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GREEN CONSUMERISM IN NORTHERN VIETNAM: HOW PERSONAL AND DEMOGRAPHIC FACTORS SHAPE ENVIRONMENTAL BELIEFS

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ABSTRACT

This study explores the determinants of green purchase intention (GPI) by integrating ethical ideologies, cognitive styles, and demographic factors within the Theory of Planned Behavior (TPB) framework. Using data collected from 393 respondents, the research examines the influence of the Rational-Experiential Inventory (REI), Ethics Position Questionnaire (EPQ), and demographic variables on GPI. The findings reveal that ethical ideologies and cognitive styles significantly moderate the relationship between environmental beliefs and green purchase behaviors. Notably, these findings align with Sustainable Development Goal 12 (SDG12), emphasizing sustainable consumption and production patterns. By highlighting how individual traits and demographic variables interact with pro-environmental beliefs, this study provides actionable insights for marketers and policymakers aiming to promote sustainability. Practical implications include tailored marketing strategies addressing consumer values and demographic profiles to drive green consumerism. This research contributes to advancing TPB by incorporating ethical and cognitive dimensions, offering a nuanced understanding of green consumer behavior in emerging markets.

Keywords: Environmental Beliefs, Green Purchase Intention, Personal traits, Moderator variables.

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1. INTRODUCTION

The imperative for environmental sustainability has intensified considerably amid escalating environmental degradation and climate change (Jaiswal & Kant, 2018; Nguyen et al., 2019; Tres et al., 2021). Consequently, scholarly attention has increasingly focused on green purchase intention (GPI) - the propensity of consumers to select environmentally responsible products (Sreen et al., 2018) - as a critical determinant of sustainable consumption patterns. Understanding GPI's antecedents enables the design of evidence-based interventions to promote ecological stewardship in consumer behavior.

Extant research has established that environmental beliefs - individuals' cognitive and affective orientations toward environmental issues - constitute significant predictors of GPI (Ajzen, 1991; Dunlap et al., 2000; Gansser & Reich, 2023). Notwithstanding this well-documented relationship, a substantive lacuna persists regarding how personal traits and demographic characteristics moderate the translation of environmental beliefs into green purchasing behavior. While previous investigations have examined isolated predictors of GPI (Chan & Lau, 2000; Samarasinghe & Samarasinghe, 2013; Qureshi et al., 2023), the interactive effects of cognitive styles, ethical orientations, and sociodemographic variables remain insufficiently theorized.

Specifically, the moderating role of personal traits - including the Rational-Experiential Inventory (REI), which captures rational and experiential thinking modalities (Epstein et al., 1996; Marks et al., 2008; Akinci & Sadler-Smith, 2013), and the Ethics Position Questionnaire (EPQ), which assesses idealism and relativism dimensions (Forsyth, 1980; Zaikauskaite et al., 2020; Zaikauskaitė et al., 2023) - warrants systematic investigation. These cognitive and ethical architectures may fundamentally shape how environmental convictions manifest in purchasing decisions. Concurrently, demographic factors such as gender, age, income, occupation, and educational attainment, while recognized as significant predictors of environmental concern and green consumption (Tilikidou, 2007; Patel et al., 2017; Witek & Kuźniar, 2020), exhibit underexplored moderating potential. Empirical evidence suggests gender disparities in environmental consciousness (Zelezny et al., 2000; Sakellari & Skanavis, 2013; Mohai, 2014; Subiza-Pérez et al., 2020) and generational variations in environmental attitudes (Diamantopoulos et al., 2003; M. Wiernik et al., 2013; Gray et al., 2019), yet their conditional effects on the belief-behavior nexus remain underspecified.

This investigation directly addresses United Nations Sustainable Development Goal 12, which mandates sustainable consumption and production patterns (Nations, 2023). By elucidating how individual traits and demographic characteristics condition the relationship between environmental beliefs and GPI, this research provides actionable intelligence for Vietnamese policymakers, particularly the Ministry of Natural Resources and Environment and the Ministry of Industry and Trade, enabling the formulation of targeted interventions that promote sustainable consumption aligned with national environmental commitments and international sustainability frameworks.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Environmental beliefs and Green purchase intention

Environmental beliefs and GPI are foundational concepts in studying sustainable consumer behavior. Understanding these terms and their interrelationship is crucial for developing strategies to promote environmentally friendly purchasing behaviors.

2.1.1. Environmental beliefs

Environmental beliefs refer to the attitudes, values, and perceptions individuals hold about the environment and their understanding of the human impact on ecological systems (Papagiannakis & Lioukas, 2012). These beliefs are often rooted in broader worldviews and can significantly influence behavior (Sachdeva, 2017). These beliefs are foundational to fostering sustainable consumption patterns, as emphasized in the United Nations Sustainable Development Goals (SDG12). SDG12 focuses on ensuring sustainable consumption and production patterns, with specific targets aimed at promoting resource and energy efficiency, reducing waste, and transitioning to a circular economy (Nations, 2023). By encouraging individuals to recognize the limits of natural resources, reject exemptionalist attitudes, and acknowledge the possibility of an ecological crisis, environmental beliefs drive behavioral shifts critical to achieving these goals.

