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Does Everything Depend on an Individual's Personality? The Potential Positive Impact of Pro-Environmental Behaviour on Individuals' Subjective Well-Being

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Abstract

In this study, we examine whether personality profiles moderate a recently proposed environmental behaviour–well-being model. The model is grounded in Self-Determination Theory, which suggests that pro-environmental behaviour may contribute to subjective well-being through the satisfaction of basic psychological needs. A total of 403 adolescents from four Lithuanian schools participated in this study. Participants were selected using a convenience sampling method, and the average participant age was 14.89 years (56.6% female). Structural equation modelling demonstrated acceptable model fit (CFI = 0.988, TLI = 0.986, NFI = 0.929, RMSEA = 0.043 [0.022–0.058], SRMR = 0.113, χ^2 (353) = 416.92, p = 0.011) and indicated that personality profiles moderate several pathways within the environmental behaviour–well-being model. Additionally, the results showed that pro-environmental behaviour and connectedness to nature did not significantly predict subjective well-being across all personality profiles. The findings highlight the importance of considering personality differences when designing sustainability-related educational interventions aimed at promoting environmental citizenship and improving subjective well-being.

Keywords: environmental citizenship; pro-environmental behaviour; personality; subjective well-being

1. Introduction

We all share the same planet, yet continuous environmental pollution continues to affect our daily lives, quality of life, and health [1]. Environmental challenges are not only ecological issues but also psychological ones, as they shape how people experience their lives and well-being. Research increasingly suggests that engagement in pro-environmental behaviour is positively associated with subjective well-being [2]. Thus, acting in pro-environmental ways may relate not only to sustainability but also to individual flourishing.

Environmental citizens act towards a more sustainable future through environmentally responsible behaviour, and such behaviour has been linked to well-being [2]. Although pro-environmental behaviour demonstrates a direct association with well-being [2], this relationship may also be explained through basic psychological need satisfaction [3]. A recently developed environmental behaviour–well-being model, grounded in Self-Determination Theory and integrating the environmental citizenship and connectedness to nature frameworks, seeks to explain how pro-environmental behaviour may relate to subjective well-being, particularly through the satisfaction of basic psychological needs [4]. This framework

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provides a structured explanation of how pro-environmental behaviour may contribute to subjective well-being.

However, it remains unclear whether being an environmental citizen and acting as an agent of change is equally beneficial for all individuals, or whether these associations depend on personality patterns. Traditionally, personality research has focused more on individual traits than on broader personality patterns [5]. Yet personality represents a combination of traits, and a single trait cannot fully capture how personality relates to pro-environmental behaviour [6]. Therefore, in the present study, personality is approached holistically, from a person-orientated perspective [7].

2. Literature Review

2.1. Environmental Behaviour–Well-Being Model

The environmental behaviour–well-being model, grounded in Self-Determination Theory (SDT), provides a framework for understanding how environmental citizens may satisfy their basic psychological needs through pro-environmental behaviour [4]. Environmental citizenship is defined as "*responsible pro-environmental behaviour of citizens who act and participate in society as agents of change in the private and public sphere on a local, national, and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, achieving sustainability, and developing a healthy relationship with nature*" [8]. According to this definition, environmental citizens act as change agents not only through public engagement but also through everyday behavioural choices in their private sphere.

Research indicates that pro-environmental behaviour is positively related to well-being. For example, Prinzing [2], using both experience-sampling and experimental methods, showed that engaging in pro-environmental behaviour increases happiness and meaning in life. Overall, the findings were more consistent with the idea that pro-environmental behaviour contributes to well-being through the satisfaction of basic psychological needs. Basic psychological needs—namely autonomy, competence, and relatedness—are central to SDT, and their satisfaction supports intrinsic motivation, personal growth, and overall well-being [9]. Engaging in pro-environmental behaviour may foster autonomy through self-endorsed actions, competence through the use of environmental knowledge and skills, and relatedness through shared goals and collective engagement. In this way, acting as an environmental citizen may relate not only to sustainability outcomes but also to positive psychological functioning.

An important component of the model is connectedness to nature, which refers to one's feeling of being part of nature [10]. That connection can be expressed in different forms, including affective, cognitive, and experiential [10–12]. Connectedness to nature is positively associated with environmental citizenship [13], pro-environmental behaviour [14], and subjective well-being [15], which further supports its role within the model. Furthermore, lower levels of connectedness to nature are associated with fewer pro-environmental behaviours [16] and lower environmental knowledge [17]. Despite this, adolescence represents a crucial developmental period for physical, emotional, and social development [18], making connectedness to nature particularly relevant in this age group.

As people become more aware of climate change issues, they tend to seek stronger sustainability policies [19]. Furthermore, environmental knowledge has been shown to positively predict pro-environmental citizenship behaviour [20]. However, knowledge alone may not be sufficient. It is possible that connectedness to nature functions as an underlying mechanism linking environmental knowledge to environmental citizenship. It is possible that objective environmental knowledge is related to connectedness to nature, which in turn may encourage individuals to act as agents of change toward sustainability [4].

Moreover, knowledge is necessary to understand the consequences of one's actions, as not all pro-environmental behaviours produce immediately visible outcomes [21]. In the present model, environmental knowledge refers to factual knowledge about how electricity is generated, how waste is recycled and disposed of, how water and air pollution occur, and how human actions affect nature more broadly.

Figure 1 presents the environmental behaviour–well-being model. The main purpose of this model is to explain how being an environmental citizen may relate to subjective well-being through engagement in pro-environmental behaviours that satisfy basic psychological needs. In this model, subjective well-being is defined as a "*dynamic optimal state of psychosocial functioning that arises from functioning well across multiple psychosocial domains*" [22] (p. 2). According to Kern et al. [23], those psychological characteristics for adolescents are engagement, perseverance, optimism, connectedness, and happiness. Engagement refers to the ability to become engrossed in a task at hand but also to take an active interest in and contribute to that task [23]. The domain of perseverance refers to continuing to work toward one's goals in spite of experiencing downfalls along the way [23]. The domain of optimism can be defined as hopefulness and confidence in the future; an optimistic person can see the bright side of things and can explain negative occurrences by viewing them as temporary [23]. Connectedness refers to having a positive relationship with others—not only having friends but also feeling that those around you love, support, care for, and value that relationship [23]. Lastly, the happiness domain refers to long-term states of happiness, positive mood, and satisfaction with one's life rather than situational positive emotion bursts [23].

