre-service elementary teachers who were participants in a science graduate course. These teachers were supposed to read a famous book, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*,



by Richard Louv (2005) and wrote essay responses after reading the book. They were asked to relate the reading to their own experiences from childhood and to their ideas about elementary science education. A majority of the participants a) described significant youth experiences in the outdoors (97%), b) viewed nature as important in varying ways (89.9%), and c) expressed a desire to expose their own students to the outdoors (65.5%). The pre-service teachers wrote about their interactions in outdoor places (referred to as 'place meanings') very often (Blatt & Patrick, 2014).

Julie Ernst and Ladona Tornabene (2012) did research among 110 students enrolled in the early childhood teaching licensure programme at a university in Minnesota (USA) in the summer semester of the 2010-2011 academic year. The research instrument consisted of a questionnaire to be used with a set of 16 photographs with four different landscapes (water, grassland, forest, park). The first section of the questionnaire asked the participants to indicate the three settings they would personally like to visit most and least and indicate why they selected those settings. The second section asked the participants to indicate which three settings they felt were the most and least conducive to meeting the educational outcomes of their future early childhood students.

The participants generally agreed with the importance of experiences in a natural environment for children's cognitive, socioemotional, and physical development,

as well as for their overall health and well-being. There was a difference between the personal preferences of the participants and their preferred educational settings. Although the participants personally preferred the type of setting with water (73 out of 110) and the natural settings (84 out of 110), they preferred parks (67 out of 110) and maintained areas (87 out of 110) as most suitable for education. The most frequent motivation for outdoor education was the opportunity for hands-on and experiential learning. The most frequent barrier was access and the need to take transport to natural outdoor settings.

The work of Roman Kroufek, Vlastimil Chytrý, and Miriam Uhrinová (2018) from the Czech Republic focused on the relationship of the type of secondary school that had been attended to the relationship to nature of 917 pre-service primary teachers. The research tool chosen was a questionnaire consisting of items focusing on the respondents' demographic background (their age and gender), the secondary school attended prior to university studies, and also items from the Nature Relatedness Scale (Nisbet et al., 2009) in its translation into Czech by Franěk (2012).

The highest scores in the construct analysed were obtained in branches of education oriented towards nature and science, the lowest among graduates of social sciences and general grammar schools. Such results confirm the significance of education in natural science in forming a positive attitude to nature and disprove the clichéd ideas of technically oriented



schools producing environmentally insensitive graduates.

Zbyněk Vácha, Štěpánka Chmelová, and Renata Ryplová (2019) looked in their study at the existence of school gardens in the regions of the Czech-Austrian border and at their readiness for the introduction of garden-based education in teaching. On the basis of electronic questionnaires, the preconditions for garden-based education were found rather satisfactory, with over 73% of schools having an accessible school garden. Although production facilities still prevail (present in 120 out of 190 recorded gardens), the data shows a change in the understanding of the role of school gardens in the Czech Republic. New facilities supporting more complex utilization of gardens in various subjects are being introduced (flower meadows, geological trails, insect houses...). The school gardens are used in relation to all subjects defined for primary education at various extents, with the most frequent being “Man and work” and “Man and the world”, followed by art and biological subjects. Despite that, the mean annual time devoted to education in the garden reaches only 18 hours in primary school. The school gardens are thus empty most of the year.

Konrad Reidl, Hans-Joachim Schemel, and Ester Langer (2003) from Germany presented the preliminary results of an extensive project in which they studied the natural adventure spaces in four German cities (Stuttgart, Freiburg, Karlsruhe, and Nürtingen). Their conclusion is that closeness to nature can also be experienced in

cities. In their article, they categorize the experiences that allow children to experience closeness and give examples (wading in mud, gliding down a slope, building dikes, playing hide and seek in tall grass, climbing trees, observing animals in their natural habitat, lighting a fire, etc.). They emphasize the importance of the role of parents. They describe the importance of local communities for the establishment and maintenance of urban natural adventure spaces.

The impact of educational interventions on the connectedness to nature of either pupils or pre-service teachers was addressed in the papers described below.

The research of Tina Braun and Paul Dierkes (2016) explores the impact of an outdoor environmental education programme on the connectedness to nature of 601 primary and secondary school (7-18 years of age) students with regard to the extent of their experience of nature and age. Their connectedness to nature was examined by using the Nature in Self scale (Schultz, 2001) in this case. The intervention was implemented with two durations: one-day and five-day. The findings suggest that both types of intervention lead to immediate shifts towards a stronger connectedness to nature among students. Notably, the five-day outdoor education interventions were significantly more effective in sustainably promoting connectedness to nature compared to one-day field trips. Seven-to-nine-year-old children achieved the greatest shifts towards nature. The value of short-term and residential outdoor environmental education interventions is discussed (Braun & Dierkes, 2016).