The New Environmental Paradigm (NEP), introduced by Dunlap and Van Liere (1978) and Dunlap et al. (2000), provides a comprehensive framework for assessing pro-environmental worldviews. This scale encompasses five dimensions: *Reality of limits to growth, Anti-anthropocentrism, Fragility of nature's balance, Rejection of exemptionalism, and Possibility of an eco-crisis,* all of which directly align with the principles of SDG12. For instance, recognizing ecological limits encourages responsible consumption, while valuing biodiversity promotes sustainable resource management and the preservation of ecosystems.

From the perspective of the Theory of Planned Behavior (TPB) (Ajzen, 1991), environmental beliefs strongly influence attitudes toward green purchasing. Attitudes, as a core component of TPB, refer to individuals' evaluations of behaviors as favorable or unfavorable (Ajzen, 1991). Positive environmental beliefs enhance pro-environmental attitudes by fostering a sense of responsibility and urgency toward mitigating environmental harm (Ajzen, 1991; Corral Verdugo, 2012). For instance, consumers who recognize the fragility of ecosystems and the urgency of addressing ecological crises are more likely to perceive green purchasing behaviors as beneficial and necessary. Research by Xiao and Dunlap (2007) demonstrated that individuals with higher NEP scores tend to exhibit stronger pro-environmental attitudes, which in turn drive behaviors such as recycling, energy conservation, and purchasing environmentally friendly products. These actions contribute directly to reducing environmental impact and supporting the sustainable production and consumption patterns outlined in SDG12.

2.1.2. Green Purchase Intention

Green purchase intention (GPI) represents the likelihood of consumers selecting environmentally friendly products, constituting a critical construct for understanding sustainable consumption behaviors aligned with SDG12's emphasis on sustainable consumption and production patterns. By

promoting eco-friendly purchasing decisions, GPI contributes to environmental impact reduction, waste minimization, and circular economy development.

The Theory of Planned Behavior (TPB) provides a robust theoretical foundation for understanding GPI determinants. Key factors influencing GPI include environmental awareness (Mostafa, 2007; Joshi & Rahman, 2015), attitudes towards green products (Ajzen, 1980), perceived consumer effectiveness (Roberts, 1996; Vermeir & Verbeke, 2006), and personal norms (Schultz, 2001). These factors reflect TPB's core components—attitudes, subjective norms, and perceived behavioral control—which collectively shape behavioral intentions. Environmental awareness enhances GPI by increasing consumer knowledge of ecological benefits, while personal norms encourage value-aligned consumption behaviors.

Social norms, defined within TPB as perceived social pressure to perform specific behaviors (Ajzen, 1991), significantly influence GPI by creating obligation or approval expectations regarding sustainable consumption. Research demonstrates that social norms within communities and peer groups critically foster pro-environmental behaviors, including green purchasing (Ates, 2020; Fatoki, 2023). When sustainable behaviors achieve social desirability, conformity pressures enhance GPI.

Perceived behavioral control (PBC) represents individuals' perceptions of their capacity to execute given behaviors. Within green purchasing contexts, PBC reflects ease or difficulty consumers associate with acquiring eco-friendly products, influenced by availability, affordability, and knowledge. Studies indicate that higher PBC correlates with stronger GPI (Pham et al., 2024; Shang et al., 2024), as minimized barriers empower consumer action. Accessible eco-labels and transparent sustainability information enhance PBC, facilitating greener choices.

Empirical evidence consistently demonstrates these relationships. Greater environmental awareness significantly predicts GPI (Joshi & Rahman, 2015), while strong personal norms toward environmental protection elevate green purchase intentions (van der Werff et al., 2013). Understanding GPI determinants enables policymakers and marketers to design targeted interventions promoting green consumerism, thereby advancing SDG12's long-term sustainability objectives.

2.1.3. Linking Environmental Beliefs to Green Purchase Intention

Research shows that environmental beliefs significantly influence GPI. According to the TPB, environmental beliefs shape attitudes toward green purchasing, which in turn influence consumer intention to buy eco-friendly products. Datta (2011) found that consumers with strong environmental concerns were more likely to buy eco-friendly products (Heo & Muralidharan, 2019). Similarly, Heo and Muralidharan (2019) confirmed that environmental knowledge and concern predicted the intention to purchase green products.

The NEP scale, which measures pro-environmental worldviews, further illustrates this connection. Higher NEP scores are associated with stronger green purchase intentions, as individuals with greater environmental awareness are more likely to engage in sustainable consumption behaviors

(Dunlap et al., 2000). These behaviors align closely with SDG12 by promoting reduced environmental impact and encouraging sustainable production practices.

Moreover, Stern (2000) integrated theory, which combines elements of TPB and NEP, highlights that environmental beliefs, attitudes, and personal norms collectively influence green purchasing behaviors. Empirical studies across different cultural contexts support this link. For example, Chan and Lau (2000) (Ahmed et al., 2021) found that environmental concern predicted green purchase intentions in China, while Kim and Choi (2005) identified a similar relationship in Korea. Such findings emphasize the universal importance of environmental beliefs in driving green consumerism, which is a cornerstone of achieving SDG12.

