

Measuring Environmental Attitudes of Undergraduate Sustainability Students

By

Jessica Cholette-Barr

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Supervisor: Laurel Schut

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Abstract

Since 2013, the College of Sustainability at Dalhousie University has distributed an annual survey to students enrolled in classes offered by the Environment, Sustainability and Society (ESS) program. One purpose of the survey is to measure students' environmental attitudes using a standardized tool called the Revised New Ecological Paradigm (NEP) scale. This paper examines ESS students' environmental attitudes across nine years (2013-2021) and compares students' NEP scores between survey years, levels of education, faculties of study, and between the five dimensions of the NEP scale. ANOVA results demonstrate significantly lower NEP scores from first year students versus third year students, and significantly lower scores from Faculty of Management students in comparison to Faculty of Arts and Faculty of Science students. Significant differences in NEP scores are also present in two of the five dimensions of the scale: 'Limits to Growth' and 'Eco-crisis.' The 'Limits to Growth' dimension displays a significant decrease in NEP scores across nine years, the 'Eco-crisis' dimension displays a significant increase in NEP scores across nine years. The paper concludes by highlighting outdated themes and values within the NEP scale, and posits that a different attitude measurement scale could be more useful and relevant for measuring students' environmental attitudes in future studies.

Key Words: Environmental Attitude, Sustainability, Post-Secondary Education, Revised New Ecological Paradigm Scale

List of Abbreviations

NEP: New Ecological Paradigm

EA: Environmental Attitude

IPCC: International Panel on Climate Change

CCUEN: Canadian College and University Environmental Network

ESS: Environment, Sustainability and Society

ANOVA: Analysis of Variance

DSP: Dominant Social Paradigm

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Chapter 1: Introduction

Using survey data collected by the College of Sustainability at Dalhousie University, this thesis investigates the environmental attitudes of undergraduate students enrolled in courses within the Environment, Sustainability and Society (ESS) program.

1.1 Background

1.1.1 The Rise of Sustainability Education

In recent years, post-secondary institutions worldwide have introduced new degree programs dedicated to sustainability and other environmental disciplines (O’Byrne, Dripps & Nicholas, 2014; van der Leeuw et al., 2012). Although few programs in Canada use the term ‘sustainability’ in their program title, 33 post-secondary institutions nationwide are currently full members of the Canadian College and University Environmental Network (CCUEN, 2021). Once obscure to the general public, sustainability has emerged as a leading global concern, as the impacts of climate change become more apparent and destructive with each passing year. In the most recent update to the Sixth Assessment Report, the International Panel on Climate Change (IPCC) declared that the planet is on track to experience a worldwide temperature increase of 3 degrees within this century if global emissions continue at their current levels (IPCC, 2022). A temperature increase of this magnitude will have catastrophic environmental consequences which jeopardize the future of life on earth. Such dire circumstances require urgent and significant intervention in all sectors, and universities play a pivotal role in equipping the next generation to face the most important challenges of our time.

1.1.2 Sustainability Education at Dalhousie

Dalhousie University was an early trailblazer in post-secondary sustainability education when it launched the ‘Environment, Sustainability and Society’ (ESS) program in the fall of 2009. The ESS program became one of the first sustainability degree programs offered in North America (McNutt, 2014). For 13 years, the ESS program has taken an interdisciplinary approach to sustainability education, preparing its graduates to meet the challenges of an increasingly interdisciplinary world (ESS Curriculum Map, 2021). For example, students in the ESS program are also required to enroll in a secondary major of their choice, which serves to further complement the teachings and practical applications of their sustainability education and further exemplifies the value of an interdisciplinary degree program.

Within the ESS program curriculum are four overarching program-level outcomes: 1) Complexity, 2) Interdisciplinarity, 3) Multiple Literacies, and 4) Self-Awareness and Engagement, and these outcomes guide the curriculum for each course within the ESS program (ESS Curriculum Map, 2021). One foundational principle of the ESS program is its emphasis on ‘learning by doing,’ which recognizes the value of integrating hands-on learning experiences into core curriculum to build students’ capacity for problem-solving (Wright & DeFields, 2012). Another unique aspect of the ESS program is its strong emphasis on reflection-style responses as a tool for academic assessment (ESS Curriculum Map, 2021). Critical reflection skills have been identified in the literature as a necessary component of sustainability education that helps students “build their capacity as agents of change” (Tilbury, 2004, pp. 101). In addition to their purpose as a tool for student evaluation, reflective exercises are also used to collect input from students about their experiences in the ESS program. The annual ESS Student Survey is one example of how the College of

Sustainability collects feedback from its students, and this survey will be the focus of the present study.

1.1.3 The Annual ESS Student Survey

Since the fall of 2013, the College of Sustainability has sent an annual survey to all students enrolled in a course within the ESS program. Nine years of student survey data have since been collected, comprising a database of 1299 completed ESS Student Surveys in total. So far, only data from the demographic half of the survey has been analyzed. Survey data pertaining to students' environmental attitudes has never before been analyzed, which has presented this unique research opportunity.

1.2 Purpose of the Study

The purpose of this study is to identify trends in the survey data collected from students enrolled in ESS courses across a nine-year timespan. This study could offer valuable insight into attitudinal trends within the ESS student cohort, and results could point to how ESS students' are responding to the teachings of their post-secondary education.

1.3 Research Objective

The primary research objective is to observe whether environmental attitudes have shifted within the ESS student population over the last nine years. This study compiles and analyzes ESS Student Survey data from 2013-2021 to identify possible patterns within the data set, which may indicate how attitudes have shifted. These areas of interest include comparing attitudes between students in different levels of their education (i.e. first year and fourth year students), attitudes between students enrolled in different faculties of study, and attitudes of students in different survey years (i.e. 2013 versus 2021). In addition, this study is interested in comparing scores between the dimensions within the attitude measurement scale used in the

ESS Survey (discussed at length in Chapter 2). The data analysis considers notable correlations between these variables to determine how attitudes might be changing and to infer why attitudes may have changed.

1.4 Research Design

This study follows a quantitative approach and analyzes survey data collected by the College of Sustainability prior to the undertaking of this thesis. The demographic represented in the data set are undergraduate students at Dalhousie who enrolled in an ESS course between 2013 and 2021 and decided to respond to the optional ESS Student Survey.

The design of this study begins with a review of other relevant studies within the literature of environmental attitude measurement, with a specific focus on studies centering post-secondary students. The literature review also reviews several popular scales used to measure environmental attitude (EA) to give readers a sense of what other EA scales are prominent within the literature. Next, the methods section outlines each step of the data analysis that follows, and these are informed by methodologies of similar quantitative studies which also utilize the same scale as the ESS Student Survey. Finally, the results and discussion sections summarize key findings in the data, and relate these findings back to the literature to draw final conclusions.

1.5 Study Limitations

The primary limitation of this study is its scope. Firstly, this analysis could benefit from a more comprehensive review of environmental attitude literature, specifically to include a review of scores/results from populations beyond the demographic of university students. A richer literature review could add further depth to this analysis, and would help situate the findings of the present study within the wider canon of environmental attitude research.

Secondly, there are further opportunities for statistical analysis within the present data set, but due to limitations of time and scope, these avenues of inquiry have not all been explored. One such avenue could include comparing scores between students who have declared ESS as a major versus students who have not. During statistical analysis process, this test was determined to be non-essential and was therefore omitted, but this data could offer a more granular analysis for considering the impact of education, rather than only comparing results between faculties of study more broadly. These two points could be considered limitations of the present research, and they could also be interpreted as fruitful starting points for future analyses.

Beyond the design of the present study, there are limitations inherent in the survey itself, and specifically, in its optionality. It is possible that the optional nature of the survey attracts responses from students who are more academically engaged, which could impact response trends reflected within the data. This detail does not invalidate the quality of the data collected by the ESS Student Survey, but it presents a limitation worth considering if the survey is to undergo reassessment.

1.6 Significance of the Study

It is hoped that the findings offered in this paper will help to inform future studies concerned with students' environmental attitudes in the context of post-secondary environmental education. Beyond its practical applications for the College of Sustainability, it is hoped that this research will contribute to existing literature of post-secondary students' environmental attitudes by helping to further the dialogue about the importance of an environmental education, and also make a case for the continued relevance of measuring environmental attitudes. Survey insights could be an invaluable resource for future curriculum development, and lend value to an assessment of current program offerings. It is

also my hope that the analysis offered in this paper will offer a starting point that other researchers can reference if they are interested in evaluating environmental attitudes at their own institutions.

