

Predispositions define a pro-environmental attitude

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ABSTRACT

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The awareness of pressing environmental issues such as climate change, pollution and deforestation – all anthropogenic effects – has tremendously increased during the last few years. Recently initiated by Swedish climate activist Greta Thunberg, both students and the general public demand political changes to find immediate solutions to combat the destruction of our planet. It has been suggested that pro-environmental attitude strongly depends on sociodemographic factors and cultural context. In our study, we investigated the relationship between gender, age, education level, pro-environmental behavior (Fridays for Future movement participation) and environmental attitude in 221 high-school students in the region Ostwestfalen-Lippe in Germany. We found significant relationships between all assessed factors and environmental attitude, such as younger students or female students showing a more pro-environmental attitude than older students or male students respectively. Our results suggest influential implications in the field of environmental attitude research by using predisposition data to create effective programs about environmental awareness in school.

Keywords: Environmental attitude; Germany; Fridays for Future movement; NEP; students

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INTRODUCTION

The digital age has sped up technological advancements, accompanied by industrialization and urbanization. This has led society to face an inevitable challenge unprecedented in the history of humankind; dealing with the consequences of human impacts on the environment. Confronting these issues is indisputable as the population has exponentially surged to amounts more than Mother Earth is able to handle. Global warming caused by greenhouse gases results in disastrous climate change (Intergovernmental Panel on Climate Change (IPCC) 2014; Kerr 2007), deforestation eradicates animal habitats (Symes et al., 2018; Werth & Avissar 2002), and millions of people are still left without basic needs such as food and clean water (Gerten et al. 2011; Kang, Khan & Ma 2009). Until recently, both scientists and the general public alike have realized the necessity to respond and counteract the destruction of our planet. This has been reflected by research and political initiatives as well as by popular scientific books and documentaries (Attenborough, 2020; Rich, 2019; Wallace-Wells, 2019). Although it seems that the majority of people agree on the need to change our behavior, some remain skeptical and/or even apathetic. In our study, we aim to explore if environmental attitude is a facet of the human psyche, if it can be discovered early on in life and if it reflects internal opinions and actions regarding world-wide ecological problems.

From a psychological standpoint, two aspects are of great interest: environmental attitude and pro-environmental behavior. Environmental attitude defines the way people are aware of their surroundings, adapt their behavior and treat the ecological environment protectively (Domingues & Gonçalves, 2020; Milfont, 2007). Kaiser, Roczen & Bogner (2008) proposed a “pro-environmental competence model” stating that a pro-nature attitude is the decisive motivational basis for ecological behavior. This positive relationship has been empirically corroborated and repeatedly demonstrated (Brügger, Kaiser & Roczen, 2011; Davis, Green & Reed, 2009; Geiger, Dombois & Funke, 2018; Milfont, 2009; Oerke & Bogner, 2011; Roczen, Kaiser, Bogner & Wilson, 2014). Besides the media, schools provide one of the first external, non-familiar instance known to influence and develop attitude. In relation to our context, this is the initial occasion in which environmental issues are introduced in a formal setting; both entire classes and individual lessons have been shown to have a lasting positive effect on environmental concern (Arcury & Christianson, 1993; Chanda, 1999; Theodori & Luloff, 2002; Zhou, 2013; Zsóka et al. 2013). Therefore, it is compelling to investigate pro-environmental attitude particularly in students as they are a valuable target group. As attitudes and personalities are known to form at a young age, they can already be measured in this age group, opening up the possibility to explore possible predispositions to being environmentally conscious.

Numerous studies have observed a negative relationship between age and pro-ecological attitude (Honnold, 1984; Hsu & Roth, 1996; Johnson & Schwadel, 2018; Zhang, 1993, but see Domingues and Gonçalves, 2020). Several explanations suggest that young people show less commitment to common value systems, do not feel bound to the current social order, and can accept massive disruptions of social order (Buttel, 1979; Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003; Davis, 1940; Theodori & Luloff, 2002; Van Liere & Dunlap, 1980). Thus, it seems reasonable that they are more likely to be idealists in terms of finding overarching environmental solutions and changing the way society should treat the environment. To apply this suggestion, we hypothesize that pro-environmental attitude decreases as age increases.