2.2. Personal Traits as moderators

Personal traits are crucial in moderating the relationship between environmental beliefs and GPI. Understanding these traits can provide deeper insights into how individuals process environmental information and make purchasing decisions. Rational and experiential thinking (measured by the Rational-Experiential Inventory) and ethical ideologies (measured by the Ethics Position Questionnaire) are two important traits in the context of this study.

2.2.1. Rational-Experiential Inventory (REI)

The Rational-Experiential Inventory (REI) is a dual-process model developed by Epstein et al. (1996) to measure individuals' cognitive processing styles. It comprises two primary dimensions: the *Rational System*, which emphasizes logical and analytical thinking, and the *Experiential System*, which is intuitive and emotion-based. These cognitive styles influence how individuals process information, form judgments, and make decisions (Calder et al., 2012; Wachowicz et al., 2023).

The REI framework is particularly relevant in understanding green purchase intention (GPI), as rational thinking enables consumers to evaluate product attributes, such as energy efficiency and environmental certifications, while experiential thinking drives emotional connections to sustainability values (Houde, 2018). These dual processes align with the goals of SDG12 by highlighting the need for both informed decision-making and emotional engagement in promoting sustainable consumption patterns (White et al., 2019; Ran et al., 2022).

For example, individuals with a strong rational orientation may prioritize eco-labels and lifecycle analyses when purchasing products, while those with an experiential orientation may be influenced by marketing campaigns that evoke emotional appeals about environmental protection. Research by Wang et al. (2014) found that integrating both rational and experiential appeals in marketing strategies significantly enhances consumers' green purchase intentions.

2.2.2. Ethics Position Questionnaire (EPQ)

The Ethics Position Questionnaire (EPQ), developed by Forsyth (1980), measures individuals' ethical ideologies along two dimensions: Idealism and Relativism. Idealism reflects the belief that ethical decisions should always lead to positive outcomes for all involved, while relativism

emphasizes that moral actions depend on the context and situational factors. These dimensions shape how individuals evaluate ethical dilemmas and make decisions.

EPQ is particularly relevant in the context of green purchase intention (GPI), as consumers' ethical ideologies influence their choices of environmentally friendly products (Maxwell-Smith et al., 2018). For instance, individuals with high idealism are more likely to prioritize sustainability and choose products with minimal environmental impact, as they believe in avoiding harm to others, including future generations (Vitell et al., 2005; Bodur et al., 2015; Ogiemwonyi & Jan, 2023). This aligns with SDG12, which emphasizes reducing waste and promoting sustainable production and consumption patterns.

On the other hand, relativistic consumers may approach green purchasing more flexibly, considering affordability, convenience, and product availability (Cornwell et al., 2005). These varying ethical ideologies highlight the need for tailored marketing strategies to promote sustainable behaviors across diverse consumer segments. Research by Tian et al. (2022) found that eco-labels and corporate sustainability practices influenced more idealistic consumers, while relativistic consumers responded better to price and quality incentives (Tian et al., 2022).

By understanding the role of ethical ideologies in shaping GPI, policymakers and businesses can design interventions that resonate with consumers' values and priorities, thereby contributing to the broader goals of SDG12.

2.3.3. Integrating personal traits with environmental beliefs and green purchase intention

Personal traits measured by the REI and EPQ scales measure personal traits significantly moderate the relationship between environmental beliefs and green purchase intention (GPI). Rational thinkers with strong environmental beliefs respond to detailed product information, leading to higher GPI (Epstein et al., 1996), while experiential thinkers are influenced by emotional marketing emphasizing green consumption (Pacini & Epstein, 1999; Wang et al., 2014). Idealistic individuals prioritize green products due to ethical commitments (Vitell et al., 2005; Bodur et al., 2015; Ogiemwonyi & Jan, 2023), whereas relativistic individuals consider environmental benefits alongside other personal factors (Forsyth, 1980; Tian et al., 2022). In summary, REI and EPQ traits are critical in moderating the relationship between environmental beliefs and GPI. More research is needed to understand these relationships fully. Understanding these traits can help marketers and policymakers target different consumer segments effectively and promote sustainable consumption behaviors.

Based on the literature review and the mentioned references through the previous subsections, the objectives of the current study can be achieved through testing the following hypotheses:

H1a_REI: *Rational and experiential are personal traits that will positively moderate the relationship between environmental beliefs and GPI.*
H1b_EPQ: *Idealism and relativism are personal traits that will positively moderate the relationship between environmental beliefs and GPI.*

2.3. Demographic factors as moderators

Demographic factors, such as gender, age, income, occupation, and education level, also significantly influence GPI. Numerous studies have explored how these factors affect environmental beliefs and behaviors.

