UNIVERSITY OF PADOVA

Department of General Psychology

Bachelor's Degree Course in Psychological Science

Final dissertation

"PRO-ENVIRONMENTAL ATTITUDES AND BEHAVIOURS: THE ROLE OF PERSONALITY AND SPATIAL ANXIETY IN MEN AND WOMEN"

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Academic Year 2021/2022

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INTRODUCTION

Nowadays, environmental issues became one of the most debated concern in psychology, as global warming is getting worse and human behaviour is considered largely responsible for the changes that the Nature is approaching. Identifying factors that influence and promote pro-environmental attitudes and behaviour has turned into a key task in forecasting future environmental needs and trends in society, educational programs and policies which meet world's environmental demands. The current study is designed to find and investigate the role that particular variables, specifically personality and spatial anxiety, may have on pro-environmental attitudes and behaviour. First, gender differences between eco-friendly intentions and attitudes, as well as real and concrete "green" activities will be analysed. Pro-environmental attitudes and behaviours will be assessed using specific questionnaires respectively the New Ecological Paradigm (*NEP*, Dunlap et al., 2000) and a readjusted version of the Pro-Environmental Behavioural Scale (*PEBS*, developed from Markle, 2013 and from Menardo et al., 2020). Then, we will investigate whether exists a correlation between pro-environmental attitudes and behaviour with personality and spatial anxiety. Different personality traits will be analysed using the BIG-5 Inventory (*BFI*, Ubbiali et al., 2013), while the construct of spatial anxiety will be assessed thanks to the Spatial Anxiety questionnaire (*SA*, De Beni et al., 2014).

The first chapter reports a review of studies present in the literature which investigated our variables of interest. Firstly, as theoretical background, we will provide a definition of pro-environmental attitudes and behaviour. Moreover, we will explain some studies which investigated their relationship, as well as factors that influence and affect them. Then we will mention individual features relating to environmentalism, starting from gender differences. The Big 5 model of personality will be considered in explaining the role of personality on eco-friendly intentions and actions. Lastly, we will move on to the field of spatial cognition and wayfinding attitudes, explaining the construct of spatial anxiety and the role that general anxiety has when experienced in a context related to environmental issues.

The second chapter illustrates the way the study is conducted, starting by highlighting the main objectives and hypothesis. Subsequently, we will describe in detail all the different

questionnaires administered to the participants and the administration procedure. Finally, the methods of data analysis and relative results will be presented. This study was conducted through the analysis of data obtained from a sample of 182 participants, of whom 97 are females and 85 males, between 18 and 58 years of age. Personally, I have recruited 47 participants. To conclude, in the third and fourth chapters, the discussion of the results will be illustrated, compared with the existing reference literature, to think about possible explanations of the data obtained, identify the limits of the research and propose new study questions for the future.

CHAPTER 1.

Pro-environmental attitudes and behaviours and individual features

1.1. Pro-environmental attitudes and behaviours

Nowadays it has been shown that the main cause of environmental issues and climate change is human behaviour (APA, 2009; Gifford & Nilsson, 2014; Intergovernmental Panel on Climate Change (IPCC), 2013; Mobley et al., 2010; Willett et al., 2019). As people learned how to exploit and use the resources that the Earth can offer, they developed a system able to host us with several conveniences and ease but going in this direction endlessly, the planet will probably face a tipping point. Given that, there is the need to promote pro-environmental attitudes first and then pro-environmental behaviour among the whole population. Defining the terms, ecological behaviours (EBs) refer to "all those actions that harm the (natural) environment as little as possible or that contribute to its protection" (Steg & Vlek, 2009). Environmental psychology puts an interest in exploring the causes and consequences of the development of these habits as they became one of the most discussed topics in psychology in general. Literature has used different terms to refer to EBs as pro-environmental behaviours, environmentally significant behaviours, sustainability, or green actions.

The distinction between pro-environmental attitudes and behaviours

It is important though to distinguish between pro-environmental attitudes and behaviour. The term "environmental attitudes" is used to indicate personal evaluations of specific environmental activities or issues (Schultz & Kaiser, 2012). They refer to our personal beliefs concerning nature and the "green" and reflect our opinions and intentions towards it. On the other hand, as mentioned before, pro-environmental behaviours are concrete actions (including not taking an action), whether deliberate or not, that positively impact the natural environment (Soutter, Bates, & Mõttus, 2020). Since the two factors seem to be correlated with each other, attitudes themselves, for example, are found to be a predictor of pro-environmental behaviour (Schultz and Kaiser, 2012), a question arises: when and how do pro-environmental attitudes turn into a behaviour. Given that studies were inconsistent (Mobley et al., 2010), Wyss and colleagues (2022) proposed a very recent analysis showing that pro-environmental attitudes are more predictive of pro-environmental behaviour when personal costs are low or environmental benefits are high (Wyss et al., 2022). In other words, environmental attitude could also influence

intention that, in turn, promotes the acting of the EBs, with the presence of a third variable that will be analysed later on. In the discussion part of this paper, we will also show our results concerning the correlation and influence of these two variables.

Measuring pro-environmental attitudes and behaviours

A crucial point in experimental psychology is to find a way to measure the two constructs, trying to quantify them to see whether exists a measurable correlation between the variables and other factors. To do this, a review of the literature has been performed and two main questionnaires have been adopted to measure: 1) pro-environmental attitudes using the revised New Ecological Paradigm (*NEP*, Dunlap et al., 2000); 2) pro-environmental behaviour adopting and adjusting the scale proposed by Markle and colleagues (*PEBS*) (2013). Previous studies used similar questionnaires to measure and asses general beliefs on the nature of human-environment interactions (Stern et al., 1995). Even though, changes and suggestions concerning the structures of the scales have been proposed (Amburgey and Thoman, 2011), and recent evidence supports its predictive validity (Cordano et al., 2010). On the contrary, many empirical studies examine the performance of pro-environmental behaviour, and an analysis of these studies indicates a lack of consistency among the various behavioural measures (Kaiser et al., 2000). To address the issue of inconsistency in such a critical variable, Markle (2013) proposed the adopted Pro-Environmental Behavioural Scale, PEBS (Markle, 2013). Nowadays it represents, to our knowledge, the only scale based on empirical evidence from environmental scientific studies that covers the principal EBs categories proposed in the literature (Menardo et al, 2020).

Factors influencing pro-environmental attitudes and behaviours

Evidence shows that, despite the direct influence that attitudes and behaviours may have on each other, other important variables play a crucial role in this relationship. According to the value-belief-norm theory of environmentalism (Stern, 2000), for example, environmental attitudes affect pro-environmental behaviour through a causal chain involving personal norms, awareness of consequences, and ascription of responsibility to self. This theory has been recently supported by a study carried out by Liu and colleagues (2020) that considers the role of previous knowledge and suggest how environmental knowledge has a significant positive effect on environmental attitudes, environmental attitudes have a significant positive effect on environmental behavioural intentions and pro-environmental behaviours, and environmental behavioural intentions have a significant positive effect on pro-environmental behaviours (Liu

et al., 2020). However, other studies reveal a pattern of heterogeneity, such that pro-environmental behaviour is only associated with strong environmental attitudes (Casalo & Escario, 2017).

The connectedness to nature is one of the variables that are often considered as mediating factors. CNS refers to an individual's sense of emotional connection to the natural environment and the feeling of being part of it as a unique entity (Mayer & Frantz, 2004). It is measured with the Connectedness to Nature Scale developed by Mayer & Frantz (2004) and it is now widely used in scientific literature to explore the role that this construct may have on pro-environmental attitudes and behaviour. Empirical data support this hypothesis: CNS is positively and strongly correlated with both environmental concerns (Bruni & Schultz, 2010) and EBs (Whitburn et al., 2018).

The literature explains several factors that influence the individual's pro-environmental behaviour. A literature review was performed by Li and colleagues (2017) demonstrating that the main factors which influence pro-environmental behaviour include both external and internal factors, specifically demographic variables and psychological factors, with the latter having a stronger influence on behaviour (Li et al., 2017). The previously mentioned study by Casalo and Escario (2017), is also relevant in explaining the influence of socio-economic characteristics on pro-environmental behaviour, which correlates positively with education and age. Furthermore, results show that women exhibit more pro-environmental behaviour than men. Gender differences in pro-environmental attitudes and behaviours are explained in the next chapter and analysed later in the current study.

