

Environmental Attitudes Among Undergraduate Students at a South African University

Madeline Evert¹, Hendri Coetzee^{1*}, Werner Nell¹

¹ North-West University, SOUTH AFRICA

*Corresponding Author: hendri.coetzee@nwu.ac.za

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ABSTRACT

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Understanding environmental attitudes (EAs) has been viewed as prerequisite to changing environmental behaviour and is a particularly salient topic in the context of higher educational institutions which play an important role in shaping students' worldviews. As such, the study aimed to explore EAs of undergraduate students at three different campuses of a South African University (n = 1283) and to examine how these EAs differ in terms of students' demographic characteristics. A structured questionnaire was used to collect biographical data, and EAs were assessed via the Revised New Ecological Paradigm Scale (NEP) and the Environmental Attitudes Inventory (Short form) (EAI-24). Results indicated that students' EAs lean more towards *utilization*, which is an anti-environmental factor, than to the pro-environmental factor of *preservation*. Furthermore, demographic factors such as gender and ethnicity were significantly, but often a-stereotypically associated with students' EAs. These results have practical implications for tailoring environmental-based interventions aimed at enhancing pro-environmental attitudes among students. However, the results also raise concerns about the cross-cultural validity and efficacy of some EA-related measuring instruments and environmental organizations, and suggest that a need exists to develop culturally sensitive EA measures, as well as environmental organizations that incorporate a greater focus on social justice and indigenous knowledge systems.

Keywords: environmental attitudes, environmental concern, environmental education, undergraduate students, South Africa

INTRODUCTION

The responsibility to prevent and counter the unsustainable use of natural resources is a prominent 21st-century issue and has reiterated the importance of humans viewing themselves as part of nature and subsequently part of the problem (Vining, Merrick, & Price, 2008; Mary, 2008). Furthermore, the misconception that environmental organisations and governments are mainly responsible for environmental change is being challenged and replaced with the notion that society as a whole should be accountable for environmental protection (Kent, 2009). One way to achieve this is to start at institutions of higher education, where the success of environmental education and sustainability programmes often depend on the EAs of its students

(Zilahy & Huisingsh, 2009). Investigating students' EAs is important because students are highly susceptible to new attitudes and worldviews and will carry these new EAs with them into their prospective communities and workplaces (Lozano, Lukman, Lozano, Huisingsh, & Lambrechts, 2013), and also as they will become the guardians, planners, policymakers and future educators related to environmental issues (Shafiei & Maleksaeidi, 2020). Universities have recognised this, and many now try to use this opportunity to instil positive attitudes towards the natural environment as attributes among their students (Waas, Verbruggen & Wright, 2010). Although some research has shown that no significant relationship exists between

environmental attitudes, knowledge and pro-environmental behaviour and socio-demographic characteristics, a number of recent studies have shown significant evidence that EAs and pro-environmental behaviour are mediated and/or moderated by socio-demographic characteristics, especially in a developing country context (Okumah, Ankomah-Hackman, & Yeboah, 2020; Patel, Modi, & Paul, 2017; Witek, & Kuźniar, 2021; Amoah & Adoah, 2020). It is therefore also of value to better understand how students' EAs might vary socio-demographically, as universities are in a good position to facilitate change in their students' attitudes towards the natural environment through education, innovation and research (Zilahy & Huisingh, 2009), and could thus be empowered to develop more representative and inclusive environmental educational strategies.

Definition of Environmental Attitudes

Schultz, Shriver, Tabanico and Khazian (2004) have defined EAs as the set of beliefs, impressions, and behavioural intentions a person holds regarding environmentally related activities or issues. As such, EAs provide a good understanding of the set of beliefs or values that influence pro-environmental behaviour (Wiseman & Bogner, 2003). Traditionally, EAs has been viewed as a unidimensional construct ranging from being unconcerned to concerned about the environment (Heberlein, 2012; Milfont, 2007).

EAs in International and South African Studies

Many studies have confirmed the important role played by socio-demographic characteristics in predicting students' EAs (Franzen & Vogl, 2013; Milfont, 2007; Shafiei & Maleksaeidi, 2020; Teksoz, Sahin, & Tekkaya-Oztekin, 2012; Quimby, Seyala & Wolfson, 2007). Furthermore, the results from studies investigating the relationship between socio-demographic variables and environmental attitudes could have important practical implications by supporting relevant stakeholders in developing interventions that are aimed not only at increasing environmental awareness but also at community upliftment in South Africa (Hunter, Strifen & Twine, 2010). In addition, recent research emphasized the importance of assessing sociodemographic factors as well as community-level practices and resources to serve as a facilitator for researchers, municipal personnel, and policymakers to closely examine existing strategies and outcomes and address possible stereotypes regarding environmental concern and awareness (Jones, 2002; Seacat & Boileau, 2018).

