


Research

Exploring the key drivers of pro-environmental goal formation through the lens of Theory of Reasoned Goal Pursuit to tackle plastic pollution

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Abstract

The worldwide plastic waste generation reached over 400 million metric tons annually and is seriously threatening human health and the global environment in general. Several previous research recognizes the role of pro-environmental goal and explored how it impacts plastic waste management behavior to tackle plastic pollution. However, research on the factors influencing them is still very limited. This paper provides a theoretical model that includes factors affecting the formation of pro-environmental goals (PEG) and its subsequent impact on the intention of pro-environmental behavior in the context of plastic consumption behavior among young people. The fundamental concept of the model was adopted from the theoretical contracts of the Theory of Reasoned Goal Pursuit (TRGP) to explore young consumers' intention towards responsible plastic management behavior (RPMB), which includes reduction of plastic consumption and proper disposal of plastic waste. Data was collected from 340 respondents from a developing country-Bangladesh and analyzed using the structural equation modeling (SEM) technique and Smart PLS software. It was found that PEG significantly affects the intention of RPMB. Results also showed that factors, like moral norm, sense of responsibility, and guilt feeling significantly impact forming PEG, while the impact of attitude and eco-awareness on it was found insignificant. This research theoretically contributes by offering deeper insight into how PEG is formed that can drive individuals towards developing the intention of pro-environmental behavior. Furthermore, research findings also suggest that in the case of pro-environmental goal formation, non-cognitive and normative drivers such as moral norm, sense of responsibility, and feeling of guilt play a more crucial role than cognitive factors such as attitude and eco-awareness. Therefore, practitioners could use the research findings, particularly in developing countries, to implement proper measures promoting responsible consumer behavior to fight against plastic pollution.

Keywords Plastic waste · Developing country · Pro-environmental behavior · Goal formation · Theory of reasoned goal pursuit · Pro-environmental goal

1 Introduction

Bangladesh is among the top contributors of ocean plastic waste, ranking within the top fifteen countries globally, releasing approximately 73,000 tons of plastic waste on the coast of Bangladesh [1]. The latest study shows that 89% of plastic waste is poorly managed and ends up in landfills or ocean areas [2]. A recent study conducted by the

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World Bank in 2021 showed only 37.2% of plastic waste is recycled, and the rest ends up in landfills, playgrounds, water bodies, roads, sea beaches, and other places [3]. This is due to lack of proper disposal of plastic waste such as in bins/designated places that causes difficulties in collection and sorting, resulting in poor recycling rates [4]. The latest research showing that 40–60% of the waste generated in Dhaka (the capital of Bangladesh), is still uncollected, which is one of the reasons for the poor recycling rate of plastic waste [5]. Furthermore, recently UNEP Bangladesh hosted the eighth episode of “SDG Cafe” as part of monthly roundtable discussion series addressing the development challenges and co-creating innovative solutions highlighting on the sustainable Development Goals (SDG 12 and 13) with the theme, “Plastic Pollution and Waste Management” [6]. Bangladesh, the second largest contributor to plastic waste in South Asia and sixth in the world for plastic and polythene pollution in water and drainage systems, faces critical environmental challenges [7].

The country’s governing authorities set a target to reduce plastic consumption and increase recycling to 30% by the year 2030, and to enhance the plastic recycling rate to 50% by 2025 from the baseline of the year 2020/21 which demonstrates a serious commitment to tackling this pressing environmental issues [7]. To fulfill the targets, residents must behave more sensibly, i.e., reducing plastic consumption in daily life and ensuring proper disposal of plastic waste are crucial steps in reducing plastic pollution. Therefore, policymakers need to have adequate knowledge and ensure implementation about how to enhance pro-environmental behavior within the residents.

