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Elvan Sahin & Sule Alici

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An associational study on pre-service early childhood teachers' nature relatedness in education for sustainability

Elvan Sahin^a and Sule Alici^b

^aDepartment of Mathematics and Science Education, Faculty of Education, Middle East Technical University, Ankara, Turkey; ^bElementary and Early Childhood Education Department, Faculty of Education, Kirsehir Ahi Evran University, Kirsehir, Turkey

ABSTRACT

There is significant global concern with current environmental problems, yet people's behaviour towards the environment has been resistant to change. Young people have the opportunity to bring about desirable changes through environmental behaviours and attitudes. The goal of this study is to better understand the scope of nature relatedness as an attribution interacting with pro-environmental behaviours for Turkish pre-service early childhood teachers. We examined the associations between the domains representing nature relatedness and also sought to identify any differences in nature relatedness with respect to their year of enrolment in a teacher education program. The participants were 402 students attending an Early Childhood Teacher Education Program at one of the two public universities in the capital of Turkey. A Turkish-adapted version of the Nature Relatedness Scale developed by Nisbet, Zelenski, and Murphy was administered to gather the data. Participants were found to have a mostly positive external nature-related worldview. Furthermore, the statistical analysis indicated non-significant differences in their nature relatedness with respect to the year of enrolment in the teacher education program. In terms of the relationships between the constructs representing nature relatedness, the internalized identification with nature was positively correlated with two constructs which refer to his/her physical familiarity as well as attraction to nature, and how individual's relationship with the environment is provoked by his/her behaviour. This research indicates that pre-service teachers, who are regarded as important agents for the future implementation of sustainability education, are actually lacking in their nature relatedness constructs and need to develop key competencies in a field that presupposes that they have already acquired sufficient experience of physical and emotional interaction with nature.

KEYWORDS

Associational study; early childhood education; education for sustainability; nature relatedness; Pre-service teachers

Although the negative impacts of human activities on the natural environment appear frequently in the media, people continue to engage in behaviours with dramatic negative consequences on the environment. Along with the degradation of the natural environment, such activities may lead to catastrophic consequences for our well-being and non-human living things (Kuo, 2010; Oskamp, 2000). However, some individuals demonstrate pro-environmental behaviours and/or are concerned with environmental issues (Kaplan, 2000; Schultz, 2000). Given this situation, a critical question for investigation is “why do individuals not behave in environmentally friendly ways if they care about and are aware of environmental problems and issues?” (Kaplan, 2000; Kortenkamp & Moore, 2001; Redondo & Puelles, 2017). Researchers have therefore investigated individuals’ attitude, motivation, value and beliefs in various attempts to answer that critical question for a long time (Nordlund & Garvill, 2002; Pelletier, Dion, Tuson, & Green-Demers, 1999). The authors, as educators for sustainability, were inspired by that critical question to collect some empirical evidence in considering a target group comprising student teachers of early childhood education. This article presents the first insights into nature relatedness of that population as the future role models of the next generations in Turkey, a developing country.

Our emphasis on nature relatedness originated from Nisbet, Zelenski, and Murphy (2009) claiming that the differences among human behaviours can be derived from their nature relatedness. How people relate to nature reflects individual differences in their cognitive, affective, and physical connections with the natural environment. Nisbet et al. (2009) developed a scale to assess this construct and confirmed that it has a three-factor structure representing one’s connectedness to nature. The first factor named “NR-self” refers to an internalized identification with nature, reflecting feelings and thoughts about an individual’s connection to nature. As a second factor, “NR-perspective” determines an external, nature-related worldview about how humans interact with other living things. More specifically, NR-perspective reveals one’s worldviews regarding human use of natural resources and treatment of animals. The third factor, “NR-experience”, puts forward people’s physical familiarity with the natural world. This factor represents an individual’s feelings of comfort with, attraction, and desire to be in nature.