1.2. Gender differences in pro-environment attitudes and behaviours

As mentioned in the previous study (Casalo & Escario, 2017), pro-environmental behaviour is displayed in larger amounts in women respectively to men.

In general, there is evidence in the scientific literature that gender plays a role in both pro-environmental attitudes and pro-environmental behaviour and results are consistent in favour of women. A relevant study conducted by Plavsic (2013) among university students entitled "An Investigation of Gender Differences in Pro-environmental Attitudes and Behaviors" (Plavsic, 2013) demonstrated how eco-friendly intentions affect the behaviour itself, with females reporting more favourable and appreciative attitudes towards the environment than men. This study represents a reproduction of previous research, confirming findings that were already

present in the literature, including the influence of other mediating variables, such as socialization and social role differences.

In previous studies, for example, we were already able to report results in gender differences using the NEP scale. Findings support the hypotheses showing that women endorse the NEP better than men (Casey & Scott, 2006; Dunlap et al., 2000). However, a study conducted by Zelezny and colleagues (2000) demonstrated just a small effect of gender on NEP (Zelezny et al., 2000), yet it is not statistically relevant compared to what Stern and Dietz (1995) found, formulating their theory on environmental concern. Using the NEP scale, they found that gender affected behavioural intentions both directly and indirectly, with females expressing stronger pro-environmental behavioural attitudes (Stern & Dietz, 1995).

As long as pro-environmental attitudes are influenced by gender differences, evidence shows that eco-behaviour is affected as well. Using the PEBS scale, Richardson and colleagues (2020) found that individual characteristics, such as demographics, including gender, accounted for pro-nature conservation behaviour (Richardson et al., 2020). Conversely, no significant differences between men and women were found by Prati and colleagues (2017). Exploring the role of social well-being in pro-environmental behaviour results from the PEBS scale was similar between the two sexes (Prati et al., 2017).

It is worth mentioning that articles and research concerning pro-environmental attitudes present in the current literature are quite dated compared to those concerning pro-environmental behaviour, and this may represent a limitation of the study, yet results among studies remain longitudinally consistent.

A very relevant recent study examines how different factors may affect the pro-environmental behaviour of each gender and the extent of that effect, to model such behaviour and direct better environmental policies and strategies (Vicente-Molina et al., 2018). Results suggest that women with science studies & high attitude levels are likelier to act pro-environmentally and also motivation and knowledge shape their actions; on the other hand, men are more prone to act pro-environmentally thanks to their elasticity to targeted programs and motivations. These findings are important because they suggest how gender may play a direct role in eco-attitudes/behaviours, but it may act also indirectly, influenced by other mediating variables. In support of this, for example, Mertens and colleagues (2021) observed how Machiavellianism is an important mediator explaining gender differences in meat-eating justification strategies and at the same time psychopathy explains differences in attitudes toward the environment between men and women (Mertens et al., 2021).

Nevertheless, the role of one's different personality traits on pro-environmental attitudes and behaviour will be analysed in the next chapter.

All in all, we can conclude that, based on findings present in current literature, there is evidence that gender does play a role in shaping determinants of eco-friendly intention first, and then actions, with women displaying higher results compared to men.

1.3 Personality and pro-environmental attitudes and behaviours

In the previous paragraph, we stated that gender does play a role in influencing pro-environmental attitudes and behaviour, but the literature is full of evidence about the relationship that other factors have on our interested variables. Each individual's trait is one of these factors. Personality is defined by the American Psychological Association as "the characteristic pattern of thoughts, feelings, and behaviours exhibited by individuals" (APA, 2019), forming a core part of one's motivations, beliefs, values, and attitudes and is therefore likely to be a powerful and ubiquitous antecedent for differences in individuals' pro-environmental attitudes and behaviours. Recently, environmentalism has been examined from the perspective of the associations with personality traits, taking into consideration the Big Five model (Goldberg 1993) or the HEXACO model of personality (Ashton and Lee 2009). For our study, we will focus on the BIG 5 model. The associations between personality traits and environmental behaviours are extensively discussed in the literature, although causal relations were not inferred. The associations between traits and environmental actions could be a step in explaining the role of traits as causal determinants of environmental behaviours.

Evidence in this field is quite recent, yet results seem to be not very consistent, accounting for the need for further confirmations. In 2020, Soutter and colleagues reviewed a meta-analysis on the association between the Big Five (and HEXACO) personality model and pro-environmental attitudes and behaviours, discussing previous studies. Results show that the trait openness to experience has the strongest correlation with both pro-environmental attitudes and behaviours; agreeableness, conscientiousness, and, to a lesser extent, extraversion were also associated with them and no statistically significant correlation was found for extraversion (Soutter et al., 2020).

Fewer studies on facet-level association have been analysed so far, yet results suggest that those facets can drive the domain-level association. Some studies have found that facets of the same domains were consistently associated with pro-environmental behaviours (Brick & Lewis,

2016), while others had found the opposite, which might explain a lack of an association at the domain level relation (Markowitz et al., 2012).

Analysing facet by facet, as said before, openness to experience is the trait showing more consistency in a strong association with eco-friendly attitudes and behaviour (Markowitz et al., 2012). Hirsh and Dolderman (2007) tried to explain this correlation finding out that aesthetic appreciation of nature motivates a desire to preserve the environment (e.g., Hirsh & Dolderman, 2007). However, more recent investigations found that openness to experience is only associated with intentions and not concreate actions (Brick & Lewis, 2016).

Neuroticism and extraversion are instead the more inconsistent though (Brick & Lewis, 2016). For example, extraversion, which is known to be one of the most sociable traits, is associated with pro-environmental behaviours but not with attitudes (Brick & Lewis, 2016).

Overall, these findings are relevant in showing how personality traits do have an impact on pro-environmental attitudes and pro-environmental behaviour and it can be directly, as demonstrated in the correlation with openness to experience, however other theories explain that the influence of personality factors on EBs seems to be mediated by other personal variables, such as the environmental attitudes themselves (Brick and Lewis 2016) or the connection to nature (Markowitz et al. 2012). Other studies, for example, investigating the role of personality on environmentalism, that are relevant in our case measuring eco-friendly behaviour using the PEBS scale, report the role of cynicism and self-efficacy as predictors of pro-environmental behaviour (Abraham et al., 2015).

To conclude, evidence in the literature shows the role and impact that different personality traits have on eco-friendly performance. Although, so far, no study present in current literature investigates these correlations using instruments such as the NEP and PEBS scale and the BIG5 Inventory to measure and assess respectively pro-environmental attitudes and pro-environmental behaviour and the Big5 traits at the same time. Moreover, it is worth mentioning that current studies present in the literature does not focus on gender differences in performance on the BIG5 Inventory with the association with environmentalism and this could give insight to further research.

1.4 Wayfinding attitudes

Spatial Anxiety

In the previous paragraph, we analysed the role that some factors, such as gender and personality, may or may not have in influencing the disposition of pro-environmental attitudes

and behaviour. Our study is also interested in investigating whether environmentalism could also be affected by spatial cognition properties to see if our attitudes and behaviour towards nature share any properties with the relationship with the environment itself, such as in terms of navigation and the pleasure experienced when exploring the surroundings. Considering the aim of our research we will focus on the effects of spatial anxiety.

Occasionally, the space itself may be perceived as a frightening and insecure place and people may experience the manifestation of phobic reactions and withdrawal behaviour due to extreme forms of worry and concern when employed in space. Given that, Spatial Anxiety is defined as "the construct that measures personal discomfort with the space and spatial tasks" (Lawton, 1994). Sometimes spatial anxiety could also develop into pathological aggravation, known as agoraphobia: in these cases, the level of anxiety is perceived when the individual is in an unfamiliar environment, no matter whether a large space or crowded, he or she may experience panic reactions and avoidance behaviour. Evidence shows that patients with agoraphobia show a disturbing exploration activity, showing problems during navigation and difficulties in finding the right way (Kallai et al., 2007).