Literature offers several frameworks for understanding the psychological, social, and contextual factors that shape pro-environmental behavior (PEB). The latest research shows that the Theory of Planned Behavior (TPB) [8], Theory of Interpersonal Behavior (TIB) [9], Norm Activation Model (NAM) [10], and Value Belief Norm (VBN) [11] theories are widely adopted to experiment PEB [12]. However, there is still contentious among researchers about the predicting accuracy of the models due to their contextual dependency and influence of other cognitive and non-cognitive factors [13]. Furthermore, reviewing the literature, these theories propose that an individual’s intention to engage in a behavior is a key determinant of whether they perform that behavior or not. Intentions are influenced by a combination of factors such as attitudes, subjective norms, and perceived behavioral control. However, PEB’s, like waste sorting, disposing of waste properly, using non-plastic bags, and recycling are habitual that do not require systematic and controlled thinking [14, 15]. This delimits the predicting accuracy of existing theories in PEB context due to various internal and external factors such as contextual and individual differences, temporal dynamics etc.

Recently, the Theory of Reasoned Goal Pursuit (TRGP) underscored the importance of goals (classified as procurement and appraisal goals) in forming the intention to behave in a certain way [14] and highlighted PEB are goal-driven, that pursuing active goals provides further motivation which is mediated via attitude and subjective norms. The study highlighted the importance of personal goals, specifically pro-environmental goals (PEG), in motivating individuals to engage in environmentally friendly behaviors, such as waste sorting and recycling [12]. The PEG could be viewed as a long-term aspirations related to contributing to nature, marine life, and the environment. However, earlier literature showed that there is a dearth of discussion on the consideration of environmental goals as a precursor in the waste management and recycling context [16, 17]. Therefore, there is still a lack of evidence on how PEG impacts individual’s intention to be responsible plastic management behavior (RPMB), especially among young consumers existing in developing countries that could be viewed as a research gap. However, research argued that individual’s personal goal is the prime motivator that drives them to perform the same behavior day after day, however, in TRGP, the individual’s goal is considered as an independent factor in TRGP that delimits our understanding of how these goals are formed [14]. Understanding the key drivers of PEGs within individuals is crucial for practitioners and policymakers looking to promote pro-environmental and responsible consumer behavior. Based on the above argument, the importance of having PEGs is highlighted in the literature, however, how such goals could be formed is still in question that could be viewed as another research gap and a major contribution of this study. Therefore, to address these research gaps, this research’s main aim is to explore the factors through the lens of TRGP model and existing literature that impact forming pro-environmental goals within individuals and its next impact on young consumers’ intention of RPMB. The main advantage of TRGP is that it combines TPB and goal system theory (GST), providing better insights into the consequences of behavior affecting goals and attitudes. TPB, a bottom-up theory, takes into account behavior as the starting point without considering the role of goals, while GST is a top-down theory that takes goals as the starting point. This study aims to address these research gaps by identifying the answers to the following research questions. RQ1: What are the factors that impact PEG? RQ2: To what extent do these factors play a role in influencing PEG? RQ3: To what extent does PEG directly impact responsible plastic management behavior?

There are several contributions of this research. This paper theoretically contributes by finding factors affecting PEG and augmenting our understanding of how PEG interacts with other factors affecting individuals’ intention of RPMB.

On practical grounds, this paper contributes by providing valid recommendations for practitioners to take necessary measures to tackle plastic pollution by forming PEGs among young consumers.

The rest of the paper is organized as follows: providing relevant theoretical background and developing hypotheses in Sect. 2. Section 3 presents an overview of the research context and design. Section 4 summarizes the result of this empirical study, and Sect. 5 further discusses the findings. Finally, Sect. 6 discusses the conclusion, Sect. 7 highlights the research implications, and Sect. 8 discusses the limitations and the scope of future research.

2 Theoretical background and hypotheses development

According to TRGP proposed by Ajzen and Kruglanski [14], procurement goals refer to the perceived benefits received by performing certain actions, while approval goals refer to achieving appraisal from surroundings. Furthermore, they argued that these goals need to be active to affect actual behavior. Another study shows a significant impact of active procurement goals (APG) in waste separation motivation that can also be mediated via attitude [16]. However, the impact of active approval goals on motivation was found to be insignificant. The reasoning was highlighted that waste separation and recycling actions are mostly performed inside the house; thereby, an individual's intention of achieving appraisal through waste separation activities is low [16]. Though the study of Concari et al. [12] signifies the impact of APG on motivation that could be mediated via attitude, several research reported attitude as a weak predictor of motivation and intention to PEB [18, 19]. Studies also on young consumers depicted that although they have positive environmental awareness and a favorable attitude towards the environment, they often show low commitment towards PEB [19]. Therefore, considering this theoretical backdrop and contradictions, attitude could be evaluated as a factor influencing PEG in a different context [16, 20].

