

# Adolescents' Emotional Affinity toward Nature: A Cross-Societal Study

## Markus M. Müller

Social and Organizational Psychology  
Catholic University Eichstätt-Ingolstadt, Germany  
markus.mueller@ku-eichstaett.de

## Elisabeth Kals

Catholic University Eichstätt-Ingolstadt, Germany

## Ramune Pansa

University of Kassel, Germany

**ABSTRACT:** *The role of emotional affinity toward nature (EAN) in adolescents is investigated by studying the relationships of EAN with willingness to protect the environment and by comparing the affinity toward nature of adolescents in Germany and Lithuania. Results show that in line with previous research (e.g., Kals, Schumacher, & Montada, 1999), EAN contributes significantly to willingness for pro-environmental commitment, while contact with nature does not have a direct impact on this willingness. Cross-societal differences are found both in EAN and pro-environmental commitments, both being higher in the rural Lithuanian sample. The findings are discussed with regard to the development of EAN and the role of societal factors in explaining pro-environmental action.*

Anecdotal evidence as well as research suggests that children and adolescents can react rather differently when confronted with nature. Some will feel a connection with or love of nature, others may feel disgust or fear (Bixler & Floyd, 1997), and still others may not feel anything at all but see nature as a resource for human needs such as water supply or food. Why do these different emotional and cognitive reactions develop and do they have an impact on behavioral choices? The present study takes a closer look at differences in emotional affinity toward nature and then asks how these differences can be explained.

The idea that the connection or affinity to nature is not a biological constant that is valid for all people, as proposed by the biophilia hypothesis (Eckardt, 1992; Kellert, 1997), but rather a trait that can vary between persons, along with a scale that was intended to measure affinity with nature, was presented by Kals, Schumacher, and Montada (1999). Their work draws on earlier discussions about the degree to which people feel nature as a part of their identity (see Kaplan & Kaplan, 1989). For example, Leopold (1949) argued that environmental problems—like the exploitation of natural resources—can be traced back to the lack of connectedness to nature and the estrangement of humans from nature. If people, on the other hand, feel they are a part of nature, then its destruction and

exploitation would be perceived as a sort of self-destruction, and therefore, affinity toward nature could motivate people to protect it. Kals, Schumacher, and Montada (1999) introduced a way to measure this affinity toward nature and to test its influences on pro-environmental commitments and behavior. Several facets of this idea have been proposed, either as cognitive connectedness with nature (Schultz, 2000) or as emotional affinity toward nature (Kals, Schumacher, & Montada, 1999). Similar emotional conceptualizations can be found in the works of Dutcher and colleagues (2007), Mayer and Frantz (2004), or Raudsepp (2005). The role of affinity toward nature for pro-environmental behavior and activities has been shown by a growing number of studies in the past decade (e.g., Dutcher et al., 2007; Hinds & Sparks, 2008; Kals, Schumacher, & Montada, 1999; Mayer & Frantz, 2004; Schultz, 2000), whereas the common lay theory that mere contact with nature will promote action in favor of nature and the environment could not be confirmed. Contact with nature can rather be considered a correlate of EAN (Kals, Schumacher, & Montada, 1999). An emotional affinity toward nature can also be a motivating factor to spending time in nature, be it in urban parks or in the countryside.

Kals, Schumacher, and Montada (1999) suggested that affinity toward nature can best be described as an emotion that

develops through experiences with nature during childhood. Their construct is constituted from four aspects of this emotion: Love of nature, feelings of freedom in nature, feelings of security in nature, and feelings of oneness with nature. From a psychological point of view, the relationship between humans and nature is more than a rational one, as it is—similarly to social attitudes—also based on affective experiences and behavior (Eagly & Chaiken, 1993). They showed that this emotional affinity is more closely related to environmentally relevant commitment and behavior than mere cognitive interest in nature. From a theoretical point of view, the findings can be interpreted as similar to pro-social behavior which some researchers have explained as based on the emotional reaction of empathy with a person in need (e.g., Batson et al., 1997). In this line of thought, studies in environmental psychology have shown that taking the perspective of threatened animals or plants can instigate concerns about the state of nature (Zelezny, 1999; Schultz, 2000).