A pioneering study on spatial anxiety was conducted by Lawton, in 1994. She developed a questionnaire to measure the degree of personal anxiety and discomfort experienced when travelling and moving in space, the Spatial Anxiety scale (Lawton, 1994). The participant is asked to read each statement and self-report the degree of anxiety that could arouse in them in that particular situation on a 6-point Likert scale from 1 (very little) to 6 (very much). Thanks to this instrument, she was able to investigate and demonstrate gender differences in way-finding strategies. Results are consistent and show that women were more likely than men to report anxiety about navigation (Lawton, 1994). It is not clear, though, whether this gender difference in feeling this type of anxiety may be due to the actual fear of getting lost or it is the result of a more general tendency of women to report higher levels of anxiety than men. Despite the role of gender in experiencing spatial anxiety, this study is peculiar in showing how spatial anxiety is negatively related to the orientation way-finding strategy.

Moreover, also current and more recent research is focusing on and investigating the role of spatial anxiety in different domains, using the construct to analyse correlations between variables. Hund and Minarik (2007), for example, investigated the efficiency in the use of way-findings ability and the influence that spatial anxiety has on men and women. Results report that as spatial anxiety increases, navigation errors as well as navigation time increase in a positive correlation, with women performing higher levels of spatial anxiety respectively to

men (Hund & Minarik, 2007). Tush, results did not reach statistical significance, yet they are relevant in supporting gender differences already found in this field.

In addition, in 2020, a hypothesis about the mediating role of spatial anxiety between sex differences and mental rotation test performance was proposed and investigated (Alvarez-Vargas et al., 2020). Results support the partial mediating role of SA between sex and MRT performance; navigation and mental rotation anxiety significantly mediated the relation between participant sex and mental rotation performance (Alvarez-Vargas et al., 2020). Findings suggest the importance of reducing spatial anxiety to improve spatial skills in general and reduce gender differences in visuospatial abilities.

To conclude, the construct of spatial anxiety has been analysed and investigated in many research domains, mostly concerning spatial cognition. Evidence shows the influence that SA may have on spatial skills and way-finding abilities.

Anxiety, pro-environmental attitudes and behaviours

Our study, though, is interested in finding a correlation, whether this correlation exists, between spatial anxiety, pro-environmental attitudes and behaviours, and no previous research seems to have analysed their relationship before. However, the literature contains evidence showing the role that anxiety and worry about global issues and environmentalism has on eco-friendly activity and performance (Kapeller & Jäger, 2020). Anxiety experienced in this domain is quite a recent phenomenon and data show that it is spreading and intensifying as global worming gets worse. A study by Hickman and colleagues (2020), for example, report that more that 84% of children and young people interviewed about environmental issues expressed at least moderate worry in a large-scale study.

"Eco-anxiety" is defined as a special type of stress and worry, which is related to the ecological crisis, and can be interpreted in the framework of existential and psychodynamic psychology as well as social sciences (Agoston et al., 2022). This construct represents a relevant factor in exploring its role in the performance and disposition of eco-friendly intentions and actions. Evidence demonstrates its relevance showing a positive correlation between climate anxiety with pro-environmental behaviour, mostly concerning the public sphere (Wittrock, 2021). However, the same study reports no correlation concerning behaviours in the private sphere. To support the positive influence of worrying about the nature's future towards environmentalism, a Finnish study conducted by Panu (2020) reveals that ecoanxiety manifests itself also as a kind of practical-anxiety that may leads to shape our behaviour with a further

attention toward the environment, displaying activities to save and preserve the nature (Panu, 2020).

All in all, the experience of anxiety, more specifically a type of "eco-anxiety", has been shown to be positively linked in changing our attitudes and behaviours toward the environment, in order to preserve the natural surroundings for future generations and survival. Yet, no research has investigated the role and link that spatial anxiety could have on pro-environmental attitudes and pro-environmental behaviour and this gives an insight to our current study.

CHAPTER 2. The research

2.1 OBJECTIVES

The currents study has two aims:

Aim 1. The first objective is to analyse the role of gender differences in both pro-environmental attitudes and pro-environmental behaviours. Pro-environmental attitudes have been investigated using the New Ecological Paradigm scale (NEP, Dunlap et al., 2000) that measures the individual's involvement with the nature. Pro-environmental behaviours have been assessed with a readjustment of the Pro-Environmental Behavioural scale (developed from Markle, 2013 and from Menardo et al., 2020) measuring one's personal commitment with the environment.

Aim 2. The second objective is directed at investigating whether correlation exist between pro-environmental attitudes and behaviour with personality and spatial anxiety. Different personality traits have been examined using the BIG-5 Inventory (BFI), Italian version (Ubbiali et al., 2013), while the construct of spatial anxiety has been investigated thanks to the Spatial Anxiety questionnaire (SA, De Beni et al., 2014).

2.1.1. Hypothesis

Aim 1. Gender difference and pro-environmental attitudes and behaviours

We do expect to find gender differences in both pro-environmental attitudes and behaviour, in favour to women, as suggested by previous studies (Plavsic, 2013). A more significant difference is expected to be seen in the NEP scale (Casey & Scott, 2006; Dunlap, Van Liere, & Mertig, 2000) between males and females. While a weaker variance in forecasted in the PEBS (Prati et al., 2017).

Aim 2. Relation between pro-environmental attitudes and behaviours with personality and spatial anxiety

Personality seems to be correlated with both pro-environmental attitudes and pro-environmental behaviour (Soutter et al., 2020). We expect the trait of openness to experience to be the one with the strongest correlations, among the BIG5 traits, with intentions and actions towards the nature, in a positive direction (Markowitz et al, 2012). Also, agreeableness and conscientiousness are expected to have a slightly positive influence on pro-environmental

attitudes and behaviours (Soutter et al., 2020). On the contrary, we do not have any specific expectation concerning the personality traits of extraversion and neuroticism, since studies analysing this relationship in the literature are inconsistent and not statistically significant (Brick & Lewis, 2016).

The investigation of spatial anxiety and its correlation with pro-environmental attitudes and behaviour is quite a recent topic since no previous study has analysed their relationship so far. Based on findings in the literature, and the idea that spatial anxiety does negatively affect performance in spatial tasks and way-finding abilities (Lawton, 1994), we can have expectation concerning its role in being somehow corelated with environmentalism, however further research is needed.

2.2 METHOD

2.2.1 Participants

The sample is composed of 182 participants in total who were recruited from the degree course in "Scienze e Tecniche Psicologiche" at the University of Padua in exchange of course credits and by word of mouth from the experimenters. There are 97 females and 85 males. The range of age is from a minimum of 18 years old to a maximum of 58 years old (Mean Age_{males}= 26.9, SD= 6.57; Mean $Age_{females}$= 25.7, SD= 9.95). No specific case has been excluded from the study. Personally I have recruited 47 participants, of which 31 of them are males and 16 are females.

2.2.2. Materials

** Questionnaire not analysed in this report*

Pro-Environmental Behavioural scale (developed from Markle, 2013 and from Menardo et al., 2020)

The Pro-Environmental Behavioural Scale (PEBS) (Markle, 2013; Italian adjustment; Menardo et al., 2020) was use to asses eco-friendly actions, including actions that have the most important consequences for the environment; Markle, 2013). The questionnaire is composed by 21 items, items from 1 to 8 are taken from the Pro-Environmental Behaviour Scale (Markle, 2013), items from 9 to 15 have been readjusted from the scale and items from 16 to 21 have been added by the experimenter, such as item n. 20 *"How often do you keep attention in buying goods with little packaging?"*. They are divided in four categories: Conservation (eg. *"How often do you cut down on heating or air conditioning to limit energy use?")* Environmental citizenship (eg. *"How frequently do you watch television programs, movies, or internet videos about environmental issues?"),* Food (eg. *"During the past year have you decreased the amount of beef you consume?")* and Transportation (eg. *"During the past year how often have you walked or cycled instead of driving?").* The participant is asked to express his/her frequency in performing those behaviours based on a Likert scale from 1 (never) to 5 (always). A few items (eg. item 5. Are you currently a member of any environmental, conservation, or wildlife protection group?) are composed by a double option answer (eg. yes or no) with 1 (no)

and 5 (yes). The method of assigning the score consists in adding up the item scores, with higher scores resulting in significant pro-environmental behaviour. The minimum score is 21 and the maximum is 107. The resulted reliability is (*Cronbach's alpha*) α= 0.78.

