

Predicting Students' Pro-Environmental Attitudes Based on Environmental Personality and Personal Responsibility Mediated by Locus of Control

Damianus Dai Koban¹, Erian Fatria^{2*}, Agus Priadi³, Guspri Devi Artanti⁴, Eka Apriyanti⁵

¹Department of Early Childhood Education, Universitas Prima Nusantara Bukittinggi, Indonesia

²Department of Public Health, Universitas Prima Nusantara Bukittinggi, Indonesia

³Department of English Literature, Universitas Bina Sarana Informatika, Indonesia

⁴Department of Culinary Arts Education, Universitas Negeri Jakarta, Indonesia

⁵Department of Population and Environmental Education, Universitas Negeri Makassar, Indonesia

*Penulis korespondensi: erianfatria93@gmail.com

Paper received: 13-04-2026; revised: 17-05-2026; accepted: 30-06-2026

Abstract

Climate change and the increasing frequency of hydrometeorological disasters are widely recognized as threats to ecosystems and human life. One of the underlying causes is the lack of pro-environmental attitudes within society. This study examined the determinants of students' pro-environmental attitudes by investigating the roles of environmental personality and personal responsibility, with locus of control as a mediating variable. A quantitative causal research design was employed to test a hypothetical model based on environmental education theories. The sample consisted of 65 students from SMK Negeri Semendawai, East OKU, South Sumatra, Indonesia, selected through multistage random sampling. The findings revealed that personal responsibility (PR) was the strongest and only significant predictor of students' pro-environmental attitudes (PEA), exceeding the influence of environmental personality (EP) and locus of control (LOC), both of which had direct but non-significant effects. Furthermore, LOC did not mediate the relationship between the independent variables and pro-environmental attitudes, possibly due to situational constraints and limited supporting facilities. These findings suggest that environmental education should move beyond cognitive instruction toward affective learning that strengthens students' sense of ownership and personal responsibility through practical environmental experiences.

Keywords: environmental personality; locus of control; personal responsibility; pro-environmental attitude

Abstrak

Perubahan iklim dan berbagai bencana hidrometeorologi yang terjadi saat ini diyakini sebagai sebuah fenomena yang dapat merusak seluruh tatanan ekologi dan kehidupan di permukaan bumi. Salah satu faktor yang diduga menjadi akar masalah ini adalah sikap masyarakat yang kurang pro-lingkungan. Tujuan penelitian ini adalah untuk menyelidiki faktor-faktor determinan sikap pro lingkungan didasarkan kepribadian lingkungan dan tanggung jawab pribadi dengan mediasi locus of control. Metode penelitian yang digunakan adalah metode kuantitatif dengan pendekatan studi kausal yang mengkonfirmasi beberapa model pendidikan lingkungan sebagai rujukan dalam membangun model hipotetik penelitian. Sampel penelitian ini melibatkan 65 siswa SMK Negeri Semendawai, OKU Timur, Provinsi Sumatera Selatan yang dipilih secara *multistage random sampling*. Hasil penelitian menunjukkan bahwa tanggung jawab pribadi (PR) merupakan prediktor tunggal yang

paling kuat dan signifikan dalam membentuk sikap pro-lingkungan (PEA) siswa, mengungguli faktor kepribadian lingkungan (EP) dan locus of control (LOC) yang berpengaruh langsung namun tidak signifikan. Selain itu, LOC gagal berfungsi sebagai variabel mediator dalam model ini, yang diduga akibat adanya hambatan situasional dan kurangnya fasilitas pendukung. Implikasinya, pendidikan lingkungan di sekolah perlu bertransformasi dari edukasi kognitif ke pendekatan afektif yang memperkuat rasa memiliki dan tanggung jawab personal melalui pengalaman praktis.

Kata kunci: kepribadian lingkungan; locus of control; tanggung jawab pribadi; sikap pro-lingkungan

1. Introduction

Climate change has become the most pressing existential challenge faced by humanity in the 21st century. This phenomenon is marked by extreme global temperature increases, rising sea levels, and unpredictable weather patterns that threaten food security and ecosystems. Scientifically, there is a global consensus that human activities are the primary drivers behind this crisis (Fatria et al., 2025; Tucholska et al., 2024; Uscinski & Olivella, 2017). The urgency of addressing the climate crisis is underscored by the fact that 2024 has been recorded as the hottest year in history, with the global average temperature rising by 1.55°C above pre-industrial levels (World Meteorological Organization, 2024). This phenomenon is significantly driven by anthropogenic activities across various sectors, contributing approximately 72% of total global greenhouse gas emissions, highlighting that individual attitudes and lifestyles are key determinants in climate change mitigation (Fawzy et al., 2020; Hertwich & Peters, 2009). Although cognitively most people are aware of environmental issues, data show a significant gap where only a small proportion of individuals feel they possess an internal locus of control to take real action. This reinforces the need for in-depth examination of psychological factors that mediate pro-environmental attitudes (Chiang et al., 2019; Yang & Weber, 2019).

The primary cause of environmental degradation is rooted in unsustainable human attitudes. Non-pro-environmental behaviors such as excessive energy consumption, poor waste management, and lack of concern for conservation have accelerated environmental degradation. Therefore, understanding the root causes of human behavior is essential for long-term climate change mitigation (Helbling, 2020; Kyselá et al., 2019). In environmental psychology, pro-environmental attitudes are defined as an individual's tendency to act in ways that minimize negative impacts on nature. These attitudes are not merely knowledge-based but represent a mental predisposition that drives real actions (Shen et al., 2024; Soutter et al., 2020; Tian & Liu, 2022). Unfortunately, the gap between environmental knowledge and actual behavior is still prevalent, including among students. Secondary school students represent a crucial demographic group as future decision-makers.

Developing pro-environmental attitudes early in schools is considered a strategic investment in building a greener society. However, fostering such attitudes requires a deep understanding of psychological variables that effect them, such as environmental personality, personal responsibility, and locus of control (Langenbach et al., 2020; D. Li et al., 2019; Rahayu et al., 2024; Yuriev et al., 2020).

Environmental personality refers to psychological traits that determine how individuals interact with nature. Individuals with open personalities and strong connections to nature tend to demonstrate higher concern for ecological issues (Fatria et al., 2025; Pratiwi et al., 2019; Soutter et al., 2020). This aligns with theories suggesting that personality is a fundamental foundation in shaping environmental values (Nordahl et al., 2022; Novotny et al., 2022). In addition to personality, personal responsibility plays a crucial role. When individuals feel a moral obligation to protect the environment, they are more likely to adopt sustainable lifestyles. This responsibility emerges from awareness that individual actions collectively impact environmental sustainability (Akintunde, 2017; Priadi et al., 2020). However, the relationship between personality, responsibility, and attitudes is often indirect. There are mediating variables that strengthen or weaken these relationships, one of which is locus of control (Priadi et al., 2018). LOC refers to an individual's belief regarding the extent to which they can control events affecting their lives, including environmental issues (Chukwuorji et al., 2018; Fatria, 2020; Hines et al., 1987). Individuals with an internal locus of control believe that their actions can bring positive environmental changes. In contrast, those with an external locus of control tend to feel powerless and perceive environmental issues as the responsibility of governments or fate (Chen & Wang, 2007; Derdowski et al., 2020; Putrawan, 2015). This difference in perceived control significantly determines whether environmental personality translates into actual pro-environmental attitudes. This study positions locus of control as a mediator bridging the effect of environmental personality and personal responsibility on pro-environmental attitudes. The integration of these variables into a causal model is expected to provide a comprehensive understanding of internal mechanisms in responding to the climate crisis.