Convincing evidence has demonstrated other demographics that are responsible for a predilection to support the environment. A plethora of studies have illustrated gender as an influence; women have more positive attitudes towards sustainability, renewability and environmental concern (Blocker & Eckberg, 1997; Domingues & Gonçalves, 2020; McCright, 2010; Seebauer et al., 2017; Theodori & Luloff, 2002; Xiao & McCright, 2015; Zelezny et al., 2000). This could potentially be explained by personality traits, especially related to altruistic features such as agreeableness, and that they feel socially responsible and value the needs of others (Dietz et al., 2002; Luchs & Mooradian, 2012; Zelezny, Chua & Aldrich, 2000). Based on these findings, we hypothesize that females show a higher pro-environmental attitude than males.

Without prior knowledge about the impact and relevance of ecological problems, it may be difficult to comprehend the importance of having a pro-environmental attitude. Knowledge about the current circumstances has been shown to be a strong predictor for engaging in pro-environmental behavior (Hines et al., 1987; Lee et al. 2015). As such, a background in science and the level of completed education plays a role in environmental attitude (Lyons & Breakwell, 1994; Domingues and Gonçalves; 2020). The German education system is complex and consists of distinct types of schooling which offer a variety of diplomas. This provides us with the means to investigate similarly aged students with different education levels. Our study focuses on two school types: Gymnasium and Gesamtschule. As the Gymnasium tends to have more higher-level classes, we assume that scientific knowledge is related to not only the quality of education and educational level but also to the access of specific environmental knowledge. It then seems reasonable that a higher educational level is related with more knowledge in disciplines relevant to develop an understanding of environmental aspects. Therefore, we hypothesize that Gymnasium students have a higher pro-environmental attitude than Gesamtschule students.

Finally, the Fridays For Future (FFF) movement is an international climate strike that began in August 2018 and was initiated by the Swedish youth activist Greta Thunberg. The central goal is to protest the way politicians deal with the climate crisis and raise awareness that humankind is responsible for damaging the environment. Today, the movement receives international attention and has amassed a colossal number of participants. Even in several German cities, there are series of weekly school strikes in which students skip classes to participate in FFF climate strikes. Joining this movement and actively participating can be seen as exhibiting pro-environmental behavior. As there is a strong relationship between pro-environmental behavior and pro-environmental attitude, we hypothesize that students who participated in the FFF movement show a higher pro-environmental attitude than students who did not participate.

Purpose of the research

Here, we explore possible proclivities to being pro-environmental in high school students by using a well-established questionnaire accompanied by demographic information to measure pro-environmental attitude and behavior. Based on previous literature, we hypothesize that age, gender, education level and active participation in the Fridays For Future Movement all play a role towards having a pro-environmental attitude. Knowledge about individual differences in

these factors may be a critical prerequisite to develop promising interventions and promote conservation behavior in the future (Steg & Vlek, 2009).