New-Ecological Paradigm scale (NEP, Dunlap et al., 2000)

The New Ecological Paradigm scale is a measure of endorsement of a "pro-ecological" ideal world perspective. The questionnaire is composed by 15 statements on which the participant is asked to express agreement or disagreement on a 5 points Likert scale (from 1 strongly disagree, to 5 strongly agree). The seven items are meant to represent statements endorsed by the dominant social paradigm (DSP). An example of statement is the following: *"Humans have the right to modify the natural environment to suit their needs"*. The eight odd items are meant to reflect endorsement of the new environmental paradigm (NEP). An example of statement is the following: *"If things continue on their present course, we will soon experience a major ecological catastrophe"*. To obtain the final score, the sum of the two factors (DSP and NEP) must be calculated, taking into account that items from DSP are reversed and then added up to the NEP ones. The scoring range is between 43 - 47.
The resulted reliability is (*Cronbach's alpha*) α= 0.58.

Connectedness to Nature scale (Mayer & Frantz, 2004) *

The questionnaire aims at measuring the individuals' dispositions of feeling emotionally connected to the natural world and natural environment. It reflects the relationship between an individual and the nature. The scale is constructed by 14 statements, eg. *"I recognize and appreciate the intelligence of other living organisms"*. Scores on the Connectedness to Nature scale can vary from 1 to 5 points and answers for each statement vary from 1 (strongly disagree) to 5 (strongly agree) based on how the individual generally feel. Calculating the final score, all the items must be adding up, taking into account that items n. 4, 12 and 14 are reversed. The final score may be between 26 and 58.
The resulted reliability is (*Cronbach's alpha*) α= 0.69.

*Attitudes toward Orientation Tasks questionnaire (AtOT, De Beni et al., 2014) **

The AtOT is a questionnaire that aims to evaluate the personal attitude in orienting in known or unfamiliar places. The scale is constructed taking into account two different ways of exploring the environment: 1) pleasure of walking in familiar places and fear of exploring unknown places and 2) the pleasure of taking new roads and to explore unfamiliar new places. There are 10 items in total and the final score in based on a Likert scale from 1 (definitely false) to 6 (definitely true). An example of statement is the following: *"When I walk through a new city I am afraid of getting lost"*. To calculate the final score the sum of all items must be calculated. Items from factor 1 (pleasurer of walking in familiar places and fear of exploring unknown places) are reversed. Results range between 30 and 60, with a higher score indicating a higher positive attitude toward orientation.
The resulted reliability is (*Cronbach's alpha*) α= 0.86.

Spatial Anxiety questionnaire (SA, De Beni et al., 2014)

The SA questionnaire (adapted from Lawton, 1994) consists of 8 items that investigate the degree of personal anxiety and discomfort experienced when traveling and moving in space. The participant is asked to read each statement and express the degree of anxiety that could arouse in them in that particular situation on a 6-point Likert scale from 1 (very little) to 6 (very much). An example of statement is the following: "Locate your car in a large parking lot". The final score consists in the sum of all items and could be from 8 to 48.
The resulted reliability is (Cronbach's alpha) α= 0.91.

*Sense of Direction and Spatial Representatio scale (SDSR, De Beni et al., 2014; Pazzaglia et al., 2000; Pazzaglia & Meneghetti, 2017) **

The SDSR scale aims to investigate the degree of perceived sense of orientation and direction and the preferred strategies used when representing the space in navigation and wayfinding. The questionnaire consists of 13 items that measure the following 3 factors:

- *Sense of Orientation-Survey Representation:* it measures our self-perception regarding one's spatial orientation skills and abilities, and the preference for a survey type representation. An example of item is the following: "*Think of a city that is not really*

familiar to you (a city where you have been a few times, but which you do not usually frequent). Now try to classify your representation of this city: representation "from above", that is, a map-like representation";

- *Knowledge and Use of Cardinal Points:* it measure the ability to use cardinal points to orient oneself in the surrounding environment (eg. *"If you are in an open place and must indicate the position of a cardinal point (North, South, East, West), do you indicate it easily?"*);
- *Route - Visual Representations:* it measure the representation of the environment in a path centered way from the observer's point of view and it evaluates how landmarks are used to orient oneself in the environment. An example of item is: "*Try to reflect on your way of orienting yourself in the different surrounding environments. Would you describe yourself as a person who orientates itself in an environment considering the known paths and the steps from one point to another?"*.

  Answers are given based on the individual's agreeableness on a 5-point-Likert scale from 1 (strongly disagree) to 5 (strongly agree) and the final score is calculated by in adding up the item scores all together, with a final range between 13 and 65.

The resulted reliability is (Cronbach's alpha) $\alpha = 0.87$.

BIG-5 Inventory (BFI), Italian version (Ubbiali et al., 2013)

The Italian version of the BIG-5 Inventory (Ubbiali et al., 2013) used was translated by the original theory and scale provided by Robert R. McCrae e Paul T. Costa (1980). The inventory is a self-report questionnaire composed by 44 items and measures the big 5 different personality traits that are: openness to experience, is the personality trait of seeking new experience and pursuits (eg. *"I am someone who… is full of ideas"*), conscientiousness, is the personality trait of being honest and hardworking (eg. *"I am someone who… pays attention to details"*), agreeableness, reflects how individuals adjust their behaviour to suits others (eg. *"I am someone who… feels others' emotions"*), extraversion, is the trait of seeking fulfilment from sources outside the self or the community (eg. *"I am someone who… is the life of the party"*) and neuroticism, is the emotional trait responsible of negative feelings (eg. *"I am someone who… gets stressed out easily"*).

The participant's task is to indicate the strength agreement with each statement, utilizing a Likert scale from 1 to 5 points and answers for each statement vary from 1 (strongly disagree) to 5 (strongly agree).

To calculate the final score, first, the items for each specific factors are added up and the the total sum is calculated, considering that all the reversed-scored items bust be subtracted from 6. Final range can vary from 108 to 156.

The resulted reliability (Cronbach's alpha) is calculated for each factor and is the following: $\alpha_{\text{conscientiousness}} = 0.52$; $\alpha_{\text{openness to experience}} = 0.41$; $\alpha_{\text{neuroticism}} = 0.50$; $\alpha_{\text{extraversion}} = 0.46$; $\alpha_{\text{agreeableness}} = 0.26$.

2.2.3. Procedure

The entire study was carried out online (using Qualtrix and Zoom). It is a one-session meeting and the *Zoom* platform was used to interact with the entrants. Each session lasts about 30 minutes for each individual.

After connecting to the virtual videocall, the experimenter introduce the study requests and ask for any kind of question and doubts they might have and illustrates the informed consent, showing the procedure. Then, a link is provided in the chat which allows the connection to *Qualtrics* software to complete the questionnaire online. After accepting the informed consent, the participant's identification number is provided and they are invited to proceed with the filling of general personal data, such as age, gender and education.

Afterward the candidate is ready to fill and complete all the questionnaires that are in random order administered and are the following: 1) *Pro-Environmental Behavioural scale*; 2) *New-Ecological Paradigm scale* (NEP); 3) *Connectedness to Nature scale*; 4) *Attitudes toward Orientation Tasks questionnaire* (AtOT); 5) *Spatial Anxiety questionnaire* (SA); 6) *Sense of Direction and Spatial Representatio scale* (SDSR); 7) *BIG-5 Inventory (BFI*).

Finally, at the end of the session, the participant is being thanked for they availability and time to have taken part to the experiment.

2.3 RESULTS

2.3.1. Objective 1: Gender differences in pro-environmental attitudes and pro-environmental behaviours

In order to investigate the role of gender differences in pro-environmental attitudes and in pro-environmental behaviour, difference in performance between males and females was analysed with a *t test* in both NEP and PEBS. See Table 1 for means and standard deviations for both groups.

Table 1. *Means and standard deviations regarding all the analysed variables per gender (males vs females*

	Males		***Females***		***Total***	
	M	*SD*	*M*	*SD*	*M*	*SD*
BIG5-extraversion	3.51	0.39	3.53	0.36	3.52	0.37
BIG5-agreeableness	3.32	0.51	3.37	0.56	3.35	0.54
BIG5-neurticism	3.20	0.58	3.38	0.53	3.29	0.55
BIG5-openess to experience	4.05	0.39	4.02	0.34	4.04	0.37
BIG5-conscientiouness	3.50	0.44	3.56	0.48	3.53	0.46
Spatial Anxiety	18.5	7.87	23.3	6.95	20.9	4.41
NEP*	55.8	6.42	56.3	5.82	56.05	6.12
PEBS*	60.5	10.1	64.9	8.58	62.7	9.34

*** Notes.** NEP*: New Ecological Paradigm*; PEBS*: Pro-Environmental Behavioural Scale*

For what concerns pro-environmental attitudes, there were no statistically significant differences in score between males and females (NEP: t (171.02) = 0.59, p = 0.56, Cohen's d = 0.08). See Figure 1a.