The research was conducted in East OKU Regency, South Sumatra. As a region with significant natural and agricultural resources, East OKU faces real environmental challenges, including land-use change, forest fires, and domestic waste issues (Iswandi & Rajiman, 2026; Yuningsih & Lensari, 2016). Environmental education in this region is highly relevant for protecting younger generations from local climate impacts (Apriyanti et al., 2025; Fatria et al., 2024; Priadi & Fatria, 2024). Students in East OKU represent an agrarian society undergoing transformation. The socio-cultural characteristics of South Sumatra may

shape how environmental personality and personal responsibility function as antecedents of pro-environmental attitudes. Therefore, studies in this region are crucial to enriching environmental psychology literature within the Indonesian context.

Although numerous studies have explored pro-environmental attitudes, this research conducts a comparative analysis to identify its novelty and contribution. For example, Wyss et al., (2022), emphasize the role of self-control as a resource that helps bridge the gap between attitudes and actions. Kochanek et al., (2025), found that pro-environmental attitudes are often expressed through simple actions such as waste sorting and energy saving, yet gaps remain for behaviors requiring greater effort, such as eco-driving. Y. Li et al., (2024), highlight empathy toward nature as a key internal factor positively predicting pro-environmental attitudes among students. These findings underscore the importance of integrating emotional aspects into environmental education. It can be concluded that integrating environmental personality, personal responsibility, and locus of control into a single causal model remains limited, especially among student populations in developing countries. This research seeks to fill this gap. The main issue addressed is the inconsistency of students' pro-environmental attitudes despite widespread information about climate change. Many students are aware of environmental issues but do not feel psychologically empowered to take preventive action. This indicates internal barriers that require scientific exploration through causal research. The novelty of this study lies in examining both direct effects of environmental personality and personal responsibility on pro-environmental attitudes, as well as their indirect effects through locus of control mediation. The findings are expected to guide educators in designing more effective environmental education curricula.

Theoretically, this study contributes to the development of the Theory of Planned Behavior by incorporating personality and responsibility dimensions as predictors (Fenitra et al., 2022; Fishbein & Ajzen, 2010; Hines et al., 1987; Kollmuss & Agyeman, 2002). Practically, school policies in East OKU can focus on strengthening students' psychological aspects rather than merely transferring cognitive knowledge. By understanding these causal pathways, educational interventions can be more precisely designed. For instance, if locus of control is found to be a strong mediator, school programs should focus on empowering students to feel capable of making real environmental changes. Ultimately, this article presents empirical findings that can serve as a foundation for school-based community strategies in climate change mitigation. Through a causal approach, it provides a comprehensive perspective on how to shape a generation in South Sumatra that is not only environmentally aware but also responsible and proactive toward sustainability.

Based on the background described above, the research problems proposed in this study are as follows: (1) Does environmental personality have a direct effect on pro-environmental attitudes?; (2) Does personal responsibility have a direct effect on pro-environmental attitudes?; (3) Does LOC have a direct effect on pro-environmental attitudes?; (4) Does environmental personality have a direct effect on LOC?; (5) Does personal responsibility have a direct effect on LOC?; (6) Does environmental personality have an indirect effect on pro-environmental attitudes through LOC?; and (7) Does personal responsibility have an indirect effect on pro-environmental attitudes through LOC?

2. Method

2.1 Research Design

This study employed a quantitative approach using a confirmatory survey method with a causal study design. Data analysis was conducted using path analysis techniques to identify causal relationships and estimate the effect parameters among latent variables within the constructed model. The justification for using path analysis in this study was based on its suitability as a more appropriate alternative to Structural Equation Modeling (SEM) due to the limitation of the sample size employed. This approach was adopted to minimize the occurrence of convergence failure (non-convergent solutions), bias in standard errors, and inaccuracies in testing the model fit indices (Goodness of Fit) (Hair et al., 2019; Wolf et al., 2013). Path analysis operates by examining direct and indirect effect among variables without the need to estimate a complex measurement model (Kline, 2016). This characteristic reduces the number of parameters and degrees of freedom that must be estimated by the system, allowing the analysis to produce stable and accurate path coefficient estimates with high statistical power, even when applied to a small sample size.

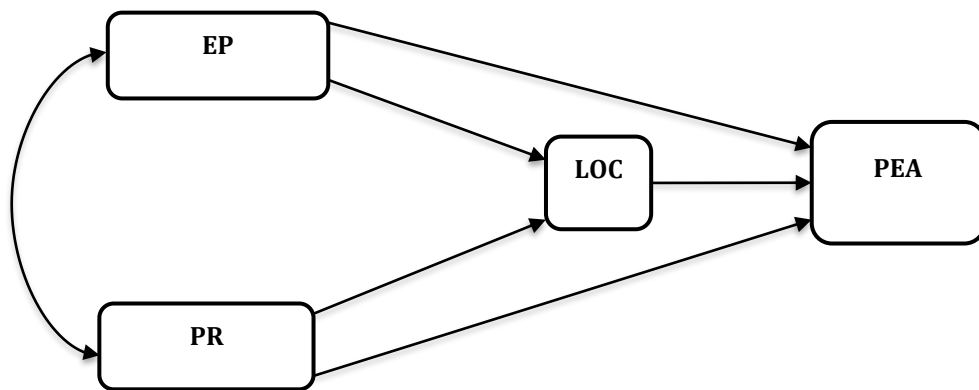
The primary focus of this study was to examine the effects of Environmental Personality (X_1) and Personal Responsibility (X_2) as exogenous variables on Pro-Environmental Attitude (X_4) as the endogenous variable, with Locus of Control (LOC) positioned as the mediating variable (X_3). Through this confirmatory model, the study aimed to map the psychological structure of students in responding to environmental issues in order to minimize variability within their pro-environmental attitude domain.

Based on the constructed theoretical framework, the research hypotheses developed in this study are as follows: (1) Environmental personality has a direct effect on pro-environmental attitude; (2) Personal responsibility has a direct effect on pro-environmental attitude; (3) LOC has a direct effect on pro-environmental attitude; (4) Environmental personality has a direct effect on LOC; (5) Personal responsibility has a direct effect on LOC; (6) Environmental personality has an indirect effect on pro-environmental attitude through

LOC; and (7) Personal responsibility has an indirect effect on pro-environmental attitude through LOC. Based on these assumptions, the hypothetical research model was constructed by integrating several theoretical frameworks adopted and confirmed from previous studies (Fatria et al., 2025; Hines et al., 1987; Hungerford & Volk, 1990; Kollmuss & Agyeman, 2002; Priadi et al., 2020), as illustrated in Figure 1.

