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## AFFECTIVE COMMITMENT: A MEDIATOR BETWEEN PERSONALITY TRAITS AND PRO-ENVIRONMENTAL BEHAVIOUR

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**Abstract.** This study investigates pro-environmental behaviour through a personality-focused approach as well as the role of emotional engagement with environmental issues, specifically through affective commitment. Using structural equation modelling, data from an online survey of 669 participants were analyzed to explore the direct and indirect effects of personality traits on pro-environmental behaviours. Findings indicate that affective commitment significantly influences pro-environmental behaviours, particularly among individuals high in Neuroticism, Conscientiousness, and to some extent, Extraversion. However, this relationship is not observed in individuals with higher levels of Agreeableness or Openness to new experiences. By integrating personality traits with the influence of the emotional state, this study offers new insights into the complexities underlying pro-environmental behaviours. These findings may have practical implications for the development of interventions, campaigns, and programs aimed at promoting pro-environmental behaviours.

*Keywords:* Pro-environmental Behaviour; Personality traits; Affective Commitment; Eco-anxiety

### Introduction

In recent years, the concept of eco-anxiety has gained increasing popularity, referring to the emotional stress and concern related to environmental issues and the future of the planet. Eco-anxiety can be seen as an expression of affective commitment – an emotional attachment to and concern for the environment that goes beyond simple awareness. In the scientific literature, there are two widely recognized definitions of the term (Pihkala 2020). The first was introduced in the

2017 report by the American Psychiatric Association on mental health and climate change (Clayton et al. 2017): “a chronic fear of environmental doom”. The second is by Australian environmentalist Glenn Albrecht: “the generalized sense that the ecological foundations of existence are in the process of collapse” (Albrecht 2012). A systematic review conducted in 2021 found that there is still a lack of conceptual clarity surrounding eco-anxiety (Coffer et al. 2021). The authors define the phenomenon as “distress caused by climate change, where people are becoming anxious about their future”. They also mention other terms found in the literature that describe affective commitment and similar distress, such as ecological grief, solastalgia, eco-angst, and environmental distress. These terms often overlap, are used interchangeably, and vary in terms of the severity of the symptoms experienced.

### **Eco anxiety and pro-environmental behaviours**

Emotions and moods have the power to influence our choices and behaviours – on one hand, by avoiding unpleasant feelings, and on the other hand, by enhancing positive ones (Schwarz 2000; George & Dane 2016). Some studies have explored the link between feelings of connectedness to nature and involvement in environmental actions (Barbaro & Pickett 2016; Martin et al. 2020; Krettenauer et al. 2020; Sierra-Baron et al. 2022; Liu et al. 2022; Duong & Pensini 2023). Others have examined how emotional factors can act as barriers to individuals engaging in pro-environmental behavior (Steg 2005). Furthermore, research has delved into the relationship between emotions like guilt (Rees et al. 2014; Bissing-Olson et al. 2016), sadness (Fan 2015; Schwartz & Loewenstein 2017), pride (Bissing-Olson et al. 2016), and transcendental emotions such as compassion, gratitude, and awe (Stellar et al. 2017; Zelenski & Desrochers 2021; Wang et al. 2019; Zhao et al. 2018; Yang et al. 2018), and the adoption of pro-environmental behaviours.

The research on eco-anxiety and its connection to pro-environmental behaviours is relatively new.

Within the context of the affect theory, one might hypothesize that eco-anxiety, being a negative emotion, would prompt pro-environmental actions. However, findings from existing studies are conflicting. Some suggest that indeed, emotional involvement with the ecological crisis drives pro-environmental behaviours (Fraj & Martinez 2006; Chan & Lau 2000; Larios-Gomez & Fischer 2018; Verplanken et al. 2020; Boluda-Verdu et al. 2022; Mathers-Jones & Todd 2023). Conversely, others find no such association (Williams & McCrorie 1990; Clayton & Karazsia 2020). Overall, in most studies, even if eco-anxiety does drive pro-environmental behavior, it is also linked to dysfunctional states and symptoms like depression, anxiety, and stress (Pihkala 2020; Clayton et al. 2017; Coffey et al. 2021; Clayton & Karazsia 2020; Hickman et al. 2021). This leads to the debate regarding whether this emotional state serves as a coping mechanism (driving pro-environmental behaviours) or represents a pathological response to adaptation (Clayton & Karazsia 2020).

Regardless, it is evident that eco-anxiety is a multifaceted phenomenon that elicits varied behaviours among individuals. The answer could be “it depends”, in this case, on the personality of each individual.

### **Personality and pro-environmental behaviours**

Recently, personality-oriented theories have emerged as part of the various attempts to explore pro-environmental behavior. These approaches consider individuals as intricate systems composed of multiple interacting components, including personality traits (Poskus 2019). Therefore, we can explore why affective commitment motivates some people to engage in pro-environmental actions while others remain unaffected, and why behavior change is driven by normative goals for some but not for others.

Within environmental psychology, the concept of the “pro-environmental individual” has gained prominence, characterizing individuals who actively participate in environmentally friendly actions across different domains such as energy consumption, water usage, transportation, and waste reduction (Markowitz et al. 2012). Numerous studies have investigated the characteristics of pro-environmental individuals, including research on the influence of personality traits (Hirsch 2010; Milfont & Sibley 2012; Markowitz et al. 2012; Brick & Lewis 2016). Given that personality plays a fundamental role in shaping our beliefs, values, and attitudes, it stands to reason that individual differences in personality could impact our engagement with environmental issues (Milfont & Sibley 2012). For instance, Poskus (2019) illustrates how individuals with varying personality traits develop their beliefs and engage in pro-environmental behavior in distinct ways, leading to differences in the effectiveness of behavior models derived from the theory of planned behavior (Poskus 2019). In this context, personality traits could serve as the foundational basis upon which behavior theories are constructed.

