

A STUDY OF THE IMPACT OF ENVIRONMENTAL GUILT ON GREEN PURCHASE BEHAVIOR

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Abstract: With the new development pattern of dual circulation, both domestic and international, achieving internal circulation fundamentally relies on consumer-driven initiatives. Therefore, amid the backdrop of green development, promoting green consumption and driving the transformation towards green lifestyles are current pressing issues. However, despite consumers generally possessing high environmental awareness, their actual behavioral response remains low. Effectively promoting consumers' green purchasing behavior is thus a current research hotspot. Within current ecological moral development, there is a lack of exploration from the perspective of ecological moral emotions on consumers' green purchasing behavior.

To comprehensively explore the mechanisms influencing green purchasing behavior, this study expands upon the Theory of Planned Behavior by integrating moral emotions—specifically environmental guilt. The research objectives are: 1. To explore the impact of environmental cognition on green purchase intention. 2. To investigate the influence of environmental guilt on green purchase intention. 3. To study the effect of descriptive norms on green purchase intention. 4. To examine the influence of injunctive norms on green purchase intention. 5. To explore the role of self-efficacy in promoting green purchase intention. 6. To investigate the impact of controllability on green purchase intention. 7. To analyze the influence of green purchase intention on green purchase behavior. 8. To explore the mediating role of green purchase intention in the pathways of environmental cognition, environmental guilt, norms, self-efficacy, and controllability.

This study, based on the Theory of Planned Behavior, introduces environmental guilt and delineates dimensions for the variables of attitudes, subjective norms, and perceived behavioral control, comparing their utility in influencing green purchase intention. Employing quantitative research methods, the study conducts surveys via online questionnaires. The data collected is analyzed using SPSS and AMOS for descriptive statistics, normality testing, common method bias testing, reliability and validity analysis, and correlation analysis. Hypotheses are tested to derive conclusions as follows: (1) Environmental guilt exhibits a relatively weak direct positive effect on green purchase behavior. However, when green purchase behavior is influenced simultaneously by environmental guilt, self-efficacy, controllability, and green purchase intention, the coefficient of environmental guilt's effect is

the highest. (2) The impact of environmental cognition and environmental guilt on green purchase intention is comparable, while the effects of injunctive norms and self-efficacy on green purchase intention are significantly greater than those of descriptive norms and controllability. (3) Environmental cognition, environmental guilt, injunctive norms, and self-efficacy all positively influence green purchase behavior through the mediating effect of green purchase intention, albeit at varying levels of significance.

Keywords: Theory of Planned Behavior, Green Purchase Behavior, Environmental Guilt, Green Purchase Intention

Introduction

With the advancement of globalization, environmental issues such as atmospheric pollution and ecological degradation have become common challenges faced by countries worldwide. The ecosystem is used imperceptibly and difficult to maintain, so how to effectively promote low-pollution, low-emission and embark on a low-carbon development path is an important issue currently being researched by countries around the world. Since the start of China's traditional industrial development model since the reform and opening up, the domestic ecological environment has been under tremendous pressure to contribute to environmental force for high-speed economic growth. Ultimately, the solution to alleviating environmental pressure lies in optimizing production and living methods. Promoting the transition of green production methods and green living methods cannot be separated from the push of supply-side reforms and demand-side reforms, and only by jointly exerting efforts on both the supply and demand sides can the high-level balance of supply and demand be guaranteed (Zhang & Ai, 2017).

Considering China's large population base, supply-side structural reforms must focus on current-stage population supply to increase consumer demand and promote demand-side reforms. At the same time, the concept of "internal circulation" has been put forward, opening up a new development pattern of "internal and external dual circulation." The essence of internal circulation lies in the endogenous power of the economy, and its fundamental principle is consumption-driven. Consequently, it can be argued that promoting consumption is a necessary path to achieving internal circulation, and promoting green consumption is an important way to implement supply-side reforms and demand-side reforms. However, data from the 2023 "Citizen Survey on Ecological Behavior" shows that the public generally recognizes the importance of green consumption, but only about half of the respondents claim to be able to practice green consumption. Clearly, there is still considerable room for improvement in current public green consumption behavior, and it is of great significance to effectively promote consumer green purchasing behavior to mitigate ecological environmental issues.