Age: The results found in previous literature on the relationship between age and concern for the

environment has differed substantially, with some studies indicating a positive relationship with age (Aminrad, Zakaria, & Hadi, 2011), some indicating a non-linear relationship (Nawrotzki & Pampel, 2013), and others indicating no relationship (Visschers et al., 2017). This could be due to different environmental factors such as processes that people go through at a young age (Chawla & Cushing, 2007). By contrast, South African research tends to indicate either a similarly positive correlation (e.g. Milfont, 2007; Reynolds, 1992) or the absence of any such correlation (Craffert & Willers, 1994; Dlamini, Tesfamichael, Shiferaw, & Mokhele, 2020).

Gender: Several studies have found that females are more sensitive towards environmental issues than males and are also more inclined to be in favour of conservation and environmentally favourable behaviour (Duman-Yuksel & Ozkazanc 2015; Fernández-Manzanal, Rodríguez-Barreiro, & Carrasquer, 2007; Zelezny, Chua, & Aldrich, 2000). However, in contrast to international findings, gender differences with regards to environmental issues in South Africa are not as clear-cut and were found to be complex and influenced by ethnicity in a study by Adejoke, Mji, and Mukhola (2014). As such, additional research is called for to clarify this association.

Ethnicity: A large number of studies, conducted in diverse settings, concluded that environmental beliefs and behaviours vary significantly across different ethnic groups (Schultz, 2002; Milfont & Fischer, 2015). Similar findings were made in a South African context, where ethnicity was found to be a major predictor of EAs. More specifically, black African participants were found to be the least concerned with the environment, followed by mixed-race, central Asian and white participants (Craffert & Willers, 1994; Struwig, 2010).

Religion and religiosity: Religious individuals have been found to be less environmentally concerned than less religious people, with this trend being even more pronounced for persons from a Judeo-Christian tradition who espouse literal beliefs in the Bible (Milfont 2007; Schultz, Zelezny & Dalrymple, 2000). However, very little research has been conducted on this topic in South Africa. In one of the few studies that have been done, no significant associations were found between religiosity and EAs (Struwig, 2010).

Education: Findings pertaining to the relationship between EAs and education have been somewhat inconsistent. Whereas some studies found education to be weakly related to values associated with pro-EAs, such as benevolence and universalism (Schwartz, 2005), most studies report strong positive correlations between pro-EAs and level of education (Jones & Dunlap, 1992; Fransson & Gärling, 1999;

Theodori & Luloff, 2002). In contrast to international findings, South African research has consistently indicated a positive relationship between education and pro-EAs (Reynolds, 1992; Craffert & Willers, 1994; Willers, 1996). However, the assumption that more educated South Africans would have more pro-EAs was challenged by Todes, Oelofse, Houghton, and Sowman, (2003) who found that educated people avoided responsibility for the environment because of the belief that human ingenuity and new technology would be able to fix environmental challenges.

Income: Another socio-demographic determinant of environmental attitudes that have been researched worldwide is socio-economic status and income (Beiser-McGrath & Huber, 2018). In accordance with the aforementioned research, several studies found that higher monthly income correlated positively with the tendency to regard environmental destruction as a priority and with concern for protecting the environment (Theodori & Luloff, 2002; Shen & Saijo, 2007; Rajapaksa, Islam & Managi, 2018).

Political orientation: Several studies indicated that pro-environmental EAs are positively related to liberal political ideology (Fransson & Gärling, 1999; Theodori & Luloff, 2002; Milfont, 2007). The relationship between EAs and this demographic variable has however not yet been significantly investigated in a South African context.

In light of the relatively limited and sometimes contradictory research findings on the topic, a need exists for additional investigation concerning the extent to which demographic variables influence South Africans' EAs, particularly in the higher education sector. Furthermore, people's socio-economic and demographic characteristics have been found to play a very important role in explaining and mediating the extent to which environmental knowledge predicted variation in pro-environmental behaviour in African contexts (Amoah & Adoah, 2020). As such, knowledge gained from studies such as this one can be used to design evidence-based and inclusive behaviour-specific intervention strategies and education programmes (Mtutu & Thondhlana, 2016).

The Purpose of This Study

The purpose of this study was to determine the EAs among a diverse sample of South African students by using the three (geographically and culturally diverse) campuses (situated in Potchefstroom, Mahikeng and Vanderbijlpark) of South Africa's North-West University (NWU). Due to its history, the NWU is reflective of many of the dynamics in South African society. The university was formed through

the merger of three diverse educational institutions; one campus being part of former Bophuthatswana, a homeland created under Apartheid; and the second being the then predominantly Afrikaans Potchefstroom University for Christian Higher Education, and the third being the former Sebokeng Campus of another mainly black university, Vista, situated in the industrial town of Vanderbijlpark. Their coming together to form the North-West University (NWU) was a strong symbolic act of reconciliation and nation-building – and together they provide a realistic representation of South African society (NWU, 2020; Raper, 2004).