The effect of a four-day-long outdoor environmental education programme in a wilderness camp on the connectedness to nature of 156 10- to 12-year-old pupils in Pennsylvania, US was explored by Lauren E. Mullenbach, Rob G. Andrejewski, and Andrew J. Mowen (2018). The authors used the Connectedness to Nature scale (Mayer & Frantz, 2004) to measure the effect on connection to nature, affinity for nature, attitudes toward outdoor play, and outdoor play behaviours. The pupils showed significant increases in their scores for connection to nature and outdoor play behaviours, while no impact was proved for affinity for nature and outdoor play attitude. According to the authors, the programme evaluated in this study “appeared to contribute to nature connection and an increase in self-reported outdoor play. Children’s connection to nature and outdoor activities have been indicated as predictors of future environmentally responsible behavior (Hinds & Sparks, 2008; Hungerford & Volk, 1990). Fostering connection to nature and positive attitudes toward playing outdoors are critical outcomes of ROEE programs and are necessary attributes of healthy child development.”

The relation of pupils to forests, specifically the sources of fear of forests and the effectiveness of educational programmes that attempt to deal with it, was explored by Jan Činčera (2012b). On the basis of its results the author presumes that pupils visit forests quite rarely; boys more often than girls. Generally, children are not scared of a forest; girls are more scared

than boys. Children mainly fear natural threats (e.g. wild animals) and social risks, e.g. threats from bad people or accidents caused by humans. The education programme did not have much effect on boys but probably influenced girls, in whom the level of fear in all the areas of sources of their fear of forests (natural threats, social threats, and uneasy situations) decreased (Činčera, 2012b).

Alexia Barrable and Liz Lakin (2019) from the UK studied the willingness of teachers to teach outside. Forty-nine future teachers (age 19-47), students of Initial Teacher Education (ITE) of the University of Dundee, took part in an outdoor session and responded to pre- and post-measures of nature-relatedness, perceived competence, and willingness to teach outdoors. They used the NR scale, which has been used in the past to measure nature-relatedness both as a trait and state level (Lumber, Richardson, & Sheffield, 2017) and a seven-point Likert scale ranging from [1] – ‘rarely’ to [7] – ‘very often’ for the students’ expression of their willingness to teach outdoors (WTO). They rated the data by conventional statistical methods. The results suggest a positive correlation between how close the student teachers feel to nature (NR) and how competent they perceive themselves as being in undertaking outdoor teaching sessions. In addition, NR also correlated positively to their willingness to teach outdoors. The outdoor environmental session that the respondents engaged in had a significant positive effect on their NR. There was



also a robust increase in the participants' perceived competence and willingness to teach outdoors, as measured in this study. However, the provision of outdoor education in teacher education programmes in higher education has not been studied widely to date (Barrable & Lakin, 2019).

Fear of animals is an important issue to consider in order to promote knowledge about nature and foster positive attitudes towards nature conservation.

The article of Maria J. Albo, Laura Montes De Oca, and Ignacio Estevan (2019) deals with research on fear and disgust aroused by spiders in 10- to 11-year-old Uruguayan children in 2015-2016. They studied the effect of single lesson and 40-hour course including teaching and contact with spiders. Both approaches improved pupils' knowledge on spiders with 40-hour course having higher effect. The pupils' attitudes towards spiders changed after the 40-hour course only (Albo et al., 2019).

The Korean researchers Yoori Cho and Dowon Lee (2018) focused on the knowledge and attitudes of 104 primary school pupils (8-9 years old, born in 2005) towards honey bees and other useful, but dangerous insects. They used questionnaires, interviews, and analysis of student drawings. They revealed a number of misconceptions, such as 'if a honey bee stings, we must die'. Following the bee programme, there was an improvement in knowledge and attitudes. Some participants in the programme retained their misconceptions even after the educational lesson (Cho & Lee, 2018).

