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Modelling Preservice Science Teachers' Environment-Friendly Behaviours

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Abstract: The purpose of this study was to examine the relationships among the preservice science teachers' proenvironmental behaviours, environmental identity, and ecocentric and anthropocentric attitudes toward environment. A total of 576 (407 females and 169 males) preservice science teachers enrolling in five public universities' education faculties in Eastern and South-eastern Anatolian Region of Turkey were administered a questionnaire regarding the variables. Convenience sampling method was chosen to constitute the sample of this study. In order to analyse the data collected, descriptive statistics and path analysis as inferential statistics were utilized. According to the results of the study, preservice science teachers held moderate level of favourable environmental behaviours, had strong environmental identity, and possessed high level of ecocentric and moderate level of anthropocentric attitudes toward environment. Moreover, environmental identity directly and strongly predicted the preservice science teachers' proenvironmental behaviours. The findings revealed that environmental identity plays a crucial role in predicting proenvironmental behaviours.

Introduction

The increase in the consumption of natural resources and industrialization in developed and developing countries inevitably diminished natural resources, and led us to a less sustainable environment for the future. Many environmental issues such as pollution of air and water, deforestation, droughts, famines have arisen due to the increasing population demanding a more comfortable and prosperous lifestyle (Ketel, 2004; Natural Resources Defence Council [NRDC], 2013). To illustrate, increasing amount of fossil fuel consumptions through industries and transportation vehicles in recent decades led to rise in carbon dioxide in the atmosphere, which resulting in heating the sphere (Andres et al., 2012; Fadnavis, Kumar, Tiwari, & Pozzoli, 2016; Forster et al., 2007; Garg, Bhattacharya, Shukla, & Dadhwal, 2001). As a result of this heating, melting massive icebergs changes salinity level of oceans, ocean currents, and sea levels. All of these consequences were considered as the possible reasons of climatic changes (Pittock, 2017). Along with overconsumption of natural resources by the society, the world began to experience hotter summers and warmer winters. Moreover, excessive rains leading to floods, desertification, diminishing of effective agriculture are some of consequences as World Meteorological Organisation (WMO, 2007) reported. Since it is clear to deduce that all these issues are rooted from humans and their lifestyles, their actions can be considered as determinants shaping the fate of the environment and the nature. Therefore, human behaviour was considered as the one of major reason of environmental problems (Gardner & Stern, 2002).

In order to solve or reduce the consequences of environmental issues, environmental education can be considered a major area because environmental education encourages individuals to protect the environment against existing and potential global and local environmental challenges. (Cole, 2007, Toumey et al., 2010). In this manner, environmental education aims individuals to have awareness of the environmental issues, to realize how human actions cause to environmental issues, to come up with solutions or suggestions to those issues, and finally to put such solutions into practice in their daily lives. Since environmental education intends to help humanity by educating students as environment-friendly individuals, teachers' actions and attitudes related to environment will be crucial since they are role models of their students in the future. Because students' behaviours are influenced by teachers' behaviours (Darling-Hammond, Hylar, & Gardner, 2017), teacher education programs focuses on preservice teachers to develop necessary behaviours. Therefore, environmental education seems to be one of the important stands in teacher education.