Adam Smith in his book "The Theory of Moral Sentiments" also pointed out that sympathy and self-interest are natural to human beings, and the market mechanism based on self-interest must be coordinated by moral sentiments based on others' interests. Therefore, fostering moral sentiments in ecological construction can play a very important role in economic development, and in the current ecological construction of moral sentiments, there is little exploration from the perspective of ecological moral sentiments on consumer behavior, so it is very necessary to carry out research on how ecological moral sentiments promote positive green purchasing behavior. Guilt is one of the important social moral sentiments. Individuals often feel anxious and sad when they see the damaged ecological environment, believing that humans are to blame for it, and then feel sorry for their inaction on environmental improvement and feel a sense of debt to the environment. This sense of guilt may inhibit individuals' active responses and lead to avoidance behavior (Naito & Sakata, 2010). It may also prompt individuals to take reparative actions to mitigate this sense of debt, such as green purchasing (Cong et al., 2017).

How to correctly use individuals' sense of debt to the environment to promote the transformation of traditional consumption patterns is not only an important issue in the field of environmental behavior, but also a practical problem that urgently needs to be solved to strengthen the ecological moral sentiments of new era citizens and promote the transformation of green lifestyles. In Western countries, people advocate individualism and generally believe that a sense of debt applies only to interpersonal relationships (Greenberg, 1980), and related research also focuses on the impact of a sense of debt on prosocial behaviors.

In China, however, influenced by traditional thoughts such as Confucianism and Taoism, which emphasize the harmony between man and nature, it is believed that there is an emotional connection between humans and the environment. Considering the influence of social emotions on social culture, there are differences in the experience of emotions in different cultural backgrounds. So, in China, can the scope of guilt be expanded to include emotions towards the environment? If so, can environmental guilt affect consumer green purchasing behavior? Does environmental guilt play an indirect role, a direct role, or both in influencing consumer green purchasing behavior? In the current in-depth promotion of ecological civilization construction, using guilt as an example to explore the influence of ecological moral sentiments under the current cultural background on green purchasing behavior is of great significance for enhancing ecological moral efficiency and cultivating ecological citizens.

In existing research, there are many studies on the factors influencing green purchasing behavior, among which the Theory of Planned Behavior is the most commonly used and systematic theoretical model for studying consumer behavior. However, although the Theory of Planned Behavior model has been continuously verified for its reliability since its proposal, in some research scenarios, this theoretical model is not completely applicable. For example, some scholars pointed out that in unconventional environments, attitudes and subjective norms can directly affect consumers' willingness

to engage in green consumption behavior, while the influence of perceived behavioral control on green consumption willingness is minimal (Zhang et al., 2019).

There are many reasons for the differences in these results. One reason may be that although the same variables are used in different studies, they tend to be biased towards different dimensions during measurement, such as the formation of "attitude-behavior" gaps to some extent may be caused by conflicts between different attitude components (i.e., cognitive, emotional) (Passafaro, 2020). Therefore, although the Theory of Planned Behavior has strong explanatory power, there are few empirical studies in the existing literature on the division of dimensions of antecedent variables in the Theory of Planned Behavior model and the conceptual model after dimension division.

Therefore, this study explores consumer green purchasing behavior from a moral emotions perspective, and comprehensively investigates the mechanisms influencing green purchasing behavior based on the Theory of Planned Behavior. This research is of significant importance in promoting individuals' active engagement in green consumption and supplements the study of ecological moral emotions.

Research Objectives

- 1) To explore the impact of environmental cognition on green purchase intention.
- 2) To investigate the influence of environmental guilt on green purchase intention.
- 3) To study the effect of descriptive norms on green purchase intention.
- 4) To examine the influence of injunctive norms on green purchase intention.
- 5) To explore the role of self-efficacy in promoting green purchase intention.
- 6) To investigate the impact of controllability on green purchase intention.
- 7) To analyze the influence of green purchase intention on green purchase behavior.
- 8) To explore the mediating role of green purchase intention in the pathways of environmental cognition, environmental guilt, norms, self-efficacy, and controllability.

Literature Review

Environmental Guilt

Guilt is an important social moral emotion in interpersonal communication (Algoe et al., 2013), with a relationship similar to but different from guilt and shame. Shi Chengsun and Qian Mingyi (1999) believe that guilt, guilt, and shame are highly socialized negative emotional experiences. Wang Yaru and Zhang Li (2020) further explored and found that the causes and focuses of these three emotions are significantly different. Guilt is a negative self-judgmental feeling triggered by social factors when people realize they have done something wrong, and this feeling can be amplified (Collins, 2021). Shame refers to a painful self-examination and negative evaluation of the entire self, making individuals

feel small, powerless, and prone to shrink back. Guilt is an individual's feeling about their behavior, while shame is a feeling about the self. In guilt, the individual's self-image remains intact, whereas in shame, the self-image is impaired (Mkono & Hughes, 2020). Compared to guilt, which is a private psychological activity, shame includes a sense of exposure, making individuals inclined to hide themselves (Han et al., 2021). Compared to shame, guilt is more similar to guilt, as guilt arises more from receiving help or benefits without immediate reciprocation. Existing research pays little attention to guilt. Guilt arises from the absence of reciprocal behavior, which in previous studies has been limited to interpersonal interactions.