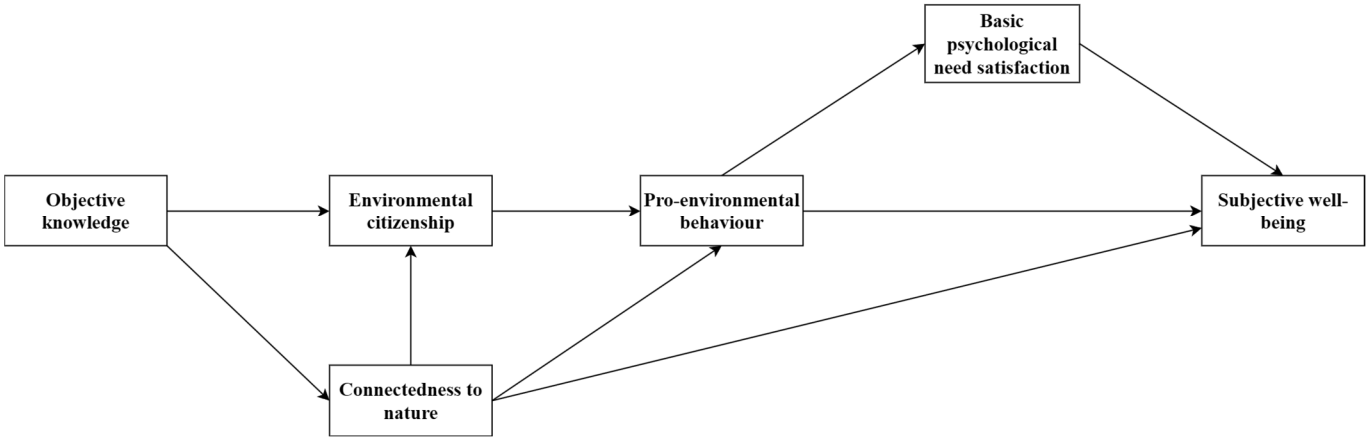


Figure 1. Environmental behaviour–well-being model illustrating the relationship between environmental citizenship and subjective well-being, based on Vijaikis and Poškus [4].

Subjective well-being has been shown to be positively associated with connectedness to nature [24] and pro-environmental behaviour [25,26]. Moreover, engagement in pro-environmental activities may enhance well-being through the satisfaction of basic psychological needs [27,28]. Although environmental citizenship encompasses both pro-environmental action and a relationship with nature, it remains unclear whether and through which psychological mechanisms environmental citizens may achieve higher levels of subjective well-being.

2.2. Personality Traits

As humans, we all share universal features as well as characteristics that distinguish us from one another. The characteristics that separate us from one another are our personality traits [29]. In spite of our similarities and differences, as mentioned before, humans generally strive to thrive and experience well-being. However, different aspects of personality

are linked in different ways to well-being [30]. Nonetheless, as humans, we have universal psychological needs, and meeting those needs supports flourishing, personal growth, and overall well-being [9]. Despite our differences, individuals are more likely to thrive when their basic psychological needs are fulfilled.

The Big Five personality traits have been proposed to be adaptive across different levels of expression, each leading to certain goals but through different ways [31,32]. Individual traits have been linked to a variety of outcomes, including pro-environmental behaviour [33–35] and well-being [30]. However, variable-orientated approaches such as correlation coefficients capture separate associations among variables rather than the integrated functioning of the whole personality [7,36]. The Big Five traits are interrelated, and viewing them as independent predictors may be too simplistic for understanding the individual [6,37,38]. Thus, the present study adopts a person-orientated approach, regarding patterns of personality traits as the central unit of analysis in order to gain deeper insight into real-life individual differences.

2.3. Present Study

This study expands the previously proposed environmental behaviour–well-being model [4] by adopting a person-orientated approach [7,36] to explore whether the pattern of associations within the model differs across personality profiles. This allows us to examine not only the average relationships between the variables, but also whether these relationships differ depending on the combination of personality traits. In this way, this study provides further insight into the individuals for whom the environmental behaviour–well-being model is more or less applicable.

Because the personality profiles were empirically identified in the current sample, we did not formulate profile-specific hypotheses. However, we expected that the strength of the associations in the environmental behaviour–well-being model would differ across personality profiles.

This study addresses the following research question:

Do the associations among environmental knowledge, connectedness to nature, environmental citizenship, pro-environmental behaviour, basic psychological need satisfaction, and subjective well-being differ across individuals characterised by different personality profiles?

3. Materials and Methods

3.1. Sample Characteristics

The sample size of the current study was 403 participants (39.2% male, 56.6% female, and 4.2% who selected "prefer not to answer" regarding sex). The mean age of the participants was 14.89 years (SD = 0.90).

3.2. Procedure

A study was conducted in four Lithuanian schools. Schools were selected through convenience sampling. Participants filled in online questionnaires with their own mobile phones. The survey was conducted in October 2022. Written consent was obtained from parents, schools, and participating students. Participants could at any time refuse to take part in this study without any negative outcome.

3.3. Measures

In this study, we used the measurements listed below in the order listed. Each participant's item order within all scales was random.

This study is part of a larger project, and participants completed additional measures that were not used or discussed in this study.

3.3.1. Demographic Variables

Essential demographic information such as age and sex was gathered. There were three options regarding participants' sex: male, female, and prefer not to answer.

3.3.2. Personality Traits

We applied the Big Five Inventory-2 (BFI-2) [29] to measure personality traits. Traits are namely: extraversion (e.g., *Is outgoing, sociable*); conscientiousness (e.g., *Tends to be disorganized*); negative emotionality (e.g., *Worries a lot*); open-mindedness (e.g., *Is original, comes up with new ideas*); and agreeableness (e.g., *Assumes the best about people*). The inventory consists of 30 items (6 items per trait). Each trait has 3 reversed items. All items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (agree strongly). The inventory demonstrated acceptable consistency: extraversion—$\alpha = 0.63$, $\omega = 0.61$; conscientiousness—$\alpha = 0.65$, $\omega = 0.60$; negative emotionality—$\alpha = 0.72$, $\omega = 0.72$; open-mindedness—$\alpha = 0.62$, $\omega = 0.65$; agreeableness—$\alpha = 0.58$, $\omega = 0.52$.