Educating individuals in order to conserve the natural resources, and develop understandings about more sustainable ways of living is considered a promising way for the future of the nature and society (Tuncer et al., 2009). One of focus point is set to sustain proper human behaviour toward the environment to reduce these environmental risks such as excessive amount of greenhouse gas emissions, rising sea levels, and climate change, which are believed to happen due to anthropogenic causes (Food and Agriculture Organisation of the United Nations [FAO], 2007; Intergovernmental Panel on Climate Change [IPCC], 2014). In addition, environmental attitudes were considered as the most widely used variable that is corresponded with the environmental behaviours (Corraliza & Berenguer, 2000). In this regard, scholars were inspired from theories interrelating behaviours and attitudes such as Theory of Reasoned Action (Fishbein & Ajzen, 1975) and Theory of Planned Behaviour (Ajzen, 1991). According to these theories, individuals develop attitudes that shapes their behaviours, and both attitudes and behaviours can be altered depending on facing with positive or negative consequences (Fishbein & Ajzen, 2010). In similar, Thompson and Barton (1994) proposed two values reflecting positive support for reducing environmental issues and different reasons to conserving the environment, namely ecocentric and anthropocentric. They defined ecocentrism as personal support for preserving all living things in the nature because of their own right to live, whereas anthropocentrism was defined as possessing positive attitudes toward environment because in return the nature serves humans and contributes to life quality of society. Based on the earlier reports, many studies revealed that ecocentric attitudes are positively related with proenvironmental behaviours (Casey & Scott, 2011; Gheith, 2013; Kil, Holland, & Stein, 2014; Martin & Bateman, 2014; Rhead, Elliot, & Upham, 2015; Thapa, 2010) although some reported the opposite (Kopnina, 2017), and anthropocentric attitudes are negatively linked with environmental behaviours (Yumusak, Ozbas, Sargin, & Baltaci, 2016). In some studies, individuals' higher anthropocentric attitudes were associated with better actions in environmental protection (Harris, 2006; Kaida & Kaida, 2016).

Nonetheless, because studies were generally able to report modest relationships between attitudes and behaviours, new variables were attempted to investigate to explore this relationship such as personal identities (Stets & Biga, 2003). Accordingly, some researchers criticized that ignoring the people' identity could be inadequate when one claims that attitudes are only reason of influencing behaviours. In line with this, the role of the self was brought forward as important variable to predict the one's behaviour (Biddle et al. 1985; Stets & Burke, 2002). With respect to environmentalism, it seems crucial to understand how a person socially perceives to and interacts with the nature because it may help to determine person's environmental identity. Therefore, environmental identities of individuals are

supposed to play important roles in forecasting their environmental behaviours (Clayton & Opatow, 2003). Van der Werff, Steg, and Keizer (2013) introduced that environmental self-identity concept, which refers to seeing one's himself as a what type of person who behaves environmentally friendly, is closely related to one's core values and past behaviours.

Accordingly, holding biospheric values more strongly leads to feel as more proenvironmental person, resulting in motivating proenvironmental actions. On the other hand, it is important to note that although values, environmental self-identities, and behaviours are related, they are not consistent all the time. For example, people who have strong biospheric values may not exhibit much proenvironmental behaviours because their identity do not include those proenvironmental actions (Biel, Dahlstrand, & Grankvist, 2005). Moreover, Whitmarsh and O'Neill (2010) found that self-identity was predicted the proenvironmental behaviours significantly and more than attitudes, risk perceptions, knowledge, and beliefs. Similarly, identity effect was found significant predictor for consumption behaviours and buying new products (Cook, Kerr, & Moore, 2002; Grewal, Mehta, & Kardes, 2000). Thus, personal identities of individuals were assumed as a significant motivator of their behaviours.

Another factor that can influence the proenvironmental behaviours was gender. With respect to gender, diverse results were reported based on type of behaviour measured, place of the study, selection of other variables, and control of these variables (Dietz, Kalof, & Stern, 2002; Katz-Gerro, Greenspan, Handy, Lee, & Frey, 2015; Wallhagen, Eriksson, & Sörqvist, 2018; Zelezny, Chua, & Aldrich, 2000). Accordingly, studies consistently revealed that females have stronger proenvironmental attitudes than males (Lee, 2009; Torgler, Garcia-Valiñas, & Macintyre, 2008; Vinz, 2009; Xiao & Hong, 2010; Zelezny et al., 2000) while Mostafa (2007) reported that women have lower environmental attitudes compared to men. Concerning environmental identity, Clayton and Kilinc (2013) reported that females had significantly environmental identity in their study investigating the natural identity and environmental identity of university students. On the other hand, gender roles in environmental identity remained inconclusive. While some studies (Karpiak & Baril, 2008; Tikka, Kuitunen, & Tynys, 2000) claimed that concerns and favourable relations of females toward environment were better than males, some studies (Katz-Gerro et al., 2015; Koc & Kuvac, 2016; Macdonald & Hara, 1994) indicated that males were more positive attitudes or behaviours toward environmental concerns. Nonetheless, there were some studies claiming that gender did not play significant role in environmentalism (Uyeki & Holland, 2000; Ozturk & Teksoz, 2016).