Guilt is often studied alongside gratitude and is considered a different variable corresponding to gratitude. Gratitude is a pleasant emotion, while guilt is associated with a certain unease (Mpinganjira, 2018). According to the rule of reciprocity in social interactions, Gouldner (1960) believes that individuals have an obligation to repay the favors they receive beyond the norms of reciprocity. Based on this, Peng et al. (2017) and Liu et al. (2018) suggest that guilt arises along with gratitude after receiving benefits but is a distinct negative emotion. The definition of guilt has not been unified. Greenberg (1980) defines guilt as the perceived obligation or responsibility to repay others, with a motivational characteristic. McCullough et al. (2008) consider guilt a unique emotional state of obligatory repayment to others. Xiong et al. (2018) define guilt as an emotional experience autonomously generated by individuals under the constraint of their moral standards. According to social exchange theory, guilt arises mainly under the rule of reciprocity in social interactions.

Green Purchase Behavior

Green purchasing behavior is a behavior beneficial to the ecological environment, and related concepts include green products, green consumers, and green purchase intentions. Green products refer to products produced with advanced and superior technology that cause as little pollution, harm, and energy consumption to the ecological environment as possible, meeting the requirements of environmental protection (Liobikienė et al., 2016). Green consumers are the subjects of green consumption, referring to individuals who actively consume green products. Green purchase intention refers to the likelihood that consumers will purchase environmentally friendly products. According to the theory of planned behavior, intention is a direct influencing factor of behavior, with other influencing factors affecting behavior through the mediation of intention. In practical research, the green purchasing behavior of many products is difficult to measure, so scholars often use green purchase intention as the outcome variable when studying the influencing factors of green purchasing behavior, to explore consumers' green purchasing behavior.

Green purchasing behavior originated from the green consumer movement in the United Kingdom, which advocated purchasing products with environmental benefits and encouraged the public to actively buy products more beneficial to the environment, thereby changing consumer demand and

prompting manufacturers to shift their supply focus. Green consumption is essentially a new consumption concept compared to traditional consumption, emphasizing the protection of the ecological environment throughout the consumption process and favoring resource-saving and sustainable products. With the widespread promotion of this movement, scholars have conducted extensive research, particularly on consumers' green purchasing behavior. Green purchasing behavior meets the basic requirements of sustainable development and significantly promotes the construction of ecological civilization.

Theory of Planned Behavior

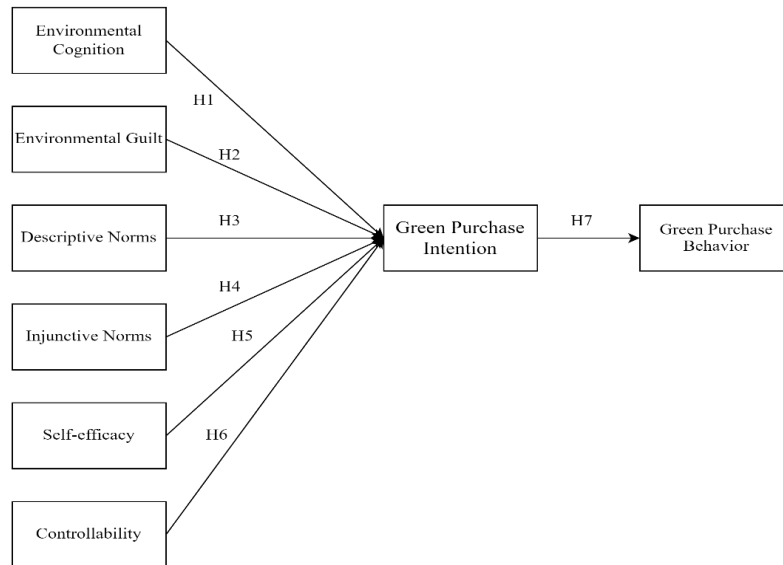
After conducting an in-depth study on the influencing factors of behavior, Ajzen et al. (1980) introduced new variables based on the Theory of Reasoned Action (TRA) to further develop the Theory of Planned Behavior (TPB). TPB takes behavioral intention as the antecedent variable of behavior and serves as a mediating variable in the influence process of attitudes, subjective norms, and perceived behavioral control on behavior. Attitude refers to the stable preference stance that an individual displays towards an object, which is a summary evaluation and view obtained through interaction with the objective object (Ajzen et al., 1980). Subjective norm refers to the degree of pressure an individual feels from the external social environment regarding whether to perform a particular behavior before making a behavioral decision (Zhao et al., 2019). Perceived behavioral control is defined as the perceived ease or difficulty of performing a particular behavior, which is an individual's judgment of their own capability (Ajzen, 1991). As one of the classic theories exploring individual behavior from a psychological perspective, TPB has been confirmed by numerous studies to successfully predict individual behavior and is widely used in academia for behavioral research. It can be said that research on expanding the TPB model has never ceased. At the same time, Ajzen (1991) also indicated that the TPB model is not a "closed loop" and needs to be tested and improved in different contexts.