3.3.3. Environmental Citizenship

To assess environmental citizenship, we applied the Agent of Change scale from the Environmental Citizenship Questionnaire [39]. The Agent of Change scale consists of 3 items (e.g., *I would actively participate in decision-making and also engage in action-taking*). Each item is rated on a 5-point Likert scale ranging from 1 (very unlikely) to 5 (very likely). The scale demonstrated good consistency: $\alpha = 0.87$, $\omega = 0.87$.

3.3.4. Objective Knowledge

To measure respondents' knowledge level about the environment, we applied a test provided by Leeming et al. [40]. We used 26 items from the test, as 4 items were unsuitable for Lithuanian adolescents. Each item has six answers, and only one is correct; furthermore, participants could choose the answer "*I don't know*". All correct answers were summed, and a higher score indicates better knowledge. The minimum score was 0, which indicated that the participant knew nothing regarding the test questions, and the maximum score was 26, which indicated that the participant knew all the correct answers. Higher scores demonstrate higher environmental knowledge. The test showed good internal consistency (KR-20 = 0.76).

3.3.5. Connectedness to Nature

We used the nature connection index (NCI) [11] to assess connectedness to nature. The scale consists of six items (e.g., *I feel part of nature*). Each item is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (agree strongly). The scale demonstrated high consistency: $\alpha = 0.91$, $\omega = 0.91$.

3.3.6. Basic Psychological Need Satisfaction

To assess basic psychological need satisfaction, we used the basic psychological need satisfaction and frustration scale (BPNSFS) [41]. We applied only the satisfaction scale. The scale consists of 12 items (4 items per need). Needs are, namely, autonomy (e.g., *I feel my choices express who I really am*), relatedness (e.g., *I feel that the people I care about also care about me*), and competence (e.g., *I feel capable at what I do*). Each item is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (agree strongly). The scale showed good consistency: autonomy—$\alpha = 0.88$, $\omega = 0.89$; relatedness—$\alpha = 0.91$, $\omega = 0.91$; competence—$\alpha = 0.88$, $\omega = 0.88$.

3.3.7. Pro-Environmental Behaviour

To measure pro-environmental behaviour, we used self-reported items provided by Krettenauer [42] and Gupta and Agrawal [43]. The instrument is composed of four scales namely, energy conservation, waste reduction, recycling, and sustainable purchasing. The energy conservation scale consists of 4 items (e.g., *I turn off the lights when they are not needed*). The waste reduction scale consists of 5 items (e.g., *I reuse my shopping bags*). The recycling scale consists of 5 items (e.g., *I recycle used bottles*). The sustainable purchasing scale consists of 5 items (e.g., *I avoid purchasing things that I do not need*). All items are rated on a 5-point Likert scale ranging from 1 (never) to 5 (always). The overall average of the scales will form an estimate of pro-environmental behaviour. The scales demonstrated good consistency: energy conservation—$\alpha = 0.78$, $\omega = 0.78$; waste reduction—$\alpha = 0.77$, $\omega = 0.77$; recycling—$\alpha = 0.78$, $\omega = 0.79$; sustainable purchasing—$\alpha = 0.84$, $\omega = 0.85$.

3.3.8. Subjective Well-Being

We used the EPOCH measurement of adolescents to evaluate well-being [23]. The instrument consists of 20 items (4 items per domain) and measures five domains of well-being, namely, engagement (e.g., *I get completely absorbed in what I am doing*), persistence (e.g., *Once I make a plan to get something done, I stick to it*), optimism (e.g., *I think good things are going to happen to me*), connectedness (e.g., *When I have a problem, I have someone who will be there for me*), and happiness (e.g., *I love life*). Items are rated on a 5-point Likert scale ranging from 1 (almost never/not at all like me) to 5 (almost always/very much like me). The overall average of the domains will form an estimate of subjective well-being. The domains showed good internal consistency: connectedness domain—$\alpha = 0.86$, $\omega = 0.86$; perseverance domain—$\alpha = 0.82$, $\omega = 0.82$; engagement domain—$\alpha = 0.85$, $\omega = 0.86$; happiness domain—$\alpha = 0.89$, $\omega = 0.89$; optimism domain—$\alpha = 0.89$, $\omega = 0.89$.

3.4. Analysis Strategy

To address the research question, both person-orientated and variable-orientated analytical approaches were applied. All analyses were conducted using JASP 0.16.4. First, structural equation modelling (SEM) was conducted to test the overall environmental behaviour–well-being model. Model estimation was performed using the diagonally weighted least squares (DWLS) estimator, which is considered appropriate for models including ordinal indicators [44]. Model fit was evaluated using commonly reported indices, including the comparative fit index (CFI), Tucker–Lewis index (TLI), normed fit index (NFI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR) [45], and following standard SEM guidelines, it was assessed using the overall pattern of fit indices instead of a single strict cut-off criterion [46].

Second, a person-orientated clustering approach (K-means) was used to identify personality profiles based on the pattern of scores across personality traits. The clustering was performed using the Hartigan–Wong algorithm [47]. This approach allows the identification of naturally occurring profiles within the sample rather than analysing personality traits separately. The number of clusters was selected by considering cluster distinguishability, the comparability of cluster sizes, the interpretability of the profiles, and internal clustering indicators. Alternative cluster solutions were also inspected before selecting the final solution. Furthermore, prior to conducting multi-group structural equation modelling, one-way ANOVA tests were conducted to examine whether personality profiles differ across the main study variables. These analyses were conducted for descriptive purposes only.

Lastly, to test whether the associations within the environmental behaviour–well-being model differ across personality profiles, multi-group SEM was performed using the identified personality profiles as a grouping variable. In this way, multi-group SEM allowed us to examine whether personality profiles moderate the associations within the environmental behaviour–well-being model. Measurement invariance across groups was tested sequentially by comparing configural and metric models before examining potential differences in structural paths between personality profiles (structural invariance). Changes in model fit were evaluated using differences in the comparative fit index (ΔCFI), root mean square error of approximation (ΔRMSEA), and standardised root mean square residual (ΔSRMR), following commonly recommended criteria for measurement invariance testing [48,49].

4. Results

4.1. Descriptive Statistics

Table 1 shows descriptive statistics and correlations for all variables. The normality of the variable distribution was assessed using kurtosis and skewness, and estimates show that all variables are approximately normally distributed.

Table 1. Correlations between all used variables.