Hence, we propose the following hypothesis:

H1: Attitude significantly affects pro-environmental goals.

Referring to the Goal Framing Theory (GFT), pro-environmental goals are classified as normative-type goals [21]. In the past literature, personal norms or moral norms have been used interchangeably [22]. Grønhoj, A., and Thøgersen [19] define personal norms as individuals' beliefs about what is right or wrong in terms of environmental behavior, reflecting their desire to maintain a positive self-image and adhere to their internalized moral standards and, therefore, personal norms play a crucial role in motivating PEB by aligning individuals' actions with their ethical principles and values [23]. Steg et al. [24] highlighted moral norms as one of the elements to enhance normative goals within individuals. Several research addressed that moral norm is a strong precursor compared to other factors of forming an intention to perform PEB [24, 25]. Having strong moral norm motivates people to perform pro-environmental actions despite the lack of convenience [26]. Several studies have shown that personal or moral norms predict PEB such as energy conservation [27], recycling [28], and choice of travel mode [29]. According to Bamberg and Möser [22], personal norms develop through a process of internalization of social norms. Therefore, moral norms could be viewed as a crucial factor affecting APG. In addition, some scholars suggest that an individual's internal factors such as moral norm, belief, awareness necessarily serve as major predictors, and external factors such as subjective norms, and behavioral control do not have a significant effect on predicting recycling behavior [30, 31]. Hence, we put forward the following hypothesis:

H2: Moral norm significantly changes pro-environmental goals.

The NAM theory suggests that eco-awareness is the main contributor to developing morality [32]. Knowledge about the negative consequences of rising pollution develops a sense of responsibility toward individuals that leads to the formation of moral norms [33, 34]. They also suggested that people are generally more likely to think about themselves as socially responsible or socially respectful; thus, a greater sense of awareness and responsibility arises due to that to act more sensibly in an altruistic way, rather than being selfish [21]. Those with stronger concerns for the future and community and have a greater sense of responsibility were found to be more likely to engage in recycling and waste management [35–38]. A study conducted by López-Mosquera et al. [36] concluded that concerns for the future and a sense of responsibility can encourage expenditures and affect environmentally responsible purchases, such as energy-efficient household appliances and low-emission cars. Onel & Mukherjee [21] highlighted moral norm, sense of responsibility and eco-awareness as factors within APG. Therefore, the following 2 hypotheses are proposed:

H3: Eco-awareness significantly affects pro-environmental goals.

H4: Sense of responsibility significantly changes pro-environmental goals.

Guilt is an emotional state that arises when individuals evaluate their actions or inactions as having caused negative outcomes for themselves or others [39, 40]. Earlier research agrees that emotions such as guilt strongly influence

consumer behavior [39] and are crucial enabler of responsible behavior such as recycling domestic waste [40]. Guilt can be a powerful motivator for PEB, especially in activities like recycling and waste management. As a key enabler of adopting PEB, guilt can be a powerful catalyst in the decision to try to recycle household waste [41]. Guilt can function as a signal that one's actions have fallen short of their desired behavioral goals, such as recycling household waste. When individuals experience guilt in response to their failure to engage in PEBs, it can serve as an added motivation to strive for change and adopt more sustainable attitudes and behaviors [41]. Thus, feelings of guilt have a significant role in easing the adoption of pro-environmental behavior, leading us to propose the following hypothesis:

H5: Guilt feeling significantly affects pro-environmental goals.