The NWU has joined the global higher education movement aimed at making pro-EAs part of its students' attributes through the Green Campus initiative, which is an international movement that aims to promote climate change interventions at college and university campuses. However, the successful implementation of this initiative is complicated by the fact that the current EAs of students at most South African universities, including the NWU, are not well studied. Consequently, time, energy and resources devoted to the implementation of interventions will be wasted or sub-optimally expended if the necessary research is not conducted to specifically determine problematic attitudes and behaviours that would need to be targeted by such interventions.

In light of the above, the following research questions were formulated:

1. What are NWU undergraduate students' attitudes towards the environment?
2. How, if at all, do their EAs differ according to demographic factors and membership to environmental organizations?

MATERIALS AND METHODS

Participants

A cross-sectional survey study was conducted in 2016 with a sample of 1139 undergraduate students drawn from all three of the North-West University's (NWU) campuses, which, at this time, had a total of 63, 395 enrolled students. Ages of the participants ranged from 18 to 55 years ($M = 22.32$, $SD = 5.07$). The participant group was found to have moderate to high levels of religiosity ($M = 3.7$, $SD = 1.17$, as measured on a 5-point scale), and to be slightly more politically liberal than conservative ($M = 3.7$, $SD = 1.47$, (1= extremely liberal and 5 = extremely conservative). Other characteristics of the participant group are set out in Table 1.

Procedure and Ethical Considerations

Permission to conduct the research was obtained from the NWU ethics committee. Participants were

Table 1. Characteristics of the participants (n = 1139)

		Total (n=1139)	Potchefstroom (n=501)	Vanderbijlpark (n=168)	Mahikeng (n=470)
Item		%	%	%	%
Gender	Male	36.3*	38.3	35.1	44.5
	Female	51.1*	61.5	61.3	51.1
Ethnicity	White Afrikaans	30.2	72.3	9.5	1.1
	White English	2.5	4.6	3.6	0.6
	African	52.2	15.4	82.5	96.4
	Asian/Indian	1.2	2.2	1.2	0.4
	Coloured	2.6	4.2	3	1.5
	Religion	Christian	87.4	88	84.5
	Muslim	1.2	1.2	1.2	1.5
	Hindu	0.2	0.4	0.6	0
	Traditional African religion	1.9	0.8	4.2	3
	Spiritual but not religious	3.4	3.4	4.8	3.8
	Non-religious	1.8	3.2	1.2	1.1
Member of environmental organisation	Member	6.5	9	7.1	5.3

*Note: As part of the ethics approval for the study, it was agreed that participants would be expressly told that they are free to opt not to indicate their gender or race, and the discrepancy results from the fact that some participants chose not to specify their gender.

recruited by posting an invitation to an internal electronic student platform, mass mail as well as by word of mouth. All participants who agreed to take part in the study were asked to sign an online consent form that explained their participation would be voluntary, confidential, and could be terminated at any time. The online questionnaire was translated into Setswana using a bilingual committee approach as proposed by Van de Vijver and Leung (1997). Responses were captured electronically by direct loading into a website database as a password-restricted file and subsequently extracted into SPSS for analysis.

Instruments

Data were collected by means of a web-based questionnaire which consisted of three sections. Section A included a series of single-item measures aimed at assessing demographic information. In this section, participants' religiosity was measured with a single item (How religious are you, if at all?), measured on a 5-point scale from 1 (not at all religious) to 5 (very religious). Political orientation was likewise measured with a single item (In general, when it comes to politics, do you usually think of yourself as...), measured on a 5-point scale, ranging from 1 (extremely liberal) to 5 (extremely conservative). Income was measured with a single item (What kind of income bracket would you see your family being in?) using a visual analogue scale ranging from 0 (lower) to 100 (upper). Section B consisted of the revised New Ecological Paradigm