Variable	*M*	*SD*	S	K	*r*											
					1	2	3	4	5	6	7	8	9	10	11	12
1. Connectedness to nature	3.68	0.76	−0.05	−0.28	–											
2. Subjective well-being	3.23	0.89	0.10	−0.55	0.55 ***	–										
3. Pro-environmental behaviour	3.17	0.80	−0.20	0.20	0.55 ***	0.49 ***	–									
4. Autonomy	3.63	0.76	−0.08	−0.04	0.59 ***	0.57 ***	0.40 ***	–								
5. Competence	3.58	0.78	0.07	−0.24	0.58 ***	0.64 ***	0.39 ***	0.84 ***	–							
6. Relatedness	3.78	0.79	−0.19	−0.30	0.61 ***	0.56 ***	0.40 ***	0.79 ***	0.75 ***	–						
7. Environmental citizenship	3.27	0.87	−0.31	0.24	0.54 ***	0.39 ***	0.47 ***	0.40 ***	0.41 ***	0.36 ***	–					
8. Objective knowledge	11.92	4.41	−0.52	0.02	0.26 ***	0.18 ***	0.24 ***	0.19 ***	0.21 ***	0.26 ***	0.16 **	–				
9. Extraversion	3.31	0.63	−0.12	0.15	0.27 ***	0.42 ***	0.20 ***	0.32 ***	0.35 ***	0.28 ***	0.28 ***	0.08	–			
10. Conscientiousness	3.51	0.60	0.14	−0.32	0.34 ***	0.46 ***	0.21 ***	0.38 ***	0.44 ***	0.36 ***	0.23 ***	0.09	0.50 ***	–		
11. Negative emotionality	2.87	0.70	0.38	0.00	−0.09	−0.35 ***	−0.09	−0.21 ***	−0.29 ***	−0.12 *	−0.01	0.05	−0.36 ***	−0.44 ***	–	
12. Open-mindedness	3.39	0.67	0.08	−0.42	0.45 ***	0.30 ***	0.31 ***	0.35 ***	0.37 ***	0.39 ***	0.34 ***	0.25 ***	0.33 ***	0.41 ***	−0.05	–
13. Agreeableness	3.53	0.56	0.08	−0.29	0.34 ***	0.33 ***	0.26 ***	0.31 ***	0.33 ***	0.38 ***	0.16 **	0.07	0.23 ***	0.49 ***	−0.30 ***	0.29 ***

Notes. *M* = mean, *SD* = standard deviation, S = skewness, K = kurtosis, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.2. Structural Equation Model (Full Sample)

We conducted structural equation modelling with diagonally weighted least squares (DWLS) estimation on the entire sample before testing the model across personality profiles. The model demonstrated acceptable fit indices: CFI = 0.974, TLI = 0.968, NFI = 0.964, RMSEA = 0.077 [0.067–0.087], SRMR = 0.093 and χ^2 (83) = 282.20, $p < 0.001$. The standardised path estimates are shown in Figure 2.

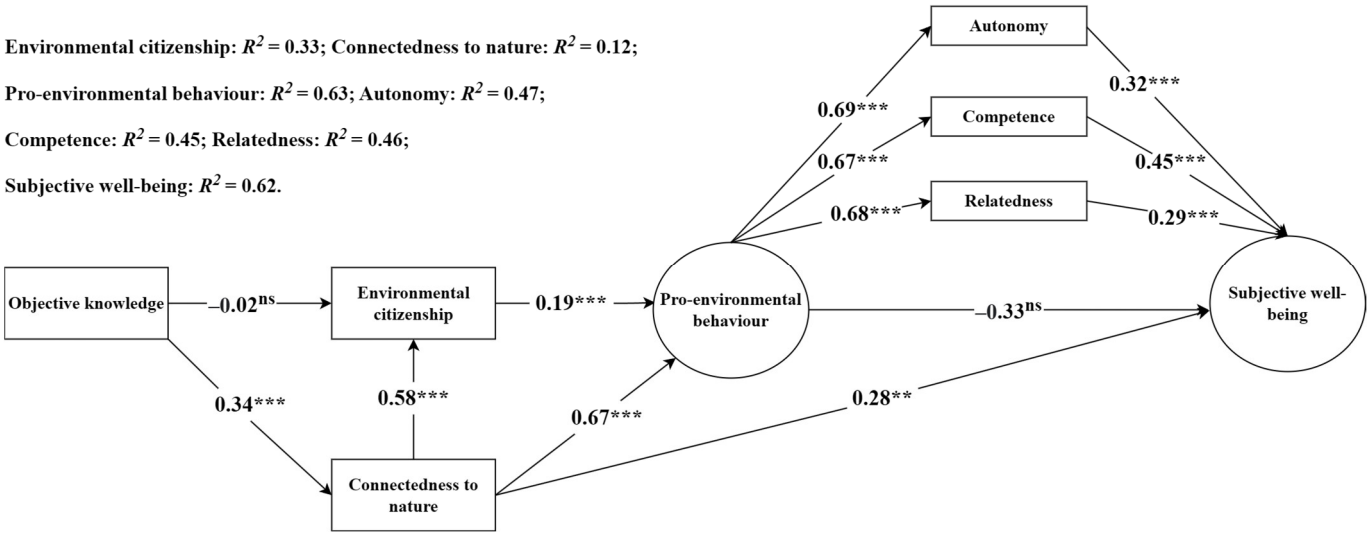


Figure 2. Structural equation modelling results of the environmental behaviour–well-being model with the entire sample. Notes. ns = not significant, ** $p < 0.01$, *** $p < 0.001$.

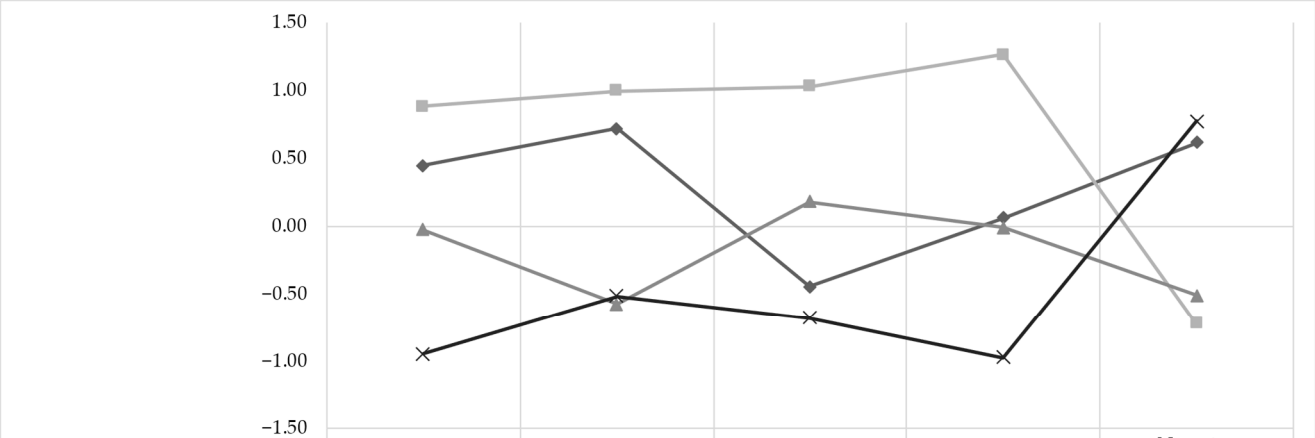
Objective knowledge does not predict environmental citizenship but significantly predicts connectedness to nature. Connectedness to nature significantly predicts environmental citizenship, pro-environmental behaviour, and subjective well-being. Environmental citizenship significantly predicts pro-environmental behaviour. Pro-environmental behaviour significantly predicts the satisfaction of all basic psychological needs but does not significantly predict subjective well-being. Finally, all basic psychological needs significantly predict subjective well-being.