In the studies discussed so far, the subjects were adults. If data on the development of affinity toward nature were included, they were gathered retrospectively by asking respondents to remember positive experiences with nature in their childhood or adolescence (e.g., Kals, Schumacher, & Montada, 1999). Despite the limited scope of these studies, the results give evidence that a positive connection to nature develops in earlier stages and remains a relatively stable trait throughout adulthood, even if the frequency of contacts with nature may decrease, a pattern that is also discussed in the context of development of values and attitudes (Berk, 2006). If we then consider the fact that affinity toward nature plays an important role in the formation of commitments to protect nature and the environment, then researchers should pay closer attention to how this affinity develops in order to find ways to promote nature affinity and pro-environmental action. Such an attempt was made by Kals and Ittner (2003), who showed that short-term interventions in the classroom can enhance EAN in children and promote pro-environmental behavior. Although individual interventions can promote behavior, we assume that societal and contextual opportunities to spend valuable time in nature can promote EAN on a much larger scale—or, if these opportunities are absent, can contribute to low EAN. Developmental psychology has long been aware of the role of environmental and contextual factors in development (e.g., Bronfenbrenner, 1986). However, the term “environment” was generally restricted to socio-cultural factors, overlooking the role of the physical and especially the biological environment (Heerwagen & Orians, 2002). Yet, research shows that contact with nature, which can vary from green spaces in cities to nat-

ural landscapes, does indeed have a positive impact on many aspects of development as well as people’s well-being (Kaplan, 2001; Kellert, 2002; Müller, Kals, & Maier, submitted; Taylor & Kuo, 2006; Ulrich, 1984; Wells, 2000).

What could be the role of social and societal factors on the development of EAN, then? While authors argue that “*children need outdoor play*” (Sluss, 2008, p. 68) and contact with the natural world, we find evidence that the time that young people spend in nature is decreasing in industrialized countries with the growing use of video games and other forms of electronic entertainment (Zaradic & Pergams, 2007). Therefore, young people might have fewer opportunities to spend time in nature because they have only limited access to it, and also have diverse other ways to spend their time without being in nature.

As an example, Hinds and Sparks (2008) investigated whether the environment in which students had grown up has an impact on pro-environmental attitudes and behavior. Their results from 199 undergraduate social science students from the UK show that students who had grown up in a rural environment have significantly higher scores on pro-environmental variables (e.g., behavioral intentions, attitudes, subjective norm, perceived behavioral control, environmental identity, and affective connection toward the environment), compared to a group of students who had grown up in an urban area. To explain how the connection to nature develops, the authors draw on ideas from research on attitude formation. They argue that direct and repeated exposure to an object can contribute to the development of a positive affective attitude toward that object, in line with research on the mere exposure effect (Zajonc, 1968) and affective versus cognitive attitude formation (Millar & Millar, 1996).

It is evident that affinity toward nature should not be considered the only predictor of the protection of nature. Several models of pro-environmental behavior have been proposed, with a wide scope of variables that have been studied. The present study will focus on awareness of risks to nature and the environment which is considered to play a central role in the formation of pro-environmental behavior. As Stern (2000) states, the awareness of consequences for valued objects—which, in this context, can be the negative consequences for nature and environment—is a direct predictor for environmental responsibility. Only when it is clear that a valued object is in danger can a person take responsibility for action to protect this object from risks. This idea is directly derived from Schwartz’s (1977) norm-activation-model, which was formulated to explain pro-social behavior and included only risks or negative consequences for other persons. In Stern’s concep-

tualization, nature or the environment can also be considered as a valued object, if this cognition is embedded in a larger ecological world view (Stern, 2000; Stern, Dietz, & Kalof, 1993).

In sum, these preceding arguments lead us to the idea that adolescents living in different contexts and environments should develop rather different degrees of emotional affinity toward nature. As mentioned before, two processes could be at the origin of these differences. First, they might differ in their access to nature, which Hinds and Sparks (2008) operationalized as whether they grew up in the city or the countryside. Second, in modern societies, people have many opportunities to spend their time without leaving the house or playing in nature. As a consequence, in line with the arguments developed by Zaradic and Pergams (2007), young people living in highly industrialized areas should not feel as emotionally connected to nature as those living in areas with lower degrees of industrialization. In order to investigate these differences, cross-societal studies can provide important insights.