Chapter 2: Literature Review

There is a significant pool of research suggesting the existence of the link between environmental attitude (EA) and environmental education, which will be explored within the literature review. The first section defines EA and outlines a handful of reputable scales used for environmental attitude measurement. The second section focuses on the New Ecological Paradigm (NEP) Scale, the research measure that is used within this study, and establishes the prevalence of the NEP scale across the literature. The third section looks at case studies which measure students' environmental attitudes, and concludes by further discussing the relationship between sustainability education and environmental attitudes.

2.1 What is Environmental Attitude?

2.1.1 Defining of EA

The measurement of environmental attitudes (EA) first emerged as a field of academic inquiry in the 1970s, and research in this area has increased substantially in the last two decades (Fernández-Manzanal, 2007). The term environmental attitude refers to a person's feelings or beliefs about the environment (Milfont, Duckett & Wagner, 2010), and the purpose of EA measurement is to identify and distil these perceptions and beliefs into concrete, measurable dimensions (McIntyre & Milfont, 2016). Milfont (2012) defines environmental attitude as “a psychological tendency to evaluate the natural and built environments, and factors affecting their quality, with some degree of favour or disfavour” (as cited in McIntyre & Milfont, 2016), and this definition is adopted in the present study.

2.1.2 Types of EA Measurement

There are a vast range of EA measurement tools used across the literature, which employ a range of approaches and techniques. Environmental attitudes are most often

assessed using self-reported measures which can be measured using quantitative or qualitative approaches. Quantitative approaches utilize measurement tools such as standardised surveys or questionnaires, which generate results that are clearly quantifiable and directly comparable to findings from other studies (McIntyre & Milfont, 2016). Qualitative approaches could include structured or unstructured interviews, or other types of data collection that offer space and opportunity for complex answers rooted in personal experience, rather than responses that fit into generalized, predefined categories (Seamon & Gill, 2016). While both approaches have their strengths and weaknesses, quantitative approaches are usually preferred because data collection is less time consuming and results are more easily synthesizable, but qualitative approaches can sometimes be more informative because they offer room for nuance and complexity in responses (Macura et al., 2019).

2.1.3 Managing Bias within EA Measurement

While both quantitative and qualitative measures of EA are prevalent throughout the literature, some researchers express concern about the viability of self-reported measures and their susceptibility to response bias (Schultz et al., 2004; McIntyre & Milfont, 2016). When assessing self-reported survey data, there are three primary types of bias to consider: acquiescence bias, extremity bias and socially desirable responding (Christine & Gifford, 2014). Firstly, acquiescence bias – the tendency to agree or disagree with all or most of the questions asked – can be managed using a balanced scale that employs a mix of positively and negatively worded items to obtain more reliable results. The NEP scale, for example, controls for acquiescence bias through balanced survey items (Dunlap et al., 2000). Secondly, extremity bias – the tendency to choose extreme ratings in response-style formats – can be identified and controlled through the analysis of descriptive statistics. Thirdly, socially desirable responding – the tendency to respond in the most socially desirable manner – is the

most difficult bias to control for, as it might unconsciously skew survey results towards a more positive outcome (McIntyre & Milfont, 2016; Ewert & Baker, 2001).

Of the three types of bias, social desirability presents the strongest threat to the reliability of results obtained using EA measurement tools, whether quantitative or qualitative (McIntyre & Milfont, 2016). Social desirability responding (SDR) is defined as “the tendency of subjects to attribute to themselves in self-description, personality statements with socially desirable scale values, and to reject those with socially undesirable scale values” (Edwards, 1957). Although SDR is a popular form of response bias, leading EA researcher Taciano L. Milfont, Professor of Environmental Psychology at the University of Waikato (New Zealand), argues that social desirability has no measurable effect on the scores of self-reported EA measures, including the NEP scale (Milfont, 2009). Milfont conducted two studies analyzing anonymous survey data from first-year undergraduate psychology students at two universities in New Zealand, and concluded that SDR has no impact on the results of anonymous EA measures. Even still, some EA researchers continue to draw attention to the potential influence of social desirability responding when analyzing results of self-reported EA measures.

2.2 Scales of Environmental Attitude Measurement

According to Dunlap & Jones (2002), there are over 700 existing measures of environmental attitude. This is a result of the tendency of researchers to create new scales and/or edit pre-existing scales to suit the purposes of their study, and as a result many existing measures of EA are not validated and do not possess high reliability (Dunlap & Jones, 2003; McIntyre & Milfont, 2016). In their book chapter titled “Who Cares? Measuring Environmental Attitudes,” McIntyre and Milfont (2016) advise future researchers to select an already existing EA scale possessing good psychometric properties, meaning it is proven to

measure attitudes consistently (high reliability) and accurately (validity). The following section highlights five validated scales identified by McIntyre and Milfont as noteworthy within EA literature.

Measurement of Ecological Attitudes and Knowledge Scale

The Measurement of Ecological Attitudes and Knowledge Scale (MEAK) is one of the earliest measures of environmental attitude, created by Maloney & Ward in 1973. This scale measures ecological attitudes, knowledge and behaviours through a 130-item scale consisting of four subscales: verbal commitment, actual commitment, affect, and knowledge (Maloney & Ward, 1973). In 1975, the original scale was shortened to contain 45 balanced items, which align with these four subscales. Many of the survey items in the MEAK scale reference specific environmental issues that were relevant at the time of the scale's creation, but are now less relevant to the measurement of environmental attitudes (Dunlap & Jones, 2002).

Environmental Concern Scale

The Environmental Concern Scale (ECS) is another early measure of environmental attitude, developed in 1978 by Weigel & Weigel. Using a 16-item balanced scale, the ECS measures environmental concern by presenting examples of specific environmental topics (such as pollution, for example) and assessing participants' knowledge, understanding and intentions relating to these topics (Weigel & Weigel, 1978). The ECS has been cited frequently throughout EA literature (Cruz & Manata, 2020), but similarly to the MEAK, the scale references specific issues that are no longer at the forefront of environmental concern today, and thus it has fallen out of favour (Dunlap & Jones, 2002; Milfont & Duckitt, 2010).

Environmental Attitudes Inventory

The Environmental Attitudes Inventory (EAI) aims to integrate past EA research and scales into a highly detailed EA measure investigating 12 dimensions of environmental attitude (Milfont & Duckitt, 2010). The two overarching principles of the scale are preservation and utilization, and the 120 items of the scale are both positively and negatively coded. Milfont and Duckitt argue that measures of EA can only be accurately calculated if they are conceived of as multidimensional and hierarchical (meaning the scale distinguishes between more extreme versus less extreme responses), challenging the validity of unidimensional EA scales including the widely endorsed New Ecological Paradigm (NEP) Scale. The EAI has been proven to display reliability and validity in studies conducted in New Zealand, Brazil, and South Africa (Hawcroft & Milfont, 2010; Milfont, Duckitt & Wagner, 2010).

Environmental Motives Scale

The Environmental Motives Scale (EMS) contains three subscales which reflect three types of environmental concern: 1) egotistic values, which focus on self-interest and success; 2) altruistic values, which focus on others; and 3) biospheric values, which focus on supporting the well-being of living things (Schultz, 2000). In this scale, participants are presented with 12 items and asked to rank them by order of importance. The EMS is built upon value-basis theory, which investigates the relationship between environmental attitude and the value a person has for themselves, other people, and the environment (Stern, Dietz, & Kalof, 1993). The length of the EMS is significantly shorter than many other measures of EA and it has been shown to produce high reliability, therefore it continues to be a reputable scale utilised for EA measurement (Cruz & Manata, 2020).

The New Ecological Paradigm

Of the 700+ scales designed for the measurement of environmental attitude, the New Ecological Paradigm (NEP) Scale is the most widely used measurement (Hawcroft and Milfont, 2010; Dunlap, 2008; Stern, Diez, & Guagnano, 1995). The purpose of the NEP Scale, as defined by Dunlap et al. (2000), is “to examine the structure and coherence of ecological worldviews and the relationships between these worldviews and a range of more specific environmental attitudes, beliefs, and behaviours” (pp. 431). The NEP Scale measures ‘ecological worldview,’ which is a person’s connection to their environment and whether they consider themselves to be a part of nature or separate from it (Dunlap et al., 2000). The NEP Scale was selected as the EA measure of choice by the College of Sustainability for the ESS Student Survey, and it will now be analyzed in further depth.