Consequently, since few studies touched on that environmental identity may be an important factor in predicting proenvironmental behaviours of preservice science teachers (Clayton & Kilinc, 2013; Tanik, 2012), it is reasonable to investigate relationships among environmental identity, environmental attitudes, gender, and proenvironmental behaviours. Concordantly, the preservice science teachers were selected as participants since they play crucial role in modelling themselves to our children in terms being environmentally literate and environment-friendly people (Clayton, 2004; McKeown & Hopkins, 2002; Pe'er, Yavetz, & Goldman, 2013). For this purpose, a proposed model (see Fig. 1) was tested and following research questions were addressed:

1. What is the level of preservice science teachers' proenvironmental behaviours, environmental identities, ecocentric attitudes, and anthropocentric attitudes?
2. What is the relationship among preservice science teachers' proenvironmental behaviours, environmental identities, ecocentric attitudes, anthropocentric attitudes, and gender?

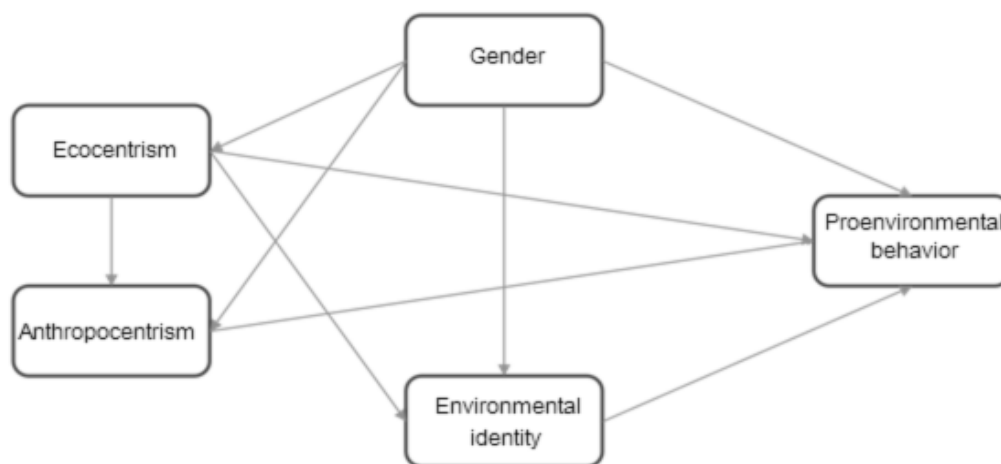


Figure 1: The Proposed Model

Method

Research Design

This quantitative research was designed by combining two methodologies together, which are namely onetime cross sectional survey and correlational study. In onetime cross sectional survey studies, information for study is collected at one point in time from a sample of predetermined population. Correlational studies aim to investigate the relationships among the variables of the study (Fraenkel & Wallen, 2006). Descriptive analysis including mean and standard deviation was calculated to reveal the level of preservice science teachers' proenvironmental behaviours, environmental identity, ecocentric and anthropocentric attitudes. Moreover, the proposed model represented in Fig. 1 was constructed based on the relevant literature. This model was tested using path analysis, which is a statistical analysis assuming several causal models among variables and applying multiple regression analysis (Cohen, Cohen, West, & Aiken, 2003). Therefore, this analysis enabled the researchers to test how proenvironmental behaviours, environmental identity, and environmental attitudes were predicted by related variables as the proposed model indicated.

Participants

The target population of this study consisted of all preservice science teachers enrolled in a four-year teacher education program of education faculties in public universities located in Eastern Anatolia and Southeaster Anatolia Regions of Turkey. However, the accessible population was compulsorily determined from five public universities in target population. Through convenience sampling procedure, a total of 576 (407 female, 169 male) preservice science teachers was determined as sample of the study. In terms of educational level, there were 162 (28.1%) freshmen, 132 (22.9%) sophomore, 166 (28.8%) junior, and 102 (17.7%) senior preservice science teachers were included in the study.