Figure 1

Hypothetical Research Model



2.2 Population and Sample

The target population in this study consisted of all students enrolled in public vocational high schools in Ogan Komering Ulu Timur Regency. The sampling procedure employed a multistage random sampling technique carried out through three systematic stages to address the wide geographical distribution of the target population in Ogan Komering Ulu Timur Regency. In the first stage, the research area was selected purposively by designating Semendawai Timur District as the study area based on the consideration that it demonstrated the most prominent level of school environmental activities within the regency. In the second stage, the researcher applied cluster random sampling to all public vocational high schools (SMKN) within the selected district, resulting in SMK Negeri 1 Semendawai Timur being selected as the research locus. In the third and final stage, individual sample units were selected using a simple random sampling method from the sampling frame of eleventh-grade students who met the inclusion criteria, namely students who had completed Biology materials related to ecology and climate change in the Integrated Natural and Social Sciences (IPAS) subject. A total of 65 respondents were selected in this study; however, this condition limits the generalizability of the research findings. The results cannot be extrapolated to represent all students in South Sumatra. In addition, the small sample size reduces statistical power, thereby increasing the risk that

weak effects or mediation effects may not be detected. A limited sample size is also vulnerable to sampling error, which may potentially trigger effect size inflation. Although this limitation has been mitigated through the use of path analysis, replication of the model remains necessary.

Inclusion and exclusion criteria were applied to ensure that the collected data were representative and relevant. The inclusion criteria included male and female students actively enrolled in Grade XI at SMK Negeri Semendawai, East OKU, who were willing to participate by completing an informed consent form. Grade XI students were selected based on the consideration that they possess sufficient emotional and cognitive maturity to understand variables such as pro-environmental attitude, LOC, environmental personality, and personal responsibility. The exclusion criteria included students on academic leave, those undertaking internships (Praktik Kerja Lapangan/PKL) outside the school during data collection, and students who did not complete the questionnaire or demonstrated inconsistent response patterns.

2.3 Research Instruments

Data were collected using structured questionnaires developed based on conceptual and operational definitions of the research variables and calibrated to determine validity and reliability coefficients. The instrument blueprint was derived from theoretical synthesis, with reliability levels as follows: Environmental Personality (0.796), Personal Responsibility (0.861), LOC (0.602), and Pro-Environmental Attitude (0.561). However, the LOC and PEA instruments represent a limitation in their application within this study because they demonstrated low reliability values, with scores falling below the generally accepted ideal threshold (commonly > 0.70). This indicates that the questionnaire items for these two variables were less consistent in measuring the investigated phenomena. The low internal consistency may potentially affect the accuracy and generalizability of the results regarding both the direct and indirect effects among variables. Therefore, the interpretation of data related to LOC and PEA in this study should be approached with caution.

The Environmental Personality instrument consisted of 25 items based on five factors: conscientiousness, agreeableness, neuroticism, openness, and extraversion, measured using the Environmental Personality (EP) scale with a 5–4–3–2–1 scoring system (5 = very accurate, 4 = accurate, 3 = unsure, 2 = inaccurate, 1 = very inaccurate). The indicators for each dimension include: (a) conscientiousness: reliability in maintaining the environment, interest in environmental organizations, ambition to prevent environmental damage; (b) agreeableness: calmness during flooding, willingness to collaborate in saving ecosystems, sympathy toward nature; (c) neuroticism: anxiety about extreme weather,

emotional response to deforestation, awareness of climate change; (d) openness: curiosity about climate change, politeness in criticizing environmental issues; (e) extraversion: frequent discussion about environmental protection, social interaction with environmental activists, enthusiasm in discussing environmental issues. The Personal Responsibility instrument consisted of 32 items measured using a 5-point Likert scale (strongly agree to strongly disagree), with indicators including consistency in environmental actions, expectations for environmental protection, willingness to sacrifice time, energy, and finances, consistency in decision-making, clear orientation, strategic choices for ecosystem preservation, a sense of balance between humans and nature, and accountability for actions taken. The LOC instrument consisted of 25 items measured using a forced-choice scale (2–1), where respondents selected statements (a or b) corresponding to their personality characteristics. Internal-oriented responses were scored 2, while external-oriented responses were scored 1. The indicators include acknowledging personal failure, efforts for self-improvement, awareness of personal weaknesses, not blaming others, and self-compassion. The use of a dichotomous forced-choice format (2–1) in measuring Locus of Control (LOC) has a strong historical methodological foundation rooted in classical psychometric scholarship, originally popularized through Internal-External Locus of Control Scale developed by Rotter (1966). Research has shown that the forced-choice format improves survey completion rates, resulting in shorter response times, as this format reduces both time demands and respondents' cognitive burden. Its primary advantage lies in reducing social desirability bias. In addition, central tendency bias and acquiescence bias are also minimized. Consequently, respondents' genuine preference characteristics can be measured more precisely (Combrinck, 2024). The Pro-Environmental Attitude instrument consisted of 36 items measured using the Environmental Attitude (EA) scale (5–1 Likert scale), based on dimensions of knowledge, feelings, and action tendencies toward both biotic and abiotic environmental components.

2.4 Procedure

The study began with direct observation of the low level of pro-environmental attitudes among students in East OKU, South Sumatra. This phenomenon was identified through students' daily behaviors, which reflected a lack of concern for environmental sustainability. Based on this issue, the researchers formulated the hypothesis that environmental personality and personal responsibility are key factors influencing pro-environmental attitudes, with Locus of Control (LOC) acting as a mediating variable. A comprehensive literature review was conducted using reputable journals to establish the theoretical framework, referring to the Responsible Environmental Behavior model by

Hines et al., (1987), the Environmental Citizenship Behavior model by Hungerford & Volk, (1990), and the Theory of Planned Behavior by Fishbein & Ajzen, (2010). The research instruments were adapted from Koban (2020) and Fatria et al., (2025). Since the original instruments had demonstrated good reliability, they were used without recalibration. The study was conducted from December 2025 to January 2026. Data collection was carried out in several SMK Negeri Semendawai schools in East OKU, South Sumatra. Primary data were collected from student respondents, then tabulated and analyzed using path analysis with SPSS software. This analysis aimed to empirically determine the extent to which personality and responsibility variables predict students' pro-environmental attitudes through the mediating effect of LOC.

2.5 Data Analysis Technique

The confirmatory analysis of the effects of environmental personality and personal responsibility on pro-environmental attitudes through the mediation of Locus of Control (LOC) among students in East OKU, South Sumatra, was conducted using path analysis techniques. Before estimating correlation coefficients and path coefficients, all variable data were analyzed using descriptive statistics to examine measures of central tendency (mean, median, mode) and dispersion (variance and standard deviation). To meet inferential statistical assumptions, prerequisite tests were conducted, including normality testing using the Shapiro-Wilk method, homogeneity testing using Bartlett's test, and tests of significance and linearity. All data processing procedures were performed using SPSS software. The final stage involved hypothesis testing by evaluating path coefficients and correlation coefficients to validate the resulting empirical model.

3. Result and Discussion

3.1 Description of Research Data

Data obtained from four types of research instruments administered to 65 students of SMK Negeri Semendawai, East OKU, South Sumatra, were subsequently processed and analyzed using both descriptive and inferential statistical approaches to obtain a comprehensive overview. The results of the descriptive statistical analysis are presented in the table below, which includes crucial parameters such as minimum score, maximum score, mean, median, mode, standard deviation, and variance for each research variable. More specifically, a detailed description of measures of central tendency and data dispersion is systematically summarized and presented in Table 1.