In existing literature on TPB, attitudes, subjective norms, and perceived behavioral control are often studied as three separate variables. However, Ajzen posits that each TPB variable comprises two specific subcomponents (dimensions): attitude consists of affect and cognition, subjective norm includes descriptive and injunctive norms, and perceived behavioral control comprises self-efficacy and controllability. Each variable's two dimensions have been reliably differentiated in extensive research. Rhodes and Courneya (2003) noted that although multiple components (dimensions) of each TPB variable have been reliably proven, no research has studied these multiple components (dimensions) within the same model. Their utility as a single predictive concept or as multiple predictive concepts has not been compared. Instead, previous studies either focused on a particular dimension of one variable or summarized these components (dimensions) into a general variable. However, without examining the optimal components, the subcomponent model may lack the simplicity of the general factor model. Conversely, the general factor model may lack the predictive differences of

subcomponents for intentions and behavior. General factors consist of their subcomponents, and ignoring subcomponents while directly studying factors can reduce research information, leading to weaker, even biased, conclusions. In existing research, many scholars use the same factor in TPB but obtain different conclusions, possibly because the factors used were biased towards different dimensions, resulting in biased conclusions. Studying factor subcomponents can help identify core components of research problems, allowing for similar levels to be achieved at a lower cost in practical benefits. Therefore, it is necessary to study different dimensions of the same variable.

Conceptual Framework

Based on the definition of the concepts influencing green purchasing behavior—attitude, subjective norms, and perceived behavioral control—further exploration was conducted into the dimensions of these three variables. Drawing from a synthesis of previous literature, attitude was divided into cognitive and affective components, applied in this study as environmental cognition and environmental guilt. Subjective norms were bifurcated into descriptive norms and injunctive norms. Perceived behavioral control was composed of self-efficacy and controllability. Subsequently, building upon the Theory of Planned Behavior model, conceptual framework Picture 1 was developed.



Picture 1: Conceptual Framework

Research Hypothesis

- H1: Environmental cognition positively promotes green purchase intention.
- H2: Environmental guilt positively promotes green purchase intention.
- H3: Descriptive norms positively promote green purchase intention.
- H4: Injunctive norms positively promote green purchase intention.

- H5: Self-efficacy positively promotes green purchase intention.
- H6: Controllability positively promotes green purchase intention.
- H7: Green purchase intention has a significant positive impact on green purchase behavior.
- H1a: Green purchase intention mediates the relationship between environmental cognition and green purchase behavior.
- H2a: Green purchase intention mediates the relationship between environmental guilt and green purchase behavior.
- H3a: Green purchase intention mediates the relationship between descriptive norms and green purchase behavior.
- H4a: Green purchase intention mediates the relationship between injunctive norms and green purchase behavior.
- H5a: Green purchase intention mediates the relationship between self-efficacy and green purchase behavior.
- H6a: Green purchase intention mediates the relationship between controllability and green purchase behavior.

Methodology

Based on the conceptual model of this study, a quantitative research method was used to design a questionnaire survey for testing. The questionnaire consists of two parts: participants' basic personal information and variable scales. The personal information section covers gender, age, occupation, monthly income, and education level. The second part includes scales for variables such as environmental cognition, environmental guilt, descriptive norms, injunctive norms, self-efficacy, controllability, green purchase intention, and green purchase behavior. The study subjects of this study are general consumers, characterized by minimal limitations and a broad scope for investigation. Data collection was conducted using electronic questionnaires distributed via an online survey platform, ensuring the randomness of the distribution and the anonymity of the respondents. In the questionnaire design, the items for each variable were appropriately shuffled to prevent respondents from guessing the answers subjectively. A total of 578 questionnaires were collected, and following the exclusion rules established during the pre-survey phase, 459 valid questionnaires were obtained after removing invalid ones, resulting in an effective response rate of 79.4%.