2.3 The New Ecological Paradigm Scale

2.3.1 Defining the New Ecological Paradigm

The New Ecological Paradigm (NEP) scale was created by Riley E. Dunlap, and Kent D. Van Liere, two Professors of Sociology based at research universities in the United States. At the time of its creation, both Dunlap and Van Liere were critical of society’s tendency towards a growth-driven, anthropocentric mindset, which they believed was contributing to the degradation of the environment (Dunlap & Van Liere, 1978). They classified this anti-ecological perspective as the ‘Dominant Social Paradigm’ (DSP), a framework which reflected the worldview and capitalistic interests of society’s dominant social groups (Pirages & Ehrlich, 1974). Dunlap and Van Liere argued that the world would fall into ecological catastrophe if society continued to make decisions through the anti-ecological lens of the DSP. In response, they conceived of an alternative framework called the ‘New Environmental

Paradigm' (NEP) to outline the facets of a pro-ecological perspective, and developed the NEP scale to measure the societal prevalence of pro-environmental attitudes within populations.

2.3.2 Developing the NEP Scale

The original NEP Scale was developed in 1978 and asked participants to respond to 12 Likert-scale statements. In 2000, the scale was revised, which was necessary for three main reasons: 1) to clarify the scale's purpose of measuring ecological worldview; 2) to address improve the scale's internal consistency; and 3) to update choices of wording, which included replacing the sexist terminology of 'mankind' in favour of the more inclusive 'humankind' (Dunlap et al., 2000; Anderson, 2012). These changes are reflected in the revised NEP scale, which has replaced its predecessor in all EA studies authored after the revised scale was published.

Another change accompanying the revised NEP scale is its dimensionality, which now reflects the existence of five dimensions comprising an ecological worldview, which are: 1) the reality of limits to growth, 2) anti-anthropocentrism, 3) the fragility of nature's balance, 4) rejection of exemptionalism, and 5) the possibility of an eco-crisis (Dunlap et al, 2000). Each of the 15 survey items in the revised NEP scale align with one of these five dimensions. The NEP scale is sometimes treated as a unidimensional measure of environmental attitude, where results for each individual survey item are averaged into a single NEP score and interpreted as such, but many researchers argue that there is the additional value in analyzing the five dimensions individually, in addition to calculating overall NEP score (Amburgey & Thoman, 2011; Rideout, 2013).

2.4 Measuring Environmental Attitudes of Undergraduate Students

There is significant research published on the topic of post-secondary students' environmental attitudes. These studies often investigate the relationship between environmental attitude and specific independent variables, such as academic major (Ewert & Baker, 2001), gender (Stern et al., 1993; Fernández-Manzanal et al., 2007) or level of education (Fernández-Manzanal et al., 2007). To highlight some of the most common findings within the literature, these studies will be explored in further depth.

Across the literature, many EA studies identify a significant relationship between level of education and pro-environmental attitude (Ewert & Baker, 2001), and some studies suggest that academic discipline could have a mediating effect on the development of environmental attitudes and beliefs (Fernández-Manzanal et al., 2007). In their 2001 study "Standing for Where You Sit," environmental professors Ewert & Baker analyze survey data collected in the mid-1990s from students enrolled at the University of Northern British Columbia. These responses represent approximately 300 students who are enrolled in a variety of academic majors, and the data is collected using a modified NEP instrument. The results reported lower NEP scores among students enrolled in business administration majors and forestry majors in comparison to students enrolled in other majors. In their discussion, Ewert and Baker posit the existence of a link between a person's field of study, or academic major, and the strength of their pro-environmental attitudes. They conclude that it is impossible to substantiate this claim based upon their data analysis, which cannot account for the impact of attitudinal influences beyond the scope of program curriculum (Ewert & Baker, 2001). Nevertheless, the significance of this correlation is relevant to acknowledge.

Many studies also investigate the relationship between gender and environmental attitudes. In their 2003 study, Stern et al. reported significantly stronger pro-environmental attitudes demonstrated by women in comparison to men. These results align with general

trends throughout EA literature, and similar results have been reported in hundreds of EA studies (Stern et al., 1993; Gökmen, 2021; Carrier, 2007; Müderrisoğlu & Altanlar, 2010).

Another popular variable of interest within the literature is the relationship between level of education and NEP score (Aminrad, Zakaria & Hadi, 2011). In their 2007 study, Fernández-Manzanal et al. (2007) measure students' environmental attitudes using a scale developed specifically for their study called the Environmental Attitudes of the University Scale (EAU Scale), which has since been cited over 100 times within EA literature, according to citations counts taken from Google Scholar (Cruz & Manata, 2020). Survey data was collected from approximately 1000 post-secondary students enrolled at the University of Zaragoza in Spain, and the findings display higher pro-environmental scores associated with upper year students in comparison to first year students. This study acknowledges that it is uncertain whether lower scores for first year students result from less time spent in university, or if this points to a difference in emotional maturity. This unknown is presented by the study as an opportunity for future research.

To conclude, results obtained from EA measurement are often very valuable for educators who may use this data to inform the development of future academic programming (Zelezny, 1999). Simultaneously, many EA scholars acknowledge that perceived changes in student attitudes cannot be directly connected to the impact of specific learning experiences, and these scholars recommend understanding EA results as a baseline tool to take useful insights from a data set (Harraway et al., 2012).

Chapter 3: Methods

The goal of this study was to understand how various factors including level of education, faculty of study, and year of survey, might impact students' responses to the questions of the NEP scale. These independent variables have the potential to influence the resulting NEP score, the dependent variable, which indicates students' environmental attitudes. Through statistical analysis, this study will gain insight to assist in answering the question: Do the environmental attitudes of students shift in relation to independent variables? And if so, in what ways do students' attitudes change?

3.1 The Population and Sample

The population represented within this study are Dalhousie undergraduate students who enrolled in a course in the Environment, Sustainability and Society (ESS) program between 2013 and 2021. The sample group included students within the ESS population who opted to complete the survey. Over nine years, 1299 completed surveys were collected, and all incomplete survey data was excluded from analysis.

It is important to note that the ESS Student Survey was sent to all students enrolled in any ESS class, therefore results will reflect environmental attitudes from a broader cohort of participants, including students who enrolled in a single ESS course as an elective, but did not pursue ESS as a major. Rather than limiting the analysis to only include students who selected ESS as their primary or secondary major, the analysis includes survey data from all participants, on the assumption that all students surveyed must have some curiosity about sustainability, given their enrolment in an ESS course. The principal motivation for conducting this study was to measure and understand the attitudes of Dalhousie students engaging with concepts of sustainability, so therefore, survey data from all participants was identified as relevant to this study and was therefore included within the analysis.

3.2 Survey Design

The primary data used in this study was collected through online surveys that were distributed before the present study was initiated. Each year, around the midpoint of the fall term, the ESS Student Survey is shared with all students currently enrolled in an ESS class. Participants were contacted by the Program Secretary at the College of Sustainability through their Dalhousie email address, and students were given approximately 30 days to complete the digital survey, which is hosted on the survey platform Opinio. In the email containing the survey link, the survey was described as a tool to “better understand the backgrounds, motivations and aspirations of students,” and its purpose was to “assist in planning future classes and program offerings” (M. Drisdelle, personal communication, October 18, 2021). Completion of the survey was voluntary and anonymous, but there was an option to enter a draw to win a small prize, and students entering the draw were required to attach their name and email address to their completed survey. For this purpose of the present study, all identifying information has been detached from the data set to preserve the anonymity of participants.

The ESS Student Survey contains two sections: the first half requires students to answer a series of 19 demographic questions about their background and motivation for pursuing studies in sustainability, and the second half asks students to respond to 15 statements on a five-item scale, ranging from ‘Strongly Disagree’ (1) to ‘Strongly Agree’ (5). These 15 statements belong to the revised NEP scale, and this half of the survey was the focus of the present study. From the demographic half of the ESS Student Survey, specific data pertaining to students’ level of education and faculty of study was included in the analysis of NEP scores to contrast these independent variables against the dependent variable of NEP score. Data about gender was not collected in the ESS Student Survey and therefore this variable will not be analyzed. The questions of the NEP scale are listed in Appendix A.

3.3 Scoring the NEP Scale

As described by Dunlap et al. (2000), the Revised NEP Scale proposes five dimensions of an ecological worldview, and each of its 15 survey items are aligned with one of the five dimensions, which include the reality of limits to growth (Items 1, 6, 11), anti-anthropocentrism (Items 2, 7, 12), the fragility of nature's balance (Items 3, 8, 13), rejection of exemptionalism (survey items 4, 9, 14), and the possibility of an eco-crisis (Items 5, 10, 15). To calculate total NEP score, results from each of the 15 survey items were averaged into a single score, which fell within the range of 1 (lowest) to 5 (highest). Scores for each dimension were also assessed individually by calculating an average score for each dimension's three associated survey items.