For what concerns pro-environmental behaviour, there were statistically significant differences in score between males and females (PEBS: t (165.96) = 3.11, p = 0.002, Cohen's d = 0.47). See Figure 1b.

Figure 1. *Gender differences in pro-environmental attitudes NEP (Figure 1a) and in pro-environmental behaviour PEBS (Figure 1b)*

Figure 1a

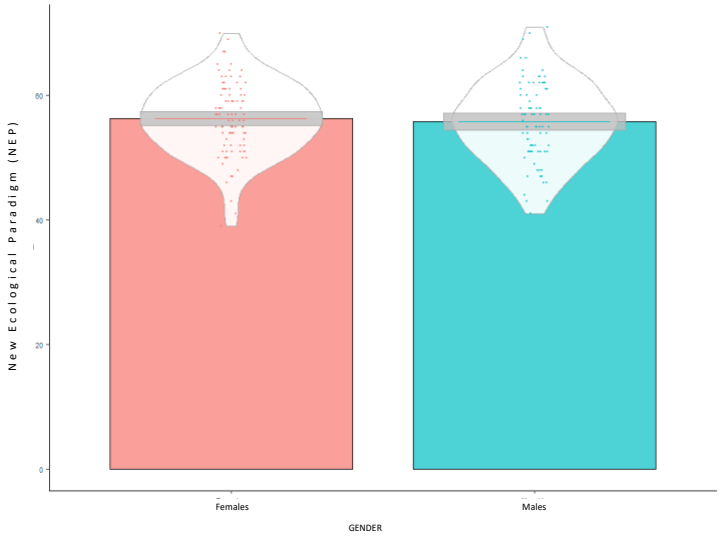
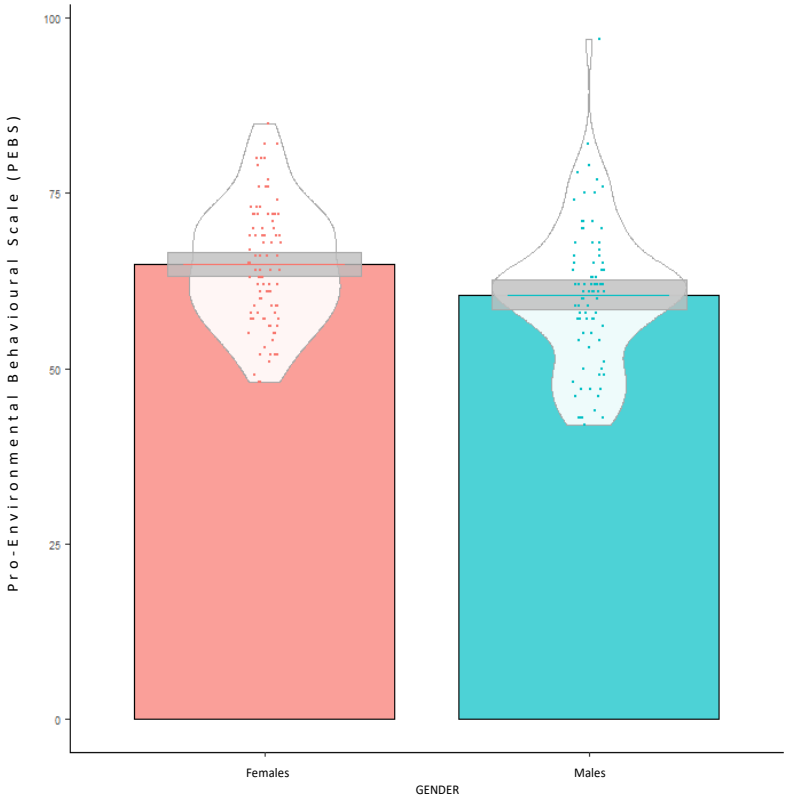


Figure 1b



2.3.2. Objective 2: relationship between pro-environmental attitudes and pro-environmental behaviours and personality traits and spatial anxiety

Table 2a. *Correlations between variables of interest in females*

	Age	BIG5-extrav	BIG5-agreea	BIG5-neurot	BIG5-openess	BIG5-consc	S. A.	NEP	PEBS
Age									
BIG5-extraversion	0.11								
BIG5-agreeableness	0.23	0.04							
BIG5-neuroticism	-0.10	-0.14	-0.05						
BIG5-openess to experience	0.02	-0.09	0.15	0.10					
BIG5-conscientiousness	-0.02	-0.04	0.03	-0.10	-0.05				
Spatial Anxiety	-0.19	-0.07	-0.02	0.12	-0.15	0.12			
NEP	-0.03	0.16	0.13	0.19	0.12	-0.04	-0.12		
PEBS	0.22	0.17	0.19	0.04	0.10	-0.04	-0.14	0.31	

Notes. $R > |0.23|$, $p < 0.05$

Table 2a. *Correlations between variables of interest in males*

	Age	BIG5-extrav	BIG5-agreea	BIG5-neurot	BIG5-openess	BIG5-consc	S. A.	NEP	PEBS
Age									
BIG5-extraversion	-0.00								
BIG5-agreeableness	-0.05	0.25							
BIG5-neuroticism	0.07	-0.27	-0.04						
BIG5-openess to experience	0.16	0.23	0.16	0.14					
BIG5-conscientiousness	0.26	0.09	0.08	-0.15	0.17				
Spatial Anxiety	-0.04	-0.10	-0.04	0.02	0.03	-0.18			
NEP	0.21	0.06	-0.07	0.23	0.09	0.24	-0.12		
PEBS	0.08	-0.12	0.08	-0.04	-0.11	0.02	0.09	0.06	

Notes. $R > |0.23|$, $p < 0.05$

Correlations were performed between pro-environmental attitudes and pro-environmental behaviour and the interested variables: the 5 factors of the BIG5 Inventory (factor 1: extraversion, factor 2: agreeableness, factor 3: neuroticism, factor 4: openness to experiences, factor 5: conscientiousness), and spatial anxiety in females (see Table 2a) and males (see Table 2b).

Concerning factor 1 of the BIG5 Inventory: extraversion, a correlation of $r = 0.16$ and $r = 0.17$, even if not statistically significant, between pro-environmental attitudes (NEP) and extraversion and pro-environmental behaviour (PEBS) and extraversion respectively in females was found, while in males they seem to be less correlated (NEP: $r = 0.06$, PEBS: $r = -0.12$).

Concerning factor 2 of the BIG5 Inventory: agreeableness, a low correlation was found in females between pro-environmental attitudes (NEP) and agreeableness ($r = 0.13$) and a correlation, although not statistically significant, of $r = 0.19$ between pro-environmental behaviour (PEBS) and agreeableness; whereas in males there was almost no correlation in both NEP ($r = -0.07$) and PEBS ($r = 0.08$) and agreeableness.

Concerning factor 3 (neuroticism) of the BIG5, results show a correlation of $r = 0.19$ in females and $r = 0.23$, that is statistically significant, in males between pro-environmental attitudes (NEP) and neuroticism; on the contrary, both females and males show almost no correlation between pro-environmental behaviour and neuroticism ($PEBS_{females}$: $r = 0.04$, $PEBS_{males}$: $r = -0.04$).

As regard as factor 4 of the BIG5 Inventory: openness to experience, there was a weak correlation in both sexes in both between pro-environmental attitudes ($NEP_{females:}$ $r = 0.12$, NEP_{males}: $r = 0.09$) and pro-environmental behaviour ($PEBS_{females}$: $r = 0.10$, $PEBS_{males}$: $r = -0.11$) and openness to experience.

Concerning the last factor n. 5, conscientiousness, of the BIG5, females seem to be less correlated in both the relationship between pro-environmental attitudes and conscientiousness (NEP: $r = -0.04$) and between pro-environmental behaviour and conscientiousness (PEBS: $r = -0.04$); males, instead, show a statistically significant correlation between pro-environmental attitudes (NEP: $r = 0.24$) and conscientiousness and a no correlation between pro-environmental behaviour and conscientiousness (PEBS: $r = 0.02$).