According to TRGP, goals (procurement and approval goals) indirectly impact motivation and motivation further impacts the intention to perform certain behaviors [14]. However, the latest meta-analysis and literature review articles in waste management and recycling context show insufficient evidence on the direct relationship between PEG and intention [16, 17]. This observation underscores a potential gap in the literature and suggests an opportunity for further exploration of the role of PEGs in shaping the intention of RPMB. Hence, in this paper, it was hypothesized that PEG acts as an intermediate construct to form intention by other factors. Having a strong PEG lead to forming intention, which leads us to explore the following hypothesis:

H6: Pro-environmental goals significantly change intention of responsible plastic management behavior.

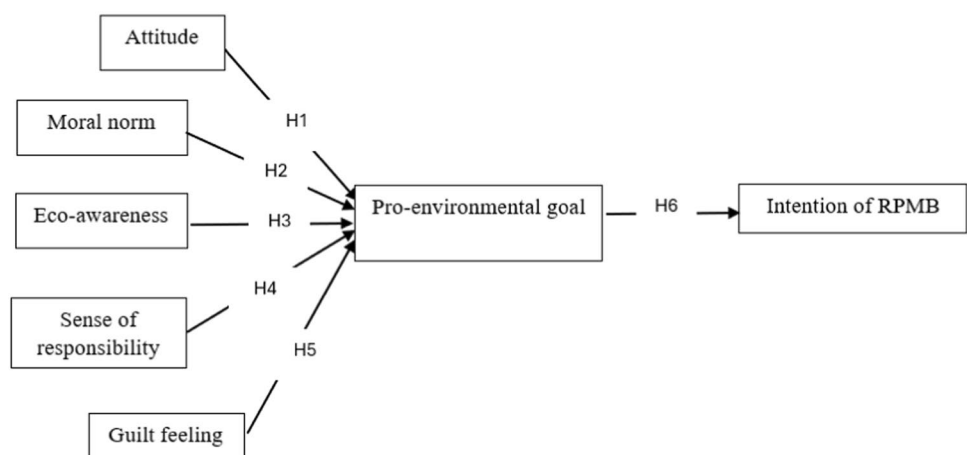
Figure 1 illustrates an overview of the hypotheses addressed in this research.

3 Methodology

This study adopted a deductive approach considering the nature and aim of the research, where the hypotheses outlined in the earlier section were evaluated quantitatively. Table 4 (Appendix) mentions all the items adopted from the previous studies to ensure the content validity of the measurement items used in the study. Data was collected based on the items presented in Table 4, using a survey-based questionnaire following a 5-point Likert scale. First, a pilot study was conducted among three academics and 30 target group respondents (i.e., young consumers aged 18–30 years) to improve clarity and remove ambiguity of the data collection. Considering their feedback, a few adjustments were made before the final study. Data was collected from randomly selected 346 university students residing in Dhaka city. Respondents were given a brief overview of the study before they filled in the questionnaire. After the first screening, data from 340 respondents were considered for statistical analysis. Using G*Power version 3.1 software [42], considering effect size 0.15, significance criteria 0.05, and power 0.95, the smallest sample size appears to be 160. Additionally, considering the 10 times of the number of items [43], the smallest sample size appears 330 (i.e., total items 30). Hence, the collected data from 340 respondents satisfies the smallest sample size.

On demographic information of the respondents, around 32% of the respondents were female, while 68% were male. About the age group, 92% of the respondents were between 18 and 24 years old, and the remaining 8% of respondents were between 25 and 30 years. Data were analyzed using a two-step approach: measurement model and structural model [43]. At first, the reliability and validity of the theoretical model were checked to assess the accuracy of the model. After that, the partial least square-based structural equation modeling (SEM) technique was used to evaluate the hypotheses