Recent research has delved into the relationship between personality traits and pro-environmental behavior, though the volume of published literature on this topic is still relatively limited. Initial studies have identified a significant positive correlation between pro-environmental behavior and individual levels of Agreeableness and Openness to new experiences (Hirsch & Dolderman 2007; Hirsch 2010). Similarly, another study found a positive correlation with Neuroticism and Conscientiousness, albeit weaker than with Agreeableness and Openness to new experiences (Nisbet et al. 2009). A subsequent Canadian study confirmed these findings, revealing that Openness to new experiences and Agreeableness are linked to a sense of connectedness with nature, which in turn correlates positively with pro-environmental behaviours (Nisbet et al. 2009).

Further exploration of the relationship between personality traits and pro-environmental actions has indicated a significant positive association with Openness to new experiences (Markowitz et al. 2012). Notably, this relationship is primarily

driven by the aesthetic appreciation aspect of Openness to new experiences, rather than curiosity. Additionally, this connection is mediated by individuals' environmental attitudes and their sense of connection with nature. However, the relationship between Agreeableness and Conscientiousness with pro-environmental behaviours was not supported in this study. Subsequent research in the same year confirmed the relationship between personality traits like Agreeableness, Openness to new experiences, and Conscientiousness with pro-environmental behavior (Milfont & Sibley 2012). Among these traits, Agreeableness exhibited the strongest correlation, being associated with higher levels of altruism, morality, empathy, and concern for others. Conversely, Neuroticism and Extraversion displayed weaker effects. However, a study focusing on emissions reduction-related behaviours did not confirm these findings, attributing the most significant effects to Openness to new experiences and Conscientiousness (Brick & Lewis 2016).

Overall, recent studies have underscored the importance of Openness to new experiences, Agreeableness, and Conscientiousness in driving pro-environmental behavior, while Neuroticism shows no significant correlation (Soutter & Mottus 2020). A meta-analysis further supports these findings, highlighting the strongest correlates of pro-environmental attitudes and behaviours as Openness to new experiences and Honesty/humility traits (Soutter et al. 2020).

The aim of the current study was to explore pro-environmental behavior through the lens of a personality-oriented approach, focusing on personality traits as well as the role of emotional engagement with environmental issues, specifically through affective commitment. We explored the interaction between those psychological mechanisms in determining pro-environmental behaviours. Given that individual traits are stable dispositions (Boeree 2006), while mental states (such as emotions) are unstable temporary conditions (Lai et al. 2011), our hypothesis is that states, such as affective commitment, mediate the impact of specific traits on behavior. For example, Neuroticism is associated with heightened anxiety and negative thoughts, while eco-anxiety encompasses negative emotions linked to environmental concern and climate change; and therefore, when specific anxieties about ecological issues arise, individuals with higher neuroticism tendencies might be more inclined to undertake specific protective actions (this hypothesis also allows Neuroticism to have a direct effect on behavior, of course). Our study explored this type of deterministic relationships for all Big Five personality traits.

## **Materials and Method**

### **Participants and procedure**

According to G\*Power, for  $1-\beta = 0.80$  and  $\alpha = 0.05/4 = 0.0125$  to find a small effect of  $f^2 = 0.02$ , we needed at least 478 participants. However, we planned to recruit slightly more participants in case that some of the participants needed to be excluded. Our final dataset contained 669 respondents who participated in a

cross-sectional study, with a majority being women (60.5%), aged between 15 and 77 years ( $M=29.30$ ,  $SD=13.39$ ). The sample was gathered through Sofia university recruitment campaign, utilizing social media, posters, and other outreach methods to reach potential participants. The study was conducted anonymously and voluntarily, with no compensation provided to the participants. The respondents completed an online questionnaire through the free platform Google Forms. Participants were informed that the study was conducted for scientific research purposes, with the topic indicated as “pro-environmental attitudes and environmental conservation.”

### **Materials/ Instruments**

The Big Five personality dimensions were assessed using a shortened version of the P. John and S. Srivastava (John & Srivastava 1999) questionnaire (Stoyanova & Karabeliova 2020). The shortened Bulgarian version of the questionnaire included 3 items per scale, in sum 15 statements and five factors: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. Items were rated on a five-point Likert-type scale ranging from “Strongly Disagree – 1” to “Strongly Agree – 5”.

To examine the role of emotional states in the ecological domain, the Affect Commitment scale from the Environmental Consumer Behavior Survey was used. The questionnaire is based on scales developed by Maloney et al. (1975) and adapted into a more contemporary version by Fraj and Martinez (2007). The Bulgarian version of the questionnaire consists of 23 self-assessment items using a five-point Likert scale ranging from “Strongly Disagree-1” to “Strongly Agree-5”. In its original form, three factors are identified: affective commitment, verbal commitment, and actual commitment. Verbal commitment describes what individuals claim they would do regarding ecological issues, actual commitment reflects their actual actions and behaviours. Affective commitment, on the other hand, relates to their feelings towards ecological topics. This includes negative emotions individuals may feel due to the ecological crisis, commonly referred to as eco-anxiety.

General Measure of Ecological Behavior – the questionnaire was developed by Florian Kaiser (1998) and measures various aspects of ecological behavior. It consists of 37 self-assessment statements using a five-point Likert scale ranging from “Never-1” to “Very Often-5”. In its original version, seven factors are identified: Prosocial behavior, Ecological garbage removal, Water and power conservation, Ecologically aware consumer behavior, Garbage inhibition, Volunteering in nature protection activities, and Ecological automobile use.

These questions reflect specific actions influenced by ecological knowledge, social, cultural, and political context. In Bulgaria, the topic of ecology and environmental conservation has gained popularity in recent years, leading to the gradual introduction of ecological infrastructure to promote pro-environmental behavior. However, not all questionnaire statements were applicable in the Bulgarian context, therefore only those relevant and recognizable to respondents were

included, resulting in a shorter version with fewer statements and 3 scales (General ecological behaviours, Pro-social and volunteering behaviours, Ecologically aware household chemicals usage).