METHOD

Data was collected from students participating in the project “Biology up close” which takes place within an external laboratory for high school classes in Ostwestfalen-Lippe, Germany (Wegner & Strehlke, 2015). The project offers multiple workshops on topics such as marine biology, bionics, photosynthesis and enzymatic reactions and served in this study solely for data collection. To measure environmental attitude, a German translation of the revised “New Ecological Paradigm Scale” (NEP) from Schleyer-Lindenmann, Ittner, Dauvier and Piolat (2018) was used. The original scale is widely used to analyze general environmental attitude and consists of 15 items such as “We are approaching the limit of the number of people the earth can support” and “Humans have the right to modify the natural environment to suit their needs” (Dunlap, Van Liere, Mertig & Jones, 2000; Cruz & Manata, 2020). Each item was recorded on a 6-point Likert Scale ranging from (1) “I strongly disagree” to (6) “I strongly agree”. Odd-numbered items were verbalized to suggest agreement with a pro-ecological attitude and even-numbered items were worded for agreement to indicate a less pro-ecological attitude. Afterwards, even-numbered items were reorganized to designate a pro-ecological attitude. General environmental attitude was calculated as the average score from the 15 NEP items since it is recommended by the authors of the NEP score to treat the scale as a single, unidimensional score if reasonable dimensions do not emerge. This was the case for our sample in both an explanatory and confirmatory factor analysis, whereas the internal consistency for the global score is appropriate and hence suitable for analysis in this study ($\alpha = .705$).

Furthermore, students were asked if they participated in the FFF movement to measure pro-environmental behavior. Finally, we recorded school type, gender and age. The questionnaire was completed by students before the workshops to avoid potential bias caused by the workshop topic, as this may have had a situational influence on environmental attitude. Questionnaires were anonymous and confidential. Data processing, analysis, and presentation were conducted using R v.4.0.2 (R Core Team, 2020).

RESULTS

Participants

A total of N=221 students (n=120 female, n=88 male, n=8 other, mean age = 15.69, age range = 12-20) answered the questionnaire. One participant was excluded as they only answered the two first items. In our sample, n=148 students attended Gymnasium and n=70 students the Gesamtschule. 3 subjects did not answer the school-item. Furthermore, n=53 students were involved in the “Fridays for Future” movement, n=166 were not and 3 participants did not answer the question.

Findings

Age and pro-environmental attitude

Overall, students tended to have a pro-environmental attitude (NEP global score mean = 4.23). To examine the relationship between age and NEP-score, we conducted a linear regression analysis, revealing that age is a significant predictor for NEP-score ($\beta = -0.086$, $t = -2.83$, $p < .005$, see Figure 1a). With each year that a person gets older, their NEP-score decreases by approximately 0.08 points. This variable also predicted a significant proportion of NEP-score variance in our regression model ($F(1, 168) = 7.997$, $p < 0.005$, $R^2 = 0.046$). As younger students scored higher values, they appear to have a higher pro-environmental attitude than older students.