### *The Present Study*

The present study investigates the role of emotional affinity toward nature (EAN) in adolescents by studying the relationships of EAN with willingness to protect the environment and by comparing the affinity toward nature of adolescents in two different European societies, namely Germany and Lithuania, living in either urban or rural settings. Both countries are part of the European Union, but are rather different in terms of their demographics and economy. Germany has 82.3 million inhabitants, with a population density of 230.7 per sq. km. Lithuania has a population of 3.4 million and a density of 54.2 per sq. km (these and the following data from the year 2006 are published in Eurostat, 2008). In both countries, processes of industrialization have taken place, but Germany was one of the first countries in the world to establish large factories in the 19<sup>th</sup> century, whereas Lithuania was industrialized only in the second half of the 20<sup>th</sup> century, when the Soviet occupation led to a growth of industry and urbanization. The gross domestic product per capita in Germany is twice as high as in Lithuania (in purchasing power standards, in the year 2007: 28,600 Euros in Germany and 14,800 in Lithuania), but Lithuania is keeping up with the larger European countries in terms of industry growth rates. Despite these processes that make the Lithuanian economy move closer to central European standards with the majority of the working population being employed in services and industry, rural Lithuania remains largely agricultural with a low population

density. Therefore, the study not only examines differences between the countries, but also between urban and rural contexts, aiming to provide a sample with variance in economic development of the society in which the respondents live, as well as their access to nature.

We will focus on two research questions. First, we hypothesize that EAN has a strong positive influence on commitment to protect the environment in adolescents, along with well-established variables such as awareness of risks to nature. In line with previous findings (Kals, Schumacher, Montada, 1999), contact with nature should not have as much of an impact on willingness for pro-environmental commitment as affinity toward nature. Secondly, it is assumed that societal context influences the development of EAN. Adolescents who live in a context with a lower level of industrialization and those who live in rural settings should have more access to positive experiences with nature and therefore develop higher degrees of EAN. Moreover, we will investigate inter-individual differences in contact with nature, awareness of risks to nature, and willingness for pro-environmental commitment.

## **Method**

Data were gathered by means of a questionnaire (N = 403) in public schools in Germany (N = 196) and Lithuania (N = 207). The questionnaires were distributed and collected during lessons, the investigator being present during that time.

### *Participants*

The respondents were students in the 11<sup>th</sup> and 12<sup>th</sup> grades of high schools in Germany and comprehensive schools in Lithuania. The age ranged from 15 to 19, 58% being 17 years old. More girls (239, 59.3%) than boys (164, 40.7%) participated in the study, but the ratio was the same in both countries. In each of the countries, schools in both urban and rural environments were chosen, to make sure that sub-samples of students living in rural villages and larger cities would be created. Altogether, 199 (49.4%) of the respondents live in cities, and 204 (50.6%) in smaller villages. The subsamples were distributed as shown in Table 1.

Table 1. Sample distribution.

<b>Germany</b>	<b>Lithuania</b>
Rural <i>N</i> = 104	Rural <i>N</i> = 97
Urban <i>N</i> = 92	Urban <i>N</i> = 110

## *Instruments*

The variables used in the study were emotional affinity toward nature; awareness of environmental risks; current contact with nature; and willingness for pro-environmental commitment. All variables were assessed using Likert-like six-point scales (1 = completely disagree to 6 = completely agree), adopting scales that were first published by Kals, Schumacher, and Montada (1999). In addition, demographical data were assessed to collect the gender, age, and nationality of the respondents, as well as the school that they attend. The original scales were constructed in German and then translated into Lithuanian by a professional translator. The items were then re-translated into German by a bilingual native speaker, allowing ambiguities to be identified in the translations. An English translation of all items can be found in the appendix.

*Emotional Affinity toward Nature (EAN).* The original scale measuring EAN was introduced by Kals, Schumacher, and Montada (1999). The authors presented EAN as a dispositional variable that describes the extent to which a person has an emotional connection to his or her natural environment. In the original questionnaire, the items made explicit references to the present time (using expressions like “nowadays,” “today,” etc.), thus establishing a clear contrast to the items asking for respondents’ memories of experiences with nature in the past. Since such a contrast was not the intention of the study discussed here, these references to the present time were omitted in the items. Also, the scale was shortened from 16 to 11 items with satisfying results concerning reliability ( $\alpha = .86$ ).