Instruments

Three instruments, apart from a demographical questionnaire, were utilized to collect data from the preservice science teachers, which are namely Environmental Identity Scale

(EIS), Environmental Attitude Scale (EAS), and Proenvironmental Behaviour Scale (PBS). In the demographical questionnaire, gender was coded as 0 (male) and 1 (female).

EIS was developed by Clayton (2003), and translated and adapted into Turkish by Clayton and Kilinc (2013). Twenty-four items in this scale were related to the understanding and identification of individuals toward the natural environment. Participants were to rate the items by utilizing a 7-point Likert-type scale ranging from 1 (completely wrong) to 7 (completely true). Based on the reliability analysis of the test, reliability coefficient was found as .88, indicating a reliable scale.

EAS was formed by Thompson and Barton's (1994) as Environmental Attitudes and Apathy Scales, and translated and adapted into Turkish by Uçar and Oztekin (2013). The scale items were rated to five-point Likert-type ranging 1 (strongly disagree) to 5 (strongly disagree). In ecocentrism dimension of the scale, ten items assess participants' relationships with the nature, feelings about and valuing to the nature and living things. Regarding to anthropocentrism dimension, the focus of those thirteen items was to determine participants' relationships with the natural environment was based on positive contribution to human life quality and/or results concerning only humans. According to reliability results, both dimensions were found .84 and .78, respectively, implying high reliability.

Variables	Number	Mean	SD	Cronbach's Alpha
Environmental identity	576	5.39	.80	.89
Ecocentrism	576	4.36	.50	.79
Anthropocentrism	576	3.38	.63	.79
Proenvironmental behaviour	576	3.53	.59	.83

Table 1: Descriptive statistics and reliability coefficients of the measured variables

PBS is a fourteen-itemed instrument developed by Mertig (2003) in order to measure proenvironmental behaviours. Rating of the items was assigned as “never” (1), “rarely” (2), “sometimes” (3), “frequently” (4), and “always” (5). The items in the scale are to evaluate the respondents' actions related to conserving the environment, maintaining a sustainable life, and communicating others to behave more responsible in environmental issues. The instrument translated into Turkish by Sahin and her colleagues (2012). They reported that the reliability of the scale was .86.

As regard to internal validity issues in correlational and survey studies, researchers must ensure that participants should not become bored or tired (Fraenkel & Wallen, 2006). In this study, although there were about sixty items that the participants were expected to state their opinions, there was not any signs of fatigue or dropout from responding the items during the data collection. Possible reason might be that participants were familiar with participating in similar types of surveys. Therefore, no actual indicator of instrument decay threat to internal validity was observed in the study. Moreover, since the study was conducted as cross sectional one-time study, mortality and testing was not an issue threatening internal validity. On the other hand, subject characteristics may usually remain as an issue because extraneous factors or other characteristics may explain the relationship between variables (Fraenkel & Wallen, 2006). To minimize this issue in this study, the relationships that are expected between the variables were proposed in consistent with previous literature works. Lastly, any remarkable location threat was not observed by researchers since the participants were from public universities in the same geographical region and close cities, the environmental conditions and infrastructure were quite similar. In addition, Cronbach alpha coefficients were estimated for each scale and given in Table 1 to ensure the reliability.

Results and Discussion

Table 1 shows descriptive statistics of corresponding variables in the study. The mean score ($M=5.39$) for Environmental Identity Scale was above the midpoint of the 7-point Likert scale with a standard deviation .80, reflecting preservice science teachers' strong environmental identity. That is, they were similar in terms of their connectedness with natural environment. For example, they reported that they like gardens, they agree with the necessity of learning about the natural world during the childhood. Similarly, their agreement on some of environmental identity scale items such as significance of teaching environmental education on early ages of life, and adoption of having sustainable lifestyle and environmental actions as their moral codes might be resulted from their positive environmental ideology and self-identification. Clayton (2003) operationalized these ideology and self-identification in terms of natural world in her environmental identity model. That is, these agreements might have been affected due to the characteristics of Turkish culture since Turkish people concerns toward environment as Sarigollu (2009) argued. Moreover, Clayton and Kilinc (2013) also supported this relatedness between cultural structure and environmental identity in their study.