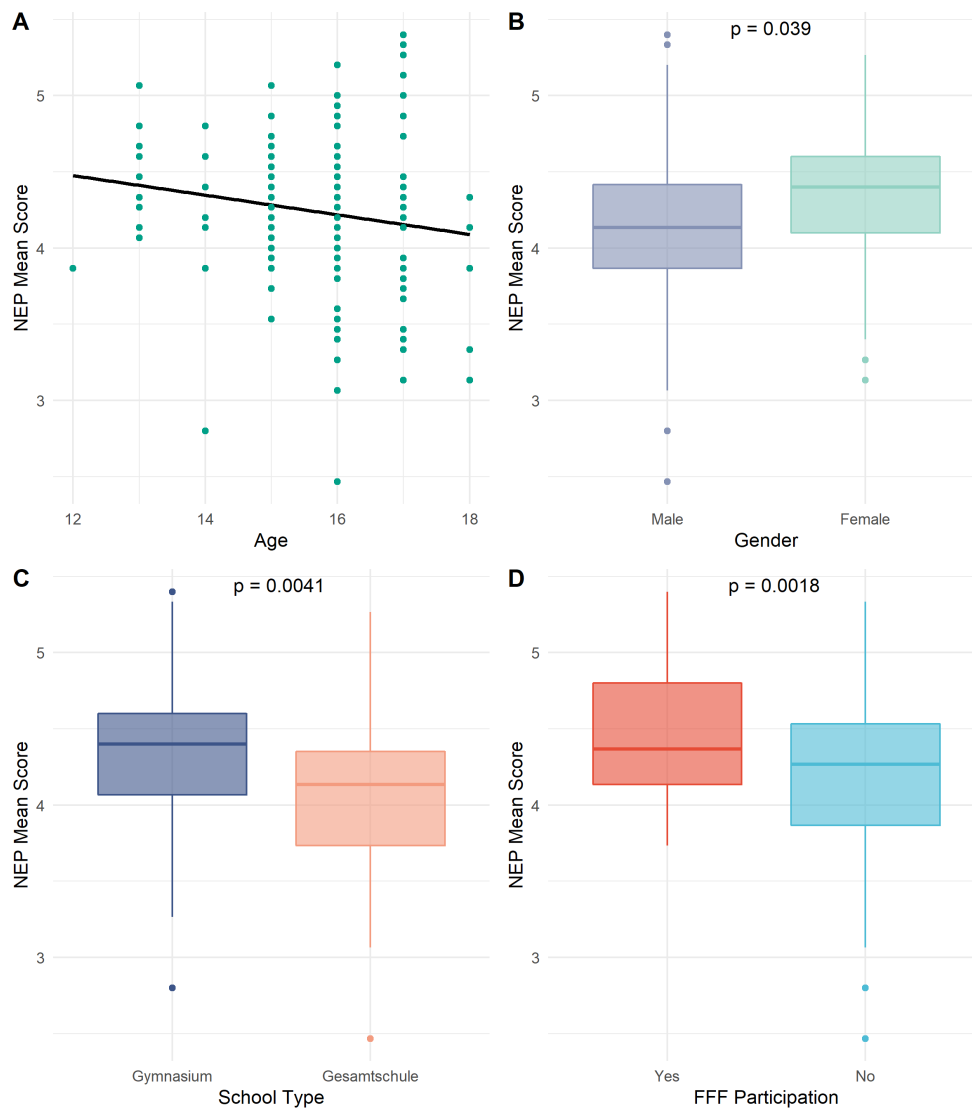


Figure 1. NEP score differences depending on Age, Gender, School Type and FFF Participation.

Gender and pro-environmental attitude

We also explored potential gender differences, concluding that women had a significantly higher average agreement to the questionnaire items than men ($M = 4.30, SD = 0.42; M = 4.13, SD = 0.60$, respectively, unpaired t-test, $t(122.45) = -2.10, p = .037$, see Figure 1b).

School type and pro-environmental attitude

We investigated differences in pro-environmental attitude based on school type. We found that Gymnasium students agreed significantly more than Gesamtschule students ($M = 4.33, SD = 0.46; M = 4.03, SD = 0.56$, respectively, t-test, $t(180) = 3.84, p < .001$, see Figure 1c). In addition, we examined differences between students participating in the FFF movement, observing that students that participated answered with higher agreement than students that did not ($M = 4.46, SD = 0.43; M = 4.17, SD = 0.51$, respectively, unpaired t-test, $t(181) = 3.27, p = .001$, see Figure 1d).

Interaction effects

As all predictors were significant, we inspected the dataset for between-factor interactions in a subsequent, exploratory step. We found a small but insignificant interaction effect between FFF participation and gender (two-way ANOVA, $F(1,168) = 3.76, p = .054, \eta^2 = 0.02$): For students who participated in FFF, male students scored higher than female students ($M = 4.58, SD = 0.50; M = 4.43, SD = 0.39$, respectively, see Figure 2). However, for the group of students who have not participated, female students scored higher than male students ($M = 4.27, SD = 0.42; M = 4.05, SD = 0.58$, respectively, see Figure 2).