Fig. 1 Research overview and hypotheses



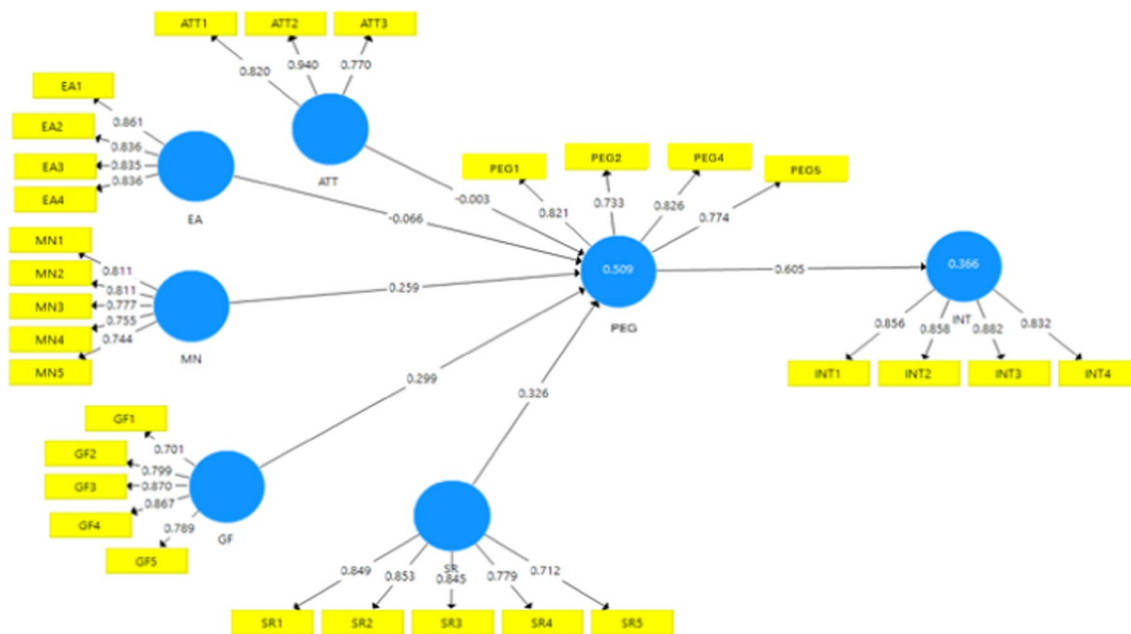


Fig. 2 Factor loading of the items in the measurement model

Table 1 Reliability and validity of the constructs

Constructs	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
PEG	0.8	0.868	0.623
ATT	0.821	0.883	0.717
EA	0.864	0.907	0.709
GF	0.865	0.903	0.652
INT	0.88	0.917	0.735
MN	0.839	0.886	0.608
SR	0.868	0.904	0.655

to check the causal relationship between dependent and independent variables. Smart-PLS (version 3) software was used to conduct all the analyses.

4 Results

At first, the validity and reliability of the constructs were estimated before going to the structural model analysis. Analyzing the resulting outer loadings in the measurement model, items PEG3, ATT4, and EA5 were removed as they got loadings less than the threshold value of 0.70. The resulting 30 items were considered to estimate the factor loadings further using the structural model (Fig. 2). Table 1 presents the obtained reliability and validity results from the measurement model (Table 1). It shows that both the Cronbach's Alpha and composite reliability coefficient values of all the items are above 0.7 which is right for a reliable construct. Moreover, all the average variance extracted (AVE) values are above the level of 0.50 which is ideal. Furthermore, the discriminant validity of the constructs was checked by using Fornell-Larcker Criterion and found to be less than the square root of AVE (Table 2).

The measurement model was determined to be valid and dependable, and then the structural model was derived. Table 3 presents the β -value, t-value and *P*-value resulting from the path model. As shown in Table 3, all hypotheses, except H1 and H2, are accepted as the correspondence t-value is more than the critical value of 1.96 (considering two tail tests), and *P*-value is less than 0.01. Hypotheses H1 and H2 are not accepted as the correspondence t-value is less than the critical value of 1.96, and *P*-value is higher than 0.05.