Nature relatedness holds great explanatory power for productive environmental concern and pro-sustainable behaviour (e.g., Markowitz, Goldberg, Ashton, & Lee, 2012; Nisbet et al., 2009; Schultz, 2002). Individuals who feel connected to nature hold a desire to protect it (Zelenski & Nisbet, 2014). Examining an individual’s bonding with nature can serve as a proxy for how they treat the environment. The first step in preventing the deterioration of our natural systems requires an understanding of the reasons for destructive behaviours in humans (Oskamp, 2004). On this point, people’s cognitive, affective, physical connection to nature received great attention (e.g. Conn, 1998; Nisbet et al., 2009; Schultz, 2000; Thomashow, 1998) as it was thought that individuals benefit from even limited personal contact with nature. Zelenski and Nisbet (2014) claim that nature relatedness can be regarded as a key factor to achieve environmental sustainability; however, further research should be conducted to confirm the causation and the complex interaction between these factors.

Based on the significance and the findings of nature relatedness depicted in previous research, young populations have the opportunity to increase connectedness to nature and thus lead to positive environmental behaviour. Teachers of those young people are agents in that process of change. Specifically, regarding their physical, cognitive, and affective connectedness with nature, teachers have been thought of in terms of being role models for children in their early years.

As depicted in the policy guide *Education for Sustainable Development in the Schools Sector* (Council for Environmental Education, 1998), the significance of pre-service and in-service teacher training has been highlighted in the context of education for sustainability because educators could be regarded as vital agents of alteration in society or key players in impacting and promoting students' interest in environmental issues and their capacity for problem-solving and decision making. Furthermore, UNESCO (2008) published a report entitled "*The Contribution of Early Childhood Education to a Sustainable Society*" and emphasized the importance of recognizing and raising awareness about the powerful role of early childhood education in order to establish a sustainable society. A call for teacher training to be strengthened as a basis for learning and teaching about education for sustainability, which presupposed teachers respect and value for nature (Lummis, Morris, Lock, & Odgaard, 2017; Saribas, Doganca Kucuk, & Ertepinar, 2017). As a guiding principle noted in that report by UNESCO (2008), it was claimed that pre-service and in-service training of early childhood educators in all countries must be revisited and reinforced from the perspectives of learning for sustainability, and that such efforts would need to be repeated on a regular basis.

Pre-service teachers became a priority of policymakers concerned with sustainability. As the future educators of pupils in their early years, they can influence the next generation in shaping a future that is more sustainable in terms of our economic, societal, and biophysical needs (Kennelly, Taylor, & Serow, 2012). Teachers demonstrating an interest in nature and providing opportunities to their pupils to engage in nature activities are among the significant factors that motivate people to become concerned about and active in nature in the future (Chawla & Cushing, 2007). Chawla (1999) found evidence to suggest that adults attribute their environmental concerns and attitudes to various factors including spending time in natural areas during childhood, as well as parents or teachers modelling actions in the environment. Furthermore, supported by Wilson (1996) teachers of the sustainability programs for the early years should show a personal wonder and joy of the natural world, as such demonstrations are vital to maintaining children's love of nature. The author also pointed out that an educator could be regarded as a model for caring and respecting the natural environment.

Early years are a crucial period to promote children's—future adults—connection with nature as during this period, they are intrinsically curious (Chawla, 1998; Torquati, Gabriel, Jones-Branch, & Leeper-Miller, 2011). Extensive childhood experiences in nature can help children develop a sound understanding of life cycles, making some predictions, and an awareness of the interdependence between plants, animals, rain and sun (Torquati et al., 2011). In this aspect, fascinating children's

interests in nature during early childhood can yield favourable dispositions towards nature that may last into adulthood (Chawla, 1998).

Unfortunately, it can be that many of today's children spend less time being in natural environments than their parents did. Louv (2005) pointed out that the lack of being exposed to nature might also influence an individual's ability to perform a certain task. Louv coined the term "nature deficient disorder" and characterized it as the "human costs of alienation from nature" whose impacts on our ecological unconscious can emerge at individual or group level (Louv, 2005, p. 36). Louv asserts that children who do not have opportunity to be in nature and make regular connection with it exhibit "disconnection" from nature which may in turn hinder their pro-environmental attitudes and pro-environmental behaviours (Brügger, Kaiser, & Roczen, 2011; Davis, 2005; Mayer & Frantz, 2004; Nisbet et al., 2009; Schultz, Shriver, Tabanico, & Khazian, 2004).