4.3. Cluster Analysis

In order to distinguish participants' personality profiles, we used a K-means clustering analysis with the Hartigan–Wong algorithm using personality traits as variables for clustering. Throughout the analysis, we aimed for the clusters to be distinguishable from one another and to have sample sizes that were as comparable as possible. Alternative cluster solutions were also inspected. The four-cluster solution explained 46.3% of the total heterogeneity in personality trait scores (R^2 = 0.46), showed a silhouette coefficient of 0.19, and had a Calinski–Harabasz index of 114.70. The cluster sizes were relatively balanced, ranging from n = 77 to n = 138. Based on the combination of internal clustering indicators, cluster distinguishability, interpretability, and sufficiently comparable sample sizes, the four-cluster solution was selected. The clusters are presented in Figure 3. We labelled the derived personality profiles as: "Positive", "Negative", "Closed and agreeable", and "Open-minded and negative".

The profile labelled "Positive" is characterised by individuals who demonstrate high scores of extraversion, open-mindedness, agreeableness, and conscientiousness while simultaneously demonstrating low levels of negative emotionality. The "Negative" profile is the opposite of the "Positive" profile. In the "Negative" profile, individuals demonstrate high scores of negative emotionality and low scores for extraversion, open-mindedness, agreeableness, and conscientiousness. We could say that the "Positive" profile possesses more socially desirable traits and the "Negative" profile less desirable ones [50]. However, the "Positive" and "Negative" labels were used as concise descriptive labels for the overall configuration of personality traits within these clusters rather than as evaluative judgements about individuals. In the profile labelled "Closed and agreeable," individuals demonstrate high scores of agreeableness and low scores of open-mindedness. The last profile was labelled "Open-minded and negative". Individuals in the latter cluster are characterised

by high scores of open-mindedness and negative emotionality. Although profiles differ qualitatively and one cluster may be more desirable in society than another, all personalities seem to be adaptive at all levels of expression and can achieve personal goals within different approaches [31,32].



	Extraversion	Open-mindedness	Agreeableness	Conscientiousness	Negative emotionality
Open-minded and negative	0.44	0.72	−0.45	0.06	0.61
Positive	0.88	1.00	1.03	1.26	−0.73
Closed and agreeable	−0.03	−0.58	0.18	−0.01	−0.51
Negative	−0.95	−0.52	−0.68	−0.98	0.78

Figure 3. Personality profiles. Notes. Personality traits are shown as standardised scores. Sample sizes: Open-minded and negative (n = 77); Positive (n = 81); Closed and agreeable (n = 138); Negative (n = 107).

Descriptive statistics for all study variables across the identified personality profiles are presented in Table 2.

Table 2. Descriptive statistics for personality profiles and variables.

Variable	Positive	Open-Minded and Negative	Closed and Agreeable	Negative
		M (*SD*)		
Objective knowledge	13.37 (3.87)	12.73 (4.36)	11.26 (4.06)	11.08 (4.90)
Connectedness to nature	4.29 (0.62)	3.75 (0.72)	3.55 (0.71)	3.34 (0.68)
Environmental citizenship	3.69 (0.85)	3.53 (0.83)	3.08 (0.82)	2.99 (0.82)
Pro-environmental behaviour	3.64 (0.83)	3.18 (0.69)	3.04 (0.77)	2.98 (0.76)
Autonomy	4.34 (0.61)	3.58 (0.71)	3.49 (0.64)	3.32 (0.72)
Competence	4.29 (0.69)	3.62 (0.67)	3.45 (0.62)	3.17 (0.73)
Relatedness	4.48 (0.59)	3.77 (0.77)	3.61 (0.72)	3.49 (0.71)
Subjective well-being	4.05 (0.69)	3.21 (0.76)	3.20 (0.81)	2.67 (0.72)

Notes. *M* = mean, *SD* = standard deviation.

4.4. Differences Between Personality Profiles (ANOVA)

Prior to testing the structural model across personality profiles using multi-group structural equation modelling, a one-way ANOVA was conducted to examine differences in the study variables across the identified personality profiles.

Objective knowledge significantly differed across profiles, $F(3, 399) = 6.37$, $p < 0.001$, $\eta^2 = 0.05$. Bonferroni post hoc comparisons indicated that the "Positive" profile had higher objective knowledge scores than the "Closed and agreeable" and "Negative" profiles.

Environmental citizenship significantly differed across profiles, $F(3, 399) = 15.90$, $p < 0.001$, $\eta^2 = 0.11$. Bonferroni post hoc comparisons indicated that the "Positive" profile

had higher environmental citizenship scores than the "Closed and agreeable" and "Negative" profiles. Similarly, the "Open-minded and negative" profile had higher scores than the "Closed and agreeable" and "Negative" profiles.

Connectedness to nature significantly differed across profiles, $F(3, 399) = 32.30$, $p < 0.001$, $\eta^2 = 0.20$. Bonferroni post hoc comparisons indicated that the "Positive" profile had significantly higher connectedness to nature scores than the other profiles. In addition, the "Open-minded and negative" profile had higher scores than the "Negative" profile.