The relevant pro-environmental behaviours for the Bulgarian respondents were identified through factor analysis using Principal Component Analysis with Varimax rotation. Before analyzing the factor analysis results, an initial data screening was conducted. The sample adequacy was verified using the Kaiser-Meyer-Olkin (KMO) measure. The KMO value was 0.75, which falls into the “marvelous” category according to Kaiser (1974) and “meritorious” according to Hutcheson and Sofroniou (1999) (see Table 1 in the Appendix). The Bartlett's test of sphericity showed statistical significance.

While the original version presents 7 factors, the current study identified 6 factors. Three of the scales had acceptable validity (see Table 2 in the Appendix), while the other three had an Alpha coefficient below 0.4 and had therefore been excluded. The final version of the questionnaire with the valid items is presented in Table 3 in the Appendix.

The first scale described various pro-environmental behaviours and therefore was named “General environmental behaviours.” The second scale was related to prosocial behaviours and volunteering. The third scale included all statements regarding the use of household chemicals. While the first two scales represented a unique collection of statements based on the current sample, the third scale was equivalent to the scale from the original version of the questionnaire.

## **Results**

The scales used in the study demonstrated internal consistency, with Cronbach’s  $\alpha$  ranging from 0.60 to 0.80 (See Table 1).

**Table 1.** Descriptive statistics and reliabilities

<b>Scales</b>	<b>Number of items</b>	<b>M</b>	<b>SD</b>	<b><math>\alpha</math></b>
Extraversion	3	10.77	2.63	0.71
Agreeableness	3	11.62	2.27	0.62
Consciousness	3	11.95	2.42	0.74
Neuroticism	3	9.62	2.76	0.60
Openness to experience	3	11.46	2.41	0.75
Affect Commitment	7	26.28	5.36	0.80
General ecological behaviours	6	18.16	2.96	0.62
Pro-social and volunteering behaviours	6	7.26	2.00	0.71
Ecologically aware household chemicals usage	6	16.29	3.82	0.67

First, an analysis of the asymmetry coefficients – kurtosis and skewness – was performed to verify the normality of the scale distributions. All skewness values fell within the acceptable range of -2 to +2 [50 – 53], and the kurtosis values for all scales were below 7 (Kim 2013) (see Appendix).

Following the normality analysis of the distribution, correlation analyses were performed using Pearson's coefficient to evaluate the relationships. Significant correlations were identified and are shown in Table 2.

The correlation analysis revealed mostly weak correlations ( $r < 0.3$ ). However, eco-anxiety correlated moderately positively with pro-environmental behaviours, specifically with overall ecological behaviours ( $r = 0.29$ ,  $p < 0.01$ ), and with prosocial behaviours ( $r = 0.32$ ,  $p < 0.01$ ).

**Table 2.** Correlation analysis results

	1	2	3	4	5	6	7	8	9
1. General ecological behaviours	-								
2. Pro-social and volunteering behaviours	<b>.35**</b>	-							
3. Ecologically aware household chemicals usage	<b>.08*</b>	0.04	-						
4. Affective commitment	<b>.29**</b>	<b>.32**</b>	0.04	-					
5. Extraversion	0.08	<b>.18**</b>	<b>.20**</b>	<b>.16**</b>	-				
6. Agreeableness	<b>.13**</b>	<b>.17**</b>	<b>.09*</b>	<b>.17**</b>	<b>.28**</b>	-			
7. Conscientiousness	0.06	<b>.12**</b>	<b>.11**</b>	<b>.14**</b>	<b>.29**</b>	<b>.27**</b>	-		
8. Neuroticism	<b>.08*</b>	0.05	<b>.16**</b>	<b>.11**</b>	<b>-.14**</b>	-0.07	<b>-.11**</b>	-	
9. Openness	<b>.10*</b>	<b>.13**</b>	0.07	<b>.11**</b>	<b>.32**</b>	<b>.12**</b>	<b>.26**</b>	-0.01	-
**Correlation is significant at the 0.01 level (2-tailed).									
* Correlation is significant at the 0.05 level (2-tailed).									

To investigate the direct and indirect effects of personality traits on pro-environmental behaviours, a mediation analysis was performed using structural equation modeling and bootstrap analysis with a 95% confidence interval. The analysis results are displayed in Table 3.

**Table 3.** Mediation analysis results

Relationship	Direct Effect				Indirect Effect		Bootstrap analysis with 95% confidence interval		p-value	Conclusion
	Unstandardized values	Standardized values	t-value	p-value	Standardized values	Unstandardized values	Low	High		
Neuroticism -> Affective Commitment -> General ecological behaviours	0.06	0.06	1.48	0.14	<b>0.04*</b>	0.04	0.02	0.08	p<0.01	Full Mediation
Neuroticism -> Affective Commitment -> Pro-social and volunteering behaviours	0.03	0.04	1.01	0.31	<b>0.04*</b>	0.03	0.01	0.05	p<0.01	Full Mediation
Agreeableness -> Affective Commitment -> General ecological behaviours	0.1*	<b>0.08*</b>	2.02	0.04	<b>0.03*</b>	0.04	0.02	0.08	p<0.01	Partial Mediation
Agreeableness -> Affective Commitment -> Pro-social and volunteering behaviours	0.08*	<b>0.09*</b>	2.4	0.02	<b>0.03*</b>	0.03	0.01	0.05	p<0.01	Partial Mediation
Extraversion -> Affective Commitment -> General ecological behaviours	0	0.01	0.09	0.93	<b>0.03*</b>	0.03	0.01	0.06	0.01	Full Mediation
Extraversion -> Affective Commitment -> Pro-social and volunteering behaviours	<b>0.07*</b>	<b>0.09*</b>	2.25	0.02	<b>0.03*</b>	0.02	0.01	0.04	0.01	Partial Mediation
Conscientiousness -> Affective Commitment -> General ecological behaviours	-0.01	0.01	-0.2	0.84	<b>0.02*</b>	0.03	0.00	0.06	0.04	Full Mediation
Conscientiousness -> Affective Commitment -> Pro-social and volunteering behaviours	0.01	0.02	0.39	0.70	<b>0.02*</b>	0.02	0.00	0.04	0.05	Full Mediation

\*p<0.05

The results of the analysis indicated a statistically significant indirect effect of affective commitment on general and prosocial environmental behaviours for four personality traits: Neuroticism (b=0.04, p<0.01), Agreeableness (b=0.03, p<0.01), Extraversion (b=0.03, p<0.01), and Conscientiousness (b=0.02, p<0.05). No indirect effect was identified for Openness to experience.