Gender differences in environmental concern and behavior have been well-documented. According to Zelezny et al. (2000) , women generally exhibit higher environmental concerns than men. This heightened concern often translates into a stronger intention to purchase green products. Similarly, the notion that women are more likely to engage in pro-environmental behaviors (Diamantopoulos et al., 2003; Tindall et al., 2003).

Age is another critical factor influencing GPI. Younger individuals tend to be more environmentally conscious and willing to adopt sustainable behaviors (Pinho & Gomes, 2024). However, older individuals may also demonstrate strong environmental beliefs, often influenced by life experiences and generational values.

Income and Occupation significantly impact green purchasing behavior, with higher-income individuals having greater financial flexibility to choose green products, which are often more expensive (Cassin et al., 2021). Additionally, occupations closely related to environmental fields may foster stronger environmental beliefs and behaviors (Schultz, 2001; Wilkinson et al., 2013).

Education level is consistently linked to environmental concern and behavior. Higher education levels are associated with greater awareness and knowledge about environmental issues, which can enhance green purchase intention (Tilikidou, 2007; Siyal et al., 2021). Educated consumers are more likely to understand the long-term benefits of sustainable practices and are thus more inclined to support green products.

Previous research indicates that gender, age, income, occupation, and education level can influence environmental beliefs and GPI. This study aims to evaluate how these demographic factors moderate the relationship between environmental beliefs and GPI, addressing a gap in the literature. We propose the following hypotheses:

H2a_Gender: *Gender will positively moderate the relationship between environmental beliefs and GPI.*

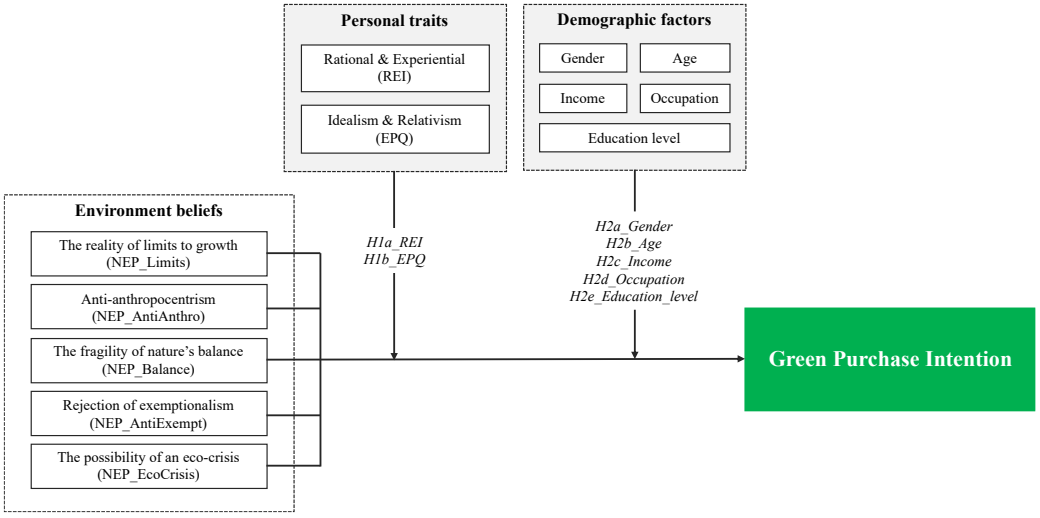
H2b_Age: *Age will positively moderate the relationship between environmental beliefs and GPI.*

H2c_Income: *Income will positively moderate the relationship between environmental beliefs and GPI.*

H2d_Occupation: *Occupation will positively moderate the relationship between environmental beliefs and GPI.*

H2e_Education_level: *Education level will positively moderate the relationship between environmental beliefs and GPI.*

Figure 1: The conceptual model



3. METHODOLOGY

3.1. Measures

We selected many scales from different studies to measure the variables in the research model. Specifically, environmental beliefs with 15 items measuring its 5 components from Dunlap and Van Liere (1978) and Dunlap et al. (2000), we slightly adjusted some items to ensure they fit the context of this study, an example of which is "Natural resources are limited, and we need to protect them". The 3 items to measure GPI were adapted from Wang et al. (2024) with a slightly modified, an example of which is " I prefer to purchase products with eco-friendly packaging". Personal traits moderator variables with two components: Rational-Experiential Inventory (REI) with 4 items were modified based on (Pacini & Epstein, 1999; Wang et al., 2014), an example of which is "I prefer to rely on my logical reasoning when making decisions"; Ethics Position Questionnaire (EPQ) with 4 items were modified based on (Forsyth, 1980; Brady & Wheeler, 1996), an example of which is " It is always wrong to lie to others". Demographic factors were adapted from Wang et al. (2024).

3.2. Data collection

3.2.1. Instrument building

Our measurement items were originally developed in English and translated into Vietnamese using a forward-and-backward translation method to ensure accuracy and consistency. A panel of five senior researchers reviewed the translations for cultural relevance and clarity. No items were

removed or modified following the pre-survey (pilot research). The pre-survey was conducted with 50 participants to ensure the clarity, reliability, and validity of the questionnaire. Feedback from participants indicated that all items were comprehensible and relevant to the research objectives. Therefore, the full set of 26 items was retained for the main survey without any changes.