Satisfaction of the basic psychological needs also significantly differed across personality profiles. Autonomy need satisfaction differed across profiles, $F(3, 399) = 39.84$, $p < 0.001$, $\eta^2 = 0.23$. Bonferroni post hoc comparisons indicated that the "Positive" profile had higher autonomy satisfaction scores than the other profiles. Competence need satisfaction also differed across profiles, $F(3, 399) = 45.13$, $p < 0.001$, $\eta^2 = 0.25$. Post hoc comparisons showed that the "Positive" profile had higher competence satisfaction scores than the other profiles, while the "Open-minded and negative" and "Closed and agreeable" profiles had higher scores than the "Negative" profile. Relatedness need satisfaction differed across profiles, $F(3, 399) = 35.17$, $p < 0.001$, $\eta^2 = 0.21$. Post hoc comparisons indicated that the "Positive" profile had higher relatedness satisfaction scores than the other profiles, and the "Open-minded and negative" profile had higher scores than the "Negative" profile.

Pro-environmental behaviour also significantly differed across profiles, $F(3, 399) = 13.75$, $p < 0.001$, $\eta^2 = 0.09$. Bonferroni post hoc comparisons indicated that the "Positive" profile had significantly higher pro-environmental behaviour scores than the other profiles.

Lastly, subjective well-being significantly differed across profiles, $F(3, 399) = 52.15$, $p < 0.001$, $\eta^2 = 0.28$. Bonferroni post hoc comparisons indicated that the "Positive" profile had higher subjective well-being scores than the other profiles. Additionally, the "Open-minded and negative" and "Closed and agreeable" profiles had higher scores than the "Negative" profile.

4.5. Multi-Group Structural Equation Modelling Across Personality Profiles

To examine whether personality profiles moderated the associations among the study variables, the proposed environmental behaviour–well-being model was tested across profiles using multi-group structural equation modelling.

First, an unconstrained model was estimated, followed by models with constrained factor loadings and structural paths across profiles. The fit indices and model comparisons are presented in Table 3.

Table 3. Comparison of model fit indices for multi-group SEM across personality profiles.

Model	χ^2 (df)	*p*	CFI	TLI	NFI	RMSEA [90% CI]	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Unconstrained model	393.03 (332)	0.012	0.989	0.986	0.933	0.043 [0.022–0.059]	0.110	–	–	–
Constrained factor loadings	416.92 (353)	0.011	0.988	0.986	0.929	0.043 [0.022–0.058]	0.113	−0.001	0.000	0.003
Constrained structural paths	558.21 (392)	<0.001	0.969	0.967	0.905	0.065 [0.052–0.077]	0.126	−0.019	0.022	0.013

Notes. Δ values represent the change compared to the previous model.

As shown in Table 3, constraining factor loadings across personality profiles did not substantially change model fit, suggesting that the measurement structure was comparable across personality profiles. However, constraining the structural paths resulted in a noticeable decrease in model fit, indicating that structural path invariance was not supported and that some structural associations differed across personality profiles. Therefore, the structural paths were separately examined for each personality profile while maintaining constrained factor loadings across profiles (see Figure 4a–d).