(NEP) Scale (Dunlap et al., 2000), which is the most widely used measure of EAs (Dunlap & Jones, 2003). The scale contains 15 balanced items, assessed on a 5-point Likert scale, that are designed to tap into each of the five hypothesized aspects of an ecological worldview: the reality of limits to growth, anti-anthropocentrism, rejection of exemptionism, the fragility of nature's balance, and the possibility of an ecocrisis. An example item includes: 'We are approaching the limit of the number of people the earth can support'. Section C consisted of the short form of the Environmental Attitudes Inventory (EAI-24), a culture-general and fully balanced assessment tool developed to measure the multidimensional and hierarchical structure of EAs (Milfont, Duckitt & Wagner, 2010b). This inventory captures both the vertical and horizontal structure of EAs by measuring twelve specific facets, or first-order factors that define the two-dimensional higher-order structure of EAs (i.e., Preservation and Utilization). The scale consists of 24 items, with two positively worded and two negatively worded items for each of the 12 subscales, with all item's beings assessed on a 5-point Likert scale. An example item includes: 'I think spending time in nature is boring'. In the present study, Cronbach alpha coefficients for the subscales of the EAI-24 varied widely (see Appendix), with some scales showing acceptable reliability (subscales 3, 5, 9 and 12), others marginal reliability (scales 1, 10, and 11), and yet others very poor reliability (scales 2, 4, and 8). However, given that Cronbach alpha values below 0.7 can realistically be expected

when assessing psychological constructs, and that these coefficients are significantly less reliable when scales with only two items are used (as is the case with the EAI subscales), with fewer items resulting in lower Cronbach alpha levels, and vice versa (Field, 2013), the results have still been considered in the analysis. Nonetheless, results from the latter scales should therefore be viewed in a tentative light, and future research is needed to verify the findings reported here. Possible reasons for these findings are discussed later in the article.

Data Analysis

The inter-item reliability of the NEP and EAI-24 scales and sub-scales were assessed via Cronbach's alpha coefficients, with scales equalling or exceeding the threshold of 0.7 being regarded as exhibiting adequate inter-item reliability (Field, 2013). Bivariate Pearson's correlations and independent t-tests (Field, 2013) were employed to examine relationships between variables among various demographic subgroups based on participants' age, gender, religiosity, ethnicity, political orientation and family income bracket. In all instances, the cut-off level for statistical significance was set at $p < .05$ (Field, 2013).

RESULTS

EAs of Students as Measured by the EAI-24 and NEP Scales

Analysis of the 12 subscales of the EAI-24 (as shown in Appendix) reveal that participants' levels of enjoyment of nature ($M = 2.94$, $SD = 1.61$), environmental movement activism ($M = 3.64$, $SD = 1.99$) and personal conservation behaviour ($M = 3.65$, $SD = 1.68$) were relatively low. These subscales are associated with the pro-environmental higher-order factor preservation of the EAI-24 scale, and as such, imply that students' EAs lean more towards apathetic or anti-EAs. Furthermore, participants also did not regard the environment as being fragile or under any imminent threat as reflected on their relatively low scores on the environmental threat ($M = 3.31$, $SD = 1.69$) and ecocentric concern ($M = 3.95$, $SD = 1.99$). By contrast, scores on sub-scales measuring conservation motivated by anthropocentric concern ($M = 7.80$, $SD = 2.16$) and human utilization of nature ($M = 7.88$, $SD = 1.91$) were high. These subscales are associated with the anti-environmental higher-order factor utilization. As such, participants' concern for nature was not only based on the extent to which it was viewed as serving human needs, but consumption of natural resources for human benefit was also strongly endorsed. However, in contrast to the overall picture painted by the results derived from the EAI-24 scores, the

student group's mean score on the NEP, which measures ecological worldviews, was moderately high ($M = 3.54$, $SD = 0.48$) indicating that the participants' attitudes were mildly pro-environmental.

Relationships between Demographic Variables, the NEP Scale, and EAI-24 Subscales

To investigate the socio-demographic correlates of students' EAs, their scores on the EAI-24 and NEP were correlated with their age, religiosity, political orientation, economic status, and membership of an environmental organisation. Results indicated that none of these demographic factors exhibited statistically significant correlations with the NEP.