For Neuroticism and Conscientiousness, full mediation was observed, showing a significant indirect effect without a direct effect. For Extraversion, full mediation was seen regarding general environmental behaviours. For prosocial environmental behaviours and volunteering, both direct (or partial mediation) ( $b=0.09$ ,  $p<0.05$ ) and indirect effects were present. For Agreeableness, partial mediation was evident, with both significant direct ( $b=0.08$ ,  $p<0.05$ ) and indirect effects ( $b=.03$ ,  $p<.01$ ). All statistically significant direct effects are described in Table 4.

**Table 4.** Significant direct effects

			Standardized values	t-value	p-value	Partial R <sup>2</sup>	f <sup>2</sup>	Power
Affective Commitment	<---	Extraversion	0.10	2.51	0.01	0.01	0.01	0.50
Affective Commitment	<---	Agreeableness	0.12	3.07	<0.01	0.01	0.01	0.72
Affective Commitment	<---	Conscientiousness	0.09	2.13	0.03	0.01	0.01	0.35
<b>Affective Commitment</b>	<---	<b>Neuroticism</b>	<b>0.14</b>	<b>3.75</b>	<b>&lt;0.01</b>	<b>0.02</b>	<b>0.02</b>	<b>0.90</b>
Pro-social and volunteering behaviours	<---	Extraversion	0.09	2.25	0.02	0.01	0.01	0.40
<b>Ecologically aware household chemicals usage</b>	<---	<b>Extraversion</b>	<b>0.20</b>	<b>4.87</b>	<b>&lt;0.01</b>	<b>0.03</b>	<b>0.04</b>	<b>0.99</b>
General ecological behaviours	<---	Agreeableness	0.08	2.02	0.04	0.01	0.01	0.32
Pro-social and volunteering behaviours	<---	Agreeableness	0.09	2.40	0.02	0.01	0.01	0.46
<b>Ecologically aware household chemicals usage</b>	<---	<b>Neuroticism</b>	<b>0.20</b>	<b>5.27</b>	<b>&lt;0.01</b>	<b>0.04</b>	<b>0.04</b>	<b>1.00</b>
<b>General ecological behaviours</b>	<---	<b>Affective Commitment</b>	<b>0.26</b>	<b>6.89</b>	<b>&lt;0.01</b>	<b>0.07</b>	<b>0.07</b>	<b>1.00</b>
<b>Pro-social and volunteering behaviours</b>	<---	<b>Affective Commitment</b>	<b>0.28</b>	<b>7.38</b>	<b>&lt;0.01</b>	<b>0.08</b>	<b>0.08</b>	<b>1.00</b>

Significant direct effects on affective commitment were observed for four personality traits: Neuroticism ( $b=0.14$ ,  $p<0.01$ ), Agreeableness ( $b=0.12$ ,  $p<0.01$ ), Conscientiousness ( $b=0.09$ ,  $p<0.05$ ), and Extraversion ( $b=0.10$ ,  $p<0.01$ ). Among

these, only the relationship between Neuroticism and affective commitment showed a high statistical power (0.90) and a small effect size ( $f^2=0.02$ ).

A significant relationship was also found between Extraversion, Agreeableness, and prosocial behaviours and volunteering ( $b=0.09$ ,  $p<0.05$ ), as well as between Agreeableness and general environmental behaviours ( $b=0.08$ ,  $p<0.05$ ). Regarding the use of household chemicals, significant relationships were observed with Neuroticism and Extraversion ( $b=0.20$ ,  $p<0.01$ ), with an effect size of  $f^2=0.04$  and high statistical power (0.90 and 0.99 respectively).

According to the analysis, affective commitment had a direct effect on general environmental behaviours ( $b=0.26$ ,  $p<0.01$ ) and on prosocial behaviours and volunteering ( $b=0.28$ ,  $p<0.01$ ), with effect sizes of  $f^2=0.07$  and  $f^2=0.08$ , respectively and a high statistical power. However, there was no significant effect of affective commitment on the use of household chemicals.

### **Discussion**

The results of the empirical study reveal that for four personality traits (Neuroticism, Conscientiousness, Extraversion, and Agreeableness), there is a tendency towards greater pro-environmental engagement in general environmental actions (such as recycling and environmentally friendly transportation) and prosocial behaviours (including eco-volunteering) through the indirect effect of affective commitment. The presence of affective commitment largely determines pro-environmental behaviours, especially in individuals with high levels of Neuroticism, following by Conscientiousness, and partially Extraversion. This does not apply to individuals with higher levels of Agreeableness or those Open to new experiences. Since affective commitment mediates the relationship between four of the personality traits (not just Neuroticism) and pro-environmental behaviours, this may support the argument that it can be considered a mechanism for coping with climate change rather than necessarily a pathological response to adaptation. This study provides additional insight into this discussion (Clayton & Karazsia 2020; Stanley et al. 2021).