Table 1*Descriptive Data of Research Variables*

Descriptive Statistics	PEA (X ₄)	EP (X ₁)	PR (X ₂)	LOC (X ₃)
Mean	130,46	93,92	120,89	40,82
Median	133,00	93,00	119,00	41,00
Mode	134	91	110 ^a	41
Std. Deviation	7,924	10,328	12,039	2,844
Variance	62,784	106,666	144,941	8,090
Range	36	51	63	17
Minimum	108	74	92	33
Maximum	144	125	155	50
Sum	8480	6105	7858	2653

Note: PEA = Pro-Environmental Attitude; EP = Environmental Personality; PR = Personal Responsibility; LOC = Locus of Control

Based on the results of the descriptive statistical analysis presented in Table 1, the general profile of the data for the four main research variables can be comprehensively identified. The Pro-Environmental Attitude (PEA) variable has a mean score of 130.46, with a score range between 108 and 144, indicating a relatively consistent tendency toward positive attitudes among respondents. Meanwhile, the Environmental Personality (EP) variable shows a mean value of 93.92 with a relatively high level of variability, as reflected in a standard deviation of 10.328. The Personal Responsibility (PR) variable exhibits the widest data dispersion, with a range of 63 and a variance of 144.941, indicating substantial differences in individuals' perceptions of responsibility. Finally, the Locus of Control (LOC) variable demonstrates the most stable data distribution, with the smallest standard deviation (2.844) and a mean score of 40.82. The identical median and mode values (41.00) indicate that the distribution of LOC data approximates normality. Overall, these data provide a strong empirical foundation for further causal hypothesis testing in predicting students' pro-environmental attitudes.

3.2 Assumption Testing and Hypothesis Testing

Data analysis in this study was conducted through rigorous scientific procedures, beginning with prerequisite tests prior to hypothesis testing using path analysis. These prerequisite tests included normality, homogeneity, significance, and linearity tests for the variables Environmental Personality, Personal Responsibility, Locus of Control (LOC), and Pro-Environmental Attitude. Based on the Shapiro-Wilk normality test, all residual data pairs were found to be normally distributed. Similarly, Bartlett's test indicated that the data variances were homogeneous. After the data were confirmed to meet the assumptions of significance and linearity, the analysis proceeded with the confirmatory model. The

coefficients for each path were calculated based on the theoretically constructed hypothetical model to map the causal relationships among the variables.

a. Structure I

Based on the results of data analysis to construct the regression equation model linking Environmental Personality (X_1) and Personal Responsibility (X_2) to Pro-Environmental Attitude (X_4), the following mathematical formulation was obtained: $\hat{X}_4 = 79.436 + 0.114X_1 + 0.334X_2$. This equation indicates the specific contribution of each exogenous variable, EP and PR, in predicting the variation in students' PEA. Details regarding the regression coefficients and the significance testing of the model for both variables are presented comprehensively in Table 2.

Table 2

Path Coefficients of Environmental Personality and Personal Responsibility on Pro-Environmental Attitude

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t_{cal}	t_{tab}		Correlations		
	B	Std. Error			.05	.01	Zero-order	Partial	Part
1 (Constant)	79,436	9,314		8,528					
EP	0,114	0,087	0,149	1,307 ^{ns}	1,998	2,656	0,363	0,164	0,135
PR	0,334	0,075	0,507	4,457**	1,998	2,656	0,570	0,493	0,459

a. Dependent Variable: PEA; * Significant in $\alpha = 0.05$; ** Very Significant in $\alpha = 0.01$

Based on the data presented in the coefficient table above, the results of the regression analysis indicate the contributions of Environmental Personality (EP) and Personal Responsibility (PR) to Pro-Environmental Attitude (PEA). The Personal Responsibility (PR) variable is shown to have a highly significant effect, with a t_{cal} of 4.457, which far exceeds the t_{table} value at the 0.01 significance level (2.656). This finding is further supported by the Standardized Coefficient (Beta) value of 0.507, indicating that PR is the dominant predictor in this model. In contrast, the Environmental Personality (EP) variable demonstrates a non-significant effect, as its t_{cal} of 1.307 is lower than the t_{table} value of 1.998 at the 0.05 significance level. For students in East OKU, the drive to adopt pro-environmental attitudes appears to be more strongly affected by a sense of moral obligation or responsibility rather than by inherent traits or personality. Many students may possess strong environmental personality characteristics; however, their pro-environmental attitudes do not emerge due to situational constraints, such as the lack of waste disposal facilities or a school curriculum that does not sufficiently emphasize ecological issues in practical terms. The characteristics of the research setting also play a significant role. In agrarian or developing regions such as East OKU, closeness to nature is often taken for

granted. As students are accustomed to living in a green environment, their environmental personality may already be well-formed but not perceived as something exceptional that must be expressed through positive attitudes. This condition leads to a mismatch between fluctuations in personality scores and attitude scores in the data analysis.

In contrast to Environmental Personality, the Personal Responsibility (PR) variable shows a positive and highly significant effect on students' Pro-Environmental Attitudes in East OKU. This finding indicates that a sense of moral obligation and individual responsibility serves as the primary driving force that directly shapes students' environmental concern. Therefore, the strong effect of Personal Responsibility emphasizes that environmental education interventions will be far more effective if they focus on strengthening students' sense of belonging and personal responsibility rather than relying solely on inherent traits or personality characteristics.

b. Structure II

Based on the results of data analysis to construct the regression equation model linking Environmental Personality (X_1) and Personal Responsibility (X_2) to Locus of Control (X_3), the following mathematical formulation was obtained: $\hat{X}_3 = 36.398 + 0.028X_1 + 0.015X_2$. This equation indicates the specific contribution of each exogenous variable, EP and PR, in predicting the variation in students' LOC. Details regarding the regression coefficients and the significance testing of the model for both variables are presented comprehensively in Table 3.

Table 3

Path Coefficients of Environmental Personality and Personal Responsibility on Locus of Control

Model	Unstandardized Coefficients		Standardized Coefficients	t_{cal}	t_{tab}		Correlations		
	B	Std. Error			.05	.01	Zero-order	Partial	Part
1 (Constant)	36,398	4,083		8,914					
EP	0,028	0,038	0,103	0,739 ^{ns}	1,998	2,656	0,129	0,093	0,093
PR	0,015	0,033	0,062	0,445 ^{ns}	1,998	2,656	0,105	0,056	0,056

a. Dependent Variable: LOC; * Significant in $\alpha=0.05$; ** Very Significant in $\alpha=0.01$

Based on the data presented in the coefficient table above, the regression analysis results indicate the contributions of Environmental Personality (EP) and Personal Responsibility (PR) to Locus of Control (LOC). The statistical testing results reveal that both variables environmental personality and personal responsibility have direct but non-significant effects on the formation of students' locus of control. This is evidenced by the t_{cal} for the EP variable (0.739) and the PR variable (0.445), both of which are substantially

lower than the t_{table} value at the 0.05 significance level (1.998). These findings indicate that variations in locus of control scores among students in the study area are not determined by the level of their environmental personality or their sense of personal responsibility within this model. The non-significant effects are likely due to the dominance of stronger external factors in shaping students' perceptions of self-control. In certain educational or social environments, students may perceive that the outcomes of their actions are more affected by teacher authority, school systems, or fate rather than by their internal personality traits or sense of responsibility. Furthermore, locus of control is a complex psychological construct; even if a student possesses a strong environmental personality or a high sense of responsibility, this does not automatically lead them to feel full control over outcomes if their surrounding environment does not provide opportunities for independent decision-making.