*Awareness of Risks to Nature.* Nine items were used to measure awareness of risks to nature, four coming from the original Schumacher questionnaire (Schumacher, 1998), and five new items ( $\alpha = .76$ ).

*Contact with Nature.* We decided to measure the frequency and time spent by the respondents in nature to test whether it is merely the fact that adolescents spend time outside or the more psychological attachment to nature that motivates behavior to protect nature. The measure, again, was based on a scale developed by Schumacher (1998). It was measured with five items ( $\alpha = .70$ ).

*Willingness for Pro-Environmental Commitment.* Stern (2000) differentiates four types of pro-environmental behavior: activism, non-activist public-sphere behaviors, private-sphere behaviors, and behaviors in organizations. In their study, Kals, Schumacher, and Montada (1999) had found that EAN is most closely connected to the third of Stern’s categories. Therefore, the present study focuses on this category: the

private sphere. However, instead of asking to report behavior, we chose to study willingness for continued pro-environmental commitments, a concept introduced by Montada, Kals, and Becker (2007). The rationale for choosing this type of variable is based on two arguments. First, it is more economical to use self-report measures than observing behavior in this kind of research, without overlooking the fact that studies with manifest behavior as dependent variables are very important. But the second argument is more fundamental: Willingness for continued commitment, in the reasoning of the authors, is a concept that encompasses more than singular behavioral episodes. It is, rather, related to a specified category of acts or decisions, like pro-environmental behavior, that is directed to an overarching aim. In their studies, Montada, Kals, and Becker (2007) showed successfully that willingness for continued commitment is a valid predictor of manifest behavior. When willingness is high, then persons engage in actual behaviors even in the presence of situational barriers, which makes it a useful concept when dealing with environmentally-related issues.

The scale used in this study is based on the one constructed by Kals, Schumacher, and Montada (1999). Items 1 – 5 were taken from their questionnaire, items 6 – 8 were developed for the present study. Special care was taken to include behaviors that can be realized by adolescents, such as being careful with plants and animals while in nature, buying environmentally sound products (e.g., soaps, etc.), or making a point in favor or against the protection of the environment in discussions. Likewise, some of Kals and associates’ original items were changed in that way (e.g., car use is not only restricted to driving—which some of the respondents are allowed to do—but also to riding as a fellow passenger). The construct was measured by eight items ( $\alpha = .80$ ).

## **Results**

The results are presented in two steps. First, we will look at general findings on the explanation of willingness for pro-environmental commitment. Secondly, the differences between subjects will be analyzed.

*Predicting Willingness for Pro-Environmental Commitment.* In order to find out which relative roles the variables play in explaining willingness for pro-environmental commitment, we conducted a stepwise multiple regression with EAN, awareness of risks to nature, and contact with nature as predictors. The results are presented in Table 2. As predicted, both EAN and awareness of risks to nature contribute significantly to the prediction of willingness for pro-environmental

commitments. Contact with nature, on the contrary, does not explain a significant portion in the variance of the criterion, although there had been a significant bivariate correlation of  $r = .25$  (for a correlation matrix of all variables, see Table 3). This can be due to the high common variance between EAN

and contact with nature. Contact with nature will not directly lead to willingness for pro-environmental commitments, but only indirectly, moderated by emotional affinity toward nature.

Table 2. Means, Standard Deviations, and Bivariate Correlations

	<b>M</b>	<b>s</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Emotional affinity towards nature	.30	.84	.	.32**	.50**	.47**
Awareness of risks to nature	.09	.70	.	.	.17**	.30**
Contact with nature	.08	.97	.	.	.	.25**
Willingness for pro-environmental commitment	.82	.91	.	.	.	.