Previous research has suggested that Openness to experience predicts pro-environmental behaviours (Hirsch & Dolderman 2007; Hirsch 2010; Nisbet et al. 2009; Markowitz et al. 2012; Milfont & Sibley 2012; Ashton & Lee 2007; Soutter et al. 2020), a finding not supported by the present study. However, our findings confirm prior research indicating that Agreeableness influences pro-environmental behavior (Hirsch & Dolderman 2007; Hirsch 2010; Nisbet et al. 2009; Milfont & Sibley 2012; Kvasova 2015; Ashton & Lee 2007; Soutter & Mottus 2020). Our results suggest that Agreeableness indirectly affects pro-environmental behavior. Individuals with higher Agreeableness tend to be more involved in environmental issues when they experience affective commitment. This might be because individuals with higher levels of Agreeableness tend to be cooperative, friendly,

value social harmony, and seek to understand others. Previous studies have found links between Agreeableness and empathy, altruism, higher levels of selflessness, and greater concern for others (Hirsch & Dolderman 2007; Milfont & Sibley 2012), which may explain the connection between this personality trait and pro-environmental behaviours.

Similar findings are observed regarding Extraversion. Individuals with higher levels of Extraversion, like those with higher levels of Agreeableness, tend to be focused on others. They exhibit traits such as sociability, assertiveness, proactivity, and impulsiveness (Lucas & Diener 2001). These traits may also explain their increased involvement in prosocial environmental behaviours and volunteering. Fewer previous studies have confirmed the association between Extraversion and pro-environmental behaviours (Kvasova 2015; Soutter et al. 2020), likely because these studies examine a variety of pro-environmental activities without considering those with a social component or the influence of a mediating factor like emotional state. In our current study, we did not find a direct effect on the relationship with pro-environmental behaviours; instead, it is mediated through affective commitment. These findings underscore the intricate nature of pro-environmental behavior and its broad spectrum, which may explain discrepancies in results across different studies due to variations in how pro-environmental behavior is defined and measured from different perspectives.

Based on our results, the presence of higher levels of Neuroticism does not directly influence pro-environmental behaviours, a result consistent with previous studies. However, what's noteworthy is the significant indirect effect observed through affective commitment in individuals with Neuroticism. Additionally, we found a significant relationship between Neuroticism and affective commitment. Neuroticism is associated with heightened anxiety and negative thoughts, while affective commitment encompasses negative emotions linked to environmental concern and climate change. It seems that when specific anxieties about ecological issues arise, individuals with higher neuroticism tendencies are more inclined to undertake specific protective actions. Understanding further the mechanism behind this phenomenon would be intriguing.

Chiang et al. (2019), for example, suggest that Neuroticism is influenced by the external environment, necessitating mediating factors to explain pro-environmental behavior. Internal locus of control seems to be one such mediating factor (Karbalaie et al. 2014; Chiang et al. 2019). Our study indicates that affective commitment also acts as a mediating factor, prompting more environmentally conscious actions in individuals with higher neurotic tendencies. In public discourse, climate change is often associated with human-caused negative impacts, potentially empowering individuals to perceive control (an internal locus of control) in altering the situation. Future research could further investigate the combined effects of locus of control and affective commitment.

Finally, the findings demonstrate a direct impact of affective commitment on both general and prosocial pro-environmental behaviours, aligning with the majority of prior research (Fraj & Martinez 2006; Chan & Lau 2000; Larios-Gomez & Fischer 2018; Verplanken et al. 2020; Boluda-Verdu et al. 2022; Mathers-Jones & Todd 2023). This finding highlights the dual role of affective commitment: not only does it serve as an indirect mediator through personality traits, but it also directly drives individuals to take action. Notably, the results regarding the usage of household chemicals, as a subset of pro-environmental behaviours, are intriguing. No indirect relationships were identified in this regard. The only significant statistical associations (direct links) were observed with Neuroticism and Extraversion. This outcome may be elucidated by the positive correlation between Neuroticism and obsessive-compulsive behaviours, which encompass cleaning and disinfecting practices (Fullana et al. 2004; Bergin et al. 2014; Samuels et al. 2020). Conversely, extraverted individuals tend to engage more in social activities, including hosting gatherings or visiting others. Research on behavior during the COVID-19 pandemic suggests that those with higher levels of Extraversion exhibit a preference for cleaning and disinfecting behaviours (Shook et al. 2020).

### **Conclusions, implications and future directions**

The findings of the present study suggest that affective commitment acts as a significant mediator among individuals exhibiting high levels of Neuroticism and Conscientiousness, influencing greater involvement in pro-environmental activities. There is a notable relationship between Neuroticism and affective commitment, highlighting the emotional state's role in shaping environmental behaviours. Additionally, affective commitment directly impacts both general and prosocial pro-environmental behaviours, underscoring its broad influence. This research holds practical implications for the design of interventions, campaigns, and initiatives aimed at promoting pro-environmental behaviours. For instance, tailored communication strategies could be devised based on these findings. Extraverted individuals and those with higher levels of Agreeableness may benefit from approaches focusing on social engagement, cooperation, and community involvement. Successful campaigns could emphasize volunteering, participating in prosocial endeavors, community engagement, and organizational involvement. Conversely, individuals with high Conscientiousness, particularly those with elevated Neuroticism, may respond well to messages highlighting the dramatic consequences of climate change. However, it is crucial to balance these messages to avoid overwhelming individuals or inducing eco-paralysis, emphasizing instead their sense of control and ability to effect positive change. Further comprehensive research is warranted to delve deeper into these dynamics.

The study also has its limitations. Firstly, it relied on a brief assessment tool for measuring personality traits. Using a more extensive instrument covering various

facets of personality traits is essential for corroborating the findings and conducting a more nuanced analysis. Secondly, the study utilized self-reported measures, which may be susceptible to response biases stemming from social desirability. Lastly, being cross-sectional in nature, the study captured results at a specific time point. Conducting interventions and longitudinal studies could track changes in pro-environmental behavior or distinguish between pro-environmental intentions and actual actions.