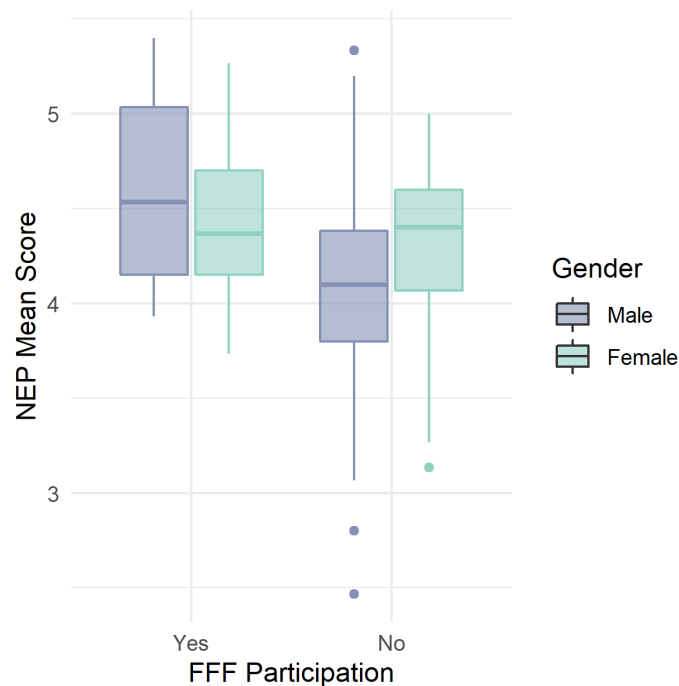


Figure 2. Interaction effects for FFF Participation and gender

DISCUSSION

The aim of this study was to investigate possible socio-demographic factors that could be considered a predisposition to having a certain environmental attitude. As attitudes and personalities form early on in life, it is of great interest to investigate how students reflect upon the relationship humanity has with the environment. Introducing programs for newer generations may in fact be the only effective way to straightforwardly address the global challenges that society faces. Our results suggest that factors such as age, gender, school type and FFF participation influence pro-environmental attitude and behavior.

Younger students showed a stronger pro-environmental attitude than older students, which has been supported by previous research (Honnold, 1984; Hsu & Roth, 1996; Johnson & Schwadel, 2018; Zhang, 1993). However, other studies have found no relationship between age and environmental attitude or even found an opposite relationship (Levine and Strube, 2012; Domingues and Gonçalves, 2020). This may potentially be due to age; there might be a threshold around puberty in which students become conscious of environmental problems and then are able to form strong opinions about them. One should also note that the participants in our study represent a narrow age range of school children, and that it is possible for other ideals or priorities to influence older age ranges. Albeit, we collected a sizable age range of students, between 12-20 years old, which we find represents biological, psychological, cognitive and personality changes at different stages.

We found that female students had a more pro-environmental attitude than male students and suggest that this is due to gender-based personality traits such as agreeableness, the extent of being “other-orientated” and a feeling of social responsibility (Blocker & Eckberg, 1997; Dietz et al. 2002; McCright, 2010; Xiao & McCright, 2015). This draws practical implications in the context of school. It is crucial that teachers equally influence female and male students in terms of environmental education (Liefländer & Bogner, 2014). Teachers should be aware that they need to sufficiently impart environmental knowledge and highlight the importance of pro-environmental thinking, especially to male students. This could be achieved by talking about several everyday items that all students use, such as talking about microplastic in cosmetics, artificial grass pitches, clothing, tyre wear particles, etc. emphasizing that all genders are affected by ecological wellbeing and should act pro-ecologically.

Gymnasium students were more pro-environmental than those attending Gesamtschule. Comparative testing shows that already in 9th grade, Gymnasium students are more competent in biology than those in the Gesamtschule (proportion of those within the top two competency levels is 39.4% and 5.1%, respectively; Hans Anand Pant et al., 2013). A weaker competency level in the Gesamtschule may correlate with teaching additional environmental topics in less depth, as the teacher might have to focus more on content for all students to catch up (e.g. studying the food web of an ecosystem to understand predator-prey interactions but not discussing the influence of humankind). Furthermore, Gymnasium students might be able to link content from different subjects with more ease, thus reflecting on the topic from alternative perspectives (e.g. political restrictions as part of social studies, agricultural problems resulting from climate change in geography, decreasing ecological diversity in biology). We suggest that further research should explicitly investigate the influence of studying environmental topics in

certain classes and the extent to which they are linked between classes. Schools should be advised that they can influence environment-friendly behavior in students if they offer environmental lessons or out-of-school environmental related projects.