The Slovak scientist Milan Kubiátko (2012) conducted a qualitatively tuned research study with 27 children from Czech kindergartens (aged 5-6 years). He presented ten coloured pictures of animals to them. There were five "bad animals" (spider, bat, shark, snake, bear) and five "good animals" (dog, monkey, cat, horse, dolphin). The questions were focused on the identification of the animals and the evaluation of the animals according to their appearance and the fear they aroused. No significant influence of gender and age on the results was found. In the conclusion of the study some implications are suggested. It was found that kindergarten children distinguish between "good" and "bad" animals. There is a strong chance of this distinction surviving into adulthood, so teachers and parents could try to reduce it.

Eunsook Hyun (2005) from Florida (US) points out that children's perceptions of the world are different from those of adults. The difference is caused by the development of the brain, which is manifested – briefly addressed – in the predominance of sensory perception over thinking in children. In a child's conversations with an adult, the child often encounters a cultural discourse which is caused by a different perception of reality (the author gives a number of examples).

Hyun draws attention to the importance of a sensitive period for the development of Naturalist Intelligence and sensitivity: "Neglecting young children's interests in nature, or hindering their curiosity and limiting their exploration of



nature throughout childhood, can impair their cognitive abilities as well as social-emotional development. This is similar to the result of emotional neglect, which predisposes an individual to respond with aggression or violence to stressful or frustrating situations.”

She points out that we should study the ways in which children learn about the world and construct knowledge about it and, on the basis of our findings, we should stimulate children and provide them with feedback.

Jana Fančovičová (2012) from Slovakia dealt with the issue of fear and disgust in 434 pupils and students (ages 8-26) concerning parasites and insect larvae. The respondents assessed their own fear, disgust, and sense of danger when looking at colour photographs representing different species of invertebrates using a Likert scale. The evaluation turned out to be very consistent. The respondents rated the parasites and the species that carry the parasites as more disgusting, and they were more afraid of them as well. In accordance with the biological hypothesis of readiness, Fančovičová points out that a certain fear and shielding is natural, evolutionary, and useful. Alienation from nature can then be represented by the loss of this natural defence.

DISCUSSION AND CONCLUSIONS

The results of the review were surprising for us. Although a large number of authors refer to the concept of alienation in the context of pre-school and primary

school education and use it as a starting point for their considerations and research work (e.g. Karakaya et al., 2017; Loureiro & Dal-Farra, 2018; Mullenbach et al., 2018; Sahin & Alici, 2019; Vácha et al., 2019; Zeyger & Kägi, 2010), alienation from nature itself is poorly explored. The first research paper found by our method that dealt with the concept was published in 2003. Growing attention has been dedicated to the problem since then. The studies that were found are spread over various journals, which is an obstacle to building a research community and carrying out additional research.

On the other hand, the fact that the articles appear in a wide range of journals is a vital clue that the problem is recognized as a major theme that affects not only biological education, but also the basics of children’s physical and mental development. Publication in journals such as *Pastoral Care in Education* shows that the theme of alienation from nature also resonates outside the field of biological education.

In other words, although the alienation of children and pupils from nature is understood as a philosophical concept by many experts, scientific knowledge about the process of alienation is sketchy and incomplete. The term ‘alienation’ is not defined exactly and is understood fairly widely; it can be labelled as a fuzzy concept. We can assume that this widely accepted concept is based more on field observations and experience than on scientific studies. This is the situation at least in the Czech Republic. A broad research



study, “Alienation of pupils from the natural environment” (Strejčková, 2005), VaV IC/4/40/04, was carried out at Toulcův dvůr, the centre of environmental education of the capital Prague, in 2004-2005. The employees of the centre and various experts (pedagogists, psychologists, and historians) took part. Children from toddler age up to 15 years of age participated. The study was focused mainly on mapping the contacts and attitudes towards nature of children from Prague. The results were published in a book and on an internet platform, but the authors lacked the ambition to publish them in peer-reviewed journals (Strejčková, 2005).

The attention of researchers publishing the papers yielded by our methodology is focused generally on just two partial themes of the wide problematics of alienation from nature, which are:

a) the diminution of opportunities for contact with nature and efforts to re-connect to nature,

b) changing attitudes towards nature and its components, mainly changes in fear and disgust aroused by nature, especially animals.

A number of papers, mainly those aimed at pre-service teachers, display ambitions to measure the level of relation to nature by comparative means. They use a few basic research instruments for it. The Nature Relatedness Scale (Nisbet et al., 2009) was used in Turkey and in the Czech Republic (Karakaya et al., 2017; Kroufek et al., 2018; Sahin & Alici, 2019), Schultz’s Nature in Self scale (Schultz, 2001; Braun & Dierkes, 2016) and Mayer

& Franz’s Connectedness to Nature scale (Mayer & Frantz, 2004; Mullenbach et al., 2018) were seldom used in the US. The scales are unsuitable for describing the attitudes of the youngest children. That is why some authors constructed their own approaches (Kubiátko, 2012; Ernst & Tornabene, 2012; Fančovičová, 2012; Zeyer & Kägi, 2010; Činčera, 2012a).