In the context of students in East OKU, cultural characteristics or parenting patterns that are presumed to be more collective, or directive may contribute to this phenomenon. Students tend to follow paths already established by their social environment, resulting in a lack of alignment between fluctuations in personality and responsibility variables and shifts in their control orientation. Thus, these findings emphasize that strengthening students' locus of control cannot rely solely on reinforcing individual traits (EP and PR). Instead, it requires environmental restructuring that provides students with greater opportunities to directly experience the consequences of their decisions and actions.

c. Structure III

Based on the results of data analysis to construct the regression equation model linking Locus of Control (X_3) to Pro-Environmental Attitude (X_4), the following mathematical formulation was obtained: $\hat{X}_4 = 109.372 + 0.517X_3$. This equation indicates the specific contribution of the exogenous variable LOC in predicting the variation in students' PEA. Details regarding the regression coefficients and the significance testing of the model are presented comprehensively in Table 4.

Table 4*Path Coefficients of Locus of Control on Pro-Environmental Attitude*

Model	Unstandardized Coefficients		Standardized Coefficients	t_{cal}	t_{tab}		Correlations		
	B	Std. Error	Beta		.05	.01	Zero-order	Partial	Part
1 (Constant)	109,372	14,110		7,751					
LOC	0,517	0,345	0,185	1,498 ^{ns}	1,998	2,656	0,185	0,185	0,185

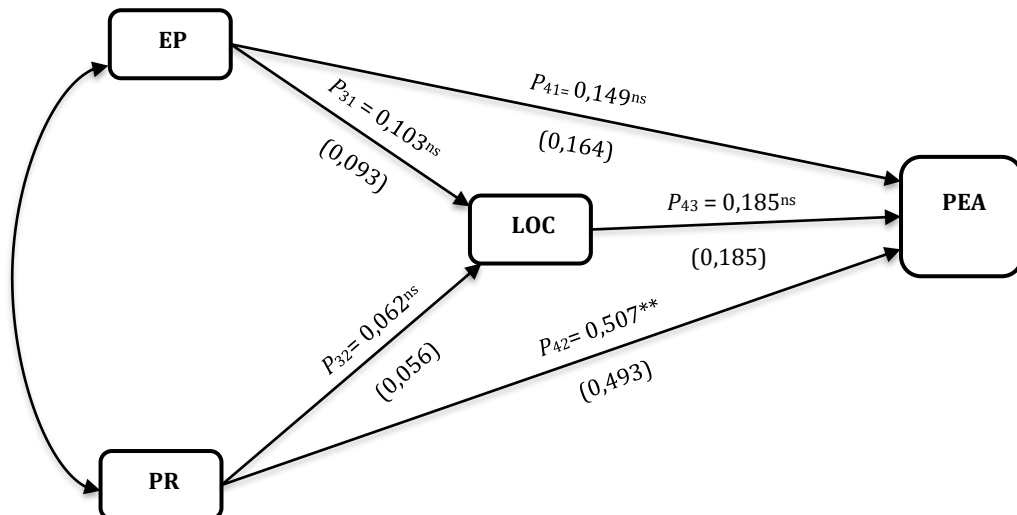
a. Dependent Variable: PEA; * Significant in $\alpha = 0.05$; ** Very Significant in $\alpha = 0.01$

Based on the data in Table 4, the results of the regression analysis indicate the contribution of the Locus of Control (LOC) variable to Pro-Environmental Attitude (PEA). The statistical testing results reveal that LOC has a direct but non-significant effect on the formation of students' pro-environmental attitudes. This is evidenced by the t -value of 1.498, which is lower than the t_{table} values at both the 0.05 significance level (1.998) and the 0.01 significance level (2.656). These findings indicate that although the regression coefficient is mathematically 0.517, an increase in locus of control scores does not necessarily guarantee an increase in students' pro-environmental attitudes within this research model. The absence of a significant effect suggests a gap between individuals' beliefs in their control (locus of control) and the manifestation of actual attitudes in practice. For students in the study area, having an internal control orientation (feeling capable of controlling one's own outcomes) does not automatically result in higher pro-environmental attitudes. This may be due to the stronger effect of external environmental factors or social norms.

Furthermore, the psychological characteristics of students at this age are often strongly affected by the availability of supporting facilities. Even if a student believes that their actions are meaningful (high internal LOC), their pro-environmental attitude may remain low if supporting infrastructure at school or home is inadequate. Thus, strengthening locus of control alone is insufficient to change students' attitudes. It requires integrative and collaborative efforts that combine self-belief with the provision of physical and social environments that consistently support ecological practices. A summary of the research findings is presented in Table 5 below.

Table 5*Summary of Path Coefficient Significance Test Results between Variable*

Indirect and Direct Effect	Path Coefficient	t-cal	t-table (0,05)	t-table (0,01)
EP towards PEA	0,149	1,307 ^{ns}	1,998	2,656
PR towards PEA	0,507	4,457 ^{**}	1,998	2,656
EP towards LOC	0,103	0,739 ^{ns}	1,998	2,656
PR towards LOC	0,062	0,445 ^{ns}	1,998	2,656
LOC towards PEA	0,185	1,498 ^{ns}	1,998	2,656
EP towards PEA through LOC	0,019	1,639 ^{ns}	1,999	2,657
PR towards PEA through LOC	0,011	0,086 ^{ns}	1,999	2,657

* = $p < 0,05$; ** = $p < 0,01$; ns = non-significant**Figure 2***Result of PEA Empirical Model based on EP and PR mediated by LOC (* = $p < 0,05$; ** = $p < 0,01$)*

3.3 Discussion

Based on the results of hypothesis testing, it was found that the Environmental Personality (EP) variable has a direct but non-significant effect on Pro-Environmental Attitude (PEA), with a path coefficient of 0.149 and a t_{cal} of $1.307 < 1.998$. The researchers argue that understanding individual variation in economic choices and environmental policies requires analysis beyond basic personality traits. However, this finding appears to contradict the study by Pavalache-Ilie & Cazan (2018), which generally indicates that personality traits (such as agreeableness and conscientiousness) are often associated with the tendency to become good citizens. Therefore, individuals with such traits are more likely to adopt pro-environmental attitudes, as these are considered socially acceptable and desirable norms.

In contrast to personality, the Personal Responsibility (PR) variable is proven to have a highly significant effect on Pro-Environmental Attitude (PEA), with a dominant path coefficient of 0.507 and a t_{cal} of 4.457. These results confirm that a sense of moral obligation serves as the primary driving force in shaping ethical attitudes toward the environment. Support for this finding is reinforced by Priadi et al. (2020), who explain that individuals with a strong sense of responsibility tend to demonstrate a more stable willingness to engage in environmentally sustainable actions, driven by internal principles and moral obligations. This is further supported by Dasi et al. (2019), who emphasize that personal responsibility plays a crucial role in transforming pro-environmental intentions into action. Studies among students show a significant positive relationship, where individuals with a higher sense of personal responsibility are more likely to possess a strong intention to engage in environmental protection efforts.

The analysis of the relationship between Environmental Personality (EP) and Locus of Control (LOC) indicates a non-significant effect, with a path coefficient of 0.103 and a t_{cal} of 0.739. This finding suggests that individual personality tendencies do not automatically foster the belief that one has control over environmental changes. As explained by Lisboa et al. (2024), although personality plays a role in shaping beliefs, its effectiveness in influencing perceived self-control is often constrained by external factors beyond students' personal variables. This is further supported by Cleveland & Kalamas (2014), who argue that personal traits are often overridden by contextual constraints, such as government policies or infrastructure. This explains why high environmental personality scores do not necessarily translate into a strong internal locus of control when students perceive their surrounding environment as unsupportive. A similar pattern is observed in the relationship between Personal Responsibility (PR) and Locus of Control (LOC), where the results show a very small path coefficient of 0.062 with a t_{cal} of 0.445. Although students may feel morally responsible, they may still perceive themselves as lacking control (internal LOC) to enact significant environmental changes. This finding is consistent with Djuwita & Benyamin (2019), who state that while personal responsibility contributes to the intention to engage in pro-environmental actions, its effect is often limited without a corresponding belief in actual control (internal LOC). The results of this study highlight the need for habituation strategies and environmental support to strengthen individuals' perceptions of control.