The 15 items of the NEP Scale are balanced to help reduce respondent bias (Dunlap et al., 2000). Half of the survey items are phrased positively, so a high score would indicate a pro-ecological perspective, and the other items are phrased negatively, meaning a high score would indicate an anti-ecological perspective. Therefore, to calculate the combined NEP score for all 15 survey items, the seven anthropocentric or anti-ecological items of the NEP Scale were reverse-scored (Ogunbode, 2013; Ntanos, 2019). The higher one's NEP score is, the stronger their alignment with values encompassed by the New Ecological Paradigm, which reflects stronger pro-ecological attitudes, whereas lower scores demonstrate stronger alignment with anthropocentric or anti-ecological attitudes that are associated with the Dominant Social Paradigm (DSP).

3.4 Data Processing Methodology

In order to interpret the meaning of variations in NEP score, the data was analyzed using an Analysis of Variance (ANOVA) which was conducted in Microsoft Excel. One primary interest of the analysis was if NEP scores would ultimately reflect a significant

difference between students who were surveyed in 2013 versus students who were surveyed in 2021. To answer this question, ANOVA was used to compare all nine years of data, and if a significant difference was identified, then paired t-tests were conducted to compare scores between two specific data points, in accordance with methodologies employed by similar studies (Harraway et al., 2012). This process was repeated to analyze NEP scores in relation to each relevant variable, including level of education, faculty of study, and the five dimensions of the NEP scale.

Chapter 4: Results

This chapter presents a statistical analysis of ESS Student Survey data. Results are organized around question statements for each variable of inquiry. First, this chapter reports significant findings for three variables: 1) Year of Survey, 2) Faculty of Study, and 3) Level of Undergraduate Education. Then, the five dimensions of the NEP are analyzed to identify significant trends within the data set.

Year of Survey	
Faculty of Study	✓
Level of Education	✓
Limits to Growth	✓
Anti-Anthropocentrism	
Fragility of Nature's Balance	
Rejection of Exemptionalism	
Eco-crisis	✓

Table 1.

Reporting significant difference in NEP scores for year, faculty, level of education, and the scale's five dimensions (2013-2021)

Note. Checked boxes are significantly different, Bonferroni post-hoc tests ($P < 0.05$).

ANOVA Test	df	F	P-value
NEP Score v. Year of Survey	1298	1.42	0.184
NEP Score v. Faculty of Study	1296	3.69	0.003
NEP Score v. Level of Education	1294	3.23	0.012
Five Dimensions of the NEP	6494	462.44	<0.001
Limits to Growth v. Year of Survey	1298	2.81	0.004
Anti- Anthropocentrism v. Year of Survey	1298	1.57	0.130
Fragility of Nature's Balance v. Year of Survey	1298	0.92	0.503
Rejection of Exemptionalism v. Year of Survey	1298	1.16	0.321
Eco-crisis v. Year of Survey	1298	3.70	<0.001
<i>Note.</i> This table displays the degree of freedom (df), F value (F) and P-value (P) for each ANOVA. All bolded values are statistically significant.			

Table 2.

Results of ANOVAs for all tested variables.

How do NEP scores compare between each year of the survey?

ANOVA results comparing all years of NEP survey data (2013-2021) identified no significant difference in overall scores across nine years (Table 2).

How do NEP scores compare between students in different academic faculties across nine years of data?

ANOVA results comparing six faculty categories determined the presence of a significant difference within the data set ($F = 3.693$, $df = 5$, 1291 , $P = 0.003$). To determine the location of the significant difference, Bonferroni post-hoc tests were conducted which identified significance between Bachelor of Arts vs. Bachelor of Management scores, and Bachelor of Science vs. Bachelor of Management scores (Figure 1).

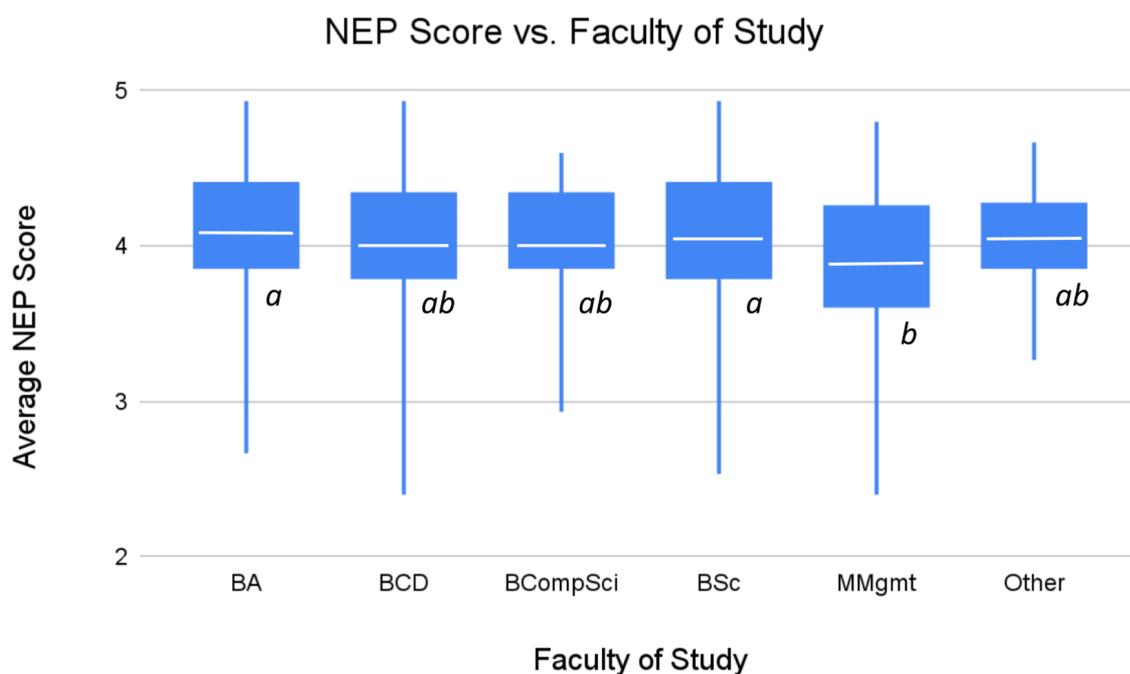


Figure 1.

Average NEP Scores (2013-2021) grouped categorically by faculty of study.

Note. This shows the six 'faculty of study' categories reflected in the ESS Student

Survey. Boxes with different letters below them are significantly different, Bonferroni

post-hoc tests ($P < 0.05$)

How do NEP scores compare between students in different levels of their undergraduate education?

ANOVA and Bonferroni post-hoc tests identified a significant difference between average scores of First Year and Third Year students ($F = 3.23$, $df = 4, 1290$, $P = 0.012$) (Figure 2).

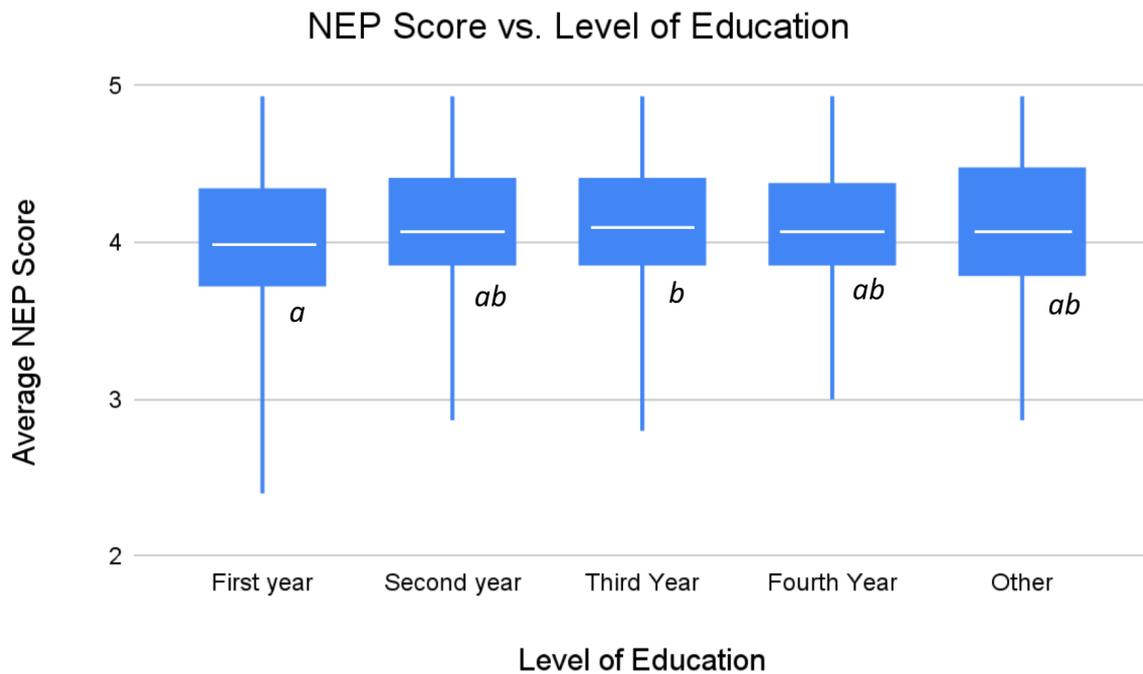


Figure 2.

