

ZERO WASTE FOR ENVIRONMENTAL SUSTAINABILITY: EXPLORING THE ENABLERS OF THE PRECYCLING LIFESTYLE

Nurul Amani Hamzah¹
Muhammad Faiq Badrul Hisham²
Nurul Hidayana Mohd Noor^{3*}

¹Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA (UiTM), 70300 Seremban, Negeri Sembilan Malaysia, (E-mail: amaniamzah503@gmail.com)

²Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA (UiTM), 70300 Seremban, Negeri Sembilan Malaysia, (Email: faiqbh2@gmail.com)

³Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA (UiTM), 70300 Seremban, Negeri Sembilan Malaysia, (E-mail: hidayana@uitm.edu.my)

Article history

Received date : 13-3-2025

Revised date : 14-3-2025

Accepted date : 27-4-2025

Published date : 15-5-2025

To cite this document:

Hamzah., N. A., Badrul Hisham., M. F., & Mohd Noor., N. H. (2025). Zero waste for environmental sustainability: Exploring the enablers of the precycling lifestyle. *Journal of Islamic, Social, Economics and Development (JISED)*, 10 (72), 298-311.

Abstract: *Precycling is a zero-waste approach to consumption that prevents waste by avoiding product packaging in the first place. Precycling is less applied in society because many people still need to learn about the concept, and most recyclables are thrown away and burned. Thus, the study examined the influence of materialism, consumer independence, environmental orientation, and voluntary simplicity on precycling behavior. A total of 300 respondents were randomly selected. Quantitative data is obtained through a question survey. Quantitative research findings are analyzed using correlation analyses and multiple regression. The study findings show significant relationships between materialism, consumer independence, environmental orientation, voluntary simplicity, and precycling. The most significant predictor of precycling was environmental orientation. The findings of this study can help the government and agencies to diversify promotions, campaigns, and activities to encourage the public to practice precycling.*

Keywords: *Precycling, Materialism, Consumer Independence, Environmental Orientation, Voluntary Simplicity*

Introduction

The speed of technology and development worldwide dramatically benefits and facilitates people. However, a price must be paid along with modern development, which is environmental pollution (Yuan et al., 2020). Modern pollution began in the Industrial Revolution era in 1850 when untreated chemicals and toxins were released into nearby water. The Industrial Revolution was one of the earliest causes of environmental pollution. The issue of environmental pollution is also linked to the sudden increase in human population in an area that exceeds the strength of the community to manage their waste (Mohd Noor et al., 2022; Zheng et al., 2020). Haze and smoke reduce the amount of sunlight plants receive and damage trees. Contaminated soil is infertile and unsuitable for plants. This will damage the natural food chain. This will cause an imbalance in the natural ecosystem. In Malaysia, the problem of domestic waste disposal is critical, especially in areas with high population density (Fadhullah et al., 2022). Among the sources of domestic waste that have been identified are laziness, the authorities are not responsible for the garbage collection schedule, self-important attitudes do not care about cleanliness, refusal to pay the garbage collection fee, lack of education about the impact on the environment, lack of civic awareness, and weak enforcement from the authorities (Noor et al., 2023b; Pariatamby & Bhatti, 2020).

The lifestyle of today's society is generally less environmentally friendly, and there are still many consumers who are not sensitive to the issue of environmental pollution (Noor et al., 2023a; Wang et al., 2021). Total solid waste can be reduced if the community is willing to change their habits and lifestyles to be more sensitive to the environment and reduce the economic burden related to the waste management system (Noor et al., 2024a). To protect the environment, precycling has been predominantly identified as a sustainable lifestyle (Hamid et al., 2020). It is centered on waste prevention activities that represent a sustainable lifestyle. It is a post-modern lifestyle demonstrating sustainable attitudes, highly reflecting purchase decisions, and mindfully handling resources in waste prevention (Chaves et al., 2022). For example, refuse to use items that cannot be recycled, such as tissues, polystyrene supplies, and others, and reduce waste and garbage disposal, such as water, electricity, and air conditioning. Another example is reducing waste from the beginning. For example, instead of using single-use plastic bags, it is better to use reusable shopping bags. The benefit of reduction is to prevent new pollution, save energy, reduce greenhouse gas emissions, reduce waste that must be recycled, and allow products to be used to the maximum (Ghosh et al., 2021; Noor et al., 2024b). The government should create more awareness and education about waste management and expand the scope of integrated waste management to make it ubiquitous (Noor, 2024).