Demographic Variables and the EAI-24 Subscales

Independent t-tests were conducted to determine whether significant group mean differences on the EAI-24 scores occurred. A statistically significant, but relatively small (mean difference = -0.55 , 95% CI: -0.91 to -0.18 ; $d = 0.20$), mean difference was found between males and females ($t = -2.95$, $df = 876$, $p < 0.005$, two-tailed), with females ($M = 6.61$, $SD = 2.67$) scoring higher than males ($M = 6.06$, $SD = 2.75$) on human dominance over nature. The human dominance over nature subscale taps into the belief that nature exists primarily for human use (Milfont et al., 2010a). Females scored significantly lower ($M = 3.74$, $SD = 1.91$) on ecocentric concern (a nostalgic concern and sense of emotional loss over environmental damage and loss) than males ($M = 4.20$, $SD = 2.05$), ($t = 3.37$, $df = 876$, $p < 0.005$, two-tailed). The magnitude of the differences in the means (mean difference = 0.45 , 95% CI: 0.19 to 0.72) was small ($d = 0.22$). Statistically significant differences in scores of some of the EAI-24 subscales were found between African and White Afrikaans speaking students. African students ($M = 3.11$, $SD = 1.73$); ($M = 7.24$, $SD = 2.28$) scored statistically significantly lower on environmental movement activism ($t = -9.42$, $df = 607$, $p < 0.005$, two-tailed, equality of variance not assumed) and conservation motivated by anthropocentric concern ($t = -9.64$, $df = 808$, $p < 0.005$, two-tailed, equality of variance not assumed) than white Afrikaans speaking students ($M = 4.41$, $SD = 2.05$; $M = 8.58$, $SD = 1.70$), respectively. The magnitude of the differences in the means for both subscales were moderately large (mean difference = 0.45 , 95% CI: -1.57 to -1.03 , $d = -0.67$; mean difference = -1.34 , 95% CI: -1.61 to -1.07 , $d = 0.67$, respectively). African students, however seem to enjoy spending time in nature more than white Afrikaans speaking students as they scored statistically significantly higher on enjoyment of nature ($M = 3.04$, $SD = 1.70$) ($t = 2.298$, $df = 769$, $p >$

0.005, two tailed, equality of variance not assumed) than Caucasian Afrikaans speaking students ($M = 2.78$, $SD = 1.73$). The magnitude of the differences in the means (mean difference = 0.25, 95% CI: 0.04 to 0.47) was small ($d = 0.16$). The seemingly logical assumption that members of environmental organisations would hold pro-EAs such as activism is contradicted by the findings of this study, as these participants scored lower on environmental movement activism ($M = 3.06$, $SD = 2.61$) than non-members ($M = 3.71$, $SD = 2.02$). An independent t-test showed that the difference was statistically significant ($t = -3.10$, $df = 85$, $p < 0.005$, two-tailed, equality of variance not assumed). The magnitude of the differences in the means (mean difference = 0.65, 95% CI: 1.6 to -0.23) was moderate ($d = 0.36$). Furthermore, members of environmental organizations scored higher on human dominance over nature ($M = 7.06$, $SD = 2.70$), which is associated with anti-EAs on the EAI-24, than non-members, ($M = 6.31$, $SD = 2.72$). Though statistically significant ($t = 2.17$, $df = 887$, $p < 0.005$, two tailed, equality of variance not assumed), the magnitude of the difference (mean difference = 0.75, 95% CI: 0.07 to 1.43) was small to moderate ($d = 0.28$). Self-reported religiosity and religious affiliation had virtually no bearing on any aspect of EAs measured by the EAI-24 or the NEP. The only exceptions to this were that Christians scored higher on environmental threat ($M = 3.36$, $SD = 1.69$) which is the belief that the environment is fragile and easily damaged by human activity (Milfont et al. 2010a) than those who regarded themselves as spiritual, but not religious ($M = 2.71$, $SD = 1.70$). An independent t-test showed that the difference was statistically significant ($t = 2.20$, $df = 813$, $p < 0.05$, two-tailed), but small in magnitude (mean difference = 0.65, 95% CI: 0. to -0.18; $d = 0.20$).

DISCUSSION

Results of the analysis of the EAI-24 scale revealed that participants' levels of enjoyment of nature, environmental movement activism and personal conservation behaviour, which are associated with the second-order factor, preservation, were relatively low. By contrast, student attitudes endorsing conservation motivated by anthropocentric concern and human utilization of nature, associated with the second-order factor, utilization (Milfont et al., 2010b), were high. Furthermore, participants also did not regard the environment as being under threat from humans as reflected on their relatively low scores on environmental fragility and ecocentric concern subscales. These findings are consistent with previous literature indicating low levels of awareness

and concern for environmental problems among university students from developing countries compared to the significantly higher levels of awareness and concern noted among students from developed countries such as Japan, Denmark and Germany (Kahraman, Yalçın, Özkan, & Aggöl, 2008; Liu & Lin, 2014, Alsaati, El-Nakla, & El-Nakla, 2020; Jusoh, Kamarudin, Abd Wahab, Saad, Rohizat, & Mat, 2018). In light of findings that environmental knowledge has been found to significantly predict pro-environmental behaviour (PEB) in African contexts (Amoah & Addoah, 2020), and that EAs are robust predictors of PEB in some student populations (Shafiei & Maleksaeidi, 2020) this suggests that initiatives aimed at instilling pro-environmental EAs among university students such as those involved in the present study would be well-warranted. By contrast, students' mean scores on the NEP scale indicated moderate pro-EAs. This suggests that these scales might be tapping into the construct of EAs in a differential manner. Concerning demographic variables, neither the students' political orientation nor the income bracket in which students' families fell had any statistically significant correlation with their EAs on either the EAI-24 or the NEP scale.