Average NEP Scores (2013-2021) grouped by level of undergraduate education.

Note. This graph depicts average NEP scores for the five 'level of education' categories reflected in the ESS Student Survey. Boxes with different letters below them are significantly different, Bonferroni post-hoc tests ($P < 0.05$).

How do NEP scores compare between the five dimensions of the scale?

The 15 items of the NEP scale can be divided into five dimensions, and ANOVA was run for all dimensions. Three of the five dimensions (2, 3, and 4) showed no significant differences when compared across nine years. The remainder, 1 and 5, did display significant differences across nine years (Table 1). The significant difference is also displayed in the graph below (Figure 3).

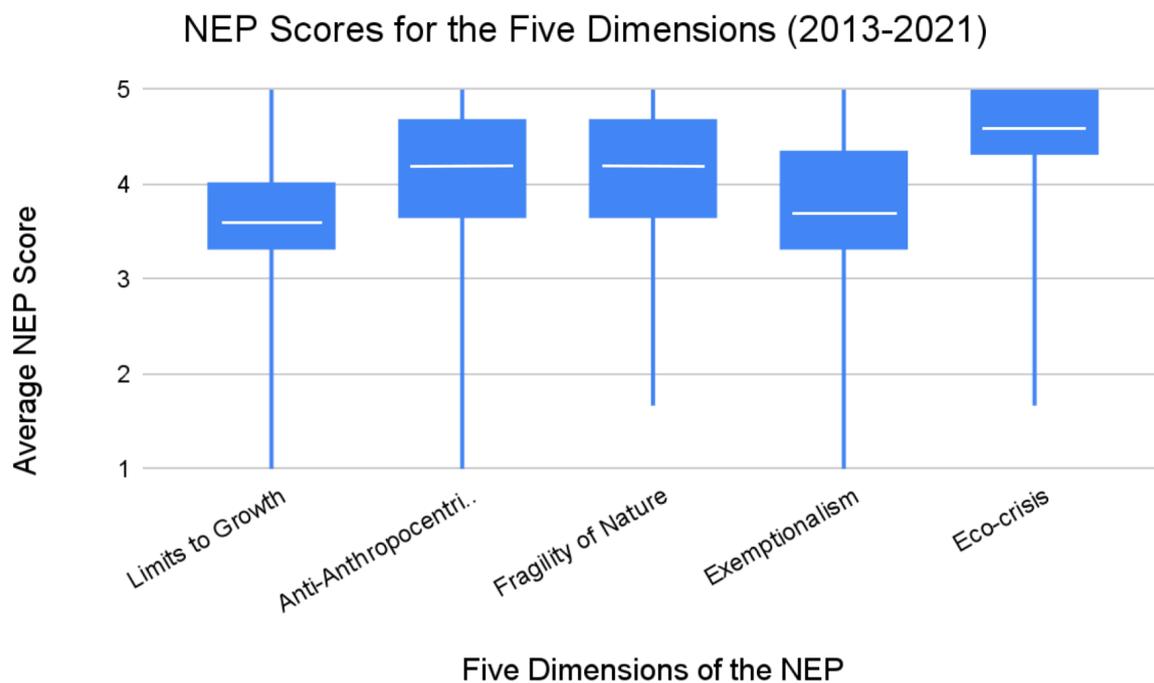


Figure 3.

Overall NEP scores for the scale's five dimensions (2013-2021)

1. Limits to Growth

The average score for the 'Limits to Growth' survey items (1, 6 and 11) was calculated for each year of survey data (2013-2021). ANOVA results indicated a significant difference within the data set ($F = 2.81$, $df = 8$, 1290 , $P = 0.004$). Follow-up Bonferroni post-hoc tests located significant differences between several years within the data, which are depicted below (Figure 4). The findings demonstrate average scores declining over time.

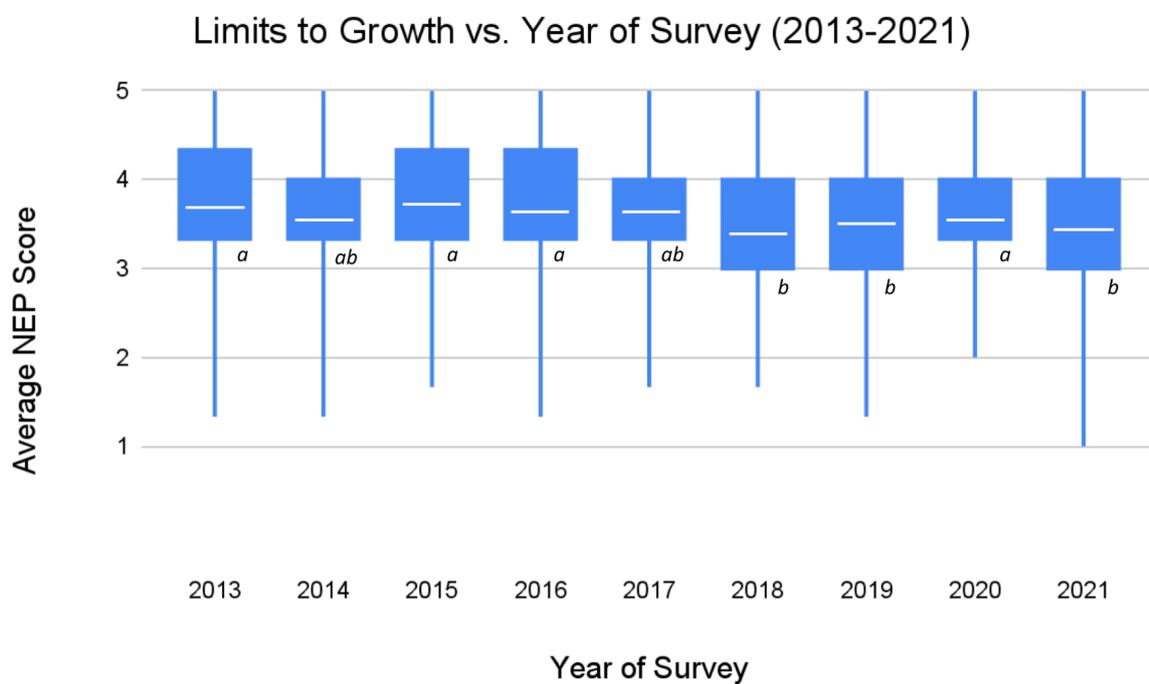


Figure 4.

Average scores for 'Limits to Growth' survey items, across nine years of data (2013-2021)

Note. Boxes with different letters below them are significantly different, Bonferroni post-hoc tests ($P < 0.05$).

2. Anti-anthropocentrism

The average score for the 'Anti-Anthropocentrism' survey items (2, 7 and 12) was determined for each survey year from 2013-2021. ANOVA results identified no significant differences (Table 2).

3. Fragility of Nature's Balance

The average score for the 'Fragility of Nature's Balance' survey items (3, 8 and 13) was determined for each survey year from 2013-2021. ANOVA results identified no significant differences (Table 2).

4. Rejection of Exemptionalism

The average score for the 'Rejection of Exemptionalism' survey items (4, 9 and 14) was determined for each survey year from 2013-2021. ANOVA results identified no significant differences (Table 2).

5. Eco-crisis

The average score for the ‘Eco-crisis’ survey items (5, 10 and 15) was determined for each survey year from 2013-2021. ANOVA results indicated a significant difference within the data set ($F = 3.70$, $df = 8$, 1290 , $P = <0.001$), and Bonferroni post-hoc tests determined the existence of significant differences between several years within the data, as depicted below (Figure 5). The findings demonstrate average scores rising over time.