Thus, the study aimed to examine the enablers of people's precycling behavior. The enablers include materialism, consumer independence, environmental orientation, and voluntary simplicity. The study's outcome was expected to contribute to a body of knowledge and create awareness among society on zero waste. Zero waste could help the government to reduce the cost of managing waste since most of the collection centers take recycled goods that are not sufficient and scattered (Merewether et al., 2023). The lack of recycling collection centers is why recycling practice is poorly received in society. Apart from that, some communities do not cooperate when the government carries out this recycling campaign (Noor et al., 2023b). This indifference towards recycling practices causes the government's efforts to save energy and recycled materials to fail. Thus, instead of recycling, we can pursue a zero-waste lifestyle

by focusing on precycling. Zero Waste is not just a concept but an essential movement for a more sustainable future of the earth. Applying principles, strategies, and awareness raising can become integral to lifestyle and environmental policy (Merewether et al., 2023; Noor et al., 2023c). The joint commitment of individuals, communities, and governments is the key to realizing the vision of zero waste (Chaves et al., 2022; Noor & Nordin, 2023). This study focused on precycling rather than recycling behavior because too little attention has been paid to the academic environment. Evidence on research related to precycling is scarce. Hence, this study was designed to address this gap. In addition, the study seeks to answer the following research questions:

- What are the enablers that influence precycling among Malaysians?
- What is the strongest predictor of precycling among Malaysians?

Literature Review

Precycling

In the West, precycling has received the attention of the community there as early as the 1980s. It is a concept that reduces the garbage or waste that is thrown into landfills. In the form of a more accurate explanation, the concept is a pragmatic and insightful goal to invite people to emulate the natural cycle where all waste materials are sources for other uses (Ghosh et al., 2021). Implementing this concept means we will reduce waste disposal in nature. Simply put, this concept encourages us to maximize precycling, minimize residual waste, reduce consumption, and ensure that every item produced can be reused, repaired, and composted (Merewether et al., 2023). The precycling is broader than the concept of recycling. Recycling starts when garbage or waste is created. In contrast, zero waste or precycling starts as early as creating goods and involves consumers, producers, and policymakers (Hamid et al., 2020). The point is that precycling challenges us to evaluate our lifestyle and see how something we consume can impact the environment. Comfort in the form of cheap products made of materials that cannot be recycled harms the planet (Chaves et al., 2022).

There is no perfect word for a precycling lifestyle, and this imperfection should not be used as a reason not to start it. Precycling is not a goal but a process. To create a precycling lifestyle, we must think carefully about what needs to be bought. If necessary, reject all expenses for trivial and non-urgent matters. The next step to create a precycling lifestyle is to reduce the use of disposable inorganic items, such as plastic bags. Instead of buying new, try to use used items that are still usable, for example, by buying thrift clothes. Although at first, it is difficult to do, when this lifestyle becomes a habit, there are various benefits that people can feel. The most noticeable benefit of precycling is that production is more economical (Shehata et al., 2022). This is because the consumer only buys the items they need and learns to process used items into antique equipment, thus reducing the furniture purchase budget. Next, a precycling lifestyle can improve the quality of life and health. This is due to the reduction of piles of garbage and waste, which will minimize the appearance of germs and diseases. In addition, changing the consumption pattern from initially buying food from outside and then changing to cooking it by yourself is certainly healthier for the body. Precycling is one of the ways to hone family planning and managerial skills in managing family needs. By applying this principle, the consumer could avoid purchasing items that could hurt human health or the surrounding environment (Chaves et al., 2022).

Materialism and Precycling

Materialism is a person who values wealth or possessions above other things. According to philosophy, materialism is everything and goes more into considering matter as the basis of reality. In general, materialism is an understanding in philosophy that states that things that can be said to exist are matter (Shrum et al., 2022). Materialism does not recognize the existence of non-material entities such as God, angels, demons, spirits, and others. This understanding assumes that only reality is material, and everything is a manifestation of material activity (Tarka, 2020). They invest a lot in improving their appearance. Those who revolve their lives around their resources see their body as part of their property. In this way, they use their appearance as capital to have more power and opportunities to access a better standard of living (Shrum et al., 2022). The most materialistic people prioritize socialization according to the possibility of having more assets by living with these people (Tarka, 2020). As we have seen, materialistic people value people according to what they have. Past studies have discovered that material people do not care about the environment and have less inclination for precycling (Delistavrou et al., 2020). Materialism thinking is related to the consumer's perception of love for money and material things, and it is also associated with consumers who are eager to have material objects (Issock, 2023; Jain et al., 2024). One of the causes of materialistic thinking that is increasingly dominating society's thinking is that a person's success is primarily measured based on material aspects (Kuanr et al., 2020). For example, our society can see and judge a person's wealth based on car use, the house they live in, and the brand of clothes they wear.