Whilst similar findings have been reported by some researchers in relation to gender (Willers, 1996; Struwig, 2010), this finding is inconsistent with the negative correlation between EAs and conservatism values reported by others (e.g. Fransson & Gärling, 1999; Theodori & Luloff, 2002), suggesting a need for additional research to be conducted on the association between these variables.

The only statistically significant difference between religious affiliation and students' EAs was that Christians had a stronger belief that the environment is fragile and threatened by human activity than students who indicated themselves to be spiritual but not religious. This contradicts previous literature that indicates that those who have higher beliefs in the Bible tend to hold anti-EAs (Milfont 2007; Konisky, 2018) but supports the claim that Christian views on human-nature relations support a belief that humans should dominate over nature evident by the high scores of these participants on the human dominance over nature subscale (Callicott, 1989). However, given the small sample size of those regarding themselves as 'spiritual but not religious', this finding would need to be subjected to verification in future studies.

Females scored higher on the human dominance over nature subscale, and lower on the ecocentric concern subscale, than males. This finding is in contradiction with previous research showing females to have stronger positive EAs than males

(Zelezny et al., 2000; Fernández-Manzanal et al., 2007). It is however consistent with research conducted in South Africa where Adejoke et al. (2014) found males to be more aware of environmental issues than females. These findings suggest a complex association between gender and EAs that might be mediated or moderated by other variables such as ethnicity, which was indeed reported to be the case by Grieve and Van Staden (1985) found that the most pro-environmental EAs were espoused by English-speaking women, followed by English-speaking men, Afrikaans-speaking men, and Afrikaans-speaking women. Caucasian Afrikaans speaking students appeared to be more inclined to environmental movement activism and conservation motivated by anthropocentric concern than African students, which concurs with the results from the Struwig (2010) report. However, African students indicated that they enjoyed nature more than white students. As enjoyment of nature is positively correlated with activism (Matsuba & Pratt, 2013), this finding suggests that there might be value in strategies aimed at increasing enjoyment of nature amongst students to increase their willingness to protect it. Overall, these findings, which suggest that ethnicity is significantly associated with environmental disposition, have also been found in both local (Craffert & Willers 1994; Struwig, 2010) as well as international studies (Johnson, Bowker, & Cordell, 2004; Milfont & Fischer, 2015; Schultz, 2002; Leung & Rice, 2002). Yet the findings also challenge overly simplistic stereotypes by indicating that EAs are complex and multi-dimensional, and thus caution against any overly generalized and decontextualized views of student EAs based on race or any other demographic characteristic.

Illustrating the above point even more emphatically, in direct contrast to most other studies on the topic (Milfont et al., 2010a; Fielding, McDonald & Louis, 2008), in the present study members of environmental organizations scored lower on 'environmental movement activism' and higher on 'human dominance over nature' than non-members. Contra-intuitively, this indicates that students who were part of an environmental organisation were less likely to be activists. This raises questions as to the effectiveness of at least some of these organizations and points to a need for additional research to shed light on this anomalous finding. One possible reason for this finding, as well as the overall tendency of students to espouse EAs that prioritise utilization over preservation of nature, might conceivably be attributable to South Africa's turbulent political history. Many African students have deeply rooted political orientations that often result in social activism with the overarching goal of correcting

social injustices (Boahen, 1994). It could be that South African students join environmental organisations with the same subconscious expectation that social justice will also be a side-effect of environmental activism, and become discouraged at the realisation that many environmental organisations concern themselves mainly with ecocentric objectives. This ecocentric approach, which is typically derived from Eurocentric contexts, could be in contradiction with a more anthropocentric traditional African worldview as evident by established findings that environmental concern among Africans is ultimately centred on human advancement and well-being (Kelbassa, 2005; Maila & Loubser, 2003; Ogunbode, 2013).

Subsequently, the realisation that being part of an environmental organisation is not aligned with one's values and concerns may cause detachment from the organisation and in turn from environmental activism (Vecchione, et al. 2015). A possible solution to this detachment is for South African Universities to adopt an integrated socio-ecological approach, implemented by institutions of higher education worldwide, to changing their students EAs by strengthening the perception that there is a connection between human well-being and the environment (Vining, Merrick & Price, 2008; Alshuwaikhat & Abubakar, 2008). Furthermore, resolving the conflict of the perception that one needs to choose between environmental justice and social justice may reduce dissonance from environmental action and lead to greater levels of environmentally responsible behaviour (Vining, Merrick, & Price, 2008; Mary, 2008).