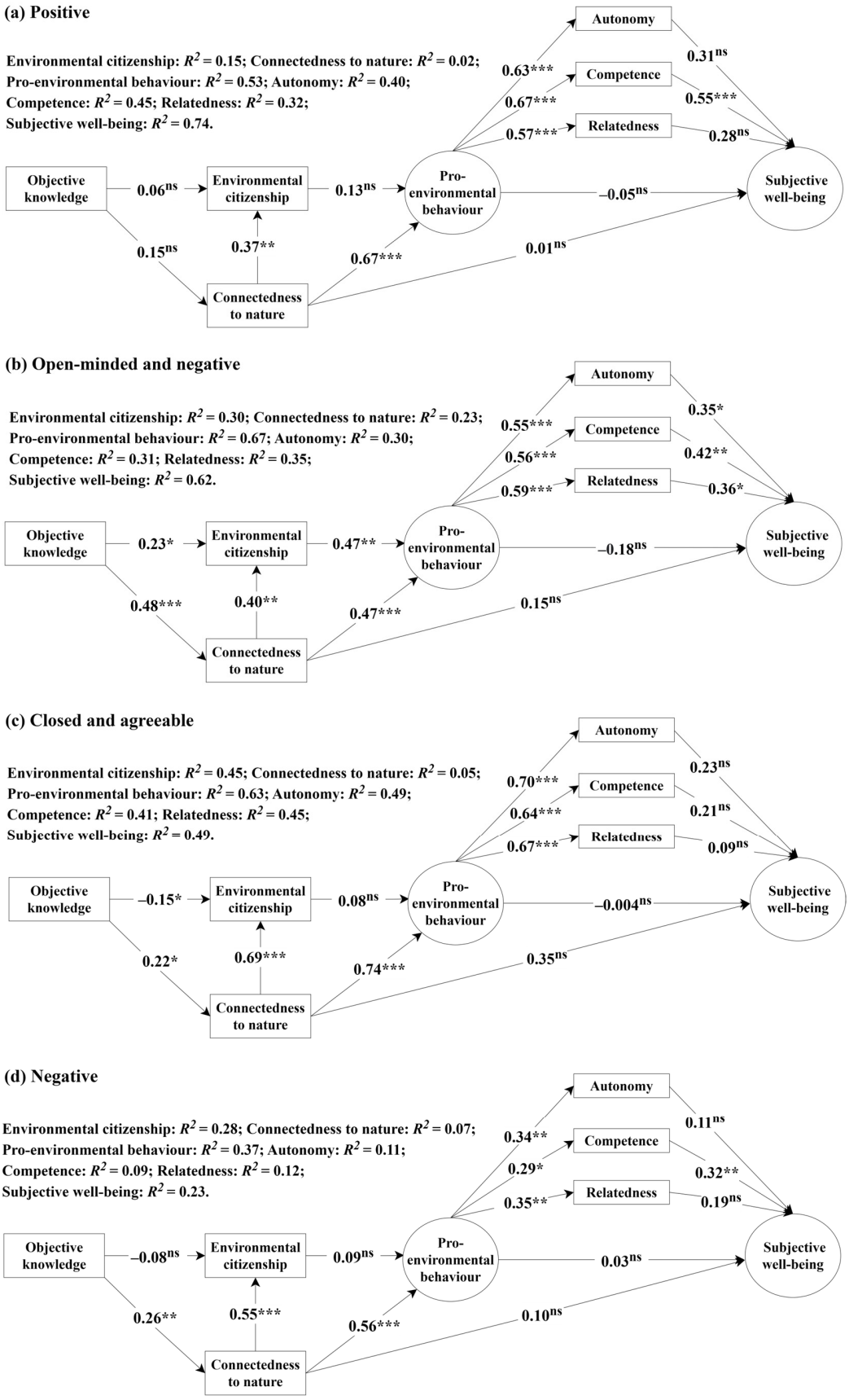


Figure 4. Structural equation model across personality profiles. Notes. Panels represent (**a**) Positive, (**b**) Open-minded and negative, (**c**) Closed and agreeable, and (**d**) Negative personality profiles. ns = not significant, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In the "Positive" personality profile (Figure 4a), the results of the structural equation model indicate that objective knowledge does not significantly predict environmental citizenship or connectedness to nature. However, connectedness to nature significantly predicts both environmental citizenship and pro-environmental behaviour, but it does not significantly predict subjective well-being. Interestingly, environmental citizenship does not significantly predict pro-environmental behaviour. Furthermore, pro-environmental behaviour does not significantly predict subjective well-being, but it significantly predicts satisfaction of all three basic psychological needs. Notably, only competence need satisfaction significantly predicts subjective well-being.

Results for the "Open-minded and negative" personality profile (Figure 4b) show that objective knowledge significantly predicts both environmental citizenship and connectedness to nature. Moreover, connectedness to nature significantly predicts environmental citizenship and pro-environmental behaviour, but it does not significantly predict subjective well-being. Environmental citizenship significantly predicts pro-environmental behaviour. Furthermore, pro-environmental behaviour does not significantly predict subjective well-being but significantly predicts the satisfaction of all three basic psychological needs. In turn, satisfaction of the basic psychological needs significantly predicts subjective well-being.

In the "Closed and agreeable" personality profile (Figure 4c), objective knowledge negatively predicts environmental citizenship but positively predicts connectedness to nature. Connectedness to nature significantly predicts environmental citizenship and pro-environmental behaviour but does not significantly predict subjective well-being. Environmental citizenship does not significantly predict pro-environmental behaviour. Furthermore, pro-environmental behaviour significantly predicts the satisfaction of basic psychological needs. However, neither pro-environmental behaviour nor basic psychological need satisfaction significantly predicts subjective well-being.

Lastly, in the "Negative" personality profile (Figure 4d), objective knowledge significantly predicts connectedness to nature but not environmental citizenship. Connectedness to nature significantly predicts environmental citizenship but does not predict subjective well-being. Pro-environmental behaviour is predicted only by connectedness to nature, while environmental citizenship is not a significant predictor. Pro-environmental behaviour does not directly predict subjective well-being but significantly predicts all three basic psychological needs. However, only competence need satisfaction significantly predicts subjective well-being.

Overall, the results indicate that the pattern of associations within the environmental behaviour–well-being model differs across personality profiles.

5. Discussion

5.1. General Model

The present study aimed to investigate how different personality profiles moderate the environmental behaviour–well-being model, which explains how being an environmental citizen may be associated with higher subjective well-being. Prior to examining the moderating role of personality profiles, we first tested the unmoderated model to assess the consistency of its structural paths. The findings indicated that the model paths in the present study were largely similar to those reported by Vijaikis and Poškus [4], with the exception that no direct association between pro-environmental behaviour and subjective well-being was observed.

Although previous studies suggest a positive association between pro-environmental behaviour and subjective well-being [2,25], the present findings suggest that this relationship may be more complex. Recent meta-analytic evidence indicates that this association may depend on the type or impact of pro-environmental behaviour [51]. In the present study, pro-environmental behaviour was not directly associated with subjective well-being either in the general model or across personality profiles. Rather, the findings suggest that this association may operate mainly through basic psychological need satisfaction. This may be because pro-environmental behaviour can include both rewarding and demanding aspects. It can be meaningful and need-supportive, but some forms of environmental engagement may also involve effort, responsibility, personal costs, or negative emotions [51–53]. This provides a useful context for interpreting the results across personality profiles.

Consistent with this interpretation, the present results suggest that basic psychological needs may mediate the relationship between pro-environmental behaviour and subjective well-being. Similar to previous research [4], the current study also highlights the importance of both connectedness to nature and objective environmental knowledge within the model. In particular, objective environmental knowledge was positively associated with connectedness to nature. One possible explanation is that individuals who understand basic ecological principles may perceive themselves as more integrated within natural systems [4].

Furthermore, connectedness to nature was positively related to both environmental citizenship and pro-environmental behaviour. These relationships indirectly contribute to subjective well-being through the satisfaction of basic psychological needs, while connectedness to nature also showed a direct association with subjective well-being.

Overall, the findings suggest that individuals who engage more actively in environmental citizenship and pro-environmental behaviour may experience higher subjective well-being through the satisfaction of basic psychological needs, supported by their environmental knowledge and sense of connectedness to nature. This interpretation is also consistent with Self-Determination Theory, which suggests that behaviours that support the satisfaction of basic psychological needs for autonomy, competence, and relatedness are associated with higher well-being [9].

5.2. Personality Profiles

Before examining how personality profiles moderate the environmental behaviour–well-being model, we first explored how the model variables differ across personality profiles. The results revealed significant differences among profiles in several variables included in the model. As expected, personality profiles characterised by more socially desirable traits [50] tended to show higher average scores across the model variables. The "Positive" profile displayed the highest scores across most variables, whereas the "Negative" profile showed the lowest scores. However, because personality traits can be adaptive at different levels of expression and may lead individuals to similar goals through different pathways [31,32], these findings should not be interpreted as indicating that the "Positive" profile is inherently superior to the others. Instead, different personality profiles may represent alternative ways of achieving similar outcomes.

The findings of the present study indicate that personality profiles moderate several pathways within the model. In particular, the association between environmental citizenship and pro-environmental behaviour was not consistent across personality profiles. However, regardless of personality profile, engaging in pro-environmental behaviour was consistently associated with the satisfaction of basic psychological needs. At the same

time, the extent to which need satisfaction predicted subjective well-being varied across personality profiles.

In the "Closed and agreeable" profile, objective environmental knowledge showed a significant negative association with environmental citizenship, which warrants further investigation. One possible explanation may relate to this profile's lower levels of open-mindedness combined with relatively higher agreeableness. Individuals in this profile may become aware of environmental problems through knowledge but may not actively seek additional information on how to address these issues through personal action. This could partly explain why environmental citizenship did not significantly predict pro-environmental behaviour in this profile, as individuals may perceive their individual actions as having limited impact.