Table 2 Fornell-Larcker Criterion

Constructs	APG	ATT	EA	GF	INT	MN	SR
PEG	0.789						
ATT	0.266	0.847					
EA	0.475	0.403	0.842				
GF	0.623	0.284	0.566	0.808			
INT	0.605	0.287	0.511	0.583	0.857		
MN	0.593	0.424	0.653	0.634	0.63	0.78	
SR	0.615	0.308	0.625	0.608	0.613	0.578	0.81

5 Discussion

This paper hypothesized PEG as an intermediate construct linking intention with other factors. The result shows that PEG is a strong precursor forming the intention of PEG (H6). Among different contributing factors, the impact of attitude and eco-awareness on PEG was not found to be significant (H1 & H2). However, the effect of guilt feeling, moral norm and sense of responsibility on PEG were statistically significant (H3, H4 & H5). This signifies an important finding that concerning PEG formation, non-cognitive factors supersede cognitive factors, and these findings are not surprising as they could be explained with the support of earlier literature.

Several studies reported a lack of influence of attitude [18, 44] and eco-awareness [14, 45] in forming the goal and intention of PEB. Despite having a cheerful outlook and awareness, it may not turn into intention or actual behavior due to other non-cognitive factors, such as habit and subdued favorable waste disposal facilities. Razali et al. [46] also claimed that people may not behave in a certain way unless they believe that their actions have a real impact on the environment. When there is a lack of facilities to dump plastic waste, or alternate products without plastic packages, it is unlikely to behave pro-environmentally. Another prime consideration is that overall environmental stability is a pre-requisite under the consideration of PEB such as plastic consumption and disposal as customary and does not consider cognitive factors such as attitude or awareness as these are formed at the beginning of habit formation. Other scholars also endorsed that pro-environmental attitude does not always promote actual behavior [47, 48]. Oskamp et al. [49] in their study states that there are no significant differences between recyclers and non-recyclers although the respondents showed positive pro-ecological attitudes and beliefs toward environmental problems.

On the other hand, several studies reported moral norms and sense of responsibility as the strongest influencing factors of intention and PEB which is consistent with our study [4, 18, 25]. Similarly, according to the Norm Activation Model (NAM), pro-environmental behavior is considered altruistic behavior, and moral norms play a crucial role in the formation of such behavior [50]. In line with this, in this research PEG is considered as an intermediate construct between intention and other factors, showing that merely having a positive attitude and eco-awareness is not enough to form Pro-environmental intention within individuals. Machová et al. [51] in their study also argued that Generation Z has a higher level of affection and attention towards various pro-environmental contexts compared to older generations. When awareness further stimulates in the creation of sense of responsibility, moral norm, and guilt feeling, PEG is formed. Earlier research also suggested that people tend to reduce consumption of plastic waste when they believe that they share responsibility for the negative consequences [34, 52]. Moral norm and feeling of guilt are considered as an important agent towards forming the pro-environmental intention [18, 52]. Prior studies also suggested that waste management behavior is more influenced by non-cognitive factors such as moral norm than financial incentives [4, 52]. Therefore, based on this argument, consideration of PEG as an intermediate construct between intention and its driving factors could be justified, as it can provide better explanation of PEB. The same findings are also clear in closely similar studies conducted in different contexts. The study conducted by Bertoldo and Castro [53] concluded that exploring the relationship between social and personal norms reveals that personal norms and environmental identity can better predict recycling and organic food buying behavior in Portugal and Brazil than more external social norms. Onel and Mukherjee [21] explained this phenomenon based on the Goal Framing Theory suggesting that despite people have lack of facilities or no financial incentive, they tend to show more environment-friendly goals due to their strong moral norm. Several earlier research also claimed that there is a significant relationship between guilt feeling and intention to reduce plastic consumption which is also consistent with the findings of our study [54]. For instance, Sun and He [55] in their study highlighted the importance of emotion and sense of responsibility from the social context reducing the sole use plastic consumption. The rationale behind this claim is when people feel they do not perform as per the moral standard,

Table 3 Results of the structural model

Paths	β -value	t-value	P-value	Status
H1: ATT—> PEG	-0.001	0.059	0.953	Not supported
H2: EA—> PEG	-0.057	0.997	0.319	Not supported
H3: GF—> PEG	0.293	5.045	***	Supported
H4: MN—> PEG	0.253	3.787	***	Supported
H5: SR—> PEG	0.328	3.672	***	Supported
H6: PEG—> INT	0.607	12.359	***	Supported

P-value: *** shows less than 0.01

this may cause anger, frustration, and guilt. According to the Goal Framing Theory, a goal is primarily influenced and activated by value priorities and situational factors. The three types of goals suggested by this theory are Hedonic, gain and normative [56]. Since pro-environmental behavior is normative type, normative factors are supposed to play a more significant role compared to others which is consistent with this study.