The natural need of children for contact with a natural environment was proved in some papers (Zeyer & Kägi, 2010; Činčera, 2012a).

Studies that analyse the availability of an environment supporting the strengthening of connectedness and their implementation in education are interesting. Pre-service teachers recognize the importance of stays and education in natural surroundings (Blatt & Patrick, 2014; Ernst & Tornabene, 2012). Although they personally prefer a natural environment, they consider parks and maintained environments more suitable for education. The necessity of organizing transport and the low availability of natural environments near the school are among the most frequently mentioned obstacles (Ernst & Tornabene, 2012).

This low availability can be compensated for by the utilization of school gardens, which are present in most of the schools in the Czech Republic. Their potential is, unfortunately, underused, as primary school pupils spent only 18 hours a year there on average (Vácha et al., 2019).

The German Federal Agency for Nature Conservation developed a land use



category devoted to “space for experiencing urban nature” (Schemel, 1998). It is a category of green areas with the purpose of providing children and young people with the opportunity to experience nature by playful means in their everyday life and consequently raise questions of nature conservation in the city. Reidl et al. (2003) give a detailed description of these areas and emphasize the role of parents and local communities for their development and maintenance.

The lack of natural contact with nature during childhood and adolescence in the present-day education system is also compensated for by various interventions, such as outdoor education programmes. The results of research studies (Barrable & Lakin, 2019; Braun & Dierkes, 2016; Činčera, 2012b; Mullenbach et al., 2018) prove their positive benefits both for children and pre-service teachers with an important message, that multi-day programmes have a significantly higher and more persistent impact than shorter ones (Braun & Dierkes, 2016).

It is obvious that a change of attitudes towards nature and its elements goes hand in hand with alienation from nature. The increasing fear and disgust aroused by animals, sometimes also plants, and natural processes is among the topics given great attention. The research studies are mainly focused on animals (Albo et al., 2019; Cho & Lee, 2018; Fančovičová, 2012; Kubiátko, 2012), and sometimes on ecosystems, specifically forests (Činčera, 2012b; Hyun, 2005; Marcum-Dietrich et al., 2011). Prokop, Tolarovičová,

Camerik, and Peterková (2010) state that different attitudes towards “generally good” and “generally bad” animals are recorded even in pre-school age. Prokop’s team was only focused on five-year-old children. But Jančaříková (2019) and Kralertová (2016) revealed that attitudes towards “generally good” and “generally bad” animals are formed in early childhood. Most three-year-old children had positive attitudes towards both “generally good” and “generally bad” animals. Early pre-school age is thus a sensitive age for building attitudes towards animals (Jančaříková, 2019). It is obvious from more studies (Albo et al., 2019; Prokop et al., 2010) that attitudes change somewhat discontinuously after long-term interventions; they do not change after short lessons. On the other hand, knowledge grows continuously, with short lessons also having an impact.

It can be derived from the above that effective interventions should be aimed at younger pre-school children and that they should last a longer time.

The results show that gender only has an effect on attitudes towards animals in older pupils. No significant differences were recorded between preschool boys’ and girls’ attitudes (Jančaříková, 2019; Kubiátko, 2012). Adult females generally report stronger fear and disgust aroused by animals than males do. The increase in the differences in the reported levels of boys’ and girls’ fear and disgust is proved from primary school age (Albo et al., 2019; Fančovičová, 2012; Karakaya et al., 2017).



On the basis of the papers that we studied we wish to point out that it is necessary to abandon the basic concept of biophilia x biophobia, where biophilia is understood as the desired attitude and biophobia as an attitude that is unwanted and results from alienation. It is obvious that a certain level of disgust and fear is natural, desirable, and beneficial (as a defence against injuries or infections) and is of evolutionary origin (Fančovičová, 2012; Jančaříková, 2019). Paradoxically, the insufficient level of fear and disgust is as much a result of alienation as excessive level of those.

Alienation from nature also affects the education process, particularly outdoor activities, e.g. excursions (Pavlasová et al., 2015). The teachers performing activities oriented towards the development of environmental literacy have to adapt their procedures to these changes in order to safeguard pupils' welfare. They should anticipate the excessive levels of pupils' fear and disgust and operate with them. They should also anticipate the lack of fear and disgust and avoid potential consequences (injuries or infections resulting from pupils' inappropriate behaviour).