Unlike environmental identity, the participants developed favourable ecocentric attitudes toward environment, as indicated by the mean scores 4.36 on the five-point scale. That is, it seemed that they had strong conservative attitudes towards environment for sake of all living things rather than the sole purpose of enhancing human welfare and life quality. Their tendency to value the nature was resulted from appreciation to nature due to its own sake were consisted with earlier research (Onur, Sahin, & Tekkaya, 2011). On the other hand, the mean score of 3.38 over 5 regarding to anthropocentric attitudes indicated that the respondents slightly supported human dominance on the nature, and their concerns were associated with human benefits. Contrary to desired results, which is lower anthropocentric and higher ecocentric attitudes of participants, having both ecocentric and anthropocentric attitudes implied that preservice science teachers did not have positive attitudes to live harmoniously with the nature although they supported to conserve the nature.

According to results, the mean score of 3.53 showed that preservice science teachers did not take all the necessary actions to protect the environment. To illustrate, they stated that they usually turn the lights after leaving an empty room, that they sometimes choose walking in short distance instead of riding in a car, and that they try to use less water during teeth brushing. These responses of participants might reflect that they tended to make proenvironmental behaviours in the short run. However, most of them did not support to attend of any environmental protest or demonstration as similar to results of Inglehart's study (2000). In addition, they stated that they do not urge others to make suitable behaviours for conserving the environment although green actions are necessary to have a more sustainable environment (Kagawa, 2007). Thus, underlying reason of possessing moderate proenvironmental behaviours of preservice science teachers might be the low social responsibility for conserving the environment.

Regarding to the second research question of the study, a proposed model (see Figure 1) was analysed through path analysis to examine the relationships among preservice science teachers' proenvironmental behaviours, environmental identities, ecocentric and anthropocentric attitudes, and gender. The proposed model revealed a good fit measures as depicted in Table 2. Based on the results, GFI and CFI values were equal to 1.00, which is a perfect fit. In addition, both RMSEA and SRMR values were lower than .05, implying a good fit. Since the fit indices were adequate for the model explaining the data well (Hu & Kline, 2005; Schreiber, Stage, King, Nora, & Barlow, 2006), the standardized path coefficients for direct, indirect, and total effects were analysed.

Model	RMSEA	GFI	CFI	SRMR	χ^2/df
Proposed model	.00	1.00	1.00	.01	.692
Final model	.03	1.00	1.00	.03	1.492

Table 2: Measures of Model Fit for the Proposed and the Final Model

After ensuring the adequate fit values of the model, all path coefficients in the proposed model were examined. Non-significant paths, which are from gender to environmental identity and from gender to proenvironmental behaviour, were removed from the model. Afterwards, fit indices were checked again (see Table 2). The final model was presented in Figure 2.

In the final model, 30% of the variance in participants' proenvironmental behaviours were accounted for by environmental identity, ecocentric attitudes, and anthropocentric attitudes. Thus, proenvironmental behaviours had a large effect size ($R^2=.30$) since its value is greater than .25 (Cohen, 1977). Based on the results of the path analysis, environmental identity ($\beta=.46, p<.05$), ecocentric attitudes ($\beta=.10, p<.05$), and anthropocentric attitudes ($\beta=.09, p<.05$) showed positive associations with proenvironmental behaviours of PSTs. In parallel with the previous research (Clayton, 2003; Clayton & Kilinc, 2013; Stets & Biga, 2003; Tanik, 2012; Van der Werff, Steg, & Keizer, 2013), proenvironmental behaviours were predicted significantly by environmental identity and ecocentric attitudes of preservice science teachers. However, Casey and Scott (2006) found that attitudes that are more anthropocentric are linked with lower ecological behaviours. Beside these direct effects, indirect effects of ecocentric attitudes ($\beta=.30$) and gender ($\beta=.04$) were found. Therefore, gender has significantly influenced proenvironmental behaviours indirectly through its effect on environmental identity.