Consumer Independence and Precycling

People who care about the environment began to find and use environmentally friendly alternative products (Akhtar et al., 2021). They believe that what they do can affect the environment. Not using plastic bags is part of a slight movement to reduce waste. Purchasing green products is one of the pro-environmental behaviors referring to the purchase and consumption of products that have little impact on the environment (Sun et al., 2022). The purchase behavior of green products leads to the preference and use of environmentally friendly products and or products using ecological processes and materials (Gilal et al., 2020). According to Zhuang et al. (2021), the benefits of green products include efficiency and cost-effectiveness, health and safety, performance, symbolism and status, and comfort. Consumers who have high green self-efficacy are believed to have precycling solid behavior (Noor et al., 2023a). Consumer independence refers to a person's confidence in his/her ability to act in a particular situation. A person with high consumer independence will be more optimistic and motivated to act environmentally (D'Souza et al., 2023; Rotimi et al., 2023; Zhuang et al., 2021).

Environmental Orientation and Precycling

Several terminologies are used for the concept of behavior towards the environment. Among them are environmentally responsible behavior, pro-environmental behavior, environmentally significant behavior, environmental orientation, and sustainable behavior, which carry the same meaning, which is the actual action taken by individuals on any issue related to the environment (Chwialkowska et al., 2020). Environmental orientation is a multidimensional construct that consists of environmental knowledge, environmental attitudes, and green behavior. Environmental orientation consciousness is the state of a person with deep knowledge, seen from their behavior and attitude (Noor et al., 2024b). Thus, someone with an

awareness of the environment will be seen from the knowledge level, how they respond to the environment, and their behavior towards it (Noor et al., 2023c). Some people have shown that environmental attitude captures a person's level of concern or interest towards phenomena of specific or general aspects of the environment, ecology, or energy saving (Beall et al., 2021). Awareness of the need to preserve and conserve the surrounding environment to maintain the balance of the ecosystem. Those with a high environmental orientation will realize the importance of taking care of the environment, not threatening the importance of the ecosystem, not destroying/damaging flora and fauna, and protecting the environment (Chwialkowska et al., 2020; Noor, 2024).

Voluntary Simplicity and Precycling

Simple living is a concept that emphasizes awareness of essential needs and reduces the tendency to seek happiness in material things. If applied wisely, the practice of simple living can bring many benefits. Simple living is worth considering, from reducing stress to saving money to respecting the environment. A simple life is when a person prioritizes the essentials and avoids excessive luxury (Rebouças & Soares, 2021). This way of life focuses on internal happiness rather than material possessions. This does not mean living in poverty or hardship but making wise decisions in production, appreciating natural resources, and emphasizing more eternal values (Kuanr et al., 2020). A simple life can also be defined as a lifestyle when one tries to focus on the essential things in life. Simple living is associated with sustainable practices (Aidar & Daniels, 2024; Campos et al., 2023; Chen et al., 2022). Everyone can reduce their environmental footprint and help preserve the planet by reducing consumption. Reducing consumption can also help reduce the carbon footprint. Budgeting is an essential step in simple living. Budgeting helps each track production and avoid waste. Everyone can allocate funds for basic needs such as food, shelter, and transportation before spending money on other things. Every individual is advised to invest in quality items that last longer than replacing them regularly. This saves money in the long run and supports a simple lifestyle by reducing waste (Kuanr et al., 2020). Based on the above reasoning, the following hypotheses are developed:

- H1: Materialism significantly influences the precycling behavior of the Malaysian public in Negeri Sembilan.
- H2: Consumer independence significantly influences the precycling behavior of the Malaysian public in Negeri Sembilan.
- H3: Environmental orientation significantly influences the precycling behavior of the Malaysian public in Negeri Sembilan.
- H4: Voluntary simplicity significantly influences the precycling behavior of the Malaysian public in Negeri Sembilan.

Figure 1 summarises the research model of the study.