The analysis of the effect of Locus of Control (LOC) on Pro-Environmental Attitude (PEA) also reveals a non-significant result, with a path coefficient of 0.185 and a t_{cal} of 1.498. This finding indicates that possessing an internal control orientation does not guarantee that students will exhibit strong pro-environmental attitudes. According to Sulphrey et al.

(2023), the relationship between self-control and environmental action depends heavily on how positive an individual's environmental paradigm is; without such a paradigm, LOC loses its predictive power regarding attitudes. Giefe et al. (2019) also found that the effect of attitudes on environmental behavior often depends on the level of LOC, yet this relationship is not always linear or directly significant. These findings are highly relevant in explaining why an internal locus of control does not necessarily ensure strong pro-environmental attitudes, particularly when situational factors or interactions with other variables mediate the relationship.

Regarding indirect effects, Environmental Personality (EP) through Locus of Control (LOC) on Pro-Environmental Attitude (PEA) was found to be non-significant, with a path coefficient of 0.019 and a $t_{\text{-cal}}$ of 1.639. This indicates that LOC is not an appropriate mediating variable for linking personality to pro-environmental attitudes. Hidalgo-Crespo et al. (2023) argue that personality domains are more effective when directly associated with specific values or paradigms rather than being mediated through control-related pathways. Similarly, Personal Responsibility (PR) through Locus of Control (LOC) on Pro-Environmental Attitude (PEA) shows an almost negligible indirect effect, with a path coefficient of 0.011 and a $t_{\text{-cal}}$ of 0.086. This suggests that students tend to act based on what they perceive as morally right, regardless of the extent to which they feel they have control over the situation.

Overall, these findings indicate that Personal Responsibility is the strongest single antecedent factor in this model. The dominant effect of PR on PEA suggests that environmental education interventions will be more effective when focused on affective and moral dimensions. As emphasized by Samsudin et al. (2026), strengthening students' sense of belonging and personal responsibility is a key driver in promoting active engagement in sustainable environmental conservation efforts. It is important to note that the relatively weak effect of Environmental Personality (EP) highlights the need for a new approach to character education in schools. Students' inherent traits need to be guided through practical experiences in order to be transformed into observable attitudes.

Based on the presented findings and data analysis, the limitations of this study are as follows: (1) The limited sample size, involving only 65 students from a single school (SMK Negeri 1 Semendawai), which is relatively small for a causal study and restricts the generalizability of the findings to broader student populations at the regional or national level; (2) The findings indicate that environmental personality and LOC do not have significant effects on attitudes, suggesting the presence of strong external variables—such as school infrastructure, local policies, or social norms in East OKU—that were not included

in the research model but are theoretically influential; (3) The reliance on self-report data, collected through questionnaires, which carries the risk of social desirability bias, where students may provide socially acceptable responses (especially for PR) that do not fully reflect their actual behavior or attitudes in real-life situations; (4) The cross-sectional nature of the data collection, conducted at a single point in time, which limits the ability to capture long-term changes or deeper causal relationships over time, given that attitudes and locus of control are dynamic and may evolve with age or exposure to information; (5) The use of LOC and PEA instruments with low reliability values indicates that the questionnaire items for both variables were less consistent in measuring the phenomena under investigation.

4. Conclusion

This study concludes that Personal Responsibility (PR) is the strongest and most significant single predictor in shaping students' pro-environmental attitudes. This finding confirms that moral motivation and internal obligation are far more effective in driving students' ethical attitudes toward the environment than inherent personality traits or locus of control (LOC). Environmental Personality (EP) and LOC exhibit direct but non-significant effects on pro-environmental attitudes. This finding challenges the assumption that individuals with strong environmental personality traits or an internal control orientation will automatically demonstrate high levels of environmental concern. This condition is likely affected by situational constraints, prevailing paradigms, and the lack of supporting facilities within students' environments. Furthermore, LOC fails to function as a mediating variable in linking both environmental personality and personal responsibility to pro-environmental attitudes. The implications of this study emphasize the urgency of strengthening pro-environmental attitudes in schools, which should not rely solely on cognitive instruction or the development of basic personality traits. The practical implications of these findings require educational institutions to shift their instructional focus from merely emphasizing cognitive understanding of scientific theories toward strengthening students' moral motivation and internal obligations at the affective level. To achieve this, conventional lecture-based methods should be transformed into Project-Based Learning and experiential learning approaches, such as independent waste management programs and school greening activities, in order to foster students' sense of belonging toward nature. Recommendations for environmental education in Ogan Komering Ulu Timur Regency include enriching the curriculum with case-study discussions on environmental crises, natural resources, and energy issues to deepen students' personal responsibility. On the other hand, situational barriers that limit the manifestation of

students' environmental personality and locus of control orientations must be eliminated through the provision of adequate supporting facilities, such as evenly distributed waste-sorting bins, energy-saving areas, and ready-to-drink water taps within school environments. These policies should be reinforced through binding eco-school culture regulations, including bans on single-use plastics and mandatory use of personal food and beverage containers. The implementation of these regulations will certainly have a direct impact on students' pro-environmental attitudes (PEA), which in turn will become a predisposition for the emergence of pro-environmental behavior (PEB) among students.

References

- Akintunde, E. A. (2017). Theories and Concepts for Human Behavior in Environmental Preservation. *Journal of Environmental Science and Public Health*, 01(02), 120–133. <https://doi.org/10.26502/jesph.96120012>
- Apriyanti, E., Fatria, E., Priadi, A., & Wilti, I. R. (2025). 21st Century Environmental Education: A Strategy for Transforming Community Behavior in Facing the Environmental Crisis. *IJIS Edu : Indonesian Journal of Integrated Science Education*, 7(1), 14–39. <https://doi.org/http://dx.doi.org/10.29300/ijisedu.v7i1.4755>
- Chen, J., & Wang, L. (2007). Locus of control and the three components of commitment to change. *Personality and Individual Differences*, 42(3), 503–512. <https://doi.org/10.1016/j.paid.2006.07.025>
- Chiang, Y. Te, Fang, W. T., Kaplan, U., & Ng, E. (2019). Locus of control: The mediation effect between emotional stability and pro-environmental behavior. *Sustainability (Switzerland)*, 11(3). <https://doi.org/10.3390/su11030820>
- Chukwuorji, J. B. C., Ituma, E. A., & Ugwu, L. E. (2018). Locus of Control and Academic Engagement: Mediating Role of Religious Commitment. *Current Psychology*, 37(4), 792–802. <https://doi.org/10.1007/s12144-016-9546-8>
- Cleveland, M., & Kalamas, M. (2014). Environmental locus of control. In J. L. R. & J. Barling (Ed.), *The Psychology of Green Organizations* (hal. 1–37). Oxford University Press. <https://doi.org/https://doi.org/10.1093/acprof:oso/9780199997480.003.0009>
- Combrinck, C. (2024). Not Liking the Likert? A Rasch Analysis of Forced-choice Format and Usefulness in Survey Design. *SAGE Open*, December, 1–18. <https://doi.org/10.1177/21582440241295501>
- Dasi, A. A., Miarsyah, M., & Rusdi, R. (2019). Hubungan antara Wilayah Kendali dan Tanggung Jawab Personal dengan Intensi Pro-Lingkungan. *Jurnal Psikologi Ulayat*, 6(1), 69–82. <https://doi.org/10.24854/jpu02019-224>