We found that students participating in the FFF movement had higher NEP-scores, suggesting that they have a pro-environmental attitude. FFF participation can be seen as an indicator of pro-environmental behavior. Recently, people have been curious about the effect of the FFF movement and critical opinions suggest that students only participate to skip classes. Although we cannot fully reject such statements, investigating motives to participate was not our main focus and was not incorporated into our study design. Therefore, our results should be interpreted with caution as students may have ulterior motives to participate in FFF. Nonetheless, we suggest that our findings should motivate schools and other institutions to organize and promote opportunities for students to participate in pro-environmental programs and projects. There is a good chance that increasing student pro-environmental attitude can influence the public as well, leading to even bigger changes.

Although insignificant, we found a slight Gender x FFF interaction effect. Males participating in FFF showed higher pro-environmental attitudes than females, but among those not participating in FFF, females showed higher pro-environmental attitudes than males. This effect could be explained by the fact that more female students participated in FFF. It is possible that only male students with a high level of pro-environmental attitude participate. Wahlström et al. (2019) assume that the role of female leaders in the FFF movement might have a particularly strong effect on female students leading them participate even those with a “lower” pro-environmental attitude. We find this result noteworthy as it could have potential theoretical relevance as a promising and pivotal subject of further research.

Finally, the act of measuring environmental attitude is a multifaceted concept. It must be noted that there is a large discrepancy about the factorial structure and interpretation of using the NEP as our primary method; researchers often use different dimensions in their application of the NEP, resulting in a difficulty to form generalizations (Amburgey & Thoman, 2012). Although there is a consensus that the scale subdimensions are correlated, it is still debated as to which and how many subdimensions there are (Amburgey & Thoman, 2012). The authors of the NEP recommend to treat the scale as a single, unidimensional score if reasonable dimensions do not emerge (which was the case for our sample in both an exploratory and confirmatory factor analysis) and if the internal consistency for the global score is appropriate ($\alpha = .705$, this study). Since we are primarily interested in the global extent to which a person embodies pro-environmental attitude, we averaged all 15 items to determine pro-environmental attitude. However, we find that it would be thought-provoking to explore other ways of measuring pro-environmental attitude and behavior, possibly by gathering qualitative data by means of interviews or observations.

CONCLUSION AND SUGGESTIONS

To combat the demise of the planet, becoming environmentally aware is our only prevention method. There is an enormous potential to reach students using appropriate methods in schools to point out the pertinence of ecological responsibility and awareness. Although everyone

benefits from environmental programs, some adjustments could be made (Liefländer & Bogner, 2014). Our results alone indicate possible predispositions that could be used to help tailor individualized projects aimed at different genders, age ranges and educational level. Environmental issues could be well-addressed as a project week in school. Tackling the subject from multiple angles could reach students with different interests and allow them to individually work on topics adapted to their cognitive level. Environmental courses should be taught early on as young minds are open and flexible; forming an initial, strong pro-environmental attitude results in students that are much more likely to engage and possibly develop effective pro-environmental engagement activities. This leads to the possibility for society-wide programs to be enacted that maximize pro-environmental attitudes and ultimately, change the way we interact with the environment. As climate change is one of today’s most challenging problems, it is crucial to investigate all possible influential factors and design pragmatic educational interventions to change students’ attitude for good because – to put it in the words of Greta Thunberg – “our house is on fire”.

DATA AVAILABILITY

Code and documentation are available as a PDF file written in Rmarkdown (File S1). Raw data and scripts for the analysis of the NEP Data are available via Github (https://github.com/vlitzke/NEP_Analysis).

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