Effect	Direct Effects	Indirect Effects	Total Effects	Standard Errors of the Estimates	<i>p</i>	R^2
Proenvironmental Behaviour						.30
Environmental identity	.46	-	.46	.03	.00	
Ecocentric attitudes	.10	.30	.40	.05	.03	
Anthropocentric attitudes	.09	-	.09	.03	.01	
Gender	-	.04	.04	-	-	
Environmental Identity						.39
Ecocentric Attitudes	.63	-	.63	.05	.00	
Gender	-	.08	.08	-	-	
Ecocentric Attitudes						.01
Gender	.12	-	.12	.05	.00	
Anthropocentric Attitudes						.03
Ecocentric Attitudes	.15	-	.15	.05	.00	
Gender	-.09	.02	-.07	.06	-.04	

p<.05 level

Table 3: Direct, indirect, and total effects of the related variables

With respect to environmental identity, ecocentric attitudes ($\beta=.63, p<.05$) had strong and positive significant relationship with the environmental identity. That is, respondents who had more favourable attitudes toward the nature due to its intrinsic value also possessed

more connections with the nature. Furthermore, gender ($\beta=.04, p<.05$) was negatively linked with environmental identity indirectly. Regarding to effect size, environmental identity possessed large effect size ($R^2=.39$), suggesting that predictors of environmental identity explain 39% of the variance.

In terms of ecocentric attitudes, only gender ($\beta=.12, p<.05$) had positive direct effect in the model. The effect size of the ecocentric values ($R^2=.01$) can be considered as small since it is lower than .09 (Cohen, 1977). As consistent with previous research studies (Calubaquib, 2016; Zelezny et al., 2000), female participants held greater intrinsic value to the nature as compared to males.

Concerning anthropocentric attitudes, ecocentric attitudes ($\beta=.15, p<.05$) and gender ($\beta=-.09, p<.05$) were found significantly related with it. Although relationship between ecocentrism and anthropocentrism was reported in the literature as negative (Tarrant & Cordell, 1997), this study showed positive relationship. Effect size of the anthropocentric attitudes explaining by its predictor variables was small ($R^2=.03$).

Corresponding to gender, the results of this study are consistent with most of previous research mentioned in the literature review. That is, female preservice science teachers had stronger environmental identity, higher ecocentric attitudes, and lower anthropocentric attitudes as compared to male preservice science teachers. In contrast with Zelezny and her colleagues (2000), proenvironmental behaviours of male participants slightly higher than female participants. Further research seeking for the reasons or barriers underlying this situation is needed to clarify the insufficient proenvironmental behaviours of female preservice science teachers' although they had high level of environmental attitudes and identity. Lastly, female preservice teachers should be encouraged to develop actions that are more favourable toward environment such as taking social responsibility for conserving the environment, encouraging other people to stop harming the environment.

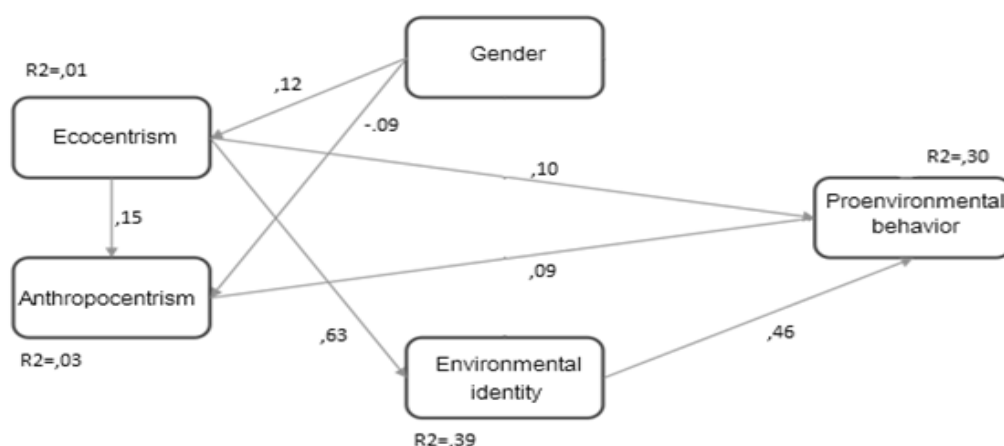


Figure 2. The Final Model

Conclusion

This study set out to achieve two purposes. The first one was to examine the level of preservice science teachers' proenvironmental behaviours, environmental identity, ecocentric and anthropocentric attitudes. The second one was to investigate relationship among these variables including gender.