Children's connection to nature could be promoted basically by taking them outdoors and talking about the environment, but especially, with "careful planning and facilitation of the nature experience" (Preston, 2004, para. 4). In other words, to raise children's connection to nature, as supported by Bragg, Wood, Barton, and Pretty (2013), educational systems should be constructed by paying special attention to "the amount of exposing to nature in the learning environment" and essentially "learning about nature". At this point, it should be noted that the quality of education for sustainability depends on a number of teacher-related factors including their attitudes, interests, and awareness. As supported by Tuncer et al. (2007), teachers are therefore individuals who are expected to significantly impact and cultivate students' interest in the environment.

This study focused on portraying pre-service early childhood teachers' nature relatedness and revealing the relationships among the dimensions of nature relatedness in Turkey, a developing country. Some indicators have shown unsustainable lifestyle in Turkey since 1970s which forced educators and researchers touch upon behaviours and the related constructs for people for all ages. For instance, it was this time period that total ecological footprints of both consumption and production exceeded the countrywide biocapacity for the first time due to industrial development and changes in personal life (Global Footprint Network, 2012). In addition, Turkey's total greenhouse gas emission has doubled since 1990s (Turkish Ministry of Environment and Urbanization, 2010). Given this situation, first initiatives on environmental and sustainability education took the place in the agenda.

A closer look into the development of education for sustainability in Turkey indicates that although the first policy on environmental rights and protection was declared in 1971, the regulations specifically about early childhood education appeared in 1997 as part of the National Environmental Action Plan. From 2007, the Ministry of Environment and Urban Planning issued five declarations with the focus of education for sustainability being shifted mostly to climate change in line with the world agenda (e.g., Kyoto protocol). Since 2011, some NGOs (e.g. The Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats, Regional Environmental Center) have worked with the Ministry of National Education to organize in-service training about eco-literacy for teachers educating early childhood to high school students (Alici, 2018). Given these policies and activities in the field, and

as the drivers of education for sustainability for pre-schoolers, in this study, we intended to assess Turkish pre-service teachers' readiness to implement such training programs while providing some empirical evidence in terms of their nature relatedness. The pre-service teachers' nature relatedness was also examined for differences including the number of years they had been enrolled in teacher training. In Turkey, depending on instructors' interest, pre-service early childhood teachers have the opportunity to be introduced to topics related to environmental and sustainability education beginning from their second year of training. Thus, the years in the program may be a relevant variable to cover pertinent to nature relatedness as it may explain the differences in the extent to the enhancement of connections with the natural environment.

Methods

Study context

There is a growing interest in environmental and sustainability education in Turkey but it is widely accepted that this field of interest is in a developing stage in our country (e.g. Alkis, 2008; Haktanir, Guler, & Kahriman Ozturk, 2016). We, as the researchers and educators of environmental and sustainability education have not reached the desired levels in our country (Gulay-Ogelman & Gungor, 2015; Toran, 2017). A complete pre-service teacher training program in this field does not exist in Turkey and the current early childhood teacher education program makes no direct reference to environmental and sustainability education (Guner, 2013). Current environmental and sustainability issues are infused into various subject-related courses (e.g. Basic Science, Teaching Science in Early Childhood, Physical Education and Games, Creativity and Children) depending on the instructors' interest, and department and/or faculty's priorities since the Council of Higher Education enables institutions to redesign 25% of teacher education program. These teacher training courses are offered beginning from the second year of the program. In their third and fourth years, pre-service teachers are also provided some opportunities to attend elective courses which aim to raise awareness of environmental issues and sustainability. However, these courses whether they are categorized as compulsory or elective, cover mostly environmental science, and pay some attention to human–environment interactions with limited emphasis on the societal and economic factors regarding sustainability. Considering their development of competencies in teaching environmental and sustainability issues, the pre-service teachers are required to use their knowledge, values, and skills to teach in this area at a pre-school through practice teaching courses in their fourth year. In other words, pre-service teachers only have an opportunity to put into practice what they have learned in these courses during their internship period in the last year of their 4-year program.