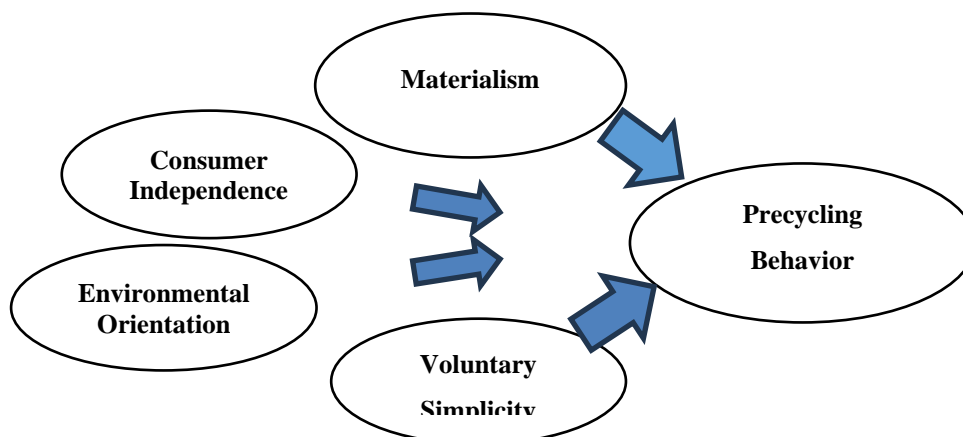


Figure 1: Conceptual Model

Methodology

The population of this research is the Malaysian public in Negeri Sembilan. This study employed multi-stage sampling by combining two sampling techniques: cluster and convenience. First, the researchers clustered the sample into three districts: Seremban, Kuala Pilah, and Port Dickson. The sample distribution for each district is 300. Next, a convenience sample is employed, in which researchers use the closest and most available subjects to participate in a research study. The primary data used is sourced from questionnaires directly given. A t-test was performed using GPower software to determine the sample size of this study. After filling in the required information in the GPower software, the minimum sample size required for the study is 111 respondents. Two hundred fifty-five respondents have responded to the survey, which is considered better and has successfully demonstrated higher consistency for this study. This research has two variables: the independent variable and the dependent variable. Independent variables include materialism, consumer independence, environmental orientation, and voluntary simplicity. At the same time, the dependent variable consists of precycling. The instruments are adapted from Klug and Niemand's (2021) study.

Validity and reliability are important so that each adapted item can meet the characteristics of a good instrument and be suitable for the researchers' field of study. Validity testing can be done with several approaches, one of which is construct validity. Construct validity is a test done to see if the items in the research instrument are suitable to measure the existing theoretical construct. A sufficient sample is needed to see whether there is a correlation. Therefore, the Kaiser-Meyer-Olkin (KMO) value above 0.50 indicates a sufficient sample. Then Bartlett's test of sphericity must show a significant value ($p < 0.05$). The following output is the rotated component matrix. The principle of exploratory factor analysis is that each item can be correlated with all factors, but a good item only has a high loading factor on the factor it measures. Next, the reliability of the questionnaire items was determined using Cronbach's Alpha value (> 0.60). Previous studies, such as those by Lundberg et al. (2024) and Wenzel (2024), have validated the instruments used in this study. Each variable uses several statements, and a Likert scale is used to measure it. The analysis method is multiple linear regression. Table 1 summarizes the survey items used.

Table 1: Measurement of the Variables

Variable	Items
Precycling	<p>I consciously buy unpacked products.</p> <p>I buy sustainably produced products.</p> <p>I avoid (packaging) waste at all.</p> <p>Compared to others, I cause little waste.</p> <p>I strictly reject superfluous (packaging) waste.</p>
Materialism	<p>I admire people who own expensive homes, cars, and clothes.</p> <p>I like to own things that impress people.</p> <p>Buying things puts me under much pressure.</p> <p>My life would be better if I owned certain things I did not have.</p>
Consumer Independence	<p>I prefer wearing clothes without considering current fashion trends.</p> <p>I buy fashion without consulting other people's opinions.</p> <p>When buying something, my preferences and tastes are more important to me than the opinions of others.</p> <p>I buy things that I like whether others agree or not.</p> <p>I need time in nature to be happy.</p>
Environmental Orientation	<p>Being out in nature is a great stress reducer for me.</p> <p>It makes me sad to see natural environments destroyed.</p> <p>Nature is valuable for its own sake.</p> <p>I only need a little money to live.</p>
Voluntary Simplicity	<p>I live a simple life without much property.</p> <p>I voluntarily refrain from buying much stuff.</p>

Reliability is often referred to as describing stability and consistency internally (Pallant, 2001). Cronbach's Alpha value is often referred to when measuring the internal consistency of a construct. A Cronbach Alpha value that exceeds 0.60 is often used as the reliability index of an instrument (Pallant, 2001). Skewness and kurtosis are used in data analysis to understand data distribution characteristics. Skewness measures the skewness of the data distribution, while kurtosis measures the steepness of the peak of the data distribution. The Skewness value should fall within the range of -3 to +3.