N = 403, \*\*  $p < .01$ , \*  $.01 < p < .05$

Table 3. Stepwise Multiple Regression to Predict Willingness for Pro-Environmental Commitment

<b>Criterion</b>	<b>Predictors</b>	<b>R<sup>2</sup></b>	<b>B</b>	<b>SE B</b>	<b>r</b>	<b>beta</b>	<b>F</b>
Willingness for pro-environmental commitment	Emotional affinity towards nature	.22	.45	.05	.47	.41	80.10**
	Awareness of risks to nature	.24	.22	.06	.30	.17	13.06**
	Contact with nature	-	-	-	.25	-	-
	(Constant)		.79	.32			6.32**
F(total) = 63.55**		df = 2/400					

\*\*  $p < .01$  \*  $.01 < p < .05$

*Inter-Individual Differences.* Differences for all demographic variables (i.e., gender, country, urban, rural) are tested using ANOVAS with EAN, awareness of risks to nature, con-

tact with nature, and willingness for pro-environmental commitment as dependent variables. The results are presented in Table 4.

Table 4. ANOVAS for Emotional Affinity towards Nature, Contact with Nature, Risk Awareness, and Willingness for Pro-Environmental Commitment.

Dependent Variable : Emotional Affinity Towards Nature				
Source	df	F	$\eta$	p
Gender (G)	1	10.70**	.03	.00
Nationality (N)	1	23.92**	.06	.00
Residence (R)	1	3.72	.01	.05
G x N	1	2.64	.01	.10
G x R	1	0.02	.00	.90
N x R	1	0.76	.00	.39
G x N x R	1	0.33	.00	.57
Error	395	(0.66)		

  

Dependent Variable : Contact with Nature				
Source	df	F	$\eta$	p
Gender (G)	1	18.99**	.05	.00
Nationality (N)	1	0.04	.00	.85
Residence (R)	1	14.95**	.04	.00
G x N	1	0.29	.00	.59
G x R	1	1.92	.00	.17
N x R	1	2.82	.01	.09
G x N x R	1	0.17	.00	.68
Error	395	(0.86)		

  

Dependent Variable : Awareness of Risks to Nature				
Source	df	F	$\eta$	p
Gender (G)	1	14.60**	.04	.00
Nationality (N)	1	1.32	.00	.25
Residence (R)	1	3.31	.01	.07
G x N	1	15.26**	.04	.00
G x R	1	1.61	.00	.20
N x R	1	0.57	.00	.45
G x N x R	1	0.04	.00	.85
Error	395	(0.46)		

  

Dependent Variable : Willingness for Pro-Environmental Commitment				
Source	df	F	$\eta$	p
Gender (G)	1	14.28**	.03	.00
Nationality (N)	1	6.25*	.02	.01
Residence (R)	1	0.30	.00	.59
G x N	1	0.05	.00	.83
G x R	1	2.99	.01	.08
N x R	1	12.19**	.03	.00
G x N x R	1	0.09	.00	.77
Error	395	(0.78)		

N = 403, \*\* p < .01, \* .01 < p < .05

Note: Values enclosed in parentheses represent mean square errors.

Overall, the main effects of gender are stable across all analyses. On all variables, girls score significantly higher than boys. For awareness of risks to nature, this main effect is altered by an interaction of gender with nationality: We find that there are no significant gender differences for awareness of risks to nature within the Lithuanian sample, while the differences in the German sample are very articulate ( $M_{\text{German, female}} = 5.29$ ,  $M_{\text{German, male}} = 4.76$ ).

Emotional affinity toward nature, in addition to the gender differences, also differs between the German and the Lithuanian sample. The adolescents in Lithuania show a significantly higher affinity toward nature ( $M = 4.47$ ) than those in Germany ( $M = 4.07$ ). Differences for the urban and rural samples are not significant, although there is a tendency in all groups toward a higher EAN in rural samples.

The urban vs. rural dimension, though, does play a significant role in the amount and frequency of contact with nature reported by the respondents. As could be expected, adolescents living in a rural environment spend more time with nature than those in the cities ( $M_{\text{rural}} = 4.22$  vs.  $M_{\text{urban}} = 3.85$ ).

Finally, in addition to the main effects of gender and nationality, we find an interaction for the residence and nationality variables on willingness for pro-environmental commitment. Overall, the Lithuanian sample scores higher on commitment than the German sample ( $M_{\text{Lithuanian}} = 3.90$ ;  $M_{\text{German}} = 3.68$ ). However, commitment is highest for Lithuanians living in the countryside, while those Germans living in rural environments show the lowest scores for commitment ( $M_{\text{Lithuanian, rural}} = 4.08$ ;  $M_{\text{Lithuanian, urban}} = 3.72$ ;  $M_{\text{German, rural}} = 3.55$ ;  $M_{\text{German, urban}} = 3.81$ ).