Participants

In this study, the participants were 402 students pursuing an Early Childhood Teacher Education Program at two public campus universities in capital of Turkey.

Of the participants, 23.8% were freshman, 24.4% were sophomore, 26.4% were junior, and 25.4% were senior class students. The average age of the participants was calculated as 20.2 years. Among this sample, 98.5% were female and 1.5% were male. The majority of these pre-service teachers (96.3%) reported that they were living in a city centre in Turkey prior to attending university. A few of the participants (3.7%) stated they had lived a village before starting university. Thus, our data came from a group of pre-service teachers who have mostly experienced urban living from an earlier age.

Instrument

For the specified purpose of the study, a Turkish-adapted version of the Nature Relatedness Scale developed by Nisbet, et al. (2009) was administered to gather the data. This instrument provides an opportunity to gain an in depth understanding of the “affective, cognitive, and physical relationship individuals have with the natural world” (Nisbet et al., 2009). The adaptation process of the measuring tool was carried out by Cakır, Karaarslan, Sahin, and Ertepinar (2015) by considering the characteristics of the Turkish language and its cultural, social and environmental structures. The Nature Relatedness Scale was constituted of three factors namely, NR-self, NR-perspective, and NR-experience which were reflected by a total of 21 items in a 5-point Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Examining the internal consistency of the scale, Cronbach’s alpha reliability coefficients of the three factors were calculated as .85 (NR-self), .75 (NR-perspective), and .73 (NR-experience) in the present study. In order to provide evidence of construct-related validity, confirmatory factor analysis was carried out. The results of this analysis showed good fit indices and supported the three-factor structure of the scale.

Data analysis

In order to assess pre-service early childhood teachers’ connectedness to nature, the descriptive statistics were carried out by calculating means and standard deviations as well as the percentage of participant responses to the items with respect to the three-factor structure in Nature Relatedness Scale. Moreover, multivariate analysis of variance (MANOVA) was utilized to investigate the difference in the factors of nature relatedness in terms of the number of years the students had been enrolled in their teacher education program. In order to examine the associations among those factors of nature relatedness, Pearson product–moment correlations were taken into account. The significance level was set to .05.

Results

Pre-service early childhood teachers’ connectedness to nature

In this study, pre-service early childhood teachers were asked to reveal their level of agreements to a series of statements about connectedness to nature. The mean score on NR-self was calculated as 3.94 in a scale of 1–5 ($SD = 0.56$). In addition to the mean score, the percentage of their responses to the NR-self items reflect that pre-service early childhood

teachers hold favourable feelings and thoughts about their personal connection to nature (see Table 1). These pre-service teachers' internalized identification with nature could be inferred from their agreement with such statements 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%). Regarding these pre-service teachers' responses on NR-perspective items, the mean score ($M = 3.81$, $SD = .79$) and percentage of agreement with these items indicated that they possessed an external nature-related worldview. For instance, these pre-service teachers supported that nature conservation is necessary (71.6%), and the state of nonhuman species is an indicator of the future for humans (79.8%). However, when it comes to their physical familiarity with the natural world, the results of descriptive statistics ($M = 3.13$; $SD = .68$) showed that the pre-service teachers did not hold strong desire to be out in nature. More specifically, only 41.1% of them declared that they “enjoyed being outdoors even in unpleasant weather”, and 41.0% of these pre-service teachers noted that they took notice of wildlife wherever they were.