Moreover, for kurtosis, the range of -10 to +10 needs to be assumed (Kline, 2005). Pearson's correlation is used to examine the relationships between the variables. It measures the strength and direction of the linear relationship between two variables. Two variables are said to be correlated when one variable is accompanied by a change in the other, either in the same or opposite direction. Finally, the regression analysis technique is used to study the relationship between the predictor variables and the dependent variable.

Findings and Discussion

Table 2 shows the profile of the respondents. Usable questionnaires were received from 255 respondents. From the data, most of the respondents are female (69.4%), and the rest are male respondents (30.6%). Next, most respondents are from the 21 to 28-year-old group (80.0%). Meanwhile, the highest academic level is a bachelor's degree (78.8%). Finally, most respondents live in urban areas (55.7%).

Table 2: Demographic Profile

No.	Profile	Frequency (n)	Percentage (%)
1	Gender		
	Male	78	30.6
	Female	177	69.4
2	Age		
	18-20	50	19.6
	21-28	204	80.0
	Above 28	1	0.4
3	Highest Academic Qualifications		
	Secondary Level	3	1.2
	Diploma	51	20.0
	Degree	201	78.8
	Other	0	0
4	Current Living Area		
	Urban	142	55.7
	Semi-Urban	90	35.3
	Rural	23	9.0

As shown in Table 3, the variables used are acceptable and reliable and can be used in the following study. For Skewness and Kurtosis, the variables used are normally distributed (Kline, 2005). All instruments show a Cronbach's alpha reliability value of more than 0.7, which means that the variables have a high level of consistency.

Table 3: Normality & Reliability Results

Variable	Mean	SD	Skewness	Kurtosis	Cronbach's Alpha
Materialism	3.7745	1.01690	-0.389	-1.132	0.860
Consumer Independence	4.1451	0.81390	-0.504	0.304	0.809
Environmental Orientation	4.3745	0.73203	-1.069	0.875	0.873
Voluntary Simplicity	3.7111	1.08628	-0.236	0.968	0.800
Precycling	4.0680	0.83015	-0.389	-0.797	0.744

Table 4: Pearson Correlation Results

		Precycling
Materialism	Pearson Correlation	0.683***
	Sig. (1-tailed)	0.000
	N	255
Consumer Independence	Pearson Correlation	0.673***
	Sig. (1-tailed)	0.000
	N	255
Environmental Orientation	Pearson Correlation	0.740**
	Sig. (1-tailed)	0.000
	N	255
Voluntary Simplicity	Pearson Correlation	0.674**
	Sig. (1-tailed)	0.000
	N	255

Based on Table 4, there is a significant positive relationship between Materialism ($r = 0.683$; $p < 0.050$), Consumer Independence ($r = 0.673$; $p < 0.050$), Environmental Orientation ($r = 0.740$; $p < 0.050$), and Voluntary Simplicity ($r = 0.674$; $p < 0.050$) towards precycling.

Table 5: Regression Results

Variables	Beta (β)	Sig. (p)	Tolerance	VIF
Materialism	0.275	0.001	0.495	2.021
Consumer Independence	0.111	0.047	0.403	2.480
Environmental Orientation	0.417	0.001	0.500	1.999
Voluntary Simplicity	0.170	0.002	0.409	2.443
R ²	0.686			
Adjusted R ²	0.681			
F Change	136.659			
Sig.	0.000			