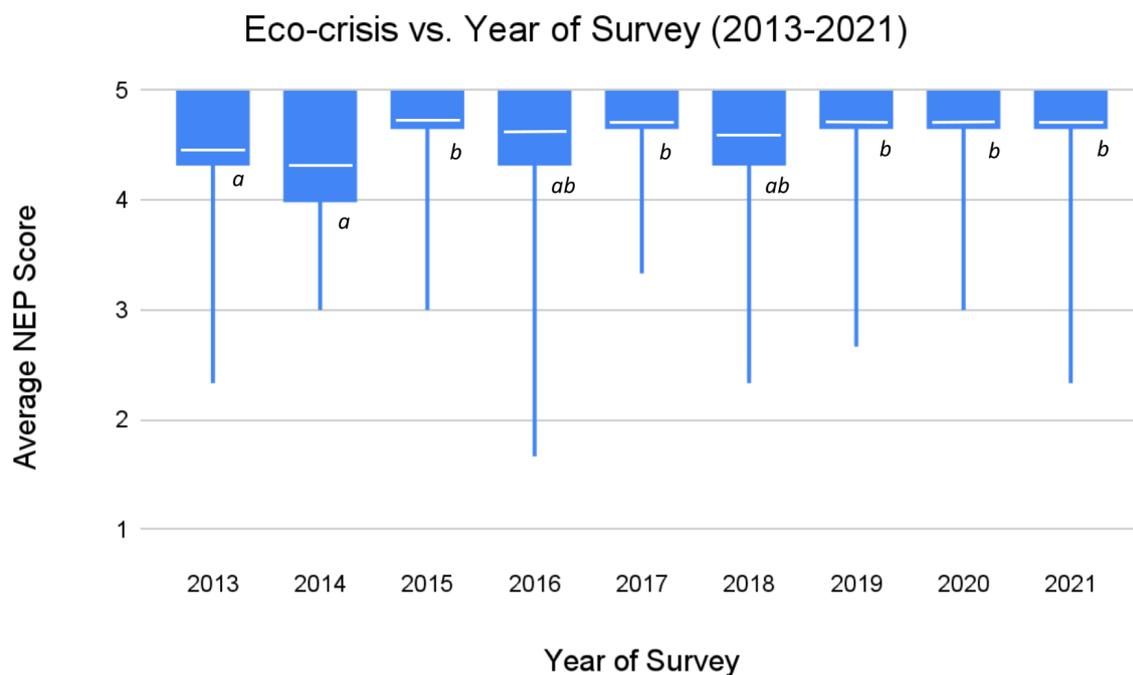


Figure 5.

Average scores for ‘Eco-crisis’ survey items, across nine years of data (2013-2021).

Note. Boxes with different letters below them are significantly different, Bonferroni post-hoc tests ($P < 0.05$).

Chapter 5: Discussion and Conclusion

The primary objective of this study was to investigate whether environmental attitudes of Dalhousie students have shifted in the last nine years. Following the analysis of the ESS Student Survey data, this chapter will situate these findings alongside trends within the wider literature and discuss the insights this research might offer to the College of Sustainability, along with its relevance for any post-secondary institution offering an undergraduate-level education in sustainability or environmental studies. This chapter will also identify potential limitations of this study and conclude with suggestions of directions for future research.

5.1 Key Findings

5.1.1. No Significant Differences Between Survey Years, But Change in Two Dimensions

From comparing scores across nine years, one interesting observation was the absence of a significant difference in the scores of students surveyed in 2013 ($\mu = 4.084$) versus students surveyed in 2021 ($\mu = 4.076$). Looking more closely, these stable scores conceal the existence of two significant differences in the results, which appear to balance each other out. Namely, the declining trend of scores in the ‘Limits to Growth’ dimension is a significant finding within the data, and simultaneously, increasing scores in the ‘Eco-crisis’ dimension hold significance. Taken together, these two opposing trends appear to neutralize each other. Therefore, when taken at face value, students’ environmental attitudes appear to remain relatively consistent over the nine years of survey responses, but a more granular analysis is required to reveal nuance in these findings.

5.1.2. Significant Differences Between Faculties

When comparing survey results by faculties of study, a clear disparity emerged between the scores of students enrolled in the Faculty of Management versus scores of

students in other faculties. Across all nine years of survey data, students enrolled in the Faculty of Management consistently reported the lowest average NEP scores ($\mu = 3.90$), and this trend was proven to be statistically significant when compared to scores of students enrolled in the Faculty of Arts ($\mu = 4.10$) and those enrolled in the Faculty of Science ($\mu = 4.08$). This trend is not unique to Dalhousie University; in fact, these results are consistent with popular trends across environmental attitude (EA) literature. Many studies investigating pro-environmental attitudes in universities reported significantly lower scores from students enrolled in business-related programs when compared to those of their peers in other disciplines (Ewert & Baker, 2001; Ling et al., 2020; Synodinos, 1990). These studies concluded that students enrolled in business programs, or in related areas of study, reported lower pro-environmental scores and possessed stronger anthropocentric values (Ewert & Baker, 2001).

Many EA studies propose the existence of a correlational relationship between educational discipline and the development of environmental attitudes. In their 2001 study of post-secondary students in British Columbia, Ewert and Baker suggested that education and academic major could play a “mediating” or “transmissional role...with respect to social values and beliefs” (pp. 701). Although education likely plays a strong role in the development of environmental attitudes, it is only one of many factors that may contribute to shaping an individual's environmental attitudes and beliefs. Students who choose to enrol in a Bachelors of Management or Bachelors of Commerce might do so because it resonates with their pre-existing beliefs, attitudes, career goals, or other affinities that formed before entering post-secondary education.

From the data available in the ESS Student Survey, it is impossible to identify a specific reason explaining why students in the Faculty of Management are scoring consistently lower on the NEP scale. That being said, some potentially useful inferences can

be drawn from the discussions of similar studies. From a curricular perspective, the results may suggest that pro-environmental values are not as strongly communicated to students through the curriculum offered by the Faculty of Management when compared to other faculties. Simultaneously, it is possible that some individuals are drawn to studying management because they possess stronger anthropocentric values, which inform their desire to pursue a career either in the corporate sector or in business management.

5.1.3. Significant Difference Between Levels of Undergraduate Study

By comparing scores between students in different levels or years of undergraduate study, this study aimed to understand whether amount of time enrolled in sustainability education might correlate with stronger pro-environmental worldviews. The results of data analysis located a significant difference between scores of students in first year ($\mu = 4.02$) versus students in third year ($\mu = 4.12$), but notably, no demonstrable difference was found between the scores of students in first year ($\mu = 4.02$) versus those in fourth year ($\mu = 4.11$). The average scores between third and fourth year students only differ by an average of 0.1, but this difference is enough to render the gap in scores between first year and fourth year students statistically insignificant. The results depict average scores increasing between first and second year (from 4.02 to 4.09, respectively), and then between second and third year (from 4.09 to 4.12, respectively), at which point they level out, remaining consistent for both fourth year, and for the 'other' category. This levelling trend is likely related to the gradual narrowing of the ESS cohort which occurs as students progress through their studies, a phenomenon which will now be explained in greater detail.

As is clearly visible within the ESS data set, there is a negative relationship between increasing level of education and number of survey responses. For example, of the 1299 total survey responses, almost half of respondents were in their first year ($\Sigma = 585$), followed by

second year ($\Sigma = 313$), third year ($\Sigma = 203$), fourth year ($\Sigma = 131$), and the students who selected ‘other’ ($\Sigma = 63$). One explanation for this could be the result of the general structure of a standard undergraduate degree at Dalhousie, where students have the flexibility to explore different avenues of academic interest in their earlier years, but upon entering third year, they must begin considering which academic major they intend to declare. As students progress further into their degree, it becomes more likely that the courses they enrol in will align with their chosen academic major. It is likely that many of the students enrolling in upper-year ESS courses have declared or are considering declaring their combined major in ESS, and therefore, because they have made this commitment, they likely hold stronger pro-environmental views in comparison to the majority of first year students who are more likely taking sustainability courses as electives, or to fulfil various program requirements.