6 Conclusion

The current attention on determinants of PEB has experienced a notable shift in attention towards understanding the complexities of social and psychological determinants of pro-environmental behavior. This shift reflects a growing recognition that environmental actions are influenced by a multitude of factors beyond purely cognitive or external influences. The latest development in this field is the TRGP model which merged TPB and Goal Systems Theory (GST) concluding that the formation of a behavioral intention is influenced by the individual's motivation to perform a behavior, the consideration of alternative options, and the context of their currently active goals [8]. However, there is a lack of in-depth analysis of the formation mechanism of these goals. The main goal of this paper was to find the factors and their impact on forming PEG. Synthesizing literature, we have considered the following: attitude, eco-awareness, moral norm, sense of responsibility, and guilt feelings in our analysis. Among these factors, this empirical study shows a significant impact of moral norm, sense of responsibility, and guilt feelings in forming PEGs. Although attitude and eco-awareness are typically strong predictor of behavior, we found these factors have an insignificant impact on forming PEGs [57]. The result also suggests that PEGs significantly affect the intention, which is also a strong precursor of actual PEB. To our knowledge, this study is the first to apply TRGP model to assess the factors and their impacts on forming PEG to examine young consumers' intention of plastic waste management behavior in developing country contexts like Bangladesh. This can be further tested in countries with comparable economic and demographic populations. This study can aid future studies in generalizing the idea further and can be extended to developed countries to assess its wider acceptability. In addition, this study contributes substantially to the existing theory and practice that is elaborated in the following section.

7 Research implications

7.1 Theoretical implications

There are two distinct theoretical contributions of this paper. Firstly, the latest research depicts a lack of consideration of PEG as a construct to predict PEB and calls for further exploration [12, 17]. Concari et al. [16] claimed that TRGP should be evaluated in different contexts and open to incorporating additional constructs. Additionally, there is a lack of evidence on if young consumers' RPMB is affected by their PEG. Secondly, though the latest research underscored the importance of an individual's PEG in shaping PEB, how the PEG is formed is yet to be explored. This study confirms the impact of several factors in forming PEG for young consumers' RPMB context. Therefore, this research augments our understanding towards formation of PEG and its later impact on PEB. Furthermore, this research provides a theoretical model to illustrate how PEG interplays with other factors affecting the intention of PEBs, which is another novel contribution of this research. The empirical findings show that the inclusion of PEG can offer better explanatory capability of PEB. Therefore, this paper augments our understanding on how an individual's PEG interacts with other factors affecting PEB.

7.2 Practical implications

Based on the findings, this study suggests policymakers and practitioners to take necessary measures that would accelerate forming PEG within young polluters. In most cases, policy makers emphasize creating eco-awareness on mass scale, which is not enough as suggested in this study. Though eco-awareness is fundamental to create moral norms and sense of responsibilities, authorities may delude the importance of the formation of moral norms, sense of responsibility, affection towards nature, and guilt feelings which can lead not to act pro-environmentally. Hence, more attention should be given to developing academic curriculum and starting other programs that would foster these attributes to form PEG within young generations. Utilizing feeling of guilt as a catalyst for forming PEG and driving positive intentions towards eco-friendly behaviors, such as plastic waste disposal, can be an effective strategy for environmental campaigners. Leveraging guilt-appeal messages in persuasive communication campaigns can evoke strong emotional responses and motivate individuals to act [58]. In addition, the potency of favorable and effective government policies could be helpful in behavioral shift of consumers to act responsibly and explore eco-friendly technologies in transforming plastic waste to valuable products, maximizing the financial benefits for the recycling companies [59].