Differences in pre-service early childhood teachers' nature relatedness with respect to year level

One-way MANOVA was performed to investigate the differences in pre-service early childhood teachers' nature relatedness with respect to years enrolled in the teacher education program. Assumptions of normality, linearity, univariate, and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity were checked by conducting preliminary analysis and no serious violations were reported. The results revealed that there was a statistically significant difference with respect to year level on the combined dependent variables, namely self-relatedness, perspective-relatedness, and experience in nature ($F(6, 794) = 2.196$, $p = .041$; Wilks' Lambda = .968; partial eta squared = .016). However, when the results for dependent variables were examined separately, there was no difference to reach statistical significance using a Bonferroni-adjusted alpha level of .017. In other words, no year level difference was observed for pre-service early childhood teachers' self-relatedness, perspective-relatedness, and experience in nature, separately.

Associations among the attributes reflecting connectedness to nature

Pearson product-moment correlations were used to examine the associations among the attributes reflecting connectedness to nature (NR-self, NR-experience, and NR-perspective) for pre-service early childhood teachers. The correlation coefficients and p values were presented in Table 2. The results showed that NR-perspective was not statistically related to NR-experience. On the other hand, NR-self construct was found to show statistically significant positive correlations with NR-experience and NR-perspective. Considering the strength of these associations among the variables, the values ranging between .3 and .5 indicated medium effect size. To be more specific, it was found that 21.1% of the variance could be explained by the linear relationship



Table 1. The results of descriptive statistics regarding nature relatedness.

	M	SD	St. D.	D.	Un.	Ag.	St. Ag
Self (M = 3.94; SD = .56)							
My connection to nature and the environment is a part of my spirituality	3.74	0.91	0.7	11.0	22.1	46.0	20.1
My relationship to nature is an important part of who I am	3.75	0.91	0.7	11.2	18.6	51.4	17.9
I feel very connected to all living things and the earth	3.76	0.93	1.4	10.3	17.6	52.4	18.3
I am not separate from nature, but a part of nature	3.99	0.93	3.0	3.7	14.2	49.3	29.9
I always think about how my actions affect the environment	3.90	0.94	2.2	7.4	14.9	43.2	24.6
I am very aware of environmental issues	4.16	0.74	0.7	3.0	7.5	57.4	31.3
I think a lot about the suffering of animals	3.96	0.76	0.7	3.0	17.2	57.5	21.6
Even in the middle of the city, I notice nature around me	3.93	0.88	2.2	4.5	15.7	53.7	23.9
My feelings about nature do not affect how I live my life*	3.28	0.79	8.5	18.5	27.3	33.2	12.5
Perspective (M = 3.81; SD = .79)							
Humans have the right to use natural resources any way we want*	3.78	1.23	7.5	11.9	8.2	41.3	32.1
Conservation is unnecessary because nature is strong enough to recover from any human impact*	3.86	1.16	5.2	10.4	12.7	36.5	35.1
Animals, birds and plants have fewer rights than humans*	3.92	1.08	2.2	13.4	9.7	40.3	34.3
Some species are just meant to die out or become extinct	4.23	1.04	3.7	5.2	7.5	31.3	52.2
Nothing I do will change problems in other places on the planet.	3.27	1.24	9.0	17.2	24.6	35.8	13.4
The state of nonhuman species is an indicator of the future for humans	4.06	1.14	5.2	8.2	6.7	35.0	44.8
Experience (M = 3.13; SD = .68)							
The thought of being deep in the woods, away from civilization, is frightening*	2.84	1.17	14.2	27.6	25.4	25.4	7.5
My ideal vacation spot would be a remote, wilderness area	3.50	1.08	3.0	18.6	22.4	37.3	18.7
I enjoy being outdoors, even in unpleasant weather	3.08	1.18	7.5	30.6	20.9	28.4	12.7
I don't often go out in nature*	2.54	1.14	19.1	37.1	19.2	19.8	4.8
I enjoy digging in the earth and getting dirt on my hands	3.72	1.09	3.7	13.4	14.9	43.2	24.6
I take notice of wildlife wherever I am	3.10	1.24	13.4	17.9	27.6	26.8	14.2

*Reverse items recorded.

between NR-experience and NR-self, and 14.5% of the variance could be explained by the linear relationship between NR-perspective and NR-self.