The questionnaire has two parts: Part 1 collects demographic information, and Part 2 includes 26 items measuring the research variables on a 7-point Likert scale. Participants are instructed to answer all questions based on their circumstances to avoid bias, and the survey is anonymous, targeting Vietnamese residents in Northern Vietnam.

3.2.2. Sample selection and data collection

To select the sample, we utilized a non-random method, specifically convenience sampling, with two primary criteria (Smith, 1983). Convenience sampling was chosen due to its practicality and efficiency in accessing participants who met the study's criteria within a limited timeframe and budget. First, respondents had to be Vietnamese and have never purchased green products. A screening question was included in the email to filter out those who did not meet this criterion. The questionnaire emails were sent in January 2024 to 500 potential respondents from the authors' network in Vietnam. A follow-up email in early March 2024 reinforced the survey invitation. We received 393 valid responses, resulting in a 78.6% response rate, which exceeds the 15% rate recommended by Hair (2009).

Non-response bias was assessed by comparing early respondents (January; $n_1 = 232$) and late respondents (March; $n_2 = 161$) using Levene's test for equality of variances and a t-test for equality of means (Armstrong & Overton, 1977). Results showed no significant differences in means and variances between the groups. Additionally, Harman's single-factor test via exploratory factor analysis was conducted to check for common method bias (Fuller et al., 2016; Tran & Huang, 2022). The first factor accounted for 37.12% of the total variance, less than the 50% threshold indicating common method bias (Podsakoff et al., 2003). This suggests that common method bias is not a concern. Regarding respondent demographics, 49.9% were male, and 50.1% were female. The majority (65.6%) were aged between 35-54 years. Only 13.2% had a high school education level. Occupation-wise, the largest group was staff (32.1%), and the smallest was retired individuals (9.2%).

Table 1. Sample characteristics (n=393)

	Frequency	Percent		Frequency	Percent
Gender			**Age_Group**		
Male	196	49.9	18-24	24	6.1
Female	197	50.1	25-34	55	14
Education_level			35-44	151	38.4
High school diploma or less	52	13.2	45-54	107	27.2
College or associate degree	85	21.6	55 and above	56	14.2
Undergraduate degree	139	35.4	**Occupation**		
Postgraduate degree	117	29.8	Student	29	7.4
Income			Staff	126	32.1
$350	111	28.2	Manager	123	31.3
$351-$700	119	30.3	Housewife	79	20.1
Over $700	163	41.5	Retired	36	9.2

3.3. Data analysis

3.3.1. Validity and reliability of constructs

The first exploratory factor analysis (EFA) conducted personal traits (see Table 2). The Kaiser-Meyer-Olkin (KMO) value was 0.854, indicating adequate sampling and Bartlett's test of sphericity was significant (Bartlett, 1951; Shrestha, 2021) ($\chi^2 = 1911.345$, df = 28, $p < 0.001$), confirming the factoriality of the data (Tabachnick et al., 2013). Two principal components with eigenvalues greater than 1 were identified, explaining 76% of the total variance. The first component accounts for 50.002% and the second for 25.998%. Varimax rotation of the component matrix revealed high factor loadings (0.792 to 0.900), confirming strong construct validity. Communalities ranged from 0.671 to 0.831, indicating significant variance explanation by factors. Cronbach alpha values were 0.918 for the REI and 0.867 for the EPQ, demonstrating high internal consistency and reliability (Meyers et al., 2016). These findings confirm the robustness and reliability of the measured constructs.

Table 2. EFA to validate elements of Personal traits

Constructs	Item	Mean	Std. Dev.	Factor loading	
				1	2
Rational-experiential inventory (REI)	Experiential2	4.11	1.617	0.9	
	Rational2	4.09	1.685	0.888	
	Experiential1	4.04	1.642	0.878	
	Rational1	4.03	1.645	0.872	
Ethics position questionnaire (EPQ)	Idealism2	4.42	1.731		0.851
	Relativism2	4.44	1.74		0.851
	Relativism1	4.5	1.748		0.842
	Idealism1	4.44	1.727		0.792
Extraction sums of squared loadings				4	2.08
% of variance				50.002	25.998
Rotation Sums of Squared Loadings				3.213	2.867
% of variance				40.163	35.837
Cronbach's alpha				0.918	0.867
KMO measure of sampling adequacy				0.854	
Bartlett's test of sphericity (χ^2/df)				1911.345/28**	

Note: Extraction Method: Principal Component, Rotation Method: Varimax with Kaiser Normalization, ***, **, * are p-value at 0.01, 0.05, and 0.1 respectively.

Based on the second EFA results for the factors (EcoCrisis, Balance, AntiAnthro, AntiExempt, Limits, and GPI), several important conclusions can be drawn. The KMO value is 0.793, indicating that the sample data is sufficiently adequate for factor analysis (Bartlett, 1951; Shrestha, 2021). Bartlett's Test of Sphericity shows a Chi-Square value of approximately 4245.045 with a degree of freedom (df) of 153 and a significance level (Sig.) < 0.001, demonstrating that the variables have significant correlations suitable for factor analysis (Tabachnick et al., 2013).