5.1.4. Significant Difference Between Five Dimensions of the NEP Scale

1. Reality of Limits to Growth

The ‘Limits to Growth’ dimension of the NEP scale measures whether respondents believe there is a limit to the amount of development the planet can support. Three of the NEP scale items correspond to this dimension; two of them are related to population growth (Items 1 and 11), and the third is a statement about limits on the development of earth’s natural resources (Item 6). Of the five dimensions of the NEP, the lowest overall scores were associated with ‘Limits to Growth’ survey items ($\mu = 3.66$), and of all nine survey years, scores for this dimension were lowest in 2021 ($\mu = 3.52$).

‘Limits to Growth’ is the most arguably the most ambiguous dimension of the NEP scale, and therefore, it should not be inferred that lower scores necessarily indicate overwhelming student support for limitless expansion and development. Across EA literature, some studies raise concerns about the themes and ideas associated with this dimension

(Lundmark, 2007; Lalonde & Jackson, 2002). One concern raised by these studies relates to the notion of limits to population growth. For example, Item 1 of the NEP scale proposes a limit to the number of people earth can support, and Item 11 likens planet Earth to a spaceship “with very limited room and resources” (Dunlap et al., 2000, pp. 433). The spaceship metaphor is a residual trace from environmental discourses of the 1970s, around the time when the original NEP scale was conceived. In 1972, the Club of Rome released their famous report titled “The Limits to Growth” which introduced the spaceship metaphor into popular vernacular. When it was first released, the report was making waves, and it influenced the development of Dunlap and Van Liere’s original NEP scale (Dunlap & Van Liere, 1978, cited in Lundmark, 2007). The metaphor of earth-as-spaceship was very popular because it employed the fashionable image of space exploration to illustrate an emerging concern that nature might not be a limitless entity. Scientific research at the time was beginning to point to the existence of finite space and resources on earth, recognizing that current levels of resource extraction and population growth is not infinitely sustainable, which may result in irreversible consequences for the future of humanity (Eckersley, 1992, cited in Lundmark 2007).

The spaceship metaphor has been widely criticized by contemporary environmentalists for being an outdated and problematic paradigm. The metaphor is often critiqued for assuming the equal responsibility of every person on Earth for the consequences of climate change (Lalonde & Jackson, 2002). This suggestion is ahistorical, ignoring by omission the indisputable role that colonization has played in catalyzing the current climate crisis (Davis & Todd, 2016). By asserting the assumption of equal responsibility, colonial countries attempt to wash their hands clean of the violence of colonialism, while simultaneously deflecting the blame and responsibility for climate change onto others. Powerful stakeholders in the Global North are quick to point fingers and shift blame towards

countries with higher-than-average birth rates, deeming uncontrolled global population growth as a major contributor towards the climate crisis (Hartmann, 1995; Hendrixson & Hartmann, 2019). This is a dangerous narrative to pedal. Discourses of population control are closely associated with violent histories of domination, racism, and mass genocide – all rooted in the foundations of eugenics and overpopulation (Dyett & Cassidy, 2019). Therefore the use of the spaceship metaphor within the NEP scale points to the scale’s Eurocentric foundations and reveals a degree of unrecognized privilege in the scale’s creators, who carelessly reproduce this narrative without pausing to consider its harmful implications.

Beyond its problematic historical context, another consequence of this outdated metaphor is that students may not understand its meaning. As previously mentioned, many students participating in the ESS Student Survey are in their first year of study and are likely unfamiliar with the spaceship metaphor and the context associated with it, which may detract from its intended meaning. It was noted that scores for the ‘Limits to Growth’ dimension are significantly lower than those of any other dimension. Even if students may believe in the importance of limits to growth, they might be unsure about the meaning of the spaceship metaphor, leading them to respond with a ranking of ‘3’ or ‘Uncertain,’ allowing them to convey their confusion within the framework of the rating scale. It is therefore uncertain if students’ responses to these survey items are informative or relevant. According to Lalonde and Jackson (2002), the metaphor of the spaceship is “no longer prevalent nor is it perceived as an accurate reflection of current understanding” (pp. 32). Can the metaphor of the spaceship be relied upon to measure environmental attitudes 40 years after its inception in the scale, or did its relevance expire at the end of the 20th century? It must now be decided whether this dimension of the scale is useful any longer, and if not, this might signal the need for a new type of measure.

2. Anti-Anthropocentrism

This dimension intends to measure levels of anthropocentrism, asking respondents if they see the natural world as a resource for human beings to utilize and ultimately control. Although there was no statistically significant difference between scores across the years, the results show an upward trend when comparing average scores between 2013 ($\mu = 4.18$) and 2021 ($\mu = 4.25$). This trend, although minor, may point to attitudes shifting away from values of anthropocentrism and towards more ecocentric values. Studies critiquing the NEP scale argue that values of anthropocentrism are more strongly represented in the NEP scale than those of ecocentrism (Lundmark, 2007). The scale assumes anthropocentrism by default, which restricts the range of values that participants may express and leaves no space for the expression of ecocentric values, which is a limitation of this measure.

Ecocentrism may also have different connotations within the NEP scale than in popular understandings of the term in the year 2022. For example, in their first year, students in Dalhousie's ESS program are introduced to the principle of Two-Eyed Seeing, originated by Mi'kmaw Elder Albert Marshall as a framework for looking at the world "from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of [Western] knowledges and ways of knowing, and to use both these eyes together, for the benefit of all" (Bartlett, Marshall & Marshall, 2012). In Mi'kmaq, the phrase 'Msit No'kmaq' (all my relations) expresses the foundational principle that all living and non-living beings are interconnected and related to one another (Robinson, 2014). Returning to the NEP scale, one of the ecocentric scale items asks if "plants and animals have as much right as humans to exist," and this sentiment was widely accepted by students responding to the ESS survey ($\mu = 4.67$) (Dunlap et al., 2000). From the perspective of first year ESS students, who are familiar with the principles of Two-Eyed Seeing and Msit No'kmaq, it is

understandable that this statement has received strongly positive responses, and potentially demonstrates the positive impact of considering these concepts in class.

3. Fragility of Nature's Balance

This dimension of the NEP scale asks participants to consider the balance of nature, and whether this balance is vulnerable to disturbance as a consequence of human interference. In the ESS Student Survey results, scores for this dimension remained very consistent across the data set, fluctuating only slightly, and demonstrating no significant difference between attitudes in 2013 ($\mu = 4.11$) versus 2021 ($\mu = 4.12$).

Within the 'Balance of Nature' dimension, survey Item 3 asks participants to respond to the statement: "When humans interfere with nature it often produces disastrous consequences" (Dunlap et al., 2000). Here, the word 'interfere' holds negative connotations, but what types of interactions this 'interference' might include are not clearly specified. This statement may leave survey respondents questioning whether any positive interactions truly exist between humans and the natural world.

In her book "Braiding Sweetgrass," Indigenous scholar and scientist Robin Wall Kimmerer considers the implications of such a reality, asking: "How can we begin to move toward ecological and cultural sustainability if we cannot even imagine what the path feels like?" (Kimmerer, 2013, pp. 6). Kimmerer recounts distributing a survey to her third-year General Ecology class, and one of its questions asking students to indicate their level of knowledge regarding positive interactions between human beings and other species. To her shock, the median response of her students was 'none' (pp. 6). She reflects on this discovery in the context of environmental education and writes: "perhaps the negative examples they see every day—brownfields, factory farms, suburban sprawl—truncated their ability to see some good between humans and the earth. As the land becomes impoverished, so too does

the scope of their vision” (pp. 6). Kimmerer is concerned that the next generation of changemakers will not be able to imagine possibilities for futures that are so desperately needed.

Kimmerer's concerns are highly pertinent to themes emerging from this dimension of the NEP scale. It is possible that survey items in this dimension imply an inherent negativity or toxicity in all relationships between humans and the natural world. Such depictions must not be exclusively reinforced, because as Kimmerer emphasizes, it is imperative that students are also exposed to examples of positive relationships between humans and nature, as embodied by Mi'kmaq principles including Msit No'kmaq. Otherwise, there is a risk that undergraduate students will continue struggling to envision positive possibilities for the future, and the future cannot afford such a loss.

4. Rejection of Exemptionalism

This dimension encapsulates the importance of rejecting the principle that humans are a superior species, or somehow exempt from the laws of nature. Survey Items 4 and 14 are concerned with the idea that humans are able to control nature, and Item 9 proposes that humans are indeed subject to the laws of nature. Although the results of this study indicated no significant differences within this dimension over time, it is notable that average scores for this dimension are comparable low in contrast to other dimensions of the NEP ($\mu = 3.77$), and only marginally higher than average score for the 'Limits to Growth' dimension ($\mu = 3.65$). These lower scores may indicate an underlying tone of uncertainty or indecisiveness within the student population in response to these survey items.