Concerning spatial anxiety, negative weak - no statistically significant - correlations between pro-environmental attitudes (NEP) and Spatial Anxiety in females and males, respectively r = - 0.12, r = - 0.12, and between pro-environmental behaviour (PEBS) and Spatial Anxiety, with females that seem to be more negatively correlated (r = - 0.14) that males (r = 0.09).

Finally, it is worth noting the correlation between pro-environmental attitudes (NEP) and pro-environmental behaviour (PEBS).
Females show a positive statistically significant correlation of r = 0.31 between pro-environmental attitudes and behaviour, while in males they seem to be not correlated (r = 0.06).

CHAPTER 3. Discussion

The current study analysed the role of gender differences in the performance and disposition of pro-environmental attitudes and pro-environmental behaviour. Pro-environmental attitudes have been investigated using the New Ecological Paradigm scale (NEP, Dunlap et al., 2000); while pro-environmental behaviours have been assessed with a readjustment of the Pro-Environmental Behavioural scale (developed from Markle, 2013 and from Menardo et al., 2020) measuring respectively the individual's involvement and commitment with the environment. Moreover, the correlation between pro-environmental attitudes and behaviour with personality has been investigated. The BIG-5 Inventory (BFI, Ubbiali et al., 2013) has been used as a tool to measure each participant's personality traits based on the BIG5 model of personality (Goldberg, 1993). Lastly, also the correlation between pro-environmental attitudes and pro-environmental behaviours with the effect of spatial anxiety has been examined. To measure the degree of such construct the Spatial Anxiety questionnaire (SA, De Beni et al, 2014) has been adopted.

3.1. Gender differences in pro-environmental attitudes and pro-environmental behaviours

As first aim of the study, we examined gender differences in pro-environmental attitudes and behaviours.

As expected, we did find gender differences in the performance of both pro-environmental attitudes and behaviours, in favour of females. First, we compared the mean scores and relative standard deviations for each group to see differences in performance on the NEP scale and PEBS scale in both sexes. Results show higher scores in women, mostly in the PEBS scale with a slightly larger difference. Then, a *t-test* for independent samples, and relative Cohen's *d*, were performed to compare such differences between the groups and evaluate the relative effect size. On the whole, our results are in line with previous research already found in the literature. Many studies investigating differences in performance between females and males in eco-friendly attitudes and behaviours report that women display a higher number of positive intentions and "green behaviours" respectively to men (Casalo & Escario, 2017; Plavsic, 2013; Casey & Scott, 2006; Dunlap, Van Liere, & Mertig, 2000).

However, analysing the two variables separately, our results are not consistent with existing findings, since, based on our theoretical background we expected to see a more significant difference between the sexes in the NEP scale (Casey & Scott, 2006; Dunlap, Van Liere, & Mertig, 2000) and more similar results were expected in the PEBS scale. Following this perspective, the literature suggested that, in general, in women there is a higher interest and involvement concerning the natural environment itself, as well as its related issues and values. Casey and Scott (2006) demonstrated that women endorse the NEP better than men. Nevertheless, pro-environmental behaviour, which is the factor considering the real commitment to preserving the planet, in the end, seems to be displayed similarly in both females and males (Prati et al., 2017). In contrast, our study rose quite opposite results. Surprisingly, no statistically significant differences in scores between men and women were found in assessing participants' involvement with nature using the NEP scale. Moreover, our results support the strongest role of the females in displaying pro-environmental behaviours, as shown in other previous analyses, i.e. it is in line with Casalo and Escario's findings (Casalo & Escario, 2017). Similar results could be explained considering the role of other mediating variables that may influence the actual translation of intentions into behaviours. A small effect of gender on the NEP scale was already found by Zelezny and colleagues (2000). The influence that other factors have on pro-environmental attitudes and behaviours has been demonstrated by several researchers (Li et al, 2017; Stern, 2000) and this relationship could fit in our study. Men and women may, therefore, display the same degree of interest and involvement towards nature, thus there exist some factors that are responsible for translating these eco-friendly attitudes and intentions into real and concrete pro-environmental behaviour. As shown by Soutter and colleagues (2020) personality does play a role in the disposition of green behaviour. In addition, in support of this view, our study reports gender differences in the correlations between different personality traits with pro-environmental attitudes and behaviour, as explained later in the discussion.

Furthermore, it is worth mentioning that the resulted reliability for the NEP scale is (*Cronbach's alpha)* α= 0.58 while for the PEBS scale is (*Cronbach's alpha)* α= 0.78. Even though both results are statistically acceptable, responses on the NEP scale seem less coherent and this may represent a limit of the discussion. The sample size may also have influenced the results since a larger number of responses were given by females compared to males. Given these two considerations, further research should focus on finding a way to increase consistency and representativeness among the two compared groups.

Lastly, analysing the inconsistency in the literature, our findings question what Schultz and Kaiser (2012) found in their study. They suggested that attitudes themselves were a predictor of pro-environmental behaviour (Schultz and Kaiser, 2012). We also compute correlations between pro-environmental attitudes and behaviour, to see whether the two variables influence each other. A positive statistically significant correlation was found in females, while males seem to be not correlated. To conclude, this seems to be in line with our expectation in the hypothesis, assuming the role of gender differences in the performance of pro-environmental attitudes and behaviour in favour of women.

3.2 Relationship between pro-environmental attitudes and pro-environmental behaviours and personality traits and spatial anxiety

As second aim of the study, we examined whether correlations exist between pro-environmental attitudes and pro-environmental behaviour and personality traits and spatial anxiety. To find out these relationships, we computed correlations r for each of the five traits of the BIG-5 model of personality with both pro-environmental attitudes and behaviour in men and women, as well as spatial anxiety, and different the results depending on the given variable. A general view seems to suggest that personality somehow influences the performance of eco-friendly intentions and activity, and this is in line with current literature (Soutter et al., 2020), still, results are not very consistent, therefore further research is needed to better understand this relationship.

We analysed facet by facet and different were the expectation based on the factor considered. The trait that seemed to have the strongest correlation with environmentalism was factor 4, openness to experience. Several studies demonstrated such relationship and results were consistent among them (Markowitz et al., 2012; Hirsh & Dolderman, 2007). Even though our hypothesis expected to find this relation, our study shows different results: a weak correlation in both sexes in both between pro-environmental attitudes and pro-environmental behaviour and openness to experience was found. Yet no statistically significant relationship between the variables resulted in our research, conversely as expected by the literature.

Concerning agreeableness and conscientiousness, they both show positive correlations, yet are not very consistent among studies. For example, Markowitz and colleagues (2012) found no consistent associations with the facets of agreeableness and pro-environmental attitudes, as measured by the NEP. In contrast, the same research suggests that other factors, such as facets

concerning perseverance and self-discipline or empathy, may play mediating role between these personality traits and pro-environmental attitudes and behaviour.

We also had a hypothesis concerning a positive influence on environmentalism from the traits of agreeableness and conscientiousness, even though the literature reported different results. There is no relevant relationship between agreeableness and environmentalism that is worth to be mentioned. The same results were found by Markowitz and colleagues (2012) and they explained these findings suggesting how the presence of different sub-factors in the trait of agreeableness, i.e. self-discipline may be the real responsible for the relationship investigated. Our results report a statistically significant relationship between conscientiousness and the NEP scale in males, whereas no relevant data was found in the PEBS. This finding may represent an explanation about data mentioned before on the role of gender difference: the fact that males reported higher scores in the NEP, measuring eco-friendly intentions and attitudes, and a lower one in the PEBS, may be due to the trait of conscientiousness, being this factor related to features, such as responsibility and virtue (Goldberg, 1993), a more attention and care towards the nature could be developed. In any case, this last point generates more of a research question than an explanation, and further research is needed to deepen the role of this trait.

There was no consistent previous knowledge of the role of neuroticism and extraversion (Boeve-de Pauw et al., 2011; Brick & Lewis, 2016). Our study is relevant in showing a positive correlation, yet not statistically significant, between females with extraversion and environmentalism. This finding may be relevant in explaining the reason why women performed better in the NEP and the PEBS: it could be the case that the trait of extraversion, linked with sub-features such as friendliness and activity level (Goldberg, 1993), plays a role in influencing the individual in spending more time in the natural environment, feeling more connected and linked with it. In addition, this link is in line with the sociable role of this trait applied to pro-environmental behaviour discovered by Brick and Lewis (2016). As said before concerning conscientiousness, more research is needed on this topic.