The extraction method used is Principal Component Analysis (PCA) with the Kaiser criterion and Varimax rotation with Kaiser Normalization. A total of 6 factors were extracted, explaining 27.701%, 13.419%, 11.486%, 11.157%, 9.663%, and 8.185% of the total variance respectively, cumulatively accounting for 81.611% of the variance explained by these factors. All of the factor loadings of the 6 constructs are greater than 0.6, with no load factors outside of its construct (Hair, 2009). Each factor has representative variables with high loadings, indicating strong correlations and good representation for each specific factor. Composite Reliability (CR) values >0.7 are appropriate thresholds (Henseler & Sarstedt, 2013). Average Variance Extracted index AVE (Average Variance Extracted) >0.5, the scale achieves convergent validity (Fornell & Larcker, 1981) (see Table 3).

Table 3. EFA to validate elements of Environmental beliefs and Green purchase intention

Constructs	Items	CR	AVE	Factor loading					
				1	2	3	4	5	6
Possibility of an eco-crisis	EcoCrisis3	0.909	0.77	0.892					
	EcoCrisis1			0.889					
	EcoCrisis2			0.845					
Fragility of nature's balance	Balance1	0.899	0.748		0.906				
	Balance3				0.884				
	Balance2				0.883				
Anti-anthro_pocentrism	AntiAnthro3	0.897	0.744			0.899			
	AntiAnthro1					0.881			
	AntiAnthro2					0.874			
Rejection of exemp_tionalism	AntiExempt1	0.879	0.707				0.885		
	AntiExempt2						0.876		
	AntiExempt3						0.857		
Green purchase intention	GPI3	0.868	0.687					0.898	
	GPI2							0.883	
	GPI1							0.883	
Reality of limits to growth	Limits3	0.858	0.67						0.887
	Limits2								0.885
	Limits1								0.838
Extraction sums of squared loadings				4.986	2.415	2.067	2.008	1.739	1.473
% of variance				27.701	13.419	11.486	11.157	9.663	8.185
Rotation Sums of Squared Loadings				2.513	2.508	2.498	2.436	2.379	2.356
% of variance				13.964	13.933	13.875	13.534	13.218	13.086
Cronbach's alpha				0.908	0.898	0.895	0.878	0.868	0.857
KMO measure of sampling adequacy				0.793					
Bartlett's test of sphericity (χ^2/df)				4245.045/153***					

Note: Extraction Method: Principal Component, Rotation Method: Varimax with Kaiser Normalization,
***, **, * are p-value at 0.01, 0.05, and 0.1, respectively.

3.3.2. Structural model

We conducted a regression analysis to test the impact weights of the components of environmental beliefs (Reality of limits to growth, Anti-anthropocentrism, Fragility of nature's balance, Rejection of exemptionalism, Possibility of an eco-crisis). Table 4 shows that "Possibility of an eco-crisis" has the highest level of influence ($\hat{\beta}$= 0.332, corresponding to 33.2%), and the lowest is Anti-anthropocentrism ($\hat{\beta}$= 0.209, corresponding to 20.9%). Thus, all data conditions and model structures that must be checked have been guaranteed. The next step will be to test the research hypotheses.

Table 4. The impact weights of Environmental beliefs on GPI

Environmental beliefs	Mean	SD*	$\hat{\beta}$	Sig.	CI* on .05 level	VIF
Reality of limits to growth	3.712	1.478	0.245	0.001	0.199 ≤ 0.341	1.083
Anti-anthropocentrism	3.760	1.686	0.209	0.001	0.136 ≤ 0.267	1.197
Fragility of nature's balance	3.740	1.521	0.212	0.001	0.155 ≤ 0.299	1.169
Rejection of exemptionalism	3.741	1.596	0.22	0.001	0.154 ≤ 0.293	1.195
Possibility of an eco-crisis	3.949	1.612	0.332	0.001	0.262 ≤ 0.409	1.369

Note: SD*: Standard Deviation, CI*: Confidence Interval

4. RESULT AND DISCUSSION

4.1. The result of the hypotheses test

We used Moderated Regression Analysis (MRA) in SPSS to examine whether the moderator variables Rational & experiential (REI) and Ideology & relativism (EPQ) influence the effect of environmental beliefs on GPI (see Tables 5 and Table 6).

H1a_REI: The results of the MRA provide strong support for this hypothesis. The interaction term between rational and experiential traits and environmental beliefs is significant (β = 0.179, p = 0.010), indicating that these personal traits positively moderate the relationship between environmental beliefs and GPI. This suggests that individuals with higher rational or experiential thinking styles are more likely to translate their environmental beliefs into GPI. However, rational and experiential traits' direct effect on GPI was insignificant, highlighting the importance of the interaction between rational and experiential traits and environmental beliefs in influencing GPI.