Discussion and conclusion

In this study, we sought to determine pre-service early childhood teachers' nature relatedness by investigating their thoughts, feelings, and experiences of nature without intervention, using the Nature Relatedness Scale. This scale has a three-factor structure (nature relatedness-self, nature relatedness-perspective, and nature relatedness-experience). The results indicate that our cohort in Turkey has a positive external nature-related worldview yet prefer not to be out in nature. While these individuals were undergraduate students at a university campus that is considered "more of a park-like campus" and a welcoming place to live and study, especially when it was compared with other places in this metropolitan city, less than half of the students were found to spend time in nature. In fact, as students of the most prestigious universities in Turkey they had the opportunity to be active members of various university clubs (e.g. scouting, mountaineering, bird watching). However, previous research (Teksoz, Sahin, & Tekkaya-Oztekin, 2012) carried out by sampling students at one of the universities engaged in this study reported that these individuals put great effort into their academic achievement and did not have time for outdoor activities.

The findings of this study of young people in Turkey could be connected to other developing countries as well. The idea of being outside or working in the natural environment is not an ideal lifestyle and widely accepted in many developing countries. UNICEF (2011) published a report entitled "The state of the World's children 2011" and stated that the new generation in these countries spends their lives trying to escape from nature although highly concerned about global environmental problems. It was also emphasized in this report that going out and working in the garden or engaging in eco-living practices such as planting trees is not both socially and economically rewarded.

From a different perspective, the findings of this present study might be attributed to a lack of any courses and training opportunities in early childhood teacher education program that make a direct emphasis to support pre-service teachers' physical connection to nature. As pointed out by Feral (1998), an individual might not have empathy for all living things and the earth unless they comprehend their connection to nature completely. Hence, some attention could be given to concerns about how to improve the quality of teacher education programs in the service of sustainability promoting pre-service teachers' experience in nature. Also, training programs or courses might be revisited or designed with the collaboration of departments and various university clubs to encourage pre-service teachers to engage in outdoor activities.

This study indicated that the pre-service teachers held a belief in that humans were also a part of the environment but they were not aware of their role in the environment or their connection with other components in natural cycles, and where their place is in the environment. Consistently, as declared by Karakaya, Avgın, Gömlek, and Balık (2017), pre-service teachers in the field of primary and science

Table 2. Pearson product–moment correlations between the constructs on nature relatedness.

	NR-perspective	NR-experience
NR-self		
<i>R</i>	.38*	.46*
<i>P</i>	.00	.00
NR-perspective		
<i>R</i>		.06
<i>P</i>		.20

Note: Significance level was adjusted by using the Bonferroni method which requires dividing alpha level on the basis of the number of analyses conducted. Thus, the new adjusted alpha level became .016.

*Correlation is significant at the new adjusted alpha level (2-tailed).

education from the south-eastern region of Turkey did not hold desired levels of nature relatedness. Teacher educators should encourage their students to learn outside their classrooms and use the facilities of a green campus. Teaching through nature might allow a person to review the benefits of being out in nature. While considering some empirical evidence provided by Nisbet (2005), Nisbet et al. (2009) allocating more time to the outdoors could be viewed as a vehicle to bring pre-service teachers to nature physically and spiritually. More specifically, the authors claim that spending time outdoors and engaging in educational activities in an outdoor environment promoted individuals' connectedness to nature. Furthermore, early childhood pre-service teachers can have a greater willingness to be in the natural environment and use it as a teaching setting during their future implementations with children (Yilmaz, Olgan, & Ozturk Yilmaztekin, 2016).