Based on Table 5, the study first examined multicollinearity, which refers to the occurrence of a linear relationship between independent variables in a multiple linear regression model. The value of variance inflation factor (VIF) and tolerance (TOL) can be used to detect the existence of multicollinearity in the regression model. If the VIF value exceeds four or the tolerance is less than 0.2, multicollinearity is problematic. The results revealed that there is no problem with multicollinearity. Then, the R-Square value of 0.686 shows that the 68.6% of independent variables influencing materialism, consumer independence, environmental orientation, and voluntary simplicity from precycling is 68.6%. That means all independent variables have a proportion of influence on precycling, amounting to 68.6%. The remaining variables are influenced by other variables, not the linear regression model. Next, the regression results can be defined as follows: 1) materialism ($\beta = 0.275$, $p = 0.001$), 2) consumer independence ($\beta = 0.111$, $p = 0.047$), 3) environmental orientation ($\beta = 0.417$, $p = 0.001$), and 4) voluntary simplicity ($\beta = 0.170$, $p = 0.002$). Therefore, the study accepts H1, H2, H3, and H4. Based on the beta value, environmental orientation is the most significant predictor of precycling. In this case, preserving and conserving nature is everyone's responsibility, regardless of religion. Every religion and belief in the world has a sure guide. What matters is the ability and efforts

of followers of each religion to realize these guidelines become daily life practice (Chwialkowska et al., 2020; Noor, 2024).

As implications, some recommendations are identified. First, parents should be role models by not littering everywhere and collecting items that can be recycled by category. The children will inherit this behavior from their parents because the mold is the same as the cake. At the same time, schools and higher education institutions must raise awareness and encourage students to practice precycling (Noor et al., 2024a). For example, hold awareness campaigns such as talks and exhibitions about precycling. Pure values must also be instilled in students during moral or civic education. Establishing the environment club is also a sustainable initiative that will help this effort. For example, the club could organize a competition on precycling. As a result, the students will be exposed to precycling, thus helping them to care for the environment. The following recommendation is that the government enact a policy on waste disposal and precycling. For example, the government can set waste disposal rules by category. Local authorities should increase the number of recycling bins and centers (Noor et al., 2024b). This will make it easier for people to manage their garbage. In addition, the government can also hold a campaign to increase people's awareness of precycling practices. The mass media should support this campaign to ensure that this message of precycling is widely spread. Strictly speaking, the cooperation of the government and various parties is essential for the success of a mission. All parties must be equal to persist in practicing precycling for the environment's sake. Each of us needs to cultivate the practice of precycling because it is essential to reduce the destruction and pollution of nature. In Japan, the law is enforced by imposing a fine of over 30,000 yen (RM970.57) on those who throw away household items without recycling. In Germany, the government obliges companies and industries to separate and recycle at least 80 percent of the goods they produce. For example, companies that produce boxed drinks must recycle used drink boxes.

Mass media and social media are essential in disseminating information and issues related to environmental care. Indirectly, it has brought the community to a new cultural pattern and has begun to determine new patterns of thought and behavior. In line with Malaysia's Roadmap Towards Zero Single-use Plastic Campaign 2018-2030, most local governments have implemented a campaign to ban plastic and polystyrene. In addition, universities and educational centers could also conduct awareness campaigns through sustainable programs. Past studies have also found that the reward system attracts interest and attention to recycling (Chen & Gao, 2021). According to Zhao et al. (2022), recycling activities and waste separation can contribute to income generation. Recycling activity is beneficial when it becomes a source of side income that does the sorting of recyclables. The target of environmental education should be more comprehensive than focusing on a specific discipline. Instead, it needs to reach out to a larger audience because it involves the well-being of nature (common goods). Environmental education can be used to cultivate good values and tolerance among society.

Conclusion

The findings have found significant relationships between materialism, consumer independence, environmental orientation, voluntary simplicity, and precycling. The most significant predictor of precycling was environmental orientation. Garbage in the environment is a problem that must be eradicated immediately. The increase in the population and the lifestyle of the community results in an increase in the volume of garbage produced. One of

the solutions for reducing garbage is to apply a precycling lifestyle. It is a long-term solution that is better than throwing garbage into landfills. Some limitations need to be improved in this research. First, the study has a cross-sectional dimension, so the relationship pattern studied is a momentary portrait that describes the relationships that occur during recruitment data. At the same time, the dynamics of changes in precycling can change at any time. Recommendations for future research are to conduct a longitudinal study to ensure all answers given by the respondents are not momentary emotions but are their natural attitudes and behaviors towards the environment. Second, this research relies on information from a small sample and only takes samples from the three Negeri Sembilan, Malaysia districts. Thus, future studies are encouraged to widen sample distribution and ensure the questionnaire collects diverse and equal background information about respondents, including gender, age, race, marital status, academic qualifications, and others. Moreover, this study only focused on the influence of materialism, consumer independence, environmental orientation, and voluntary simplicity on precycling behavior. More in-depth research must be done to find more comprehensive information by expanding the current research model.

Acknowledgments

We thank the individuals who generously shared their time, experience, and materials for this project.

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