All in all, gender differences are found for all variables, but also context variables such as country and place of residence play important roles.

## Discussion

The study was aimed to investigate the role of emotional affinity toward nature for willingness for pro-environmental commitment and to find out which role societal and contextual effects play in the development of nature affinity as well as environment-related variables. We studied adolescents—students at public schools—from Germany and Lithuania living in either urban or rural environments. The variable of willingness for pro-environmental commitment is related to long-term commitments to protect nature and the environment, in contrast to short-term behaviors that are used in many studies (Montada, Kals, & Becker, 2007). Although this variable has been validated as a good predictor of manifest behaviors, sub-

sequent research should also integrate measures of behavior, either self-reported or observed.

The findings support the hypotheses in that EAN does explain an important amount of variance in willingness for pro-environmental commitment. Awareness of adverse consequences for nature—a variable that has been discussed as crucial for the development of action in favor of the environment (e.g., Stern, 2000)—also qualifies as a predictor of willingness for commitment, although to a lesser degree. The mere amount and frequency of contact with nature, on the other hand, is not directly related to willingness for commitment. How much time a young person spends in nature may contribute to positive feelings and an affinity toward nature, which is suggested by the close correlation between those variables. However, only if nature has become part of the identity, then can it be valued as something that has to be protected (Kals & Maes, 2002). As other researchers have pointed out, positive emotional experiences with nature are crucial for the development of that affinity, especially if these experiences are accompanied with significant others (Kals, Schumacher, & Montada, 1999). The form of these contacts can be manifold: They can range from visits at the zoo (Clayton, Fraser, & Saunders, in press), playing in the forest, or walks in countryside with the family on weekends, to symbolic experiences by consuming green products (Hartmann & Apaolaza-Ibáñez, 2008). However, the present data cannot draw a more precise picture of the relationship between experiences with nature and the integration of nature in the identity, especially because the data are based on one-shot correlational measures. More elaborate developmental, longitudinal studies are needed to investigate the causal relationships, the conditions under which affinity toward nature develops, and how affinity toward nature motivates action, like spending time in nature or becoming an environmental activist.

The findings show also that there are important inter-individual differences. First, there are consistent gender effects, showing that girls in all groups are more connected with nature, spend more time in it, are more aware of environmental risks, and, finally, express more willingness to act in favor of conservation. These findings can be seen as a replication of previous studies (e.g., Kals, 1996; Niesbach & Schell, 1998; Russell, 2000), adding the cross-societal perspective, since the effects are also rather consistent in Lithuania. Only for awareness of risks to nature, we found gender differences only in the German sample, but not in Lithuania. The consistency of the findings in the two societal groups raises the question whether these differences also occur in societies with larger cultural differences in the sense of Hofstede's (2001) dimensions of

culture. Further cross-cultural research should address these questions in more detail.

Effects of context, then, are important in the study. Affinity toward nature is much higher in the Lithuanian sample, with some indication that it is especially high in rural Lithuania. Given the consistent lines of results, it can be argued that—in line with our hypotheses—societal and environmental differences do indeed have an effect on adolescents' experiences with nature and also on their commitment to protect the environment. Although the differences between Lithuania and Germany are getting smaller in terms of industrialization and economic development, we find notable differences between the groups in affinity toward nature. This finding reflects the statements by Zaradic and Pergams (2007) who claimed that young people in industrialized countries spend much less time in nature due to the lack of opportunities and existence of other attractive ways to spend their free time, and therefore have fewer chances to develop an affinity toward nature.