5. Eco-crisis

Survey items associated with the ‘eco-crisis’ dimension measure the degree to which respondents believe that climate change is the result of humanity’s interference with nature, including if respondents believe that “the so-called ‘ecological crisis’ facing humankind has been greatly exaggerated” (Dunlap et al., 2000). The results of statistical analysis reported high eco-crisis average scores across all survey years ($\mu = 4.66$) and showed that scores have been steadily rising between the years 2013 ($\mu = 4.54$) and 2021 ($\mu = 4.71$).

One possible takeaway from these high scores and upward overall trends could be that ESS students express a high degree of awareness about the significance of climate change. One notable factor to consider is how the ‘Dominant Social Paradigm’ encapsulated within the NEP scale has shifted dramatically in the four decades since the scale was published. When the NEP scale was designed, survey items aligning with the dominant social paradigm were meant to represent a ‘business-as-usual’ point of view, which at the time, reflected a general absence of concern regarding the existence and/or implications of climate change. Therefore, high scores in the eco-crisis dimension would have indicated higher-than-average levels of awareness about climate change. Since societal awareness of climate change has improved since the 1970s, it could be possible that high scores in this category hold less significance today than they once did. This being said, it remains meaningful to see ESS students reporting high scores in this dimension, as it demonstrates that students recognize the threat of climate change and have understand humanity’s impact on global ecosystems.

Another takeaway worth considering is the impact of high eco-crisis scores in connection to students’ overall mental health and well-being. In the last 15 years, there has been a surge of new literature investigating rising levels of anxiety in relation to climate change. This phenomenon is often known as ‘eco-anxiety,’ which is popularly defined by

environmental philosopher Glenn Albrecht as “[an] emotional response to the threat posed by the climate and biodiversity crisis” (Albrecht, 2019, as cited in Hickman, 2020). Emerging literature on the topic of eco-anxiety identifies a strong correlation between awareness of eco-crisis and high levels of eco-anxiety (Bourque & Cunsolo Willox, 2014; Pihkala, 2020; Usher et al., 2019). In their article “Climate Change Education: A New Approach for a World of Wicked Problems,” Lehtonen, Salonen & Cantell (2019) discuss the range of emotional responses students’ may experience as they learn about the current eco-crisis within the context of an environmental education:

Facing crises like climate change promotes existential questions and critical reflections such as: do we have a future? Why are we here? What is the meaning of life? Climate change could have a great potential for transformative learning and promote re-evaluation of value-hierarchies. But reflection on climate change naturally evokes intense feelings, which are not easy to manage (pp. 350).

With this context in mind, when reflecting on consistently high eco-crisis scores, it is possible that many ESS students are also grappling with these difficult questions as they progress through their post-secondary studies, and this may be linked to a rise in feelings of eco-anxiety amongst students.

Of course, strong emotions are not inherently negative, and they can often be strong motivators for action. As Lehtonen, Salonen & Cantell (2019) write: “Emotions, embodied and intuitive knowing have remarkable value in our search for vital knowledge for survival” (pp. 350). It is possible that difficult emotions have a necessary place within the learning process, and therefore it is vital to acknowledge the presence of difficult emotions such as eco-anxiety, rather than attempting to suppress and ignore them. As Hickman (2020) writes, it is possible to “both take action in the outer world and also give attention to inner relational landscapes, our inner emotional climate crisis” (pp. 422). In the context of sustainability

education, it is crucial for educators to strike a balance between optimism and urgency, and to make space for discussions of eco-anxiety within a sustainability curriculum (Gousse-Lessard & Felix Lebrun-Paré, 2022). To conclude, in future studies of students' environmental attitudes, it could be interesting and highly relevant to assess levels of eco-anxiety among students who are enrolled in sustainability programs or other environmental disciplines. It would also be worthwhile to engage in further research surrounding effective coping mechanisms for eco-anxiety that could be integrated into the program curriculum.

5.2 Limitations of the NEP Scale

In order to offer meaningful next steps, this study must consider limitations of the current method of EA measurement. Although the NEP scale is the most popularly endorsed EA measurement, many studies offer compelling arguments for why the NEP scale is a less-than-ideal tool for measuring environmental attitudes.

The primary limitations of the NEP scale are its outdatedness and lack of specificity in its wording. The original NEP scale was published over 40 years ago, and the revised version was published 20 years ago, therefore it is unsurprising that some of its core concepts are no longer applicable to the societal context of the present-day. Most notably, the 'dominant social paradigm' represented by the scale has shifted drastically, making interpretation of its results more complicated. In addition, the scale's references to dated concepts like the 'spaceship metaphor' are likely to be less familiar to students today and present opportunities for further complication.

In addition to its outdated language, some researchers suggest that the NEP survey items are superficial and vague, making it difficult to identify whether pro-ecological responses indicate the respondent's support of the New Ecological Paradigm, or if they simply lack context about the current environmental situation that is necessary to select an

informed response. For example, Item 13 of the revised NEP states: “The balance of nature is very delicate and easily upset” (Dunlap et al., 2000), which some scholars argue is a vague and potentially misleading statement which does not capture the necessary complexity of current environmental issues (Lalonde & Jackson, 2002). This critique again points to the aging nature of the NEP scale and offers another potential challenge to its relevance.

5.3 Recommendations and Considerations

5.3.1 Implications for the Post-Secondary EA Assessment

Although the NEP scale is generally recognized as a reputable tool for EA measurement, whether it remains a relevant tool for measuring students’ attitudes is a question worth consideration. Based upon the findings of this study, there are a few recommendations I would offer to guide future decision-making surrounding the selection of a EA survey measure. The first suggestion is that faculty consider whether themes and ideas within the NEP scale reflect the current values and teachings of their environmental program. For students entering their first year of study, will the items of the NEP scale convey ideas and values that do not align with those of the program, and could these ideas affect students' ideas about sustainability? It is possible that these ideas and values could affect students' ideas about sustainability moving forward, and/or lead students to assume that their program curriculum prioritizes the content reflected in the NEP scale.

Another consideration is whether continued use of the NEP scale via annual survey can present any new or further information in regards to students’ attitudes. Findings in the present study demonstrated scores related to the ‘eco-crisis’ dimension steadily increasing, hovering around the maximum score of ‘5’ on the scale, and scores related to the ‘limits to growth’ dimension of the NEP decreasing, averaging around a score of ‘3’ and indicating uncertainty as the average response. Trends for these two dimensions are the only two that

significantly shifted across nine years of data, while trends for the other three NEP dimensions have remained relatively consistent. Since scores have remained relatively consistent across the data set over nine years, it can be inferred that they will remain consistent if the NEP scale continues to be used to measure students' environmental attitudes. If an environmental program is hoping to make new discoveries about its students' attitudes, it may be beneficial to use a measure which asks questions that are more specific to teachings of their unique environmental program or to consider using an EA measure that is more relevant to the current environmental context.

5.3.2 Potential Next Steps

With these considerations in mind, it is recommended that future surveys consider alternatives to the NEP scale when selecting a tool to measure students' environmental attitudes. This recommendation is based upon consideration of the NEP scale's limitations, and the review of other attitude measurement tools that are potentially more relevant for assessing student attitudes in a post-secondary context. Moreover, for the College of Sustainability, these findings suggest that a dialogue should be initiated to consider either replacing the NEP scale with another attitude measurement tool or integrating another measurement tool into the ESS Student Survey alongside the NEP scale to gather more specific information about students' environmental attitudes. These recommendations may also be applicable for other environmental programs that are currently measuring student attitudes using the NEP scale or they may offer some guidance for institutions who are interested in conducting similar surveys with their student populations.

Appendix A

Items of the Revised NEP Scale (Dunlap et al., 2000):

1. We are approaching the limit of the number of people the earth can support.

2. Humans have the right to modify the natural environment to suit their needs.

3. When humans interfere with nature, it often produces disastrous consequences.

4. Human ingenuity will ensure that we do not make the earth unlivable.

5. Humans are severely abusing the earth.

6. The earth has plenty of natural resources if we just learn how to develop them.

7. Plants and animals have as much right as humans to exist.

8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.

9. Despite our special abilities, humans are still subject to the laws of nature

10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.

11. The earth is like a spaceship with very limited room and resources.

12. Humans were meant to rule over the rest of nature.

13. The balance of nature is very delicate and easily upset.

14. Humans will eventually learn enough about how nature works to be able to control it.

15. If things continue on their present course, we will soon experience a major environmental catastrophe.

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