Previous research suggests that individuals with similar personality profiles may not form recycling intentions based on attitudes or personal norms [38]. Instead, their behaviour may be more strongly influenced by social norms [54], which is consistent with the tendency of agreeable individuals to seek social harmony [55]. Nevertheless, in this profile pro-environmental behaviour predicted the satisfaction of basic psychological needs, although this satisfaction did not translate into higher subjective well-being.

In the "Positive" profile, environmental knowledge was not significantly associated with either environmental citizenship or connectedness to nature. Furthermore, environmental citizenship did not significantly predict pro-environmental behaviour. One possible explanation might be related to the relatively high level of extraversion within this profile. Individuals who identify as environmental citizens may prefer engaging in pro-environmental actions within the public sphere, where social interaction is more prominent. Nevertheless, connectedness to nature remained an important predictor of both environmental citizenship and pro-environmental behaviour. These activities were associated with the satisfaction of all three basic psychological needs, although only competence satisfaction significantly predicted subjective well-being. Given that this profile also displayed relatively high levels of environmental knowledge, it is possible that such knowledge functions as a resource that supports competence satisfaction, which in turn contributes to subjective well-being.

The relationships between variables were relatively similar in the "Positive" and "Negative" profiles. The main difference was that environmental knowledge significantly predicted connectedness to nature in the "Negative" profile but not in the "Positive" profile. Considering that extraversion is associated with greater spatial mobility and visiting a larger number of locations [56], individuals in the "Negative" profile may have fewer opportunities for direct contact with nature. In this case, environmental knowledge may play a more important role in strengthening their perceived connection with nature.

Previous research suggests that individuals with personality traits similar to those observed in the "Negative" profile may believe that they are equally engaged in learning about environmental issues while actually possessing relatively limited objective environmental knowledge [57]. The present findings appear consistent with this observation and suggest that increasing environmental knowledge may encourage greater engagement in pro-environmental behaviour within this profile.

Finally, in the "Open-minded and negative" profile, objective environmental knowledge significantly predicted both environmental citizenship and connectedness to nature. Importantly, this was the only profile in which environmental citizenship significantly predicted pro-environmental behaviour. Individuals with high levels of open-mindedness combined with higher neuroticism may be particularly sensitive to environmental issues [58]. As Hirsh [58] suggests, open-minded individuals tend to adopt a broader perspective regarding humanity's role within the ecosystem, while individuals higher in neuroticism

may be more concerned about potential environmental risks. Together, these traits may motivate individuals to engage more actively in pro-environmental action.

In this cluster, subjective well-being was also predicted by the satisfaction of all three basic psychological needs through engagement in pro-environmental behaviour. These findings suggest that individuals characterised by higher open-mindedness and neuroticism may experience particularly strong subjective well-being benefits from engaging in pro-environmental activities.

5.3. Practical Implications

The findings of the present study suggest that individuals with different personality profiles may experience improvements in subjective well-being through different pathways within the environmental behaviour–well-being model. According to the present results, individuals with personality trait patterns similar to the "Positive" profile identified in this study may benefit from educational or environmental engagement interventions that strengthen their sense of connectedness to nature. For individuals with profiles resembling the "Negative" and "Closed and agreeable" clusters, educational approaches aimed at improving environmental knowledge while also fostering connectedness to nature may be particularly beneficial. Additionally, for individuals with profiles similar to the "Open-minded and negative", educational programmes that promote environmental citizenship may be more effective.

Taken together, these findings emphasise the importance of considering personality differences when developing educational or environmental engagement interventions that aim to promote environmental citizenship and improve individuals' subjective well-being.

5.4. Limitations

The present study has several limitations. First, although the overall sample size was relatively large, the use of cluster analysis resulted in smaller subsamples within each personality profile. Because the model was later analysed using multi-group structural equation modelling, these smaller subsamples may have reduced the statistical power of some profile-specific path estimates and limited our ability to investigate certain aspects of the model in greater detail, such as specific pro-environmental behaviours or separate domains of subjective well-being. Additionally, the smaller group sizes prevented us from examining potential sex differences within the moderated model. Another limitation concerns model fit, as the SRMR value in the present study was relatively high compared to commonly recommended thresholds. This may indicate some local misfit or residual differences not fully captured by the specified model. However, no additional model modifications were made because the model was theoretically grounded. Although the remaining fit indices indicated a good model fit, the results should nevertheless be interpreted with some caution. Moreover, the replication of this study may be challenging due to the inherent difficulty of identifying identical personality profiles when using a person-orientated clustering approach. In addition, the reliability of some personality trait measures was not optimal, which may have introduced additional measurement errors into the clustering procedure. Therefore, the identified personality profiles should be interpreted cautiously. Future research applying a similar approach may therefore identify slightly different personality patterns. Finally, the present study sample consisted of Lithuanian adolescents selected through convenience sampling, which may limit the generalisability of the findings to individuals from different age groups or cultural contexts.

5.5. Future Directions

Further research should examine whether the environmental behaviour–well-being model operates similarly across different populations and contexts. In particular, future

studies could investigate whether the relationships observed in the present study remain stable across different age groups or cultural settings. Furthermore, future research could expand the recently developed model to include basic psychological need frustration and eco-anxiety, as the present model primarily focuses on positive outcomes.

Additionally, the current model lacks sufficient verification to determine whether it is suitable as a change model. To demonstrate the potential usefulness of the model for monitoring changes, future research could apply interventions, such as educational programmes aimed at improving environmental knowledge, fostering a stronger connection to nature, or an effective combination of both approaches. Longitudinal studies would be particularly useful for examining whether changes in these variables lead to improvements in subjective well-being.

6. Conclusions

Taken together, the findings of the present study indicate that personality profiles moderate several pathways within the environmental behaviour–well-being model. These results highlight the value of a person-orientated approach, as exploring patterns of traits rather than individual traits allows a broader understanding of how personality shapes pro-environmental behaviour and subjective well-being. In particular, the association between environmental citizenship and pro-environmental behaviour differed across personality profiles.

Furthermore, the results suggest that connectedness to nature and pro-environmental behaviour do not directly predict subjective well-being but contribute to it indirectly through the satisfaction of basic psychological needs. These findings suggest that if interventions aim to encourage environmental citizenship and support individuals' subjective well-being, it may be important to consider personality differences and tailor interventions to different personality profiles.

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Data Availability Statement: The data associated with this study are available on the Open Science Framework (OSF) at https://osf.io/thmxu (accessed on 15 June 2026).

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