Regarding the first purpose, the results of the study indicated that preservice science teachers did not take actions to protect the environment, and did not fully appreciate the nature for its own intrinsic value but rather self-interest of human beings. According to the results, preservice science teachers tended to consume natural resources on behalf of human profits rather than caring other species. On the other hand, preservice science teachers' strong environmental identity implied that they tend to make proper decisions and actions about environment to protect and value it as compared to those having weaker environmental identity. Related to behaviour, preservice science teachers were not so successful in acting proenvironmental behaviours. To resolve these issues, environmental awareness and responsibility of preservice teachers should be promoted. To illustrate, students and children are generally perceived -or taught- that cleaning home is mother's duty, and scavenging streets is sanitation worker's duty. In this manner, individuals mostly think cleaning, caring, protecting environment is in the responsibility of someone else who are assigned to do so. However, protecting the nature and acting environment-friendly behaviours should be accomplished by individuals when they feel responsible to overcome these issues. Accordingly, preservice teachers should be trained with objectives and activities that enable them to look out for their environment, caring all species in their environment, and see the nature as a part of their identity.

Concerning the second purpose of this study, path analysis results indicated that environmental identity is an important contributor in predicting proenvironmental behaviours and environmental attitudes. Therefore, environmental identity may be used a strong predictor offering to those researchers who investigating psychometric factors influencing environmental attitudes and behaviours. Thus, strengthening preservice science teachers' environmental identity may help them to generate environmentally favourable behaviours. For example, it may be helpful to increase preservice science teachers' closeness to the nature by taking them to field trips in natural environments, encouraging them to join students' clubs such as scout groups, bird watching. As spending time in the nature increases, environmental identity, and therefore proenvironmental behaviours may also be increased. Apart from environmental identity, ecocentric attitudes seem to have crucial role in shaping proenvironmental behaviours as well as environmental identity. Consisted with earlier research such as Stets and Biga (2003), preservice science teachers' ecocentric attitudes should be considered as strong motivators during constructing environmental education courses and curricula. Contrary to positive relationship between ecocentrism and proenvironmental behaviours, link between anthropocentric attitudes and proenvironmental behaviours seem to remain inconclusive. Even though some studies reported that holding anthropocentric attitudes by preservice science teachers may result in generating less environmentally favourable actions (Casey & Scott, 2006), the results of this study indicated that there is positive relationship between anthropocentric attitudes and proenvironmental behaviours. Nonetheless, it is necessary to teach the consequences and drawbacks of anthropocentrism, helping to convert anthropocentric attitudes into more ecocentric viewpoints until further research clarify this link better.

Preservice science teachers are future generations' role models in terms of many aspects including raising environment-friendly students, preservice science teachers should be well equipped to address environmental conditions, and coping with these problems. Since these results implied an unfavourable impression about preservice science teachers corresponding to the environment and environmental issues, efforts need to be made in order to motivate preservice science teachers to develop proenvironmental attitudes and behaviours. To accomplish these objectives, one of the possible steps to take is to exposure them more environmentalist viewpoints, practices, and experiences. That is, it seems necessary to revise teacher education curricula and course contents in accordance with

enhancing awareness and sensitiveness toward the nature. Therefore, it can be achieved to develop more favourable attitudes and behaviours toward environment.

Further research seems necessary to explain the effects of identity-related characteristics on environmental behaviours and attitudes. For instance, even though male preservice science teachers who performed lower than females appears to require more reinforcements to heal their proenvironmental behaviours and attitudes. Therefore, the question of role of gender in shaping environmental attitudes and behaviours still seeks an answer. Accordingly, investigating gender identities and other contextual factors such as socioeconomic characteristics may shed light on relationship among behaviour, attitude, gender, and identity toward environment. In addition, future studies should be conducted to seek answers to barriers to engaging proenvironmental behaviours though having favourable attitudes. Lastly, these findings reflected the condition of preservice science teachers from a particular region of Turkey regarding to the environment. Thus, larger samples from different context may draw conclusions that are more valid.

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