Table 5. H1a_REI

Variables	Model 1		Model 2		Model 3	
	β	Sig.	β	Sig.	β	Sig.
Environment beliefs (NEP)	0.866	***	0.866	***	0.850	***
Rational & Experiential (REI)			-0.001	0.989	-0.002	0.973
Interation_REI_x_NEP					0.179	0.010
F-value	0.001		0.989		0.010	
R	0.541		0.541		0.552	
R^2	0.293		0.293		0.305	
Change in R^2	0.293		0.000		0.012	

Notes: ***, **, * are p-value at 0.01, 0.05, and 0.1 respectively.

H1b_EPQ: The MRA shows that the interaction between idealism and relativism traits and environmental beliefs is marginally significant (β = 0.116, p = 0.073). This suggests a potential positive moderating effect on the relationship between environmental beliefs and GPI, though the evidence is weaker compared to the interaction with rational and experiential traits. The direct effect of idealism and relativism traits on GPI was insignificant, indicating a more complex moderating role that may need further investigation.

Table 6. H1b_EPQ

Variables	Model 1		Model 2		Model 3	
	β	Sig.	β	Sig.	β	Sig.
Environment beliefs (NEP)	0.866	***	0.866	***	0.846	***
Idealism & Relativism (EPQ)			-0.030	0.521	-0.018	0.705
Interation_EPQ_x_NEP					0.116	0.073
F-value	0.001		0.521		0.073	
R	0.541		0.542		0.547	
R^2	0.293		0.294		0.299	
Change in R^2	0.293		0.001		0.006	

Notes: ***, **, * are p-value at 0.01, 0.05, and 0.1 respectively.

H2a_Gender: ANOVA analysis reveals a significant influence of gender on GPI, with females demonstrating a higher mean GPI than males. The effect size, represented by Eta-squared (0.035), indicates that gender accounts for a modest portion of the variability in GPI. This finding supports hypothesis H2a_Gender, suggesting that gender moderates the relationship between environmental beliefs and GPI, with women showing a greater inclination toward purchasing green products.

Table 8. Hypotheses results

Hypotheses	Statistic measure	F	Sig.	Eta-squared	Test Results
H1a_REI:	MRA		**		Supported
H1b_EPQ:	MRA		0.073		Not Supported
H2a_Gender	ANOVA	14.161	***	0.035	Supported
H2b_Age	ANOVA	6.922	***	0.067	Supported
H2c_Income	ANOVA	1.150	0.318	0.006	Not supported
H2d_Occupation	ANOVA	3.058	0.017	0.031	Supported
H2e_Educarion_level	ANOVA	3.477	0.016	0.026	Supported

Notes: ***, **, * are p-value at 0.01, 0.05, and 0.1 respectively

H2b_Age: The ANOVA results highlight a significant effect of age on GPI, with the 25- 34-year-old age group displaying the highest mean GPI. The effect size, denoted by Eta-squared (0.067), implies that age accounts for a moderate proportion of the variance in GPI. This supports hypothesis H2b_Age, indicating that younger consumers, particularly those aged 25-34, are more likely to exhibit higher GPI, thereby moderating the relationship between environmental beliefs and GPI.

H2c_Income: There is no significant impact of income on GPI ($F = 1.150$, $p = 0.318$). The effect size (Eta-squared = 0.006) suggests that income explains only a minimal portion of the variance in GPI. Consequently, Hypothesis H2c_Income is not supported, indicating that income does not significantly moderate the relationship between environmental beliefs and GPI among the surveyed consumers.

H2d_Occupation: ANOVA results demonstrate a significant effect of occupation on GPI ($F = 3.058$, $p = 0.017$). The effect size (Eta-squared = 0.031) indicates that occupation accounts for a modest portion of the variance in GPI. This supports hypothesis H2d_Occupation, suggesting that occupation moderates the relationship between environmental beliefs and GPI, with students and staff exhibiting higher green purchase intentions than other occupational groups.

H2e_Education_level: The ANOVA results indicate a significant effect of education level on GPI ($F = 3.477$, $p = 0.016$). The effect size (Eta-squared = 0.026) suggests that education level accounts for a modest portion of the variance in GPI. Therefore, hypothesis H2e_Education_level is supported, indicating that education level moderates the relationship between environmental beliefs and GPI. Individuals with a high school diploma or less and those with a postgraduate degree exhibit higher GPI than those with some college or an undergraduate degree.

4.2. Discussion

4.2.1. Personal traits moderator

The analysis of hypothesis H1a_REI demonstrates that rational and experiential traits significantly moderate the relationship between environmental beliefs and GPI. The significant interaction term indicates that individuals with elevated levels of rational or experiential thinking exhibit stronger associations between environmental beliefs and purchasing intentions. Rational thinkers appear more responsive to factual information and logical arguments regarding green product benefits, whereas experiential thinkers demonstrate greater responsiveness to emotional appeals and personal environmental narratives. These findings align with Wang et al. (2014), who documented stronger GPI among experiential thinkers exposed to emotionally engaging environmental messages, and Osburg et al. (2020), who identified rational thinkers' preference for detailed, evidence-based information in sustainable product decision-making. The significant moderating effect of REI underscores the necessity of cognitive-style-tailored environmental campaigns.