But the findings are not limited to affinity toward nature. We also find important differences between the groups in contact with nature, awareness of risks to nature, and willingness for pro-environmental commitments. It seems that although there are many possibilities for young people in Germany to become active conservationists, this does not contribute to their commitments to act accordingly. Rather, emotional affinity toward nature turns out to be the best predictor of these commitments. These results are in line with findings from Montada, Kals, and Becker (2007) who found that psychological variables such as perceived responsibility or environment-related emotions are best predictors for long-term pro-environmental commitment, while situational appeals or incentives might change behavior on a short-term basis. Societal changes seem to influence the way young people think and feel about nature, and this change can also lead to a lower commitment to protect nature. So, despite the fruitful attempts to show that interventions in the classroom can promote affinity toward nature (Kals & Ittner, 2003), we note societal trends that are much more powerful than single interventions could ever be. We are therefore convinced there is a strong need to learn more about how nature affinity is formed in youth and adulthood on the one hand, and, on the other hand, find effective ways to promote contact with nature and positive experiences with nature in order to make sure that future generations will feel a connection to nature and a need to protect it. If, as Hinds and Sparks (2008) argued, a positive feeling toward nature is based on repeated exposure to nature, we should think about how these experiences can be facilitated for children and adolescents. There are many ways that come to

mind: creating green areas in cities and schools, integrating spaces for young people in parks and nature sites, having special activities in zoos and wildlife parks aimed at adolescents, and the like.

Again, although there are notable differences between the Lithuanian and the German sample, and these differences lead us to make a point for contextual influences on the development of EAN and its relationship to action, we should be careful when generalizing the findings unless more research is conducted which includes different countries and cultures, longitudinal data on the stability of emotional affinity toward nature, and also different natural settings. As the research by Balling and Falk (1982) and subsequent work (e.g., Herzog et al. 2000) suggest, different types of natural landscapes are perceived rather differently. The authors argue that humans have an innate preference for savanna-like settings, and preferences for other types of landscapes arise due to contact with nature. It would be a compelling question to integrate the idea of "different natures" in the concept of EAN and especially to scrutinize which aspects of the connection with nature are universal and which are developed during childhood and adulthood.

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## Appendix: Scales

### Emotional affinity towards nature ( $\alpha = .86$ )

1. When I spend time in nature I feel free and easy.
2. I have the feeling I can live my life to the full in nature.
3. When surrounded by nature I get calmer and I feel at home.
4. I feel relaxed and have a pleasant feeling of intimacy when spending time in nature.
5. I am often very much absorbed through nature (landscapes, plants, animals, water, etc.) and I do not notice how time goes by.
6. I do not feel especially at ease whenever I spend time in nature.
7. Whenever I spend time in nature I do not experience a close connection to it.
8. By direct contact with nature I feel respect for its uniqueness.
9. By getting in touch with nature today I have the feeling of the same origin.
10. Whenever I spend time in nature I do not experience a close connection to it.
11. Sometimes when I feel unhappy I find solace in nature.

### Awareness of risks to nature ( $\alpha = .76$ )

1. Without any major changes, nature will be threatened even more in the coming years.
2. The problems of nature have many negative consequences already today (endangered species, resource scarcity, etc.)
3. Contamination and pollution are increasingly becoming a problem.
4. It will probably not be necessary to worry about the extent and consequences of natural problems over the next few years.
5. There are enough natural resources. We don't have to be economical with them or waste money on renewable energies.
6. Whenever I see a burning garbage heap, I don't think of anything bad, but I think it's good that the waste stays away from the streets.
7. I think that there is too much importance attached to the protection of nature.
8. I don't think that the climate change caused by the "greenhouse effect" is dangerous.
9. Nuclear power plants and radioactive waste are less dangerous than proclaimed to the public.

### Contact with nature ( $\alpha = .70$ )

1. I frequently spend time in nature.
2. Nowadays, I'm rarely in nature.
3. I currently have no sojourns in nature.
4. When I have a free day, I often spend it in nature.
5. Whenever possible, I try to spend my time in nature and do my work there.

### Willingness for pro-environmental commitment ( $\alpha = .80$ )

I am willing...

1. to take action for the protection of natural resources.
2. not to disturb or harm endangered animals or plants while in nature.
3. to make a contribution to the protection of the environment by reducing my car use (also as a fellow passenger) and by switching to public transport or the bicycle instead.
4. to buy products that are bio-compatible with animals and plants (e.g., soap, detergent) provided it's good value for money.
5. to make regular donations (even small amounts of money) to associations that take charge of the protection of natural resources.
6. to get involved with an initiative aiming at the protection of the local wildlife.
7. to insist, in discussions, on the fact that we do not have to worry about natural resources because they are abundant.
8. at school, to call attention to the fact that measures to protect the environment (like waste separation) are important, and to realize them personally.