- Derdowski, L. A., Grahn, Å. H., Hansen, H., & Skeiseid, H. (2020). The new ecological paradigm, pro-environmental behaviour, and the moderating effects of locus of control and self-construal. *Sustainability (Switzerland)*, 12(18), 7–9. <https://doi.org/10.3390/su12187728>
- Djuwita, R., & Benyamin, A. (2019). Teaching Pro-Environmental Behavior: A Challenge in Indonesian Schools. *Psychological Research on Urban Society*, 2(1), 26. <https://doi.org/10.7454/proust.v2i1.48>
- Fatria, E. (2020). Pengaruh Investasi Personal, Komitmen Personal, Locus of Control dan Keinginan untuk Bertindak terhadap Perilaku Bijak Lingkungan (Studi Kausal pada Mahasiswa Generasi Z di Universitas Negeri Jakarta) [Universitas Negeri Jakarta]. *In Repositori Universitas Negeri Jakarta*. <http://repository.unj.ac.id/id/eprint/8560>
- Fatria, E., Priadi, A., & Apriyanti, E. (2025). Predicting student's pro-environmental behavior based on antecedent's factors: A confirmatory study. *Biosfer: Jurnal Pendidikan Biologi*, 18(2), 45–62. <https://doi.org/https://doi.org/10.21009/biosferjpb.52862>
- Fatria, E., Priadi, A., Apriyanti, E., Koban, D. D., & Yuniasih, I. (2024). Komparasi Kurikulum Pendidikan Lingkungan Negara Maju dan Negara Berkembang: Sebuah Kajian Literatur. *UNM Environmental Journals*, 7(2), 1–10. <https://doi.org/https://doi.org/10.26858/uej.v7i2.71969>
- Fawzy, S., Osman, A. I., Doran, J., & Rooney, D. W. (2020). Strategies for mitigation of climate change: a review. *Environmental Chemistry Letters*, 18(6), 2069–2094. <https://doi.org/10.1007/s10311-020-01059-w>
- Fenitra, R. M., Premananto, G. C., Sedera, R. M. H., Abbas, A., & Laila, N. (2022). Environmentally responsible behavior and Knowledge-Belief-Norm in the tourism context: The moderating role of types of destinations. *International Journal of Geoheritage and Parks*, 10(2), 273–288. <https://doi.org/10.1016/j.ijgeop.2022.05.001>
- Fishbein, M., & Ajzen, I. (2010). *Predicting and Changing Behavior The Reasoned Action Approach*. Psychology Press Taylor & Francis Group.
- Giefe, M. M., Peterson, M. N., & Chen, X. (2019). Interactions among Locus of Control, Environmental Attitudes and Pro-Environmental Behaviour in China. *Environmental Conservation*, 46(3), 234–240. <https://doi.org/doi:10.1017/S0376892919000043>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate Data Analysis (Eighth Edi). *Cengage Learning, EMEA*. https://eli.johogo.com/Class/CCU/SEM/_Multivariate Data Analysis_Hair.pdf

- Helbling, M. (2020). Attitudes towards climate change migrants. *Climatic Change*, 160(1), 89–102. <https://doi.org/10.1007/s10584-020-02697-3>
- Hertwich, E. G., & Peters, G. P. (2009). *Carbon Footprint of Nations : A Global, Trade-Linked Analysis*. *Environmental Science & Technology*, 43(16), 6414–6420. <https://doi.org/https://doi.org/10.1021/es803496a>
- Hidalgo-Crespo, J., Velastegui-Montoya, A., Amaya-Rivas, J. L., Soto, M., & Riel, A. (2023). The Role of Personality in the Adoption of Pro-Environmental Behaviors through the Lens of the Value-Belief-Norm Theory. *Sustainability (Switzerland)*, 15(17). <https://doi.org/10.3390/su151712803>
- Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and Synthesis of Research on Responsible Environmental Behavior: A Meta-Analysis. *The Journal of Environmental Education*, 18(June 2013), 1–8. <https://doi.org/http://dx.doi.org/10.1080/00958964.1987.9943482>
- Hungerford, H. R., & Volk, T. L. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education*, 21(3), 8–21. <https://doi.org/10.1080/00958964.1990.10753743>
- Iswandi, I., & Rajiman, R. (2026). Dampak Kebakaran Hutan Dan Lahan Terhadap Produktivitas Tenaga Kerja Pada Proyek Pembangunan Infrastruktur Jalan Pemerintah Kabupaten Oku Timur. *Jurnal Ilmiah Ilmu Teknik Mesin, Industri dan Komputer (MUARA TEKNIK)*, 2(1), 21–33. <https://doi.org/https://doi.org/10.64365/muaratek.v2i1.194>
- Kline, R. B. (2016). *Principles and Practice of Structural Equation Modeling (Fourth Edi)*. The Guildford Press. https://eli.johogo.com/Class/CCU/SEM/_Principles and Practice of Structural Equation Modeling_Kline.pdf
- Koban, D. D. (2020). *Kepribadian Siswa terhadap Lingkungan Studi Korelasional Sikap Lingkungan, Locus of Control dan Tanggung Jawab Pribadi Pada Siswa SMA Swasta di DKI Jakarta* [Universitas Negeri Jakarta]. <http://repository.unj.ac.id/8491/>
- Kochanek, A., Załona, T., Cembruch-nowakowski, M., Janczura, J., Pietrucha, I., Herbut, P., Kotowski, T., Oleksy-g, A., Guzdek, S., & Majkrzak, A. (2025). Pro-Environmental Attitudes and Behaviors Toward Energy Saving and Transportation. *Energies*, 18(23), 6137. <https://doi.org/https://doi.org/10.3390/en18236137>
- Kollmuss, A., & Agyeman, J. (2002). *Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior?*. *Environmental Education Research*, 8(3), 239–260. <https://doi.org/10.1080/13504620220145401>