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### **REFERENCES**

- ALBRECHT, G., 2012. Psychoterratic Conditions in a Scientific and Technological World. In P. H. KAHN & P. H. HASBACH (eds.), *Eco-psychology: Science, Totems, and the Technological Species*, pp. 241 – 264. MIT Press: Cambridge, UK.
- ASHTON, M. C., & LEE, K., 2007. Empirical, Theoretical, and Practical Advantages of the HEXACO Model of Personality Structure. *Personality and Social Psychology Review*, vol. 11, no. 2, pp. 150 – 166.
- BARBARO, N., & PICKETT, S., 2016. Mindfully Green: Examining the Effect of Connectedness to Nature on the Relationship between Mindfulness and Engagement in Pro-Environmental Behavior. *Personality and Individual Differences*, vol. 93, pp. 137 – 142.
- BERGIN, J., VERHULST, B., AGGEN, S., NEALE, M., KENDLER, K., BIENVENU, O., & HETTEMA, J., 2014. Obsessive-Compulsive Symptom Dimensions and Neuroticism: An Examination of Shared Genetic and Environmental Risk. *American Journal of Medical Genetics*, vol. 0, no. 8, pp. 647 – 653.
- BISSING-OLSON, M., FIELDING, K., & IYER, A., 2016. Experiences of Pride, Not Guilt, Predict Pro-Environmental Behavior When Pro-Environmental Descriptive Norms Are More Positive. *Journal of Environmental Psychology*, vol. 45, pp. 145 – 153.
- BOEREE, G., 2006 *Personality Theories*. [viewed 22 April 2024]. Available from: <http://webSPACE.ship.edu/cgboer/allport.html>
- BOLUDA-VERDU, I., SENENT-VALERO, M., CASAS-ESCOLANO, M., MATJASEVICH, A., & PASTOR-VALERO, M. 2022. Fear for the Future: Eco-Anxiety and Health Implications, a Systematic Review. *Journal of Environmental Psychology*, vol. 84, p. 101904.

- BRICK, C., & LEWIS, G., 2016. Unearthing the “Green” Personality: Core Traits Predict Environmentally Friendly Behavior. *Environment and Behavior*, vol. 48, no. 5, pp. 635 – 658.
- CHAN, R., & LAU, L., 2000. Antecedents of Green Purchases: A Survey in China. *Journal of Consumer Marketing*, vol. 17, no. 4, pp. 338 – 375.
- CHIANG, Y., FANG, W., KAPLAN, U., & NG, E., 2019. Locus of Control: The Mediation Effect between Emotional Stability and Pro-Environmental Behavior. *Sustainability*, vol. 11, no. 3, 1 – 14.
- CLAYTON, S., KARAZSIA, B., 2020. Development and Validation of a Measure of Climate Change Anxiety. *Journal of Environmental Psychology*, vol. 69, p. 101434.
- CLAYTON, S., MANNING, C., KRYGSMAN, K., & SPEISER, M., 2017. *Mental Health and Our Changing Climate: Impacts, Implications, and Guidance*. APA & EcoAmerica: Washington, DC, USA.
- COFFEY, Y., BHULLAR, N., DURKIN, J., ISLAM, M., & USHER, K., 2021. Understanding Eco-Anxiety: A Systematic Scoping Review of Current Literature and Identified Knowledge Gaps. *Journal of Climate Change and Health*, vol. 3, p. 100047.
- DUONG, M., & PENSINI, P., 2023. The Role of Connectedness in Sustainable Behaviour: A Parallel Mediation Model Examining the Prosocial Foundations of Pro-Environmental Behavior. *Personality and Individual Differences*, vol. 209, p. 112216.
- FAN, N. 2015. *The Role of Emotions in Stimulating Pro-Environmental Behavior on Social Media* (Ph.D. Thesis, Wageningen University and Research Centre).
- FIELD, A., 2013. *Discovering Statistics Using IBM SPSS Statistics*. Sage Publications: Thousand Oaks, CA.
- FRAJ, E., & MARTINEZ, E. 2006. Ecological Consumer Behavior: An Empirical Analysis. *International Journal of Consumer Studies*, vol. 31, no. 1, pp. 26 – 33.
- FULLANA, M., MATAIX-COLS, D., TRUJILLI, J., CASERAS, X., SERRANO, F., ALONSO, P., MENCHON, J., VALLEJO, J., & TORRUBIA, R., 2004. Personality Characteristics in Obsessive-Compulsive Disorder and Individuals with Subclinical Obsessive-Compulsive Problems. *British Journal of Clinical Psychology*, vol. 43, no. 4, pp. 387 – 398.
- GEORGE, J., & DANE, E., 2016. Affect, Emotion, and Decision Making. *Organizational Behavior and Human Decision Processes*, vol. 136, pp. 47 – 55.
- GRAVETTER, F., & WALLNAU, L. 2014. *Essentials of Statistics for the Behavioral Sciences* (8th ed.). Wadsworth: Belmont, CA.