Hypothesis H1b_EPQ, proposing that ethical ideologies (idealism and relativism) positively moderate the environmental beliefs-GPI relationship, yielded marginally significant results, suggesting nuanced roles for ethical considerations. This finding indicates that while ethical dimensions influence GPI, their impact remains less pronounced than cognitive processing styles. The results corroborate Vitell et al. (2005), who established that idealistic individuals demonstrate higher propensity for socially responsible consumption, and Brady and Wheeler (1996), who documented ethical ideologies' predictive capacity for environmentally friendly product attitudes. The marginal significance suggests that cultural norms, perceived product effectiveness, and social influences may mediate ethical ideologies' moderating role.

4.2.2. Demographic factors moderator

Demographic variables demonstrate significant moderating effects on the environmental beliefs-GPI relationship. Gender moderates this relationship significantly, with females exhibiting elevated GPI, consistent with established literature documenting women's stronger pro-environmental attitudes and eco-friendly behavioral engagement (Zelezny et al., 2000). This gender differential reflects socialization processes fostering nurturing orientations and environmental sustainability concerns among women.

Age functions as a significant moderator, with younger consumers (25-34) displaying higher green purchase intentions, aligning with Pinho and Gomes (2024). This pattern reflects younger generations' enhanced exposure to environmental education and climate change discourse.

Occupation significantly moderates the relationship, with students and staff demonstrating elevated GPI compared to other occupational categories, consistent with research indicating heightened environmental awareness in educational and public service sectors (Schultz, 2001; Wilkinson et al., 2013).

Education level moderates the relationship significantly, with both lower-educated (high school or less) and highly educated (postgraduate) consumers showing elevated GPI. This bimodal distribution potentially reflects divergent motivations: higher education correlates with enhanced environmental awareness (Tilikidou, 2007; Siyal et al., 2021), while lower educational attainment may prioritize cost-saving benefits or community sustainability norms.

5. CONCLUSION

5.1. Conclusion

This study examines how personal traits and demographic factors moderate the relationship between environmental beliefs and green purchase intention (GPI) among consumers in Northern Vietnam. The findings indicate that cognitive styles significantly influence this relationship, with rational thinkers responding to evidence-based information and experiential thinkers to emotional appeals (H1a_REI), consistent with Wang et al. (2014). Ethical ideologies demonstrate marginally significant effects, wherein idealists prioritize sustainability principles while relativists exhibit context-dependent decision-making (H1b_EPQ), aligning with Vitell et al. (2005).

Demographic factors function as critical moderators. Gender demonstrates significant moderating effects, with females exhibiting higher GPI, corroborating established research on women's pro-environmental attitudes and behaviors (Zelezny et al., 2000; Diamantopoulos et al., 2003; Tindall et al., 2003). Age moderates the relationship significantly, with younger consumers (25-34) displaying elevated GPI (Pinho & Gomes, 2024). Occupation influences GPI substantially, particularly among students and public service employees (Schultz, 2001; Wilkinson et al., 2013). Educational attainment moderates GPI, with postgraduate degree holders demonstrating heightened environmental purchasing behaviors (Tilikidou, 2007; Siyal et al., 2021).

5.2. Implications

5.2.1. Theoretical implications

This research confirms the positive association between environmental beliefs and GPI while advancing understanding of moderating mechanisms. The findings demonstrate that ethical ideologies, particularly idealism and relativism, substantially shape GPI in alignment with SDG12 objectives. High-idealism individuals prioritize eco-friendly products despite cost premiums, whereas high-relativism consumers demonstrate contextual flexibility in purchasing decisions. Demographic variables—gender, age, occupation, and education—emerge as significant moderators, enriching theoretical understanding of how socio-economic and educational backgrounds influence environmental behaviors.

5.2.2. Practical Implications

These findings inform targeted interventions for marketers and policymakers. Marketing strategies should differentiate between rational thinkers (emphasizing factual benefits) and experiential thinkers (employing emotional narratives). Gender-specific campaigns targeting women should emphasize nurturing dimensions of sustainability. Age-specific strategies should leverage digital platforms for younger demographics (25-34). Occupation-targeted approaches should address students and public service workers through institutional channels. Education-stratified campaigns should emphasize cost savings for lower-education segments and ethical commitment for highly educated consumers. Policymakers should implement educational programs, incentives for green purchases, and community-based initiatives to promote sustainable consumption patterns.

6. LIMITATIONS AND FUTURE RESEARCH

This study has several limitations. First, the sample is limited to consumers in Northern Vietnam, which may not represent the entire Vietnamese population or other regions with different contexts. Future research should include a broader geographic scope to enhance generalizability. Second, the study relies on self-reported survey data, which may be biased due to social desirability. Future studies should use more objective measures, such as actual purchasing data or longitudinal studies, to validate the findings. Third, the study focuses on personal traits and demographic factors as moderators. Other potential moderators were not explored, such as cultural values and social norms. Future research should include these variables for a more comprehensive understanding.

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