

EMPIRICAL ANALYSIS OF THE INFLUENCE OF PERCEIVED BEHAVIORAL CONTROL, ENVIRONMENTAL CONCERN AND ATTITUDE ON PRO-ENVIRONMENTAL BEHAVIOR

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Abstract: *Pro-environmental behavior plays a crucial role in maintaining environmental sustainability. College students and environmental activists are considered a group with significant potential to promote pro-environmental actions. However, a deeper understanding of the factors influencing pro-environmental behavior is still essential. The aim of this research is to analyze the extent to which perceived behavioral control, environmental concern, attitude, and behavioral intention can influence pro-environmental behavior. Additionally, this study examines the role of behavioral intention in mediating the relationships between these factors and pro-environmental behavior. This research employs a quantitative method with a sample size of 293 participants selected through random sampling. Data is collected through questionnaires and analyzed using Structural Equation Modeling (SEM) with the assistance of SmartPLS 4.95 software. The results of this study indicate that perceived behavioral control significantly influences behavioral intention but does not significantly affect pro-environmental behavior. Environmental concern has a significant influence on behavioral intention, whereas attitude does not significantly affect behavioral intention. Furthermore, behavioral intention significantly influences pro-environmental behavior. Additionally, behavioral intention mediates the relationships between perceived behavioral control and attitude with pro-environmental behavior. However, it does not mediate the relationship between environmental concern and pro-environmental behavior..*

Keywords: *Perceived Behavioral Control, Environmental Concern, Attitude, Behavioral Intention, Pro-Environmental Behavior,*

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1. Introduction

Environmental sustainability is a highly crucial concept as environmental degradation has resulted in many significantly adverse impacts (Oláh et al., 2020). Environmental sustainability pertains to efforts aimed at preserving and protecting natural resources and ecosystems to ensure their sustainability for both the present and future generations (Helm, 2020; Zhang et al., 2020). Environmental damage results from various human activities that harm ecosystems, such as excessive deforestation, air and water pollution, and climate change due to increased greenhouse gas emissions (Panda & Maity, 2021). The negative consequences of environmental damage encompass biodiversity loss, water crises, and even the potential for natural disasters. Ekins & Zenghelis (2021) emphasize that environmental sustainability is not merely an environmental issue but is closely related to human well-being. Human dependence on natural resources and ecosystems necessitates the need to preserve the environment to ensure the provision of food, energy, and clean water. Efforts to maintain environmental sustainability involve changes in attitudes and awareness of sustainability, including raising awareness about the individual's impact on the environment (Kruize et al., 2019; Khan et al., 2020; Rustam et al., 2020).

Pro-environmental behavior is a key element with a significant impact on efforts to maintain ecosystem sustainability and protect the environment. As environmental challenges such as climate change, biodiversity loss, and pollution become increasingly pressing, pro-environmental behavior becomes a crucial personal asset (Janmaimool & Khajohnmanee, 2019; Chwialkowska et al., 2020). Individuals who consciously engage in pro-environmental behavior contribute to reducing the negative impacts resulting from human actions on the environment. According to Khan & Terason (2022), pro-environmental behavior encompasses a range of positive actions, from energy conservation practices to waste reduction and active participation in environmental campaigns and advocacy for pro-environment policies. Individuals who care about the environment, have a positive attitude toward environmental issues, and feel in control of concrete actions to support sustainability (Foster et al., 2022). With more people adopting pro-environmental behavior, this positive influence can significantly accelerate the transition to more sustainable lifestyles and mitigate negative environmental impacts (Islam & Managi, 2019; Kim & Koo, 2020).

Among college students and environmental activists, an understanding of the importance of environmental conservation has a very significant impact on their behavior in supporting environmental sustainability. College students and environmental activists, as active and concerned groups, play a key role in influencing views and actions related to environmental issues (Boca & Saraçlı, 2019). College students and environmental activists are agents of change who can motivate positive changes in society (Hadjichambis & Paraskeva-Hadjichambi, 2020). A clear understanding of the urgency and significance of environmental conservation provides a strong moral and ethical foundation for college students and environmental activists to take pro-environmental actions. With a strong understanding, individuals will internalize the importance of pro-environmental behavior, such as reducing carbon footprints, supporting green initiatives, and participating in environmental campaigns (Grilli & Curtis, 2021; Mouro & Duarte, 2021). Conversely, when the understanding of pro-environmental behavior is unclear, programs and initiatives

aimed at supporting environmental sustainability become less effective (Latif et al., 2022; Van Valkengoed et al., 2022).

Several factors play a crucial role in influencing pro-environmental behavior. These factors include perceived behavioral control, environmental concern, and attitude. Perceived behavioral control refers to an individual's belief in their ability to control and perform pro-environmental actions (Liu et al., 2021). This factor is highly significant because when someone feels in control of their behavior, they are more likely to take actions that support the environment. Lim & Weissmann (2023) state that perceived behavioral control creates self-efficacy, the belief that individuals have the capability to effect positive change. Regarding environmental concern, Yin et al. (2021) suggests that the higher an individual's level of concern for the environment, the more likely they are to engage in pro-environmental actions. Environmental concern can inspire individuals to understand the impact of their actions on the environment and feel a responsibility to protect and preserve ecosystems (Yue et al., 2020). According to Sanchez-Sabate & Sabaté (2019), attitude refers to an individual's views on environmental issues. Someone with a positive attitude toward pro-environmental actions is more likely to adopt behavior related to sustainability. A positive attitude can be a strong driver in motivating individuals to consistently engage in pro-environmental behavior (Dilkes-Hoffman et al., 2019; Huber, 2020).

The aim of this research is to analyze the extent to which three key factors, namely perceived behavioral control, environmental concern, and attitude, influence pro-environmental behavior. The importance of the influence of these factors in shaping pro-environmental behavior is widely recognized, as all three play a key role in encouraging positive environmental actions. Furthermore, this study also includes behavioral intention in the analysis, which refers to how much individuals intend to engage in pro-environmental actions. Additionally, this research analyzes the variable of behavioral intention as a mediator. By including behavioral intention as a mediator, this study seeks to explain how behavioral intentions play a role in connecting perceived behavioral control, environmental concern, and attitude with pro-environmental behavior.

2. Literature Review

This research is based on two theoretical frameworks: the Theory of Planned Behaviour and Value, Belief Norms. Each of these theoretical frameworks provides valuable insights into the psychological factors influencing individual pro-environmental behavior. The Theory of Planned Behaviour is a psychological approach that focuses on understanding an individual's intention regarding specific behavior. This theory posits that intention is a critical factor influencing an individual's behavior (Yuriev et al., 2020; Ajzen, 2020). Intentions are influenced by three main components: attitude towards the behavior, perceived behavioral control, and subjective norms. The Theory of Planned Behaviour is used to explain individual intentions regarding pro-environmental behavior, providing a deeper understanding of the extent to which these intentions influence concrete actions taken by individuals (Si et al., 2019; Ateş, 2020). Value, Belief Norms is a theoretical approach focusing on the aspects of values, beliefs, and social norms that influence an individual's attitudes and behaviors. This theory is one of the most dominant in predicting attitudes and behaviors related to environmental issues (Gkargkavouzi et al., 2019). The Value, Belief Norms approach is

used to identify the psychological factors influencing pro-environmental behavior (Ghazali et al., 2019; Liobikienė & Poškus, 2019). The combination of these two theoretical frameworks provides a holistic approach to understanding pro-environmental behavior. The Theory of Planned Behaviour helps identify individual intentions, while Value, Belief Norms delves deeper into the psychological factors underpinning an individual's attitudes and behaviors.

Perceived behavioral control is a crucial concept in understanding individual behavior (Vamvaka et al., 2020). It refers to an individual's belief in their ability and control to successfully perform a specific behavior. Gieure et al. (2020) state that perceived behavioral control plays a significant role in influencing an individual's intentions and actions. Vasquez et al. (2019) explain that the belief of control within perceived behavioral control includes two main aspects: self-efficacy and beliefs in the availability of necessary resources. Self-efficacy refers to the extent to which an individual believes they can carry out a particular action. The higher the level of self-efficacy, the more confident an individual will be in successfully performing that action. Self-efficacy plays a critical role in shaping an individual's intention to engage in pro-environmental behavior (Liu et al., 2020; Foster et al., 2022). Besides self-efficacy, perceived behavioral control also encompasses an individual's belief in the availability of the resources required to perform a specific behavior (Cop et al., 2020). Individuals who believe they have access to the tools, knowledge, support, or time necessary for pro-environmental action will feel capable of carrying out that action. Perceived behavioral control is a significant factor in driving positive changes in individuals' environmental behaviors. Yuriev et al. (2020) state that an individual's belief in their ability to control and perform pro-environmental behavior not only influences the intention to act but also the actual actions taken to support environmental sustainability. Therefore, the hypotheses proposed in this study are as follows:

Hypothesis 1. Perceived behavioral control influences behavioral intention

Hypothesis 2. Perceived behavioral control influences pro-environmental behavior

Environmental concern is a highly relevant and significant factor proposed as a predictor of individuals' behavioral intentions in engaging in pro-environmental behavior (Wu et al., 2020). This factor reflects the level of care, attention, and awareness individuals have toward environmental issues. Environmental concern is an emotional response to environmental issues. Key factors related to environmental concern include awareness, empathy, value alignment, and personal connection (Brown et al., 2019; Khan & Terason, 2022). Individual awareness of environmental issues, such as climate change, biodiversity loss, and pollution, is a primary component of environmental concern. Liobikienė & Poškus (2019) suggest that the higher an individual's awareness of environmental challenges, the more they will feel compelled to take action. Empathy motivates individuals to take pro-environmental actions in response to the suffering and damage experienced by the environment and living beings (Wang et al., 2023). Environmental concern is also influenced by the extent to which an individual's values align with those that support sustainability and environmental protection. Additionally, personal experiences with specific natural environments or ecosystems can strengthen environmental concern. Environmental concern is a crucial factor in motivating individuals to develop intentions to engage in pro-environmental actions (Mouro & Duarte, 2021; Ekins & Zenghelis, 2021). Yin et al.

(2021) state that individuals who care about the environment have stronger intentions to engage in pro-environmental actions because they feel a deep emotional and moral involvement in environmental issues.

Hypothesis 3. Environmental concern influences behavioral intention

The Theory of Planned Behaviour assumes that attitudes also provide a rational basis for individuals' behavioral intentions. Attitudes are formed by two main components: evaluation (positive or negative feelings towards the behavior) and belief (beliefs about the consequences and benefits of the behavior) (Huber, 2020; Liu et al., 2020). Attitudes reflect the extent to which individuals perceive the behavior as good or bad, important or unimportant, and the extent to which individuals believe that the behavior will bring benefits (Dilkes-Hoffman et al., 2019). Thus, attitudes provide a strong rational basis for individuals' intentions to perform or not perform pro-environmental behavior (Sanchez-Sabate & Sabaté, 2019).

Hypothesis 4. Attitude influences behavioral intention

Behavioral intention is a key concept in the Theory of Planned Behaviour. Behavioral intention reflects the extent to which an individual is willing and intends to engage in a specific behavior (Kim et al., 2020; Saari et al., 2021). In the Theory of Planned Behaviour, intention is considered a vital link between the factors influencing individual behavior and the actual actions taken. A higher level of desire to perform a behavior improves the likelihood of realizing that behavior. Liu et al. (2020) noted that a strong intention to perform a specific behavior serves as a good predictor of actual behavior because it demonstrates an individual's commitment to act in accordance with that intention. In the Theory of Planned Behaviour, behavioral intention functions as a mediator that links factors like perceived behavioral control, environmental concern, and attitude to actual behavior. Mahardika et al. (2020) found that with a high level of intention, individuals are better able to overcome obstacles, tackle challenges, and engage in pro-environmental actions effectively. Therefore, the following hypotheses can be proposed:

Hypothesis 5. Behavioral intention influences pro-environmental behavior

Hypothesis 6. Behavioral intention mediates the relationship between perceived behavioral control and pro-environmental behavior

Hypothesis 7. Behavioral intention mediates the relationship between environmental concern and pro-environmental behavior

Hypothesis 8. Behavioral intention mediates the relationship between attitude and pro-environmental behavior.

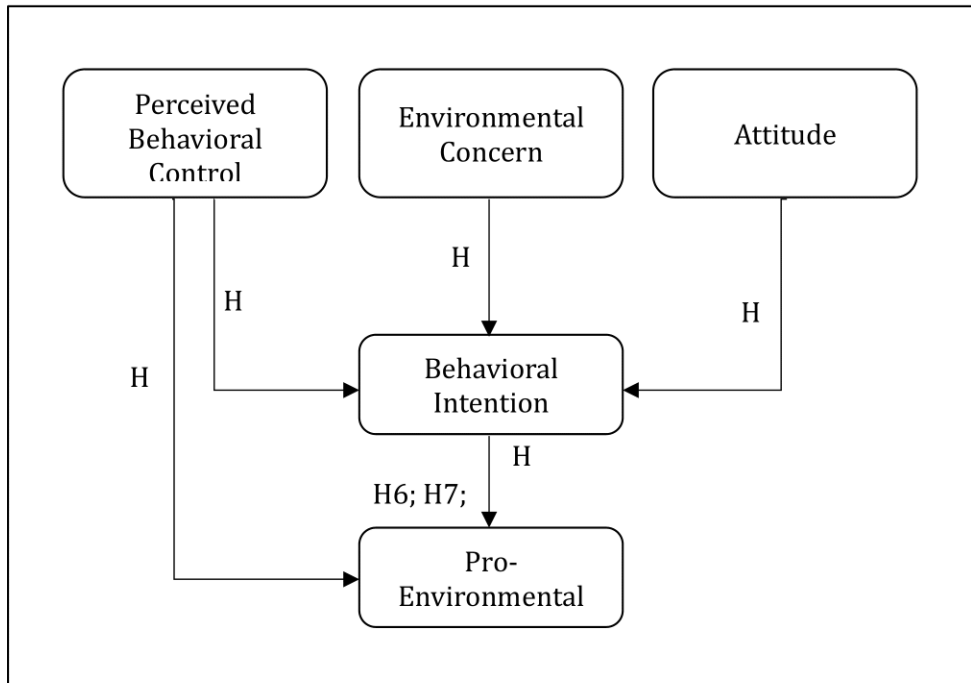


Figure.1: Research Framework

3. Research Methods

The research method employed in this study is quantitative. The study's population includes university students and environmental activists at one of the universities in Indonesia. The sample was randomly selected using the random sampling technique. Data were collected through a questionnaire containing questions rated by respondents using a Likert scale ranging from 1 to 7, indicating from strongly disagree to strongly agree. Questionnaires were distributed online, with a total of 400 questionnaires distributed to respondents. Out of this total, 312 questionnaires were successfully collected, reflecting a significant response rate of 78%. However, 19 questionnaires were not completed in full, resulting in 293 questionnaires available for further analysis. The variables studied in this research include perceived behavioral control, environmental concern, and attitude (independent variables), behavioral intention (mediating variable), and pro-environmental behavior (dependent variable). Data analysis was conducted using Structural Equation Modeling (SEM) with the assistance of SmartPLS software version 4.95.

4. Results and Discussion

The analysis in this study was conducted using the Structural Equation Modeling (SEM) method. SEM was employed to analyze the influence of independent variables (perceived behavioral control, environmental concern, attitude) on the dependent variable (pro-environmental behavior), as well as to identify the role of the mediating

variable (behavioral intention) in connecting independent and dependent variables. The use of statistical software SmartPLS 4.95 facilitated SEM analysis by providing powerful tools for processing and analyzing data, as well as generating outputs that assist in evaluating the model and research findings. The initial analysis in this study aimed to test the accuracy of items or questionnaires in measuring latent variables. This was done using the standard loading factor test. The standard loading factor test is a factor analysis used to measure the extent to which each item or questionnaire can accurately measure or represent the latent variable. The results of the standard loading factor test provide an overview of the quality of the items or questionnaires. The goal is to ensure that the questionnaires can provide reliable and valid measurements of latent variables. The minimum threshold for the loading factor value for an item or questionnaire to be accepted is 0.6. The higher the loading factor value, the better the item or questionnaire is at measuring the latent variable. The results of the analysis can be seen in Figure 1 and are presented in more detail in the Table 1.

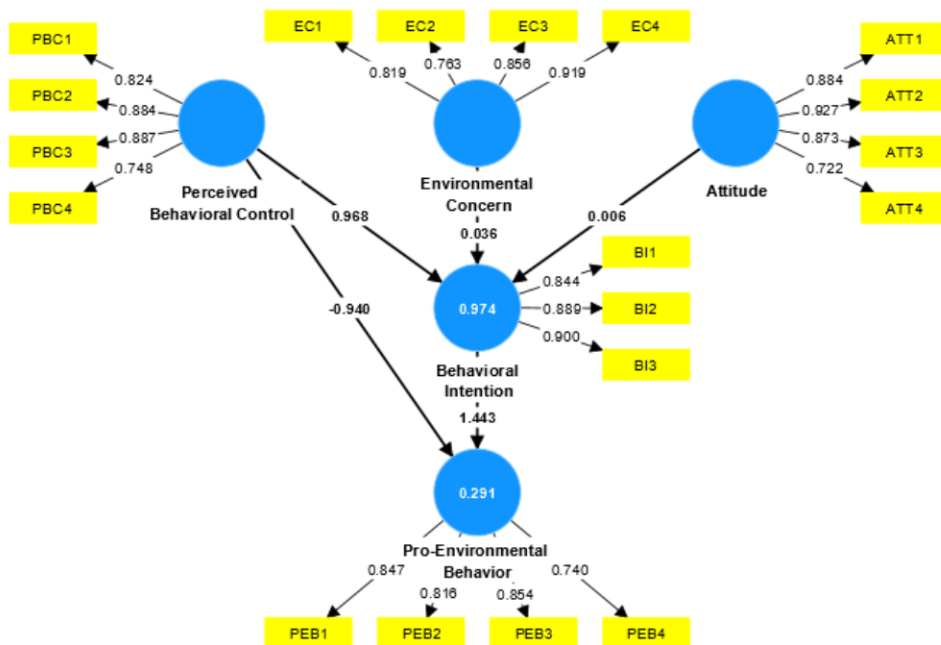


Figure.2: Research Analysis

Table.1: Standard Loading Factor

Variable	Std. Loading Factor
Perceived Behavioral Control → PBC1	0.824
Perceived Behavioral Control → PBC2	0.884
Perceived Behavioral Control → PBC3	0.887
Perceived Behavioral Control → PBC4	0.748
Environmental Concern → EC1	0.819
Environmental Concern → EC2	0.763
Environmental Concern → EC3	0.856
Environmental Concern → EC4	0.919
Attitude → ATT1	0.884

Attitude → ATT2	0.927
Attitude → ATT3	0.873
Attitude → ATT4	0.722
Behavioral Intention → BI1	0.844
Behavioral Intention → BI2	0.889
Behavioral Intention → BI3	0.900
Pro-Environmental Behavior → PEB1	0.847
Pro-Environmental Behavior → PEB2	0.816
Pro-Environmental Behavior → PEB3	0.854
Pro-Environmental Behavior → PEB4	0.740

The results of the standard loading factor test in Table 1 above indicate that each item in the perceived behavioral control variable has significant loading factors. The perceived behavioral control variable is measured using 4 items, with item loading values ranging from 0.748 to 0.887. This demonstrates that all the items used can be relied upon as measures of the perceived behavioral control variable. The environmental concern variable is measured using 4 items, with loading factor values ranging from 0.763 to 0.919, indicating that the items used are strong indicators for measuring the environmental concern variable. Furthermore, the standard loading factor test results for the attitude variable, which also uses 4 items in its measurement, obtained loading values ranging from 0.722 to 0.927, confirming that the items used are good indicators for measuring the latent attitude variable. In the behavioral intention variable, 3 items are used for measurement. The test results show that the loading values obtained from these items are 0.844, 0.889, and 0.900. These values indicate that these items are strong contributors as measures of the behavioral intention variable. This variable is the dependent variable that reflects individual pro-environmental behavior. Furthermore, the pro-environmental behavior variable, which uses 4 items in its measurement, obtained loading values ranging from 0.740 to 0.854, demonstrating that the items used are reliable for measuring the dependent pro-environmental behavior variable.

Furthermore, reliability and validity analyses were performed to demonstrate that the questionnaires or items used are reliable and valid. Reliability refers to the extent to which the questionnaires or items used can provide consistent results. Reliability is measured using the Composite Reliability (CR) value. A CR value higher than 0.7 indicates that the questionnaires or items are considered reliable in measuring latent variables. Validity is measured using the Average Variance Extracted (AVE) value. An AVE value higher than 0.6 indicates that the questionnaires or items are considered valid in measuring latent variables. With CR values higher than 0.7 and AVE values higher than 0.6, it can be confirmed that the measurement instruments used in this study are of high quality for measuring variables such as perceived behavioral control, environmental concern, attitude, behavioral intention, and pro-environmental behavior. The test results can be seen in Table 2.

Table.2: Reliability and Validity

Variable	Composite Reliability (CR)	Average Variance Extracted (AVE)
Perceived Behavioral Control	0.879	0.702
Environmental Concern	0.917	0.708
Attitude	0.874	0.731
Behavioral Intention	0.854	0.77

Pro-Environmental Behavior	0.834	0.665
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The results of the reliability and validity tests in Table 2 above show that the perceived behavioral control variable has a Composite Reliability (CR) value of 0.879 and an Average Variance Extracted (AVE) value of 0.702. The CR value obtained is higher than 0.7, indicating that the instrument used is reliable in measuring perceived behavioral control. Furthermore, the AVE value obtained is higher than 0.6, indicating that the instrument used is valid in measuring the perceived behavioral control variable. The environmental concern variable has a CR value of 0.917 and an AVE value of 0.708. The CR value obtained is higher than 0.7, and the AVE value obtained is higher than 0.6. This demonstrates that the instrument used to measure the environmental concern variable is both reliable and valid. As for the attitude variable, the CR value obtained is 0.874 (> 0.7), and the AVE value obtained is 0.731 (> 0.6). Therefore, it can be concluded that the instrument used to measure the attitude variable is reliable and valid. In the case of behavioral intention, the CR value obtained is also higher than 0.7, at 0.854. The AVE value obtained is also higher than 0.6, at 0.770. This result indicates that the instrument used is both reliable and valid in measuring the behavioral intention variable. Furthermore, the CR value obtained for the pro-environmental behavior variable is 0.834 (> 0.7), and the AVE value obtained is 0.665 (> 0.6). From these values, it can be concluded that the instrument used to measure the pro-environmental behavior variable is reliable and valid.

In addition to the AVE value, the measurement of the validity of instruments used for latent variables can also be done using discriminant validity. Discriminant validity is performed to further confirm that the instruments used are accurate in measuring the latent variables being measured. This is shown in Table 3, where in the discriminant validity test (Cross Loading), the values of the items are higher in measuring their respective latent variables than in measuring other variables.

Table.3: Discriminant Validity (Cross Loading)

Variable	Perceived Behavioral Control	Environmental Concern	Attitude	Behavioral Intention	Pro-Environmental Behavior
PBC1	0.824	0.351	0.252	0.844	0.414
PBC2	0.884	0.422	0.245	0.889	0.415
PBC3	0.887	0.473	0.416	0.900	0.525
PBC4	0.748	0.215	0.177	0.628	0.203
EC1	0.259	0.819	0.492	0.292	0.602
EC2	0.280	0.763	0.461	0.280	0.551
EC3	0.431	0.856	0.401	0.450	0.568
EC4	0.474	0.919	0.453	0.501	0.740
ATT1	0.236	0.389	0.884	0.255	0.315
ATT2	0.288	0.475	0.927	0.305	0.375
ATT3	0.292	0.489	0.873	0.302	0.387
ATT4	0.314	0.419	0.722	0.318	0.463
BI1	0.824	0.351	0.252	0.844	0.414
BI2	0.884	0.422	0.245	0.889	0.415
BI3	0.887	0.473	0.416	0.900	0.525

PEB1	0.345	0.448	0.319	0.373	0.847
PEB2	0.365	0.406	0.285	0.387	0.816
PEB3	0.357	0.520	0.401	0.386	0.854
PEB4	0.474	0.919	0.453	0.501	0.740

Hypothesis testing was conducted to analyze the relationships between variables. In this study, the first hypothesis tested the influence of perceived behavioral control on behavioral intention. In the second hypothesis, the influence of perceived behavioral control on pro-environmental behavior was examined. Furthermore, the third hypothesis tested the influence of environmental concern on behavioral intention. The fourth hypothesis examined the influence of attitude on behavioral intention. Moreover, in the fifth hypothesis, the influence of behavioral intention on pro-environmental behavior was tested. In the sixth hypothesis, the mediating role of behavioral intention in the relationship between perceived behavioral control and pro-environmental behavior was examined. The seventh hypothesis tested the mediating role of behavioral intention in the relationship between environmental concern and pro-environmental behavior. As for the eighth hypothesis, the mediating role of behavioral intention in the relationship between attitude and pro-environmental behavior was tested. A hypothesis is accepted if the T statistic obtained > 1.96 and the P-value obtained < 0.05 . The results of hypothesis testing in this study are presented in Table 4.

Table.4: Hypothesis Testing

Hypothesis		T statistics	P values
H1	Perceived Behavioral Control -> Behavioral Intention	139.591	0.000
H2	Perceived Behavioral Control -> Pro-Environmental Behavior	1.674	0.095
H3	Environmental Concern -> Behavioral Intention	2.076	0.039
H4	Attitude -> Behavioral Intention	0.311	0.756
H5	Behavioral Intention -> Pro-Environmental Behavior	2.674	0.008
H6	Perceived Behavioral Control -> Behavioral Intention -> Pro-Environmental Behavior	2.681	0.008
H7	Environmental Concern -> Behavioral Intention -> Pro-Environmental Behavior	1.416	0.158
H8	Attitude -> Behavioral Intention -> Pro-Environmental Behavior	1.994	0.047

The results of the first hypothesis testing indicate that the relationship between perceived behavioral control and behavioral intention obtained a T statistic of 139.591 (> 1.96) and a P-value of 0.000 (< 0.05). This indicates that the first hypothesis is accepted. The results of the second hypothesis testing show that the relationship between perceived behavioral control and pro-environmental behavior only obtained a T statistic of 1.674 and a P-value of 0.095. Therefore, the second hypothesis in this study is rejected. In the third hypothesis, the test results show that the relationship between environmental concern and behavioral intention obtained a T statistic of 2.076 and a P-value of 0.039. Thus, the third hypothesis in this study is accepted. Furthermore, the results of the fourth hypothesis testing show that the relationship between attitude and behavioral intention only obtained a T statistic of 0.311 and a P-value of 0.756. It is concluded from these results that the fourth hypothesis is rejected.

The results of the fifth hypothesis testing indicate that the relationship between behavioral intention and pro-environmental behavior obtained a T statistic of 2.674 and a P-value of 0.008. This indicates that the fifth hypothesis in this study is accepted.

As for the hypothesis testing that places behavioral intention as a mediating variable, the sixth hypothesis in this study shows that behavioral intention mediates the relationship between perceived behavioral control and pro-environmental behavior, and it obtained a T statistic of 2.681 and a P-value of 0.008. Thus, the sixth hypothesis in this study is accepted. Therefore, behavioral intention significantly mediates the relationship between perceived behavioral control and pro-environmental behavior. In the seventh hypothesis, the variable behavioral intention mediating the relationship between environmental concern and pro-environmental behavior only obtained a T statistic of 1.416 and a P-value of 0.158. Thus, it can be concluded that the seventh hypothesis in this study is rejected. As for the eighth hypothesis, the test results show that the variable behavioral intention mediates the relationship between attitude and pro-environmental behavior and it obtained a T statistic of 1.994 and a P-value of 0.047. This indicates that the eighth hypothesis is accepted. In other words, behavioral intention can be considered a suitable mediating variable in the relationship between attitude and pro-environmental behavior.

The results of these hypothesis tests provide a strong insight into the extent to which factors like perceived behavioral control, environmental concern, attitude, and behavioral intention influence pro-environmental behavior in the context of this study. Some relationships were found to be significant, while others were not. The findings of this study align with [Gieure et al. \(2020\)](#), who stated that perceived behavioral control plays a significant role in influencing individuals' intentions and actions. However, this study contradicts the findings of [Yuriev et al. \(2020\)](#), which suggested that an individual's belief in their ability to control their behavior affects actual actions taken to support pro-environmental behavior. This study also supports the results of [Yin et al. \(2021\)](#), who found that individuals who care about the environment have stronger intentions to engage in pro-environmental actions. Nevertheless, the findings of this study reject the results of the study by [Sanchez-Sabate & Sabaté \(2019\)](#), which indicated that attitude provides a strong rational basis for individuals' intentions to engage in pro-environmental behavior. Furthermore, this study supports the findings of [Liu et al. \(2020\)](#) and [Mahardika et al. \(2020\)](#), which suggested that a strong intention to engage in a particular behavior is a good predictor of actual behavior, and a high level of intention enables individuals to overcome obstacles and challenges and engage in pro-environmental behavior effectively. Thus, this study can provide an understanding of the dynamics of pro-environmental behavior among university students and environmental activists, leading to important implications for the development of more effective educational programs and environmental campaigns. Additionally, these results can assist universities and environmental organizations in designing more efficient strategies to promote pro-environmental behavior and encourage environmental sustainability in the future.

5. Conclusion

The results of this study conclude that perceived behavioral control and environmental concern significantly influence behavioral intention. This highlights the importance of individual psychological factors and perceptions in shaping the

intention to engage in pro-environmental behavior. It emphasizes that an individual's belief in their ability to control their behavior and their concern for environmental issues play a crucial role in forming the intention to act. However, this study yields an interesting result in which attitude does not have a significant influence on behavioral intention. This suggests that the evaluative aspect of pro-environmental behavior does not significantly influence an individual's intention to engage in those actions. This raises questions about the role and other dominant factors that motivate individuals' intentions in the context of pro-environmental behavior. Furthermore, behavioral intention has a significant influence on pro-environmental behavior. This finding underscores the importance of individual intentions in driving actual pro-environmental behavior. It indicates that having a strong intention to engage in pro-environmental actions can predict the extent to which individuals will translate their intentions into actual actions. Additionally, the findings examining the mediating pathways, where behavioral intention mediates the relationships between perceived behavioral control, behavioral intention, and attitude with pro-environmental behavior, provide a deeper understanding of how behavioral intention can serve as a suitable mediator in the relationships between perceived behavioral control and attitude with pro-environmental behavior; but it was not found to be significant in mediating the relationship between environmental concern and pro-environmental behavior.

The results of this study have significant implications for designing more effective environmental education and campaigns. Understanding that perceived behavioral control and environmental concern have a significant influence can assist in developing programs that strengthen individual beliefs and raise their awareness of environmental issues. Furthermore, knowing that an individual's intention has a direct impact on pro-environmental behavior can help design campaigns that encourage the formation of positive intentions. It's important to acknowledge that not all factors had a significant influence, as in the case of attitude. This can be a recommendation for further research in understanding alternative factors that may be more relevant in the context of pro-environmental behavior. This study makes a valuable contribution in guiding steps to support environmental sustainability in the future, especially in the higher education environment, and encourages individuals to take concrete actions to preserve a better ecosystem and environment.

References

- Ajzen, I. (2020). The theory of planned behavior: Frequently asked questions. *Human Behavior and Emerging Technologies*, 2(4), 314-324.
- Ateş, H. (2020). Merging theory of planned behavior and value identity personal norm model to explain pro-environmental behaviors. *Sustainable Production and Consumption*, 24, 169-180.
- Boca, G. D., & Saraçlı, S. (2019). Environmental education and student's perception, for sustainability. *Sustainability*, 11(6), 1553.
- Brown, K., Adger, W. N., Devine-Wright, P., Anderies, J. M., Barr, S., Bousquet, F., ... & Quinn, T. (2019). Empathy, place and identity interactions for sustainability. *Global environmental change*, 56, 11-17.
- Chwialkowska, A., Bhatti, W. A., & Glowik, M. (2020). The influence of cultural values on pro-environmental behavior. *Journal of Cleaner Production*, 268, 122305.

- Cop, S., Alola, U. V., & Alola, A. A. (2020). Perceived behavioral control as a mediator of hotels' green training, environmental commitment, and organizational citizenship behavior: A sustainable environmental practice. *Business Strategy and the Environment*, 29(8), 3495-3508.
- Dilkes-Hoffman, L. S., Pratt, S., Laycock, B., Ashworth, P., & Lant, P. A. (2019). Public attitudes towards plastics. *Resources, Conservation and Recycling*, 147, 227-235.
- Ekins, P., & Zenghelis, D. (2021). The costs and benefits of environmental sustainability. *Sustainability Science*, 16, 949-965.
- Foster, B., Muhammad, Z., Yusliza, M. Y., Faezah, J. N., Johansyah, M. D., Yong, J. Y., ... & Fawehinmi, O. (2022). Determinants of pro-environmental behaviour in the workplace. *Sustainability*, 14(8), 4420.
- Ghazali, E. M., Nguyen, B., Mutum, D. S., & Yap, S. F. (2019). Pro-environmental behaviours and Value-Belief-Norm theory: Assessing unobserved heterogeneity of two ethnic groups. *Sustainability*, 11(12), 3237.
- Gieure, C., del Mar Benavides-Espinosa, M., & Roig-Dobón, S. (2020). The entrepreneurial process: The link between intentions and behavior. *Journal of Business Research*, 112, 541-548.
- Gkargkavouzi, A., Halkos, G., & Matsiori, S. (2019). Environmental behavior in a private-sphere context: Integrating theories of planned behavior and value belief norm, self-identity and habit. *Resources, Conservation and Recycling*, 148, 145-156.
- Grilli, G., & Curtis, J. (2021). Encouraging pro-environmental behaviours: A review of methods and approaches. *Renewable and Sustainable Energy Reviews*, 135, 110039.
- Hadjichambis, A. C., & Paraskeva-Hadjichambi, D. (2020). Education for environmental citizenship: The pedagogical approach. *Conceptualizing environmental citizenship for 21st century education*, 4, 237-261.
- Helm, D. (2020). The environmental impacts of the coronavirus. *Environmental and Resource Economics*, 76, 21-38.
- Huber, R. A. (2020). The role of populist attitudes in explaining climate change skepticism and support for environmental protection. *Environmental Politics*, 29(6), 959-982.
- Islam, M., & Managi, S. (2019). Green growth and pro-environmental behavior: Sustainable resource management using natural capital accounting in India. *Resources, Conservation and Recycling*, 145, 126-138.
- Janmaimool, P., & Khajohnmanee, S. (2019). Roles of environmental system knowledge in promoting university students' environmental attitudes and pro-environmental behaviors. *Sustainability*, 11(16), 4270.
- Khan, M. S., & Terason, S. (2022). Encouraging pro-environmental behavior in university employees: An approach toward environmental sustainability as moderated by green organizational culture. *Journal of Community Psychology*, 50(3), 1454-1469.
- Khan, M. S., Saengon, P., Alganad, A. M. N., Chongcharoen, D., & Farrukh, M. (2020). Consumer green behaviour: An approach towards environmental sustainability. *Sustainable Development*, 28(5), 1168-1180.
- Kim, M. J., Lee, C. K., & Preis, M. W. (2020). The impact of innovation and gratification on authentic experience, subjective well-being, and behavioral intention in tourism virtual reality: The moderating role of technology readiness. *Telematics and Informatics*, 49, 101349.

- Kim, M., & Koo, D. W. (2020). Visitors' pro-environmental behavior and the underlying motivations for natural environment: Merging dual concern theory and attachment theory. *Journal of Retailing and Consumer Services*, 56, 102147.
- Kruize, H., van der Vliet, N., Staatsen, B., Bell, R., Chiabai, A., Muiños, G., ... & Stegeman, I. (2019). Urban green space: creating a triple win for environmental sustainability, health, and health equity through behavior change. *International journal of environmental research and public health*, 16(22), 4403.
- Latif, B., Gunarathne, N., Gaskin, J., San Ong, T., & Ali, M. (2022). Environmental corporate social responsibility and pro-environmental behavior: The effect of green shared vision and personal ties. *Resources, Conservation and Recycling*, 186, 106572.
- Lim, W. M., & Weissmann, M. A. (2023). Toward a theory of behavioral control. *Journal of Strategic Marketing*, 31(1), 185-211.
- Liobikienė, G., & Poškus, M. S. (2019). The importance of environmental knowledge for private and public sphere pro-environmental behavior: modifying the value-belief-norm theory. *Sustainability*, 11(12), 3324.
- Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. *Science of the total environment*, 728, 138126.
- Liu, Z., Yang, J. Z., Clark, S. S., & Shelly, M. A. (2021). Recycling as a planned behavior: the moderating role of perceived behavioral control. *Environment, Development and Sustainability*, 1-16.
- Mahardika, H., Thomas, D., Ewing, M. T., & Japutra, A. (2020). Comparing the temporal stability of behavioural expectation and behavioural intention in the prediction of consumers pro-environmental behaviour. *Journal of Retailing and Consumer Services*, 54, 101943.
- Mouro, C., & Duarte, A. P. (2021). Organisational climate and pro-environmental behaviours at work: The mediating role of personal norms. *Frontiers in Psychology*, 12, 635739.
- Oláh, J., Aburumman, N., Popp, J., Khan, M. A., Haddad, H., & Kitukutha, N. (2020). Impact of Industry 4.0 on environmental sustainability. *Sustainability*, 12(11), 4674.
- Panda, R., & Maity, M. (2021). Global warming and climate change on earth: duties and challenges of human beings. *International Journal of Research in Engineering, Science and Management*, 4(1), 122-125.
- Rustam, A., Wang, Y., & Zameer, H. (2020). Environmental awareness, firm sustainability exposure and green consumption behaviors. *Journal of Cleaner Production*, 268, 122016.
- Saari, U. A., Damberg, S., Frömling, L., & Ringle, C. M. (2021). Sustainable consumption behavior of Europeans: The influence of environmental knowledge and risk perception on environmental concern and behavioral intention. *Ecological Economics*, 189, 107155.
- Sanchez-Sabate, R., & Sabaté, J. (2019). Consumer attitudes towards environmental concerns of meat consumption: A systematic review. *International journal of environmental research and public health*, 16(7), 1220.
- Si, H., Shi, J. G., Tang, D., Wen, S., Miao, W., & Duan, K. (2019). Application of the theory of planned behavior in environmental science: a comprehensive bibliometric analysis. *International journal of environmental research and public health*, 16(15), 2788.

- Vamvaka, V., Stoforos, C., Palaskas, T., & Botsaris, C. (2020). Attitude toward entrepreneurship, perceived behavioral control, and entrepreneurial intention: dimensionality, structural relationships, and gender differences. *Journal of Innovation and Entrepreneurship*, 9(1), 1-26.
- Van Valkengoed, A. M., Abrahamse, W., & Steg, L. (2022). To select effective interventions for pro-environmental behaviour change, we need to consider determinants of behaviour. *Nature human behaviour*, 6(11), 1482-1492.
- Vasquez, A. K., Foditsch, C., Dulièpre, S. A. C., Siler, J. D., Just, D. R., Warnick, L. D., ... & Sok, J. (2019). Understanding the effect of producers' attitudes, perceived norms, and perceived behavioral control on intentions to use antimicrobials prudently on New York dairy farms. *PloS one*, 14(9), e0222442.
- Wang, L., Sheng, G., She, S., & Xu, J. (2023). Impact of empathy with nature on pro-environmental behaviour. *International Journal of Consumer Studies*, 47(2), 652-668.
- Wu, H., Hao, Y., & Ren, S. (2020). How do environmental regulation and environmental decentralization affect green total factor energy efficiency: Evidence from China. *Energy Economics*, 91, 104880.
- Yin, H., Huang, Y., & Wang, K. (2021). How do environmental concerns and governance performance affect public environmental participation: A case study of waste sorting in urban China. *International Journal of Environmental Research and Public Health*, 18(19), 9947.
- Yue, B., Sheng, G., She, S., & Xu, J. (2020). Impact of consumer environmental responsibility on green consumption behavior in China: The role of environmental concern and price sensitivity. *Sustainability*, 12(5), 2074.
- Yuriev, A., Boiral, O., & Guillaumie, L. (2020). Evaluating determinants of employees' pro-environmental behavioral intentions. *International Journal of Manpower*, 41(7), 1005-1019.
- Zhang, J., Kang, L., Li, H., Ballesteros-Pérez, P., Skitmore, M., & Zuo, J. (2020). The impact of environmental regulations on urban Green innovation efficiency: The case of Xi'an. *Sustainable Cities and Society*, 57, 102123.