The concept of alienation from nature is described as a process with increasing trends; every new generation is more alienated than the previous one. The new generation of pupils has fewer and fewer opportunities to get into contact with nature (Nedovic & Morrissey, 2013; Taylor, Kuo, & Sullivan, 2001, as cited in Blatt & Patrick, 2014) and they are emotionally and psychically stressed. Some authors

even describe children as “suffering” from a lack of contact with nature (Louv, 2005; Pyle, 1998).

The studies in this area reveal that connectedness to nature is built from childhood and mainly by natural contact with the environment in everyday life. This contact usually leaves deep and persistent memories (Blatt & Patrick, 2014; Waite et al., 2016).

It is obvious that attention cannot be aimed just at children and pupils when studying the theme. It also has to be devoted to their parents and teachers. They strongly influence what and how children do; they present standards of behaviour and children imitate them and take over their patterns of behaviour, including their attitudes towards nature. Fear and disgust are transmitted from teachers or parents (Jančaříková, 2019). Parents and teachers who are themselves alienated to a certain extent (e.g. they did not have the opportunity to visit grandparents in the countryside during school holidays) cannot pass on the necessary experience, even if they wanted to (Jones, 2014 as cited in Blatt & Patrick, 2014; Marcum-Dietrich et al., 2011). The education and social situation of parents also have an effect – parents with a higher level of education generally encourage their children to come into contact with nature more than parents with a lower level of education or income (Ahmetoğlu, 2017). These findings are consistent with Schoeppe et al. (2015), who found that parents with lower incomes are less likely to permit their children to play independently outdoors.



Despite this fact, most of the studies that were analysed are aimed at pre-school children or school pupils, and less often at teachers, who strongly influence children and pupils (Barrable & Lakin, 2019; Blatt & Patrick, 2014; Ernst & Tornabene, 2012; Karakaya et al., 2017; Kroufek et al., 2018; Sahin & Alici, 2019). Even fewer papers are aimed at parents (Ahmetoğlu, 2017; Hyun 2005).

This study has its limits, which are specific to all review texts. The results are influenced by the choice of keywords, which was based on our experience and the available literature. It is possible that adding some less used phrases related to alienation from nature to the keywords would expand the number of texts analysed. Other articles on the topic under analysis have probably appeared in scientific journals that were not included in the databases

we searched in. In the Czech Republic, we have solved this limitation by manual analysis of published pedagogical journals; in a broader international context, this is a challenge for other researchers who have an overview of the local journals and the corresponding language skills.

It is obvious that the field of humans' alienation from nature provides multiple opportunities for further research.

SUMMARY CONCLUSION

Research trends in the field of alienation from nature from 2000 to the present and the current state of knowledge in the field are presented in this paper. The authors indicated the direction in which pedagogy should continue in this area on the basis of the analysis that was performed.

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JANČAŘÍKOVÁ, K., KROUFEK, R., MODRÝ, M., VOJÍŘ, K. Odcizování přírodě a jeho dopady na primární a preprimární vzdělávání

Odcizování přírodě je fenomén, který má zásadní dopad na vzdělávání žáků základních škol a dětí předškolního věku. Představujeme přehled výzkumů, které se odcizováním přírodě zabývají. Ze 79 prací vybraných z databáze Web of Science, 39 prací z databáze Scopus a dvou prací z české databáze RIV bylo analyzováno a čtenářům představeno 21 relevantních článků. Ukázalo se, že odcizování přírodě je nejasně vymezený, mlhavý (fuzzy) koncept. Ačkoli se vyskytuje v odborné literatuře často, není jednoznačně chápán ani přesně definován. V analyzovaných článcích se objevují nejčastěji tato témata: 1. kontakt s přírodou a vztah k přírodě a 2. strach ze zvířat a štitivost, kterou vzbuzují. Hlavní zjištění jsou: a) učitelé a rodiče jsou již odcizeni; b) příklady dobré praxe ukazují způsoby, jak přiblížit přírodu dětem; c) postoje dětí k přírodě se mění, více se bojí zvířat a více se jich štítí; d) jistá míra strachu a štitivosti je užitečná; e) rozdíly mezi chlapci a dívkami se projevují až ve vyšším věku. Odcizování přírodě je třeba dále studovat.

Klíčová slova: předškolní pedagogika, primární pedagogika, odcizování přírodě, generace alfa