- HICKMAN, C., MARKS, E., PIHKALA, P., CLAYTON, S., LEWANDOWSKI, R. E., MAYALL, E. E., WRAY, B., MELLOR, C., & VAN SUSTEREN, L., 2021. Climate Anxiety in Children and Young People and Their Beliefs about Government Responses to Climate Change: A Global Survey. *Lancet Planetary Health*, vol. 5, no. 12, pp. 863 – 873.
- HIRSCH, J., 2010. Personality and Environmental Concern. *Journal of Environmental Psychology*, vol. 30, no. 2, pp. 245 – 248.
- HIRSCH, J., & DOLDERMAN, D., 2007. Personality Predictors of Consumerism and Environmentalism: A Preliminary Study. *Personality and Individual Differences*, vol. 43, no. 6, pp. 1583 – 1593.
- HUTCHESON, G., & SOFRONIOU, N., 1999. *The Multivariate Social Scientist: Introductory Statistics Using Generalized Linear Models*. Sage Publications: Thousand Oaks, CA.
- JOHN, O. P., & SRIVASTAVA, S., 1999. The Big-Five Trait Taxonomy: History, Measurement, and Theoretical Perspectives. In: L. A. PERVIN & O. P. JOHN (Eds.), *Handbook of Personality: Theory and Research*, vol. 2, pp. 102 – 138. Guilford Press: New York.
- KAISER, E., 1998. A General Measure of Ecological Behavior. *Journal of Applied Social Psychology*, vol. 28, no. 5, pp. 395 – 422.
- KAISER, H. F., 1974. An Index of Factorial Simplicity. *Psychometrika*, vol. 39, no. 1, pp. 31 – 36.
- KARBALAEI, S., ABDOLLAHI, A., MOMTAZ, V., & TALIB, M., 2014. Locus of Control, Neuroticism, and Spirituality as Predictors of Waste-Prevention Behaviors. *Ecopsychology*, vol. 6, no. 4, pp. 1 – 8.
- KIM, H., 2013. Statistical Notes for Clinical Researchers: Assessing Normal Distribution (2) Using Skewness and Kurtosis. *Restorative Dentistry & Endodontics*, vol. 38, no. 1, pp. 52 – 64.
- KRETTENAUER, T., WANG, W., JIA, F., & YAO, Y., 2020. Connectedness with Nature and the Decline of Pro-Environmental Behavior in Adolescence: A Comparison of Canada and China. *Journal of Environmental Psychology*, vol. 71, 101348.
- KVASOVA, O., 2015. The Big Five Personality Traits as Antecedents of Eco-Friendly Tourist Behavior. *Personality and Individual Differences*, vol. 83, pp. 111 – 116.
- LARIOS-GOMEZ, E., & FISCHER, L., 2018. Relation among Ecological Affect, Concern, and Knowledge and Purchase Behavior: A Study Regarding Mexican Consumers. *Rev. Virtu@lmente*, vol. 6, no. 2, pp. 79 – 104.
- LAI, F., IP, A., & LEE, T., 2011. Impulsivity and Pathological Gambling: Is it a State or a Trait Problem? *BMC Research Notes*, vol. 4, no. 1, p. 492.



- LUCAS, R., & DIENER, E., 2001. In: N. SMELSER & P. BALTES (eds.), *International Encyclopedia of the Social & Behavioral Sciences*. Elsevier: UK.
- MALONEY, M., WARD, M., & BRAUCHT, G., 1975. A Revised Scale for the Measurement of Ecological Attitudes and Knowledge. *American Psychologist*, vol. 30, no. 7, pp. 787 – 790.
- MANNING, C., CLAYTON, S., & SPEISER, M., 2017. *Mental Health and Our Changing Climate: Impacts, Implications, and Guidance*. APA & EcoAmerica: Washington, DC, USA.
- MARKOWITZ, E., GOLDBERG, L., ASHTON, M., & LEE, K. 2012. Profiling the ‘Pro-Environmental Individual’: A Personality Perspective. *Journal of Personality*, vol. 80, no. 1, pp. 81 – 111.
- MARTIN, L., WHITE, M., HUNT, A., RICHARDSON, M., PAHL, S., & BURT, J., 2020. Nature Contact, Nature Connectedness, and Associations with Health, Wellbeing, and Pro-Environmental Behaviors. *Journal of Environmental Psychology*, vol. 68, p. 101389.
- MATHERS-JONES, J., & TODD, J., 2023. Ecological Anxiety and Pro-Environmental Behavior: The Role of Attention. *Journal of Anxiety Disorders*, vol. 98, p. 102745.
- MILFONT, T., & SIBLEY, C., 2012. The Big Five Personality Traits and Environmental Engagement: Associations at the Individual and Societal Level. *Journal of Environmental Psychology*, vol. 32, no. 2, pp. 187 – 195.
- NISBET, E., ZELENSKI, J., & MURPHY, S., 2009. The Nature Relatedness Scale. *Environment and Behavior*, vol. 41, no. 5, pp. 715 – 740.
- PENSE, M., & KIM, H., 2013. Exploring the Psychological Benefits of Nature. *Environmental Science*, vol. 5, no. 4, pp. 450 – 460.
- PIHKALA, P., 2020. Anxiety and the Ecological Crisis: An Analysis of Eco-Anxiety and Climate Anxiety. *Sustainability*, vol. 12, no. 19, p. 7836.
- POSKUS, M., 2019. *Predicting and Promoting Adolescents’ Pro-Environmental Behavior in Different Big Five Trait Clusters* (Ph.D. Thesis, Mykolas Romeris University).
- REES, J., KLUG, S., & BAMBERG, S., 2014. Guilty Conscience: Motivating Pro-Environmental Behavior by Inducing Negative Moral Emotions. *Climatic Change*, vol. 130, no. 33, pp. 429 – 452.
- SAMUELS, J., BIENVENU, O., KRASNOW, J., WANG, Y., GRADOS, M., CULLEN, B., & GOES, F., 2020. General Personality Dimensions, Impairment, and Treatment Response in Obsessive-Compulsive Disorder. *Personality and Mental Health*, vol. 14, no. 2, pp. 186 – 198.
- SCHWARZ, N., 2000. Emotion, Cognition, and Decision Making. *Cognition and Emotion*, vol. 14, no. 4, pp. 433 – 440.