Moreover, concerning the last factor, neuroticism, we found a correlation with pro-environmental attitudes in both males and females but not with behaviour. Further research is needed to explain such a relationship.

Given these results and comparing them with previous literature, we can conclude that different personality traits do have an influence on both pro-environmental attitudes and behaviour in

both males and females, yet their direct or indirect role as mediating variables still needs to be confirmed by other studies.

It is important to mention that the resulted reliability (*Cronbach's alpha*) calculated for each factor was not acceptable in any of the five traits and this may represent a limit of our study. Low correlations among the variables may be the result of low consistency in the answers given by participants. Part of the sample was recruited from the degree course in "Scienze e Tecniche Psicologiche" at the University of Padova and participants may have been biased by their previous knowledge in the field. However, these represent just assumptions that require later developments. To understand the role of personality on environmentalism, further research should focus on the way of assessing these variables, more studies, for example, should agree on the same tool, either the BIG5 Inventory or HEXACO scale or whatever measuring instrument, to increase consistency and increase the possibility of comparing results. As a matter of fact, our study was the first one in adopting the BIG5 Inventory to assess its influence on pro-environmental attitudes, using the NEP scale, and behaviours, thanks to the PEBS scale, and this gives insight to our research.

Another crucial point examined in our study that has never been analysed before is the role of spatial anxiety on environmentalism. No previous study has ever investigated the influence that this construct may have on nature, in terms of involvement and commitment. Our findings suggest a general negative weak correlation between spatial anxiety and pro-environmental attitudes and behaviours in both women and men. These results may be compared with previous studies found in the literature about the role of anxiety on wayfinding abilities and the perception of the natural surroundings. Hund and Minarik (2007), for example, showed the negative influence of spatial anxiety on navigation (Hund & Minarik, 2007). The direct involvement of anxiety, and specifically spatial anxiety, toward eco-friendly activity, however, still need to be investigated. On the contrary, the so-called "eco-anxiety" seems to be positively related to environmentalism (Panu, 2020). Therefore, further research may clarify the different facets that anxiety display and then investigate each characteristic and their relationship in different domains. Moreover, since anxiety is often experienced in people with a high level of neuroticism (Goldberg, 1993), and our findings suggest that this trait is somehow linked with environmentalism, it would be interesting for future research to investigate their relationship to the development of pro-environmental attitudes and behaviour.

CHAPTER 4. Conclusion

The current research aimed to identify factors that may influence pro-environmental attitudes and behaviours. As we are facing several environmental issues, it is important to assess those intentions and actions involved in preserving and promoting the planet, analysing the conditions that lead to the display of those attitudes and behaviours. In our study, we investigated the role of personality and spatial anxiety.

Our main findings show the role of gender in the disposition of green attitudes and behaviour with women acting more pro-environmentally. All in all, these results confirm previous investigations since literature in general reports a higher number of pro-environmental attitudes and behaviour in females compared to males (Casalo & Escario, 2017; Plavsic, 2013; Casey & Scott, 2006; Dunlap, Van Liere, & Mertig, 2000). However, it is important to notice that our findings suggest no particular gender difference concerning green intentions and attitudes, taking into account the individual's involvement with nature, whereas the actual gender difference is evident in the disposition of eco-friendly behaviours, concerning the real commitment to preserving and promoting the environment. Thus, women seem to have the strongest role in the contribution of pro-environmental behaviour.

Moreover, a positive correlation was found in females between pro-environmental attitudes and behaviour itself showing that the two variables may influence each other.

Identifying other factors that may impact our participation in green intentions and actions, we focus our interest on the role of personality. Soutter and colleagues (2020) already proposed its influence on these variables. We investigate this approach using the Big5 model of personality. The trait of openness to experience is the one that seemed to be more correlated (Markowitz et al., 2012; Hirsh & Dolderman, 2007), however, our results were not able to support this hypothesis. Similar findings resulted in the traits of agreeableness and conscientiousness. Previous studies were quite inconsistent (Markowitz et al., 2012) and our findings show a positive correlation in both cases related to pro-environmental attitudes and behaviour. A positive correlation resulted in females regarding extraversion and environmentalism. In 2016, Brick and Lewis (2016) already found this relationship. On the other hand, neuroticism reports a positive influence on attitudes but none on behaviour, thus these findings need to be compared with further research. Overall, our hypothesis was to investigate the role of personality on eco-friendly intentions and actions and our findings do support the role of different traits, thus

reporting mixed results. Since previous studies related to this field were quite inconsistent, our research needs further investigation on these variables to compare the result and try to give a general view of the role of personality. A crucial point could be to deepen the influence of other mediating variables that may be an answer about the different correlations resulting in different personality traits and their role on pro-environmental attitudes and behaviour.

Furthermore, anxiety seems to have an impact on the disposition toward eco-friendly activity. As spatial anxiety affects negatively navigation and wayfinding abilities (Hund & Minarik, 2007), the experience of anxiety in general negatively influences the performance of other behaviour. Our findings suggest a general negative weak correlation between spatial anxiety and pro-environmental attitudes and behaviours in both women and men. However, no previous studies have investigated this relationship before, thus results cannot be compared. Further research should focus on the construct of spatial anxiety and the role that it may have on daily activities, even if not specifically related to navigation.

To conclude, we have seen that pro-environmental attitudes and behaviour may be affected by severe variables, directly or indirectly, such as personality and spatial anxiety. Becoming aware of this phenomenon, further research needs to try to identify as many as possible variables that do have a positive impact on the individual's involvement with nature as well as their commitment to the environment. Thanks to this continuing research we will be able to develop interest and values among the population to encourage them to display a higher level of pro-environmental attitudes and behaviour and therefore to preserve and support the planet.

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Appendix

Pro-Environmental Behavioural scale (developed from Markle, 2013 and from Menardo et al., 2020)

Valuta ognuna delle seguenti affermazioni con:
1= Mai
2= Raramente
3= A volte
4= Solitamente
5= Sempre

1. Quanto spesso spegni le modalità standby di elettrodomestici o dispositivi elettronici?	1	2	3	4	5
2. Quanto spesso riduci il riscaldamento o l'aria condizionata per limitare il consumo di energia?	1	2	3	4	5
3. Quanto spesso limiti il tuo tempo sotto la doccia per risparmiare acqua?	1	2	3	4	5
4. Quanto spesso aspetti di avere un carico completo per usare la lavatrice o la lavastoviglie?	1	2	3	4	5
5. Sei attualmente membro di un gruppo ambientale, di conservazione o di protezione della fauna selvatica?	SI		NO		
6. Durante l'ultimo anno hai contribuito con del denaro a gruppi di tutela ambientale, di conservazione o protezione della fauna selvatica?	SI		NO		
7. Con quale frequenza guardi programmi televisivi, film o video su Internet sui problemi ambientali?	1	2	3	4	5
8. Quanto spesso parli con gli altri dei loro comportamenti pro-ambientali?	1	2	3	4	5
9. Quanto spesso consumi frutta e verdura coltivata a basso impatto ambientale (ad es. km 0, biologica)?	1	2	3	4	5
10. Rispondi alla seguente domanda in base al veicolo a motore che usi più spesso: approssimativamente quanti chilometri al litro fa il veicolo? * non lo so 1 — 10 o meno 2 — 11-12 3 — 13-14 4 — 15-16 5 — 17 o più 6 — non li uso 7	*				
11. Quanto spesso consumi carne di manzo?	1	2	3	4	5
12. Quanto spesso consumi carne di maiale?	1	2	3	4	5
13. Quanto spesso consumi pollame?	1	2	3	4	5

14. Quanto spesso utilizzi i mezzi pubblici per spostarti?	1	2	3	4	5
15. Quanto spesso cammini o pedali invece di utilizzare automobile o motorino?	1	2	3	4	5
16. Quanto spesso applichi la raccolta differenziata plastica e carta?	1	2	3	4	5
17. Con quale frequenza presti attenzione nell'acquisto di prodotti con pochi imballaggi?	1	2	3	4	5
18. Con quale frequenza presti attenzione alla provenienza dei prodotti che acquisti?	1	2	3	4	5
19. Quanto spesso partecipi ad iniziative promosse a sostegno dell'ambiente?	1	2	3	4	5
20. Quanto spesso preferisci acquistare capi di abbigliamento di seconda mano rispetto che nuovi?	1	2	3	4	5
21. Quanto spesso preferisci riparare oggetti usati rispetto al sostituirli con oggetti nuovi?	1	2	3	4	5