Current findings regarding pre-service teachers' experiences in nature might be pertinent to a culture effect on these individuals' preferences regarding being outdoors (Nisbet & Zelenski). Living in close physical contact with their local environment and sustaining a lifestyle within its limits was common in traditional Turkish culture. However, in recent times many green places in urban areas have been built over, and the number of safe neighbourhoods has decreased dramatically. Furthermore, the policies and practices that influence the built environment have favoured the growth of big cities and massive structures in Turkey. Bahar and Sahin (2017) also drew attention to this alteration when they found that Turkish middle school students have low levels of affective and cognitive connection with nature. The levels they reported for school students were even lower than those obtained in the present study of pre-service teachers. The research on middle school students also found that they spend most of their time indoors and in front of the computers, and preferred to play digital games than outdoor play. This shift in the culture might have a potential to impact individuals' thoughts and physical engagement in the natural environment as stated by Lummis et al. (2017) who point out that pre-service teachers' perceptions are highly impacted by their local geographical context and ontological context. From another perspective, the pre-service teachers who were the focus of the current study are part of a new generation whose parents are thought to have discouraged them from going outside and to play indoors. As supported by some researchers in the field of environmental psychology (Chawla, 2001; Nelson, 2012; Sutton, 2008), a change in parents' attitudes regarding human–environment connection might also influence pupils' views on spending much more time in the environment.

In this study, the findings regarding the correlational analysis indicated that nature relatedness-self—which refers to “an internalized identification with nature” was positively associated with nature relatedness-perspective—which reflects “an external and nature-related worldview” and nature relatedness-experience—that means “physical familiarity with the natural world”. It can be interpreted that “an internalized identification with nature” that might refer to the ecological self or how strongly individuals describe themselves as being part of the natural environment, was positively correlated with how individual’s relationship with the environment is provoked by his\her behaviour as well as attitude, and his\her physical familiarity as well as attraction to nature. This study showed consistent results with a previous research study which reported significant positive correlations among these nature-related constructs for a sample of Turkish university students (Cakir et al., 2015). However, the strength of the association between “an internalized identification with nature” and “physical familiarity with the natural world” in these researchers’ findings was higher when compared with the present study. This study concentrated on pre-service teachers, mostly females so that it might yield weaker association between these two attributes. No correlation between NR-experience and NR-perspective was also reported in the present study since it might be derived from the characteristics of the individuals who were university students pursuing an early childhood teacher education program.

Given the results in this study, we concluded that although early childhood education plays a key role in shaping children’s future awareness, skill, attitude and behaviour pertinent to nature and environment (e.g. The North American Association for Environment Education (NAAEE) 2010; Tilbury, 1994; UNESCO, 2008; Wilson, 1984), early childhood teacher candidates who are regarded as future implementing agents while using principles and putting values into practice (Alici, 2013) do not have strong feelings of connectedness to, and experiences about nature and natural life. Hence, in the context of higher education, early childhood teacher education programs could be revisited and revised in terms of not only theoretical but also practical implementations to raise teacher candidates’ awareness on environmental issues, and physical, psychological and cognitive connectedness to the natural environment (Palmer, 1995; Saribas et al., 2017; Teksoz, Sahin, & Ertepinar, 2010; UNESCO, 2008).

This research utilized nature relatedness as a proxy for people’s environmental behaviours. Future studies could consider other psychological and cognitive factors that facilitate pro-environmental behaviours. For further studies, the relationship between pre-service early childhood teachers’ nature relatedness and their outdoor experiences (such as camping, bird watching, playing in the outdoors) in the early childhood period could be examined. As pointed out by Chawla (1998) and Palmberg and Kuru (2000), experiences in the outdoors in the early years had a crucial effect on raising individuals’ favourable feelings and attitude towards the environment. Furthermore, time spent by being in nature and the perceived obstacles to being in nature could be considered as determinants of nature relatedness for university students experiencing the consequences of modern culture (Mercola, 2014; Nisbet et al., 2009). The findings further imply that undergraduate courses will need to be designed

and undertaken to support pre-service teachers' attitude and behaviour towards sustainability issues in Turkey. Tuncer and Sahin (2016) previously suggested that a course targeting education for sustainability might provide sufficient motive for pre-service students to be aware of sustainability issues via their own experiences.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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