- SCHWARTZ, D., & LOEWENSTEIN, G., 2017. The Chill of the Moment: Emotions and Pro-Environmental Behavior. *Journal of Public Policy and Marketing*, vol. 36, no. 2, pp. 255 – 268.
- SIERRA-BARON, W., OLIVOS-JARA, P., GOMEZ-ACOSTA, A., & NAVARRO, O., 2023. Environmental Identity, Connectedness with Nature, and Well-Being as Predictors of Pro-Environmental Behavior, and Their Comparison between Inhabitants of Rural and Urban Areas. *Sustainability*, vol. 15, no. 5, p. 4525.
- STANLEY, S., HOGG, T., LEVISTAN, Z., & WALKER, I., 2021. From Anger to Action: Differential Impacts of Eco-Anxiety, Eco-Depression, and Eco-Anger on Climate Action and Wellbeing. *Journal of Climate Change and Health*, vol. 1, p. 100003.
- STELLAR, J., GORDON, A., PIFF, P., CORDARO, D., ANDERSON, C., BAI, Y., MARUSKIN, L., & KELTNER, D., 2017. Self-Transcendent Emotions and Their Social Functions: Compassion, Gratitude, and Awe Bind Us to Others through Prosociality. *Emotion Review*, vol. 9, no. 1, pp. 1 – 8.
- STEG, L., 2005. Car Use: Lust and Must. Instrumental, Symbolic, and Affective Motives for Car Use. *Transportation Research Part A: Policy and Practice*, vol. 39, no. 2 – 3, pp. 147 – 162.
- SOUTTER, A., & BATES, T., 2020. Big Five and HEXACO Personality Traits, Pro-Environmental Attitudes, and Behaviors: A Meta-Analysis. *Perspectives on Psychological Science*, vol. 15, no. 4, pp. 913 – 941.
- SOUTTER, A., & MOTTUS, R., 2020. Big Five Facets' Associations with Pro-Environmental Attitudes and Behaviors. *Journal of Personality*, vol. 89, no. 4, pp. 203 – 215.
- TROCHIM, W., & DONNELLY, J. 2006. *The Research Methods Knowledge Base* (3rd ed.). Atomic Dog: Cincinnati, OH.
- VERPLANKEN, B., MARKS, E., & DOBROMIR, A., 2020. On the Nature of Eco-Anxiety: How Constructive or Unconstructive is Habitual Worry about Global Warming? *Journal of Environmental Psychology*, vol. 72, p. 101528.
- WANG, L., ZHANG, G., SHI, P., & LU, X., 2019. Influence of Awe on Green Consumption: The Mediating Effect of Psychological Ownership. *Frontiers in Psychology*, vol. 10, p. 1512.
- WILLIAMS, S., & MCCRORIE, R., 1990. The Analysis of Ecological Attitudes in Town and Country. *Journal of Environmental Management*, vol. 31, no. 2, pp. 157 – 162.
- YANG, Y., HU, J., JING, F., & NGUYEN, B., 2018. From Awe to Ecological Behavior: The Mediating Role of Connectedness to Nature. *Sustainability*, vol. 10, no. 7, p. 2477.

- ZELENSKI, J., & DESROCHERS, J. 2021. Can Positive and Self-Transcendent Emotions Promote Pro-Environmental Behavior? *Current Opinion in Psychology*, vol. 42, pp. 31 – 35.
- ZHAO, H., ZHANG, H., XU, Y., LU, J., & HE, W., 2018. Relation between Awe and Environmentalism: The Role of Social Dominance Orientation. *Frontiers in Psychology*, vol. 9.
- ZHOU, Y., & FANG, W., 2019. Effects of Connectedness to Nature on Health and Wellbeing: An Analysis of Psychological Mechanisms. *Environmental Research*, 181 .
- ZHOU, Y., & NGUYEN, P., 2022. Connectedness to Nature and Mental Health. *Journal of Psychological Well-being*, vol. 5, no. 3, pp. 23 – 39.

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## Appendix

**Table 1.** Results of the KMO and Bartlett's Test

<b>KMO and Bartlett's Test</b>		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.75
Bartlett's Test of Sphericity	Approx. Chi-Square	3750.66
	df	666
	Sig.	0

**Table 2.** Psychometric characteristics of the scales

	<b>Number of items</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>SD</b>	<b>Alpha</b>
General ecological behaviours	6	10	28	18.16	2.96	0.62
Pro-social behaviours and volunteering	6	4	16	7.26	2.00	0.71
Ecologically aware household chemicals usage	6	6	24	16.29	3.82	0.67

**Table 3.** Factor analysis results

<b>Factor loading</b>				<b>1</b>	<b>2</b>	<b>3</b>
<b>Factor 1: General ecological behaviours</b>						
12	I collect and recycle used paper.			0.60		
29	For shopping, I prefer paper bags to plastic ones.			0.56		
13	I bring empty bottles to a recycling bin.			0.52		
37	When possible in nearby areas, I use public transportation.			0.51		
33	I am pointing out to someone his or her unecological behavior.			0.48		
9	I put dead batteries in the garbage.			-0.46		
<b>Factor 2: Pro-social behaviours and volunteering</b>						
2	From time to time I contribute money to charity.				0.72	
34	I sometimes contribute financially to environmental organizations.				0.67	
1	Sometimes I give change to panhandlers.				0.62	
32	I am a member of an environmental organization.				0.55	
31	I often talk with friends about problems related to the environment.				0.48	
11	I bring unused medicine back to the pharmacy.				0.45	
<b>Factor 3: Ecologically aware household chemicals usage</b>						
20	I use an oven-cleaning spray to clean my oven.					0.71

24	I use a cleaner made especially for bathrooms rather than an all-purpose cleaner.			0.62
22	I use a chemical air freshener in my bathroom.			0.57
23	I use chemical toilet cleaners.			0.57
19	I use fabric softener with my laundry.			0.56
21	If there are insects in my apartment, I kill them with a chemical Insecticide.			0.55

**Table 4.** Descriptive Statistics

	n	Min	Max	Mean	SE	SD	Skewness	SE	Kurtosis
General ecological behaviours	669	10	28	18.16	0.11	2.96	-0.03	0.09	0.18
Pro-social and volunteering behaviours	669	4	16	7.26	0.08	2.00	1.17	0.09	1.83
Ecologically aware household chemicals usage	669	6	24	16.29	0.15	3.82	-0.15	0.09	-0.40
Extraversion	669	3	15	10.77	0.10	2.63	-0.25	0.09	-0.50
Agreeableness	669	4	15	11.62	0.09	2.27	-0.55	0.09	0.03
Consciousness	669	4	15	11.95	0.09	2.42	-0.64	0.09	-0.10
Neuroticism	669	3	15	9.62	0.11	2.76	-0.10	0.09	-0.54
Openness	669	3	15	11.46	0.09	2.41	-0.48	0.09	-0.08
Eco-Anxiety	669	7	35	26.28	0.21	5.36	-0.49	0.09	0.08