8 Future research and limitations

Future research could be directed toward developing a more comprehensive and representative model including more factors in formation of pro-environmental goals. The impact of other control/moderating variables, such as age, gender, ethnicity, and spirituality, and other key cognitive and non-cognitive variables, such as motivation, reward, habit, and belief in the formation of pro-environmental goals and their next impact on actual pro-environmental behavior could be further explored. In addition, it could be interesting to explore, if a comparison can be made on how the personal role and affiliation (environmental activists and non-activist groups) affects pro-environmental goal formation and behavior. Comparative study considering cross-cultural contexts of pro-environmental goal formation can be further extended for future studies.

We acknowledge some limitations of our study. First, the measures were made based on self-reported information that does not necessarily measure actual behavior. The results could have been different if the real observations were captured [60]. Also, this study was only based on one sample, constrained to a particular geography, and stands for similar demographic and psychographic profiles, as a result, it could be extended to different geographies, and cultural contexts to gather diverse responses.

Author contributions Md. Tamzidul Islam: conceptualization, writing—original draft, review & editing, supervision, project administration, methodology, data curation, formal analysis. Md Hasibul Islam: writing—review & editing, visualization, validation, software, data curation, formal analysis. Mohammad Rashedul Hoque: writing—review & editing. Md. Faruque Hossain: writing—review & editing.

Data availability The datasets generated and/or analyzed during the current study are available upon request.

Declarations

Ethics approval and consent to participate The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Competing interests The authors declare no competing interests.

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Appendix

See Table 4.

Table 4 Constructs and items

Constructs	Code	Items	Sources
Attitude (ATT)	ATT 1	Plastic is bad for the environment	[46]
	ATT 2	Reducing plastic consumption is good for the environment	
	ATT 3	Reducing plastic consumption and disposing plastic waste properly is an excellent idea	
	ATT 4	Properly getting rid of plastic waste helps in recycling	
	PEG 1	I have a personal goal to work for a cleaner world/climate change/global warming	
Pro-environmental goal (PEG)	PEG 2	I have a personal goal to work for marine life (i.e., fishes, water species) reduce water pollution	[18]
	PEG 3	I have a personal goal to contribute to nature either by choosing relevant career, donating, or supporting environmental activities	
	PEG 4	I want to contribute to the world by reducing plastic consumption and disposing it properly	
	PEG 5	I want to contribute to marine life (fishes, water species, etc.) by reducing plastic consumption and disposing it properly	
	EA 1	I am concerned about the global warming	
EA 2	I am aware of the harmful impact of plastic to marine life (i.e., fish, water species)		
EA 3	I am aware of the climate change		
EA 4	I am aware of the harmful effects of plastic to our nature and society		
EA 5	I am aware that we need act soon to tackle the climate change		
Sense of responsibility (SR)	SR1	I have a strong personal responsibility to do something for the environment	[13]
	SR2	I feel responsible to reduce the waste generated in the society	
	SR3	I feel responsible to do something for the plastic waste I generate	
	SR4	It is everyone's responsibility to reduce plastic consumption and waste	
	SR5	It is important to do things for the betterment of the society	
Guilt feeling (GF)	GF 1	I feel guilty when I buy products with plastic packages	[61]
	GF 2	I feel guilty when I throw plastic packages outside instead of recycling	
	GF 3	I feel happy when I avoid plastic packages and dispose it properly	
	GF 4	I feel proud of myself when I am reducing plastic consumption	
	GF 5	I feel proud of myself when I am disposing plastic packages properly	
Moral norm (MN)	MN 1	Throwing plastic waste outside goes against my principle or value	[18]
	MN 2	I dislike when others throw plastic waste outside	
	MN 3	I believe that everyone should dispose plastic waste properly and reduce its consumption	
	MN 4	I should dispose plastic waste properly and reduce its consumption	
	MN 5	I should create awareness to reduce plastic consumption and dispose properly	
Intention (INT)	INT 1	I am willing to dispose plastic waste properly and reduce its consumption from my daily life	[13]
	INT 2	I am willing to encourage my family and friends to reduce plastic consumption and dispose it properly	
	INT 3	I am willing to put extra effort to reduce plastic consumption and dispose it properly	
	INT 4	I am willing to encourage others to reduce plastic consumption and dispose it properly	

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