Ideally, a country should be able to protect a society along with its environment. Unfortunately, given its history of racial segregation, the situation in South Africa is very different, as social inequalities tended to result in a polarized situation in which social activism is generally prioritised over environmental activism by young people living in third-world countries like SA who perceive environmental issues as non-urgent in comparison to their unmet physical and socio-economic needs (Simon, 2016). As such, after joining an environmental organisation, students coming from impoverished areas may not be inclined to activism for a purpose that seemingly will not provide relief to their immediate dire circumstances (Simon, 2016).

Taken together, these issues raise deeper cultural and axiological questions concerning the nature, constitution, aims, and foundational assumptions upon which many environmental organizations and conservational initiatives are based; which commonly tend to follow Eurocentric ideals, and/or derive from contexts where social inequality and

socio-economic deprivation might be less pressing concerns, and thus run the risk of becoming disconnected from African realities and worldviews. The findings underscore the observation made by other researchers that there might be epistemic and axiological disconnections between the prevailing Western modes of knowledge production and worldviews that commonly underlie such environmental organizations, and the indigenous knowledge systems and socio-historically informed worldviews held by many students (Heleta, 2016; Mbembe, 2016). The general tendency of Western positivist scientific worldviews to view human beings as apart from, and above the natural world, contrast significantly with most African indigenous knowledge systems which offer not only important biological insights but also a cultural framework for environmental problem solving in which humans are regarded as being a part of nature and which incorporates human values that honour nature (Goduka, 2012). If this is indeed the case, it points to the need to reconsider the underlying axiological assumptions upon which such organizations or Green Campus initiatives might be based, and to harmonize them with indigenous modes of knowing, being, and doing. Perhaps the exploration and development of an integrated and inclusive approach that combines environmental and social justice would be necessary for the future success of encouraging active participation in environmental organizations whilst simultaneously promoting social justice. Approaches such as Participatory Action Research (PAR) are increasingly recognised as useful methodologies in indigenous science, as, given its emphasis on context and social justice, it has the potential to reduce the negative – and, some would argue, colonising – effects that much of the Western-based positivist paradigm has had on indigenous people (Goduka, 2012).

The results from this study make clear that the demographic and cultural diversity that characterises many student populations do indeed seem to be differentially associated with students' EAs, but also that these associations tend to be complex and a-stereotypical. Given that phenomena such as poverty and lack of education, which are commonly reflective of structural social inequalities, are associated with lower levels of pro-environmental EAs (Fransson & Garling, 1999), it would seem reasonable to argue that such differences in EAs may likely be the result of a complex confluence of deeper structural social inequalities that have resulted in differential access to and allocation of various social, cultural and economic resources among various demographic student subgroups. As such, when pursuing an agenda of environmental awareness and/or activism, the

findings of the study underscore the importance not only of empirically assessing students' EAs as a prelude to developing evidence-based and demographic-specific intervention strategies and education programmes, but also of exploring, understanding, and addressing structural constraints that might directly or indirectly affect students' EAs. In addition, it is pivotal that demographic-sensitive studies, such as this one, emphasize the aim of answering equitably to the needs and conditions of every community and that in no uncertain terms suggests separating communities to the needs and conditions of every community. Findings such as these could be pressed into the service of constructing more inclusive educational interventions that are tailored and expanded to more effectively meet the needs of a wider demographic range of students. This is particularly so in a country such as South Africa, which is characterised by high levels of both cultural diversity and structural inequality (Mtutu & Thondhlana, 2016).

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

In the present study, the reliabilities of certain subscales of the EAI-24 were found to be problematic (especially scales 2, 4, and 8). As such, results from these scales should be viewed in an extremely tentative light, and future research is needed to verify the findings reported here. However, the authors believe that this also represents an inherently significant finding of the study, as it points to a deeper set of concerns pertaining to the cross-cultural relevance and validity of many of the items in these scales as measures of EAs in contexts such as South Africa. Items such as 'I really like going on trips into the countryside, for example to the bushveld or nature reserves', 'One of the most important reasons to keep dams and rivers clean is so that people have a place to enjoy water sports', and 'I'd prefer a garden that is wild and natural to a well-groomed and ordered one' probably would not make much sense to students who come from very impoverished communities (which is the case with a significant portion of the student sample) where the notions of going on trips, enjoying water sports, or owning a garden would be completely foreign. Other items such as 'Families should be encouraged to limit themselves to two children or less' would be incongruent with prevailing traditional notions in some African cultures of the utilitarian values of children (Sam, Peltzer & Mayer, 2005; Spjeldnaes, Sam, Moland, & Peltzer, 2007), and risk the imposition of prevailing Western ideological and normative positions related to family structures, and

the subsequent marginalization or 'problematization' of indigenous African ideologies.