New-Ecological Paradigm scale (NEP, Dunlap et al., 2000)

Legga le seguenti affermazioni e valuti le seguenti affermazioni su una scala da 1 (assolutamente in disaccordo) a 5 (assolutamente d'accordo):

1= Assolutamente in disaccordo
2= In disaccordo
3= Nè in disaccordo né d'accordo
4= D'accordo
5= Assolutamente d'accordo

1. Ci stiamo avvicinando al limite del numero di persone che la Terra può sostenere	1	2	3	4	5
2. Gli umani hanno il diritto di modificare l'ambiente naturale per soddisfare i propri bisogni	1	2	3	4	5
3. Quando gli umani interferiscono con la natura, questo spesso causa conseguenze disastrose	1	2	3	4	5
4. L'ingegnosità dell'uomo garantirà che la Terra non venga resa invivibile	1	2	3	4	5
5. Gli umani stanno abusando seriamente dell'ambiente	1	2	3	4	5
6. Il pianeta Terra è ricco di risorse se solo imparassimo a svilupparle	1	2	3	4	5
7. Le piante e gli animali hanno lo stesso diritto di esistere degli umani	1	2	3	4	5
8. L'equilibrio della natura è abbastanza resistente da fronteggiare gli impatti delle moderne nazioni industriali	1	2	3	4	5
9. Nonostante le nostre abilità speciali, gli umani sono ancora soggetti alle leggi della natura	1	2	3	4	5
10. La cosiddetta "crisi ecologica", che sta affrontando l'umanità, è stata molto esagerata	1	2	3	4	5
11. La Terra è come un'astronave con spazi e risorse molto limitati	1	2	3	4	5
12. Gli esseri umani avrebbero dovuto governare il resto della natura	1	2	3	4	5
13. L'equilibrio della natura è molto delicato e facilmente alterabile	1	2	3	4	5
14. Gli esseri umani col tempo impareranno abbastanza riguardo a come la natura opera da essere in grado di controllarla	1	2	3	4	5
15. Se le cose continuano nel loro corso attuale, presto sperimenteremo una grande catastrofe ecologica	1	2	3	4	5

Spatial Anxiety questionnaire (SA, De Beni et al., 2014)

Legga le seguenti affermazioni e indichi su una scala da 1 (nessuna) a 6 (moltissima) il grado di ansia che queste potrebbero suscitare in lei:

1= Nessuna
2= Pochissima
3= Poca
4= Abbastanza
5= Molta
6= Moltissima

1. Raggiungere il luogo di un appuntamento in una zona della città che non le è familiare	1	2	3	4	5	6
2. Sapersi muovere in un ambiente che conosce poco (ad es. centro commerciale)	1	2	3	4	5	6
3. Trovare la strada per uscire da un edificio complesso (ad es. uno stabile con molti uffici) che ha visitato per la prima volta	1	2	3	4	5	6
4. Tornare indietro in una zona che conosce, dopo essersi reso/a conto di aver sbagliato strada ed essersi perso/a	1	2	3	4	5	6
5. Uscire da un ipermercato dove è stato/a per la prima volta e decidere che direzione prendere per tornare a casa	1	2	3	4	5	6
6. Localizzare la sua auto in un grande parcheggio	1	2	3	4	5	6
7. Quando si trova all'interno di un edificio indicare la direzione di un posto all'esterno che qualcuno le ha chiesto	1	2	3	4	5	6
8. Trovare una nuova strada che potrebbe essere una scorciatoia senza avere a disposizione una mappa	1	2	3	4	5	6

BIG-5 Inventory (BFI), Italian version (Ubbiali et al., 2013)

Di seguito trova elencate delle caratteristiche che possono riguardarLa o meno. Per esempio, è d'accordo di essere una persona a cui piace passare del tempo con gli altri? Per favore scriva un numero a lato di ogni affermazione che indichi quanto Lei è d'accordo o in disaccordo con quel l'affermazione:

1= In disaccordo fortemente
2= Un pò in disaccordo
3= Nè d'accordo né in disaccordo
4= Un pò d'accordo
5= D'accordo fortemente

1. Io mi vedo come una persona che... È loquace	1	2	3	4	5
2. Io mi vedo come una persona che... Tende a trovare da ridire sugli altri	1	2	3	4	5
3. Io mi vedo come una persona che... Lavora in modo accurato	1	2	3	4	5
4. Io mi vedo come una persona che... E' depressa, triste	1	2	3	4	5
5. Io mi vedo come una persona che... È originale, propone idee nuove	1	2	3	4	5
6. Io mi vedo come una persona che... E' riservata	1	2	3	4	5
7. Io mi vedo come una persona che... E' premurosa ed altruista con gli altri	1	2	3	4	5
8. Io mi vedo come una persona che... Può essere piuttosto sbadata	1	2	3	4	5
9. Io mi vedo come una persona che... E' rilassata, gestisce bene lo stress	1	2	3	4	5
10. Io mi vedo come una persona che... Ha curiosità in molti ambiti diversi	1	2	3	4	5
11. Io mi vedo come una persona che... È piena di energia	1	2	3	4	5
12. Io mi vedo come una persona che... Attacca briga con gli altri	1	2	3	4	5
13. Io mi vedo come una persona che... È un lavoratore affidabile	1	2	3	4	5
14. Io mi vedo come una persona che... Può essere tesa	1	2	3	4	5
15. Io mi vedo come una persona che... È ingegnosa, un pensatore profondo	1	2	3	4	5
16. Io mi vedo come una persona che... Genera molto entusiasmo	1	2	3	4	5
17. Io mi vedo come una persona che... Per natura tende a perdonare	1	2	3	4	5
18. Io mi vedo come una persona che... Tende ad essere disorganizzata	1	2	3	4	5
19. Io mi vedo come una persona che... Si preoccupa molto	1	2	3	4	5
20. Io mi vedo come una persona che... Ha un'immaginazione attiva	1	2	3	4	5

21. Io mi vedo come una persona che... Tende ad essere taciturna	1	2	3	4	5
22. Io mi vedo come una persona che... Di solito si fida	1	2	3	4	5
23. Io mi vedo come una persona che... Tende ad essere pigra	1	2	3	4	5
24. Io mi vedo come una persona che... È emotivamente stabile, non si turba facilmente	1	2	3	4	5
25. Io mi vedo come una persona che... È inventiva	1	2	3	4	5
26. Io mi vedo come una persona che... Ha una personalità energica	1	2	3	4	5
27. Io mi vedo come una persona che... Può essere fredda ed emotivamente distaccata	1	2	3	4	5
28. Io mi vedo come una persona che... Persevera finché il compito è terminato	1	2	3	4	5
29. Io mi vedo come una persona che... Può essere lunatica	1	2	3	4	5
30. Io mi vedo come una persona che... Apprezza le esperienze artistiche, estetiche	1	2	3	4	5
31. Io mi vedo come una persona che... È qualche volta timida, inibita	1	2	3	4	5
32. Io mi vedo come una persona che... È premurosa e gentile pressoché con tutti	1	2	3	4	5
33. Io mi vedo come una persona che... Fa le cose efficientemente	1	2	3	4	5
34. Io mi vedo come una persona che... Rimane calma nelle situazioni tese	1	2	3	4	5
35. Io mi vedo come una persona che... Preferisce un lavoro che sia di routine	1	2	3	4	5
36. Io mi vedo come una persona che... È estroversa, socievole	1	2	3	4	5
37. Io mi vedo come una persona che... È qualche volta scortese con gli altri	1	2	3	4	5
38. Io mi vedo come una persona che... Fa dei piani e li porta a termine	1	2	3	4	5
39. Io mi vedo come una persona che... Diventa facilmente apprensiva	1	2	3	4	5
40. Io mi vedo come una persona che... Ama riflettere, giocare con le idee	1	2	3	4	5
41. Io mi vedo come una persona che... Ha pochi interessi artistici	1	2	3	4	5
42. Io mi vedo come una persona che... Ama cooperare con gli altri	1	2	3	4	5
43. Io mi vedo come una persona che... È facilmente distratta	1	2	3	4	5
44. Io mi vedo come una persona che... Ha una sensibilità raffinata per l'arte, la musica o la letteratura	1	2	3	4	5