- Kyselá, E., Ščasný, M., & Zvěřinová, I. (2019). Attitudes toward climate change mitigation policies: a review of measures and a construct of policy attitudes. *Climate Policy*, 19(7), 878–892. <https://doi.org/10.1080/14693062.2019.1611534>
- Langenbach, B. P., Berger, S., Baumgartner, T., & Knoch, D. (2020). Cognitive Resources Moderate the Relationship Between Pro-Environmental Attitudes and Green Behavior. *Environment and Behavior*, 52(9), 979–995. <https://doi.org/10.1177/0013916519843127>
- Li, D., Zhao, L., Ma, S., Shao, S., & Zhang, L. (2019). Resources, Conservation & Recycling What in fl uences an individual's pro-environmental behavior? A literature review. *Resources, Conservation & Recycling*, 146(March), 28–34. <https://doi.org/10.1016/j.resconrec.2019.03.024>
- Li, Y., Zhao, Y., Huang, Q., Deng, J., Deng, X., & Li, J. (2024). Empathy with nature promotes pro-environmental attitudes in preschool children. *PsyCh Journal*, 13(4), 598–607. <https://doi.org/10.1002/pchj.735>
- Lisboa, P. V., Gómez-Román, C., Guntín, L., & Monteiro, A. P. (2024). Pro-environmental behavior, personality and emotional intelligence in adolescents: a systematic review. *Frontiers in Psychology*, 15(February), 1–11. <https://doi.org/10.3389/fpsyg.2024.1323098>
- Nordahl, H., Ebrahimi, O. V., Hoffart, A., & Johnson, S. U. (2022). Trait Versus State Predictors of Emotional Distress Symptoms: The Role of the Big-5 Personality Traits, Metacognitive Beliefs, and Strategies. *Journal of Nervous and Mental Disease*, 210(12), 943–950. <https://doi.org/10.1097/NMD.0000000000001557>
- Novotny, R., Huttmanova, E., Kalistova, A., Steiner, M. J. F., Ramharter, P. M., Benko, M., & Salabura, D. (2022). Assessment of the Impact of Personality Characteristics on the Environmental Awareness. *Polish Journal of Management Studies*, 26(1), 217–232. <https://doi.org/10.17512/pjms.2022.26.1.14>
- Pavalache-Ilie, M., & Cazan, A. M. (2018). Personality correlates of pro-environmental attitudes. *International Journal of Environmental Health Research*, 28(1), 71–78. <https://doi.org/10.1080/09603123.2018.1429576>
- Pratiwi, R. D., Rusdi, R., & Komala, R. (2019). The effects of personality and intention to act toward responsible environmental behavior. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 5(1), 169–176. <https://doi.org/10.22219/jpbi.v5i1.7120>
- Priadi, A., & Fatria, E. (2024). The Development of Early Childhood Naturalist Intelligence through Environmental Education. *Jurnal Pendidikan Usia Dini*, 18(1), 30–52. <https://doi.org/https://doi.org/10.21009/JPUD.181.03>

- Priadi, A., Fatria, E., Nadiroh, N., Sarkawi, D., & Oktaviani, A. (2018). Environmental citizenship behavior (the effect of environmental sensitivity , knowledge of ecology , personal investment in environmental issue , locus of control towards s tudents ' environmental citizenship behavior). *E3S Web Conf.*, 74, 1–6. <https://doi.org/https://doi.org/10.1051/e3sconf/20187408002>
- Priadi, A., Made Putrawan, I., & Artanti, G. D. (2020). Lecturers' Knowledge About Environmental Issues, Personal Responsibility and Personality:Its Effect on Lecturers' Intention to Act in Saving our Environment. *Indian Journal of Public Health Research & Development*, 11(1), 1848–1853. <https://doi.org/10.37506/v11/i1/2020/ijphrd/194121>
- Putrawan, I. M. (2015). Measuring new environmental paradigm based on students' knowledge about ecosystem and locus of control. *Eurasia Journal of Mathematics, Science and Technology Education*, 11(2), 325–333. <https://doi.org/10.12973/eurasia.2015.1336a>
- Rahayu, S., Novitasari, E., & Vedy, N. K. (2024). Impact of Environmental Knowledge toward Green Purchase Intention: Attitude as Mediator. *Journal of Business and Information Systems*, 6(2), 224–238. <https://doi.org/https://doi.org/10.31316/jbis.v6i2.255>
- Rotter, J. B. (1966). *Generalized expectancies for internal versus external control of reinforcement*. Psychological Monographs: General and Applied, 80(1), 1–28. <https://doi.org/https://psycnet.apa.org/doi/10.1037/h0092976>
- Samsudin, N., Parasuraman, B. A., Yasin, N. H. M., & Zhen, L. W. (2026). The Level of Green Behaviour , Green Knowledge , Self Esteem and Wellbeing among School Teachers in Malaysia. *SYMBIOHEALTH*, 4(1), 45–54. <https://doi.org/10.59525/symbiohealth.1096>
- Shen, T., Rasdi, I. B., Ezani, N. E. B., & San, O. T. (2024). The mediating role of pro - environmental attitude and intention on the translation from climate change health risk perception to pro-environmental behavior. *Scientific Reports*, 14, 1–16. <https://doi.org/10.1038/s41598-024-60418-7>
- Soutter, A. R. B., Bates, T. C., & Möttus, R. (2020). Big Five and HEXACO Personality Traits, Proenvironmental Attitudes, and Behaviors: A Meta-Analysis. *Perspectives on Psychological Science*, 15(4), 913–941. <https://doi.org/10.1177/1745691620903019>
- Sulphrey, M. M., Alkahtani, N. S., Mareai Senan, N. A., & Elneel Adow, A. H. (2023). New Environmental Paradigm, Environmental Attitude, and Proenvironmental Behaviour

- as Antecedents of Environmental Sustainability. *International Journal of Energy Economics and Policy*, 13(3), 418–427. <https://doi.org/10.32479/ijeep.14156>
- Tian, H., & Liu, X. (2022). Pro-Environmental Behavior Research: Theoretical Progress and Future Directions. *International Journal of Environmental Research and Public Health*, 19(11). <https://doi.org/10.3390/ijerph19116721>
- Tucholska, K., Gulla, B., & Ziernicka-Wojtaszek, A. (2024). Climate change beliefs, emotions and pro- environmental behaviors among adults: The role of core personality traits and the time perspective. *PLoS ONE*, 19(4), 1–20. <https://doi.org/10.1371/journal.pone.0300246>
- Uscinski, J. E., & Olivella, S. (2017). The conditional effect of conspiracy thinking on attitudes toward climate change. *Research and Politics*, 4(4), 1–9. <https://doi.org/10.1177/2053168017743105>
- Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample Size Requirements for Structural Equation Models: An Evaluation of Power, Bias, and Solution Propriety. *Educational and Psychological Measurement*, 76(6), 913–934. <https://doi.org/10.1177/0013164413495237>.Sample
- World Meteorological Organization. (2024). *State of the Global Climate 2024*. World Meteorological Organization. <https://wmo.int/publication-series/state-of-global-climate/state-of-global-climate-2024>
- Wyss, A. M., Knoch, D., & Berger, S. (2022). When and how pro-environmental attitudes turn into behavior: The role of costs, benefits, and self-control. *Journal of Environmental Psychology*, 79(December 2021), 101748. <https://doi.org/10.1016/j.jenvp.2021.101748>
- Yang, X., & Weber, A. (2019). Who can improve the environment—Me or the powerful others? An integrative approach to locus of control and pro-environmental behavior in China. *Resources, Conservation and Recycling*, 146(September 2018), 55–67. <https://doi.org/10.1016/j.resconrec.2019.03.005>
- Yuningsih, L., & Lensari, D. (2016). Application Of Gis Patterns and Community Participation to Utilization Of Inventory Production Forest By Community In Oku Regency South Sumatera Province. *Jurnal Hutan Tropis*, 4(2), 131–139. <https://doi.org/https://dx.doi.org/10.20527/jht.v4i2.3599>
- Yuriev, A., Dahmen, M., Paillé, P., Boiral, O., & Guillaumie, L. (2020). Pro-environmental behaviors through the lens of the theory of planned behavior: A scoping review. *Resources, Conservation and Recycling*, 155(November 2019). <https://doi.org/10.1016/j.resconrec.2019.104660>