A Cronbach's alpha coefficient of 0.64 was obtained for the NEP scale, which suggests that there might be some concerns in relation to inter-item reliability. A possible reason for this could be the complexity of language used in the NEP and the fact that some of the concepts do not necessarily translate well in other languages. As a result of this, the findings emanating from this scale should be interpreted with caution. It could be argued that scales such as these are biased towards respondents with middle to upper-class orientation and that they consequently fail to adequately capture the lived experience of South African students whose contexts often differ substantially from this. This points to a need to develop culturally and contextually sensitive measures of EAs to reliably assess this construct in a South African context.

Whilst the study only focused on students from one university, by sampling three different campuses with substantially differing demographic, historic and geographic characteristics, this limitation has been mitigated to some extent. However, future research should investigate EAs of students at other South African tertiary educational institutions, given the important role that such institutions can play in fostering and promoting pro-EAs and behaviours.

CONCLUSION

The results of this study, which surveyed the EAs of 1139 students of the three campuses of the NWU using a cross-sectional survey design, indicate that students' EAs lean more towards utilization, which is an anti-environmental factor, than to the pro-environmental factor of preservation. To the extent that the findings might be representative of other student populations, the findings indicate that interventions might be needed to temper EAs related to the utilization of nature for anthropogenic purposes. In addition to this, the results indicated that EAs related to the preservation of ecological resources such as enjoyment of nature, activism and personal conservation behaviour should be promoted. Furthermore, the findings revealed that demographic factors such as gender and ethnicity are significantly correlated with students' EAs, and it was argued that these findings may be reflective of larger structural social inequalities and that they exhibit complexities that caution against any stereotyping. Moreover, findings suggest that a dialogue should be initiated to integrate the environmental crisis within the fight against social injustice in South Africa. This holistic approach may be the answer to an increased awareness of environmental issues and at the same time, moving previously disadvantaged South

Africans towards an ecological and social justice framework. This study demonstrates that there could be significant value in empirically assessing and considering students' EAs and their demographic characteristics when tailoring inclusive and representative environmental-based interventions aimed at instilling pro-environmental EAs. However, the results also sounded a note of caution in relation to the cross-cultural and contextual validity of current EA-related measuring instruments as well as environmental organizations, and suggest that in the South African context, a need exists to develop culturally sensitive EA measures, as well as environmental organizations that incorporate a greater focus on social justice and indigenous knowledge systems.

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Appendix. Descriptive statistics, reliabilities, and inter-scale correlations for the NEP and the 12 scales of the EAI

Item	N	Mean	SD	α	NEP	EAI1	EAI 2	EAI 3	EAI 4	EAI 5	EAI 6	EAI 7	EAI 8	EAI 9	EAI 10	EAI 11
NEP	959	3.54	0.48	0.64												
EAI1: Enjoyment of nature	959	2.94	1.61	0.67	-0.19**											
EAI 2: Support for interventionist policies	899	4.12	1.85	0.33	-0.15**	0.24**										
EAI 3: Environmental movement activism	898	3.65	1.99	0.80	-0.08*	0.47**	0.22**									
EAI 4: Conservation motivated by anthropocentric concern	899	7.79	2.12	0.52	0.29**	-0.09**	-0.04	0.01								
EAI 5: Confidence in science and technology	899	5.59	2.26	0.82	0.19**	0.08*	0.03	0.08*	0.08*							
EAI 6: Environmental threat	899	3.31	1.69	0.62	-0.39**	0.29**	0.22**	0.25**	-0.24**	-0.04						
EAI 7: Altering nature	898	6.12	2.32	0.60	0.14**	-0.19**	-0.07*	-0.16**	0.07	0.05	-0.10**					
EAI 8: Personal conservation behaviour	896	3.65	1.65	0.54	-0.17**	0.44**	0.21**	0.41**	-0.16**	0.07*	0.30**	-0.14**				
EAI 9: Human dominance over nature	896	6.37	2.73	0.87	0.34**	-0.03	-0.00	-0.06	0.10**	0.11**	-0.10**	0.08*	-0.07*			
EAI 10: Human utilization of nature	897	7.88	1.91	0.68	0.26**	-0.24**	-0.12**	-0.27**	0.18**	0.04	-0.25**	0.20**	-0.33**	0.16**		
EAI 11: Ecocentric concern	896	3.95	1.99	0.67	-0.23**	0.22**	0.10**	0.26**	-0.16**	-0.01	0.22**	-0.14**	0.33**	-0.15**	-0.24**	
EAI 12: Support for population growth policies	898	6.05	2.74	0.79	-0.19**	0.06	0.10**	0.06	-0.11**	0.03	0.14**	-0.14**	0.07*	-0.08*	-0.11**	0.09**

Note: Mean score for the NEP ranges from 1 to 5; mean scores for all subscales of the EAI range from 2 to 10.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed)