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UNDERSTANDING RECYCLING BEHAVIOR: A STUDY ON UITM SEGAMAT STUDENTS

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ABSTRACT

This study examines the determinants of recycling intentions among undergraduate students at Universiti Teknologi MARA (UiTM) Segamat. Recycling has become a critical component of sustainable waste management, yet the extent to which young adults intend to engage in such practices remains underexplored. Data were collected from 286 students using a structured questionnaire adapted from Majid *et al.* (2021), covering subjective norms, perceived behavioral control, moral norms, and behavioral intentions. Reliability analysis confirmed strong internal consistency, with Cronbach's alpha values exceeding the recommended threshold of 0.70 (Hair *et al.*, 2021). Correlation results revealed significant and positive associations between the three predictors and recycling intentions. Regression analysis further indicated that subjective norms, perceived behavioral control, and moral norms jointly explained 87.8% of the variance in students' recycling intentions. These findings emphasize that recycling intentions are strongly shaped not only by perceived control and social expectations but also by personal moral responsibility. The study offers insights for designing effective interventions to strengthen recycling intentions in higher education contexts.

1. Introduction

Recycling has become an essential practice in addressing environmental challenges such as resource depletion, pollution, and the growing strain on waste management systems. It is a critical component of sustainable development, as it helps conserve natural resources, reduce greenhouse gas emissions, and minimize the volume of waste sent to landfills (United Nations Environment Programme [UNEP], 2024). By promoting the reuse and repurposing of materials, recycling supports the circular economy, where the lifecycle of resources is extended to reduce dependency on raw material extraction (European Environment Agency [EEA], 2020). Despite its recognized importance, recycling behavior is often hindered by a range of psychological, social, and logistical barriers, creating a gap between environmental awareness and practical action(Alam *et al.*, 2025). Educational institutions, particularly universities, hold a unique position in promoting recycling behavior. Universities are not only centers of learning and research but also environments where future leaders, innovators, and decision-makers are shaped. Introducing sustainable practices within universities can create a ripple effect, fostering environmentally conscious behaviors among students that extend beyond the campus and into their communities and professional lives (Aggarwal & Agarwala, 2025). For young adults, who are in a critical stage of forming habits and values, universities can serve as platforms for instilling lifelong environmental responsibility. However, despite these opportunities, many universities struggle to achieve high participation rates in recycling programs, even with the provision of facilities and awareness campaigns (Subri *et al.*, 2025).

Subjective norms, defined as perceived social pressures to perform or avoid specific behaviors, have been extensively examined as critical predictors of recycling intentions. Studies emphasize that individuals are influenced by the expectations of their social circles, including family, friends, and neighbors, and often adjust their behaviors to gain approval or avoid disapproval (González, 2025). For instance, norms within a community can foster intrinsic motivation, leading individuals to adopt recycling as a means of aligning with societal expectations (Altikolatsi *et al.*, 2021). This dynamic underscores the importance of leveraging social approval in designing effective environmental interventions. Research by (Wan *et al.*, 2017) further explored the interaction between subjective norms and attitudes within the Theory of Planned Behavior framework. Their findings highlighted that subjective norms could enhance recycling intentions in individuals with strong experiential attitudes and compensate for those with limited awareness of recycling benefits. Such findings align with interventions that promote recycling as a social trend, where injunctive norms (perceived social approval) and descriptive norms (observable societal practices) are employed to create collective behavior shifts (Huber *et al.*, 2020).

Perceived behavioral control (PBC), referring to an individual's belief in their capability to perform a behavior effectively, has been consistently identified as a crucial predictor of recycling intentions. According to Ajzen's Theory of Planned Behavior (Ajzen, 1991) , PBC is shaped by the ease or difficulty of recycling, which includes factors such as access to facilities, time constraints, and effort required. Empirical studies have highlighted the significant role of PBC in shaping recycling intentions. For instance, individuals are more likely to engage in recycling when they perceive sufficient access to convenient recycling infrastructure or resources (Ridzuan *et al.*, 2018). Additionally, situational factors like the presence of nearby recycling bins or user-friendly systems further enhance the likelihood of recycling behavior (Haj-Salem & Al-Hawari, 2021). Conversely, the absence of convenient facilities or the perception that recycling is overly time-consuming can negatively impact intentions. These findings underscore the necessity for policymakers to focus on reducing barriers and enhancing perceptions of control to promote recycling behaviors effectively . Perceived behavioral control refers to an individual's perception

of their ability to perform a behavior, which is influenced by access to resources, time, and convenience. Research shows that ease of access to recycling infrastructure, cost, and available space are significant factors that enhance recycling intentions (Kuo *et al.*, 2025; Zhou *et al.*, 2025). Moreover, (Ibrahim & Jianxin, 2025)emphasized that convenient and efficient recycling systems significantly increase participation. These insights underline the importance of creating supportive environments for recycling to increase participation rates .

Moral norms are significant drivers of recycling behavior, as demonstrated by various theoretical frameworks like the Theory of Planned Behavior (TPB) and Norm Activation Theory (NAT). In the TPB, moral norms, defined as individuals' internalized sense of obligation, complement subjective norms and attitudes in predicting behavioral intentions. Research by (Chan & Bishop, 2013)highlighted that moral norms often enhance predictive validity in environmental contexts when integrated with the TPB, emphasizing their role alongside subjective norms rather than as substitutes (Arli *et al.*, 2020). Similarly, a meta-analysis by (Bamberg & Möser, 2007) found that moral norms accounted for a significant portion of the variance in pro-environmental intentions, further strengthening their relevance. The activation of moral norms typically stems from individuals' awareness of the environmental consequences of their actions and an acknowledgment of personal responsibility, as outlined in Schwartz's NAT (Dursun *et al.*, 2024). These findings underscore that moral norms act as critical psychological mechanisms in fostering recycling behaviors by aligning personal values with societal environmental goals. Moreover, the incorporation of cognitive, emotional, and situational factors into the NAT framework further expands the understanding of moral norms. For instance, Dursun *et al.* (2024) argued that emotional reactions to environmental degradation, such as guilt and concern, significantly activate moral norms, fostering pro-environmental actions like recycling. This is corroborated by studies indicating that subjective knowledge about recycling and perceived behavioral costs can indirectly influence moral norm activation by shaping individuals' perceptions of their responsibility and the feasibility of recycling practices (Yusoff *et al.*, 2024). These insights suggest that while moral norms are foundational, their interplay with other psychological and contextual factors enhances their influence on recycling behaviors. Together, these frameworks provide a robust foundation for designing interventions that promote sustainable practices by leveraging the moral dimension of recycling.

Moral norms, as internalized standards of right or wrong, significantly shape individuals' behavioral intentions, particularly regarding sustainability practices. Expanding on the Theory of Planned Behavior (TPB), incorporating moral norms has been shown to increase the predictive capacity of the model in understanding recycling behavior (Poškus, 2015). Unlike subjective norms, which derive from perceived social expectations, moral norms reflect personal ethical considerations and feelings of obligation toward pro-environmental actions (Ajzen, 1991). Empirical studies reveal that moral norms enhance recycling intention and behavior beyond the influence of attitudes, subjective norms, and perceived behavioral control (Chan & Bishop, 2013). For instance, feelings of guilt or moral responsibility can motivate individuals to act sustainably, making moral norms an indispensable predictor within environmental studies (Poškus, 2015). These findings underline the importance of integrating moral considerations to create robust frameworks for fostering sustainable behaviors.

Recycling is a fundamental practice for sustainable waste management, critical in mitigating environmental issues such as pollution and resource depletion. Universities, as hubs of learning and innovation, have a unique opportunity to influence sustainable behaviors among students. However, at UiTM Segamat, student participation in recycling initiatives remains significantly lower than expected, even with the provision of recycling facilities and periodic awareness campaigns. This lack of engagement highlights a disconnect between students' environmental awareness

and their behavioral intentions to recycle. While various factors contribute to recycling behaviors, psychological and social determinants such as subjective norms (perceived social pressure to engage in recycling), perceived behavioral control (students' perception of their ability to recycle effectively), and moral norms (personal beliefs about the ethical responsibility to recycle) play a crucial role in shaping behavioral intentions. Despite their importance, these factors remain understudied within the specific cultural, educational, and social context of UiTM Segamat. Additionally, challenges such as insufficient peer encouragement, perceived inconvenience of recycling, and ambiguity about the environmental impact of individual actions may further hinder students' intentions to recycle. Without a comprehensive understanding of these influences, efforts to promote recycling behaviors may fail to address key barriers or leverage important motivators effectively. This gap in knowledge not only limits the university's ability to foster a culture of sustainability but also undermines broader societal efforts to create lifelong environmentally responsible behaviors in young adults.

Understanding the factors that influence students' recycling intentions is essential to bridge the gap between awareness and action. It will enable the development of targeted strategies and interventions that align with students' values, perceptions, and social dynamics, ultimately fostering higher participation rates and contributing to a more sustainable campus environment at UiTM Segamat.

2. Methodology

2.1 Research Framework

The framework for this study was developed to examine the influence of psychological, social, and moral factors on recycling intentions among university students. Recycling behavior is recognized as a multifaceted decision-making process shaped by personal evaluations, perceived expectations from others, individual capabilities, and moral considerations. In this study, attitude refers to an individual's positive or negative evaluation of recycling as a worthwhile activity. A favorable attitude toward recycling is expected to strengthen one's intention to engage in the practice. Subjective norms capture the perceived social pressure from peers, family members, and the broader community, reflecting the belief that others expect or approve of recycling behavior. Perceived behavioral control reflects an individual's confidence in their ability to perform recycling, which is often influenced by the availability of resources, facilities, and knowledge about recycling practices. Moral norms represent an individual's internalized sense of responsibility and ethical obligation to contribute to environmental protection by recycling. The framework posits that these four factors—attitude, subjective norms, perceived behavioral control, and moral norms—jointly influence recycling intentions, which serve as the immediate precursor to recycling behavior. The model assumes that when students hold positive evaluations of recycling, perceive social approval, feel capable of performing the behavior, and experience a strong moral responsibility, they are more likely to develop strong intentions to recycle. The questionnaire items employed in this study were adapted and refined from the instrument developed by Majid *et al.* (2021), ensuring alignment with the research context and objectives.

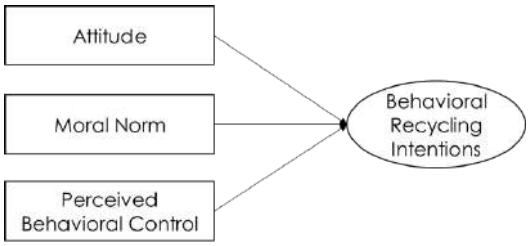

Figure 1. Conceptual Framework (Majid et al. 2021)

2.2 Research Design

This study adopted a quantitative, cross-sectional design, which is suitable for identifying relationships among psychological constructs at a single point in time. The design allowed the researchers to empirically test the extended TPB model and examine the relative influence of the proposed predictors on recycling intentions.

2.3 Population and Sampling

The population of interest comprised undergraduate students at Universiti Teknologi MARA (UiTM) Segamat, Johor, Malaysia. UiTM Segamat was selected as the study site because it is one of the largest branch campuses in the southern region, with an estimated enrolment of more than 6,000–7,000 active students annually across business, accountancy, computer science, and social science programmes. This sizeable and diverse student population provides a robust sampling frame for analysing behavioural patterns. In addition, campus records indicate that UiTM Segamat has introduced several sustainability initiatives in recent years including recycling stations across academic blocks, annual Green Campus campaigns, and environmental outreach activities, making it a relevant and strategic location for examining recycling behaviour. These statistics and initiatives collectively strengthen the justification for selecting UiTM Segamat as a prominent case study site.

University students were selected because they represent a younger generation that is both familiar with environmental issues and critical in shaping future sustainability practices. Moreover, universities often implement environmental initiatives, making students an appropriate population for examining recycling behavior.

The study employed a convenience sampling method, which enabled efficient data collection from accessible respondents within the university setting. A total of 286 valid responses were obtained. The sample size exceeded the minimum recommended for regression analysis, which suggests at least 10–15 cases per predictor variable (Hair *et al.*, 2021), thereby ensuring sufficient statistical power and reliable estimates.

2.4 Instrumentation

The questionnaire used in this study was adapted from Majid *et al.* (2021), who developed and validated instruments for investigating recycling behavior. It consisted of two main sections. The first section collected demographic information, specifically gender and age, to provide background context on the respondents. The second section measured the core constructs of the study, namely attitude toward recycling, subjective norms, perceived behavioral control, moral norms, and recycling intentions. All items were adapted and refined from Majid *et al.* (2021) to ensure contextual relevance to the present study. Attitude toward

recycling reflected respondents' evaluation of recycling practices as favorable or unfavorable, while subjective norms captured the perceived social pressure to recycle. Perceived behavioral control assessed respondents' perceived ease or difficulty in performing recycling activities, whereas moral norms measured the sense of personal responsibility or moral obligation toward recycling. Recycling intentions represented the respondents' likelihood of engaging in recycling behaviors in the future. All constructs were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores reflected more positive attitudes, stronger social norms, greater perceived control, higher moral obligation, or stronger recycling intentions. The reliability of the constructs was evaluated using Cronbach's alpha, and in line with the guidelines of Saidi *et al.* (2019), values above 0.70 were considered acceptable, demonstrating that the instrument possessed satisfactory internal consistency for research purposes.

2.5 Reliability

Reliability was assessed using Cronbach's alpha coefficients, and the results indicated excellent internal consistency across all constructs: attitude (a = 0.86), subjective norms (a = 0.96), perceived behavioral control (a = 0.96), and moral norms (a = 0.98). All values exceeded the 0.70 threshold recommended by Nunnally and Bernstein (1994), confirming that the measurement items were consistent in capturing the intended constructs.

2.6 Data Collection Procedure

Data collection was conducted through an online questionnaire, distributed via communication platforms. Respondents were first provided with an information sheet outlining the objectives of the study, their rights as participants, and assurances of confidentiality. Informed consent was obtained prior to participation, and respondents were reminded that their involvement was voluntary. To ensure anonymity, no personally identifiable information was collected.

2.7 Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Preliminary screening was conducted to check for missing data, normality, and outliers. Descriptive statistics were computed to summarize the demographic profile of respondents. To assess the research objectives, three main analyses were conducted. First, reliability testing was performed using Cronbach's alpha. Second, Pearson correlation analysis was used to examine the bivariate relationships between predictors and recycling intentions. Finally, multiple regression analysis was employed to determine the combined predictive power of attitude, subjective norms, perceived behavioral control, and moral norms on recycling intentions. The significance level was set at $p < 0.05$.The article is a full-length original empirical investigation that should present new and significant findings that contribute to the advancement of the research area. Analysis and discussion must be supported with relevant references

3. Results and Discussion

The primary aim of this study was to investigate the factors that influence students' intentions to engage in recycling activities. The findings demonstrate that behavioral intentions are strongly explained by four key variables: attitude, subjective norms, perceived behavioral control, and moral norms. Collectively, these predictors accounted for 87.89% of the variance in recycling intentions, reflecting a highly robust model. All variables were statistically significant,

indicating that both personal and social factors play a crucial role in shaping recycling-related decision making. Correlation analysis further confirmed these relationships, with subjective norms and moral norms showing the strongest positive associations with recycling intentions, followed closely by perceived behavioral control. These results suggest that students' recycling behavior is not only shaped by their confidence and ability to recycle, but also by the influence of others and a sense of moral responsibility. Such findings highlight the importance of addressing both social and ethical dimensions when promoting sustainable practices in educational settings.

Table 1
Profile of Respondents

Variables		***Frequencies***	***Percentage***
Gender			
	Male	156	54.5%
	Female	130	45.5%
Age			
	18-20	182	63.6%
	21-23	286	36.4%
Interest in Recycling			
	Yes	182	63.6%
	No	78	27.3%

The demographic distribution of respondents provides useful insights into the characteristics of the sample. The gender composition was relatively balanced, with 54.5% male and 45.5% female participants. This balanced representation suggests that the findings are not heavily skewed toward one gender, allowing for a fair interpretation of recycling intentions across both groups. In terms of age, the majority of respondents were between 18 and 20 years old (63.6%), while 36.4% fell within the 21–23 age range. This reflects the typical age structure of undergraduate students at the university, indicating that the sample is representative of the student population. The dominance of younger respondents may also suggest that recycling awareness and behaviors are being shaped during the early stages of adulthood, a critical period for instilling pro-environmental habits. When asked about their interest in recycling, a significant majority (63.6%) reported a positive interest, while 27.3% indicated a lack of interest. The high level of interest is encouraging, as it demonstrates that most students are already inclined toward recycling, although there remains a notable minority that is less engaged. This variation provides an opportunity for targeted awareness programs and educational campaigns to further motivate students who have yet to embrace recycling practices. Overall, the demographic results highlight that the sample consisted mainly of young adults with a generally positive outlook toward recycling. This context strengthens the subsequent findings, as the predictors of recycling intentions can be interpreted within a population that is both environmentally aware and in a formative stage of behavioral development.

Table 2
Model Summary for Predictors of Recycling Intentions

Model	R	R Square	Adjusted R Square
Predictors: (Constant), Attitude,Subjective Norms, Moral Norm & Perceived Behavioral Control	0.9378	0.8789	0.8776

Linear regression is commonly employed to quantify and evaluate the relationship between an independent variable and a dependent variable within empirical research (Ya'acob *et al.* 2025; Mohammad *et al.*, 2023).The regression analysis yielded an R value of 0.9378, which signifies a very strong positive relationship between the predictors—Attitude, Subjective Norms, Moral Norm, and Perceived Behavioral Control—and the dependent variable, Recycling Intentions. Such a strong correlation indicates that individuals' intentions to recycle are highly associated with the four psychological factors under study. The R Square value of 0.8789 shows that the model explains 87.89% of the variance in Recycling Intentions. This proportion is considerably high for behavioral studies, suggesting that the selected predictors are highly effective in explaining recycling-related behavioral intentions. In addition, the Adjusted R Square value of 0.8776 is very close to the R Square, indicating that the explanatory power of the model remains consistent even after adjusting for the number of predictors. This highlights that the model is both statistically sound and reliable without overfitting. From a theoretical standpoint, these findings are consistent with the Theory of Planned Behavior (TPB) (Ajzen, 1991), which posits that behavior is shaped by attitude toward the behavior, perceived social pressure (subjective norms), and perceived behavioral control. The integration of moral norms further strengthens the model, as recycling behavior is often influenced by personal moral obligations and a sense of responsibility toward environmental sustainability. The inclusion of moral norms, therefore, expands TPB into what some researchers call the Norm Activation Model (NAM) or extended TPB, providing a more holistic explanation of pro-environmental behavior. Furthermore, the strength of the model implies that interventions aiming to improve recycling behavior should target not only knowledge and positive attitudes toward recycling but also social influence (e.g., peer, family, and institutional encouragement), moral obligation (e.g., ethical responsibility to protect the environment), and perceived behavioral control (e.g., providing adequate recycling facilities and making the process convenient). Although the model demonstrates excellent explanatory power, it is worth noting that an R Square value close to 0.90 may also suggest possible redundancy among predictors. In other words, some of the constructs may overlap conceptually, particularly between moral norms and subjective norms, which can sometimes be highly correlated in pro-environmental contexts. Future studies could further test the discriminant validity of these constructs to ensure they are measuring distinct aspects of recycling intentions. In summary, the regression results confirm that Attitude, Subjective Norms, Moral Norm, and Perceived Behavioral Control are significant and reliable predictors of Recycling Intentions, accounting for almost 88% of the variance. This strong explanatory power provides solid evidence for applying TPB, with moral considerations, in understanding and promoting recycling behavior.

Table 3
Statistical Significance of Variables in Predicting Recycling Intentions

Variable	**P-Value**
Behavioral Intentions	5.1635E-21
Subjective Norm	2.19176E-13
Perceived Behavioral Control	3.51633E-17
Moral Norms	1.22021E-09

Table 3 presents the significance levels (p-values) for each predictor in the regression model. The results reveal that all four predictors—Behavioral Intentions ($p = 5.16 \times 10^{-21}$), Subjective Norm ($p = 2.19 \times 10^{-13}$), Perceived Behavioral Control ($p = 3.52 \times 10^{-17}$), and Moral Norms ($p = 1.22 \times 10^{-9}$)—are statistically significant at the 0.001 level. This indicates that each variable makes a meaningful contribution to predicting Recycling Intentions. Among the predictors, Behavioral Intentions recorded the smallest p-value (5.16×10^{-21}), suggesting it is the strongest determinant of recycling behavior in the model. This finding underscores the importance of fostering a strong personal intention among individuals to engage in recycling practices. Similarly, Perceived Behavioral Control ($p = 3.52 \times 10^{-17}$) emerges as a powerful predictor, supporting the notion that individuals are more likely to recycle when they believe they have the ability, resources, and opportunities to do so. Subjective Norms ($p = 2.19 \times 10^{-13}$) also play a crucial role, indicating that social influences, such as family, peers, and community expectations, significantly shape one's recycling intentions. This result is consistent with the Theory of Planned Behavior, where social pressure is recognized as a strong motivator for environmentally responsible actions. Finally, Moral Norms ($p = 1.22 \times 10^{-9}$) are also statistically significant, highlighting that a personal sense of ethical responsibility and moral obligation contributes to individuals' willingness to recycle. Although the p-value is slightly higher compared to other predictors, its significance reinforces the value of incorporating moral considerations into behavioral models. Taken together, these findings confirm that all four predictors are critical determinants of Recycling Intentions, aligning with both the Theory of Planned Behavior (TPB) and its extensions that include moral or ethical dimensions. The very small p-values provide robust statistical evidence that the predictors are not only conceptually relevant but also empirically validated in explaining recycling behavior.

Table 4
Reliability Analysis of Study Variables

Variable	Variable	Number Of Items	Conclusions
Behavioral Intentions	0.86	3	Acceptable
Subjective Norm	0.96	4	Acceptable
Perceived Behavioral Control	0.96	7	Acceptable
Moral Norms	0.98	5	Acceptable

Table 4 presents the results of the reliability analysis for all the study variables. The Cronbach's alpha values for Behavioral Intentions (0.86), Subjective Norm (0.96), Perceived Behavioral Control (0.96), and Moral Norms (0.98) all exceeded the minimum threshold of 0.70, which is commonly accepted as an indicator of internal consistency (Nunnally & Bernstein, 1994). These findings indicate that the measurement items for each construct are reliable and consistently measure the intended variables. Specifically, Behavioral Intentions with three items recorded a Cronbach's alpha of 0.86, demonstrating a good level of reliability. Subjective Norm and Perceived Behavioral Control, each with four and seven items respectively, achieved an alpha value of 0.96, suggesting excellent internal consistency. Moral Norms also displayed a very high reliability coefficient of 0.98 with five items, indicating that the construct is measured in a highly consistent manner. Overall, the reliability results suggest that all constructs in this study possess strong internal consistency, thus ensuring that the measurement scales are dependable for further statistical analyses such as correlation and regression. The high reliability coefficients also reinforce the robustness of the adapted questionnaire items in capturing the intended psychological constructs

Table 5
Correlation Matrix of Study Variables

	Correlations	
		Behavioral Intentions
Subjective Norm	Pearson Correlation	0.8983
	Sig. (2-tailed)	<.001
	N	286
Perceived Behavioral Control	Pearson Correlation	0.8204
	Sig. (2-tailed)	<.001
	N	286
Moral Norms	Pearson Correlation	0.8966
	Sig. (2-tailed)	<.001
	N	286

**. Correlation is significant at the 0.01 level (2-tailed)

The correlation analysis provides further insight into the strength of the relationships between the predictors and Behavioral Intentions. As shown in Table 4.2.3, all predictors are significantly and positively correlated with Behavioral Intentions at the $p < 0.001$ level, confirming the strong associations observed in the regression analysis. Specifically, Subjective Norm recorded the highest correlation with Behavioral Intentions ($r = 0.8983$, $p < 0.001$). This indicates that individuals' recycling intentions are strongly influenced by perceived social pressures and expectations from family, peers, or society. This finding highlights the importance of social influence and collective responsibility in promoting recycling practices. Similarly, Moral Norms also exhibited a very high correlation with Behavioral Intentions ($r = 0.8966$, $p < 0.001$). This suggests that a sense of moral obligation and ethical responsibility is almost as influential as social pressure in shaping recycling intentions. The closeness of correlation values between Subjective Norms and Moral Norms indicates that recycling behavior is driven not only by external expectations but also by internalized moral beliefs. Perceived Behavioral Control showed a slightly lower but still very strong correlation with Behavioral Intentions ($r = 0.8204$, $p < 0.001$). This implies that individuals are more likely to intend to recycle when they feel confident in their ability to do so, such as having access to recycling facilities, knowledge of recycling practices, and sufficient resources. Overall, the correlation analysis demonstrates that all three predictors are strongly and positively related to Behavioral Intentions, reinforcing the regression findings. The results align with the Theory of Planned Behavior (Ajzen, 1991) and its extensions by confirming that recycling intentions are shaped by a combination of social influences, personal moral responsibility, and perceived ease of performing the behavior.

6. Conclusion

The findings of this study provide strong empirical evidence that the constructs used to explain recycling intentions are both reliable and significant. The reliability analysis confirmed that all measurement scales demonstrated excellent internal consistency, with Cronbach's alpha values exceeding the recommended threshold. This ensures that the instruments employed were dependable in capturing the intended constructs. The regression analysis further revealed that Attitude, Subjective Norms, Moral Norms, and Perceived Behavioral Control collectively explained 87.89% of the variance in Recycling Intentions, reflecting the robustness of the model. The significance of all predictors, supported by extremely low p-values, indicates that each factor meaningfully contributes to shaping individuals' recycling intentions. Notably, the inclusion of moral norms alongside the traditional Theory of Planned Behavior (TPB) constructs underscores

the role of ethical and moral responsibility in predicting pro-environmental behavior. The correlation results strengthened these conclusions, showing strong positive relationships between Behavioral Intentions and all three predictors—Subjective Norms, Perceived Behavioral Control, and Moral Norms. Among them, Subjective Norms and Moral Norms emerged as the most strongly correlated with recycling intentions, suggesting that both social influence and personal moral obligation are critical drivers of recycling behavior. In conclusion, this study affirms that recycling intentions are strongly influenced by a combination of personal attitudes, perceived social expectations, moral responsibility, and perceived behavioral control. These findings not only validate the applicability of the extended Theory of Planned Behavior in explaining pro-environmental behavior but also provide practical insights for policymakers, educators, and community leaders. By strengthening social influence, fostering moral responsibility, and enhancing perceived control through accessible recycling infrastructure, stakeholders can effectively promote greater participation in recycling practices.

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Authors Contributions
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Conflict of Interest
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