Results

The data was validated using SPSS, and the results are shown in Table 1. The Cronbach's α values ranged from 0.885 to 0.927, indicating that the reliability values of all scales meet the judgment standard. This confirms that the scales used in this study have good internal consistency and stability.

The validity results, as shown in Table 1, demonstrate that the Average Variance Extracted (AVE) values for all variables are greater than 0.5, and the Composite Reliability (CR) values are greater than 0.7, proving good convergent validity for the scales. Additionally, all factor loadings are greater than 0.5, and as shown in Table 3, the square roots of AVE for all variables are greater than their respective correlation coefficients in both columns and rows, indicating good discriminant validity. Therefore, the validity of the scales used in this study is confirmed.

Table 1: Reliability and validity analysis results of the questionnaire

Variable	No.	Factor Loading (λ)	CR	AVE	Cronbach's α
Environmental Cognition	EC1	0.864	0.785	0.916	0.915
	EC2	0.896			
	EC3	0.898			
Environmental Guilt	EG1	0.907	0.782	0.915	0.913
	EG2	0.893			
	EG3	0.852			
Descriptive Norms	DN1	0.883	0.759	0.904	0.885
	DN2	0.904			
	DN3	0.824			
Injunctive Norms	IN1	0.817	0.725	0.888	0.903
	IN2	0.897			
	IN3	0.839			
Self-efficacy	SE1	0.909	0.813	0.929	0.927
	SE2	0.907			
	SE3	0.889			
Controllability	C1	0.905	0.805	0.925	0.925
	C2	0.911			
	C3	0.875			
Green Purchase Intention	GPI1	0.873	0.772	0.910	0.909
	GPI2	0.880			
	GPI3	0.882			
Green Purchase Behavior	GPB1	0.863	0.778	0.913	0.913
	GPB2	0.887			
	GPB3	0.896			

Table 2: Descriptive statistics and correlation analysis results

	EC	EG	DN	IN	SE	C	GPI	GPB
EC	0.886							
EG	0.655**	0.884						
DN	0.569**	0.564**	0.871					
IN	0.518**	0.528**	0.494**	0.852				
SE	0.583**	0.595**	0.647**	0.518**	0.902			
C	0.583**	0.543**	0.605**	0.506**	0.721**	0.897		
GPI	0.586**	0.581**	0.561**	0.533**	0.627**	0.577**	0.878	
GPB	0.580**	0.685**	0.659**	0.531**	0.677**	0.636**	0.623**	0.882

Note: **P<0.01, *P<0.05, values in parentheses on the diagonal are the square root of the variable AVE in the column where it is located

In terms of education level, nearly 60% of participants had a bachelor's degree or higher, making the collected data relatively reliable. The specific distribution of the basic information of the questionnaire participants is shown in Table 3.

Table 3: Descriptive Statistics Analysis of Valid Sample Information

Variable	Group	Number	Percentage (%)
Gender	Male	226	49.2
	Female	233	50.8
Age	18 years and under	118	25.7
	18-30 years	147	32.0
	31-40 years	87	19.0
	41-50 years	49	10.7
	Above 50 years	58	12.6
Occupation	Student	224	48.8
	Government/institution staff	39	8.5
	Teacher	32	7.0
	Enterprise manager	29	6.3
	Employee	62	13.5
	Farmer	12	2.6
	Self-employed	27	5.9
	Other	34	7.4
Monthly income	2,000 yuan or less	192	41.8
	2,001 yuan to 3,000 yuan	50	10.9
	3,001 yuan to 5,000 yuan	96	20.9
	5,001 yuan to 8,000 yuan	82	17.9
	8001 yuan and above	39	8.5
Education	Junior high school and below	41	8.9
	High school/technical secondary school	34	7.4
	College	117	25.5
	Bachelor's degree	211	46.0
	Master's degree and above	56	12.2

From Table 4, it can be seen that among the 24 items in this study's scale, none of the mean values exceed 6 or fall below 2, indicating a relatively balanced distribution of means. The standard deviations are small, ranging from 1.356 to 1.837, showing that the data fluctuations are not significant, and the degree of dispersion in the sample data is acceptable. Additionally, the absolute values of kurtosis for all items do not exceed 0.671, which is less than 1, and the absolute values of skewness do not exceed 0.876, which is also less than 1, meeting the normality distribution test standards. Therefore, the 459 data points obtained in this study conform to a normal distribution, allowing for subsequent empirical research.

In this study, the examination of common method bias was conducted using the confirmatory factor analysis method. All measurement items corresponding to the variables were placed into a single factor model and tested using AMOS. The model fit indices were as follows: $X^2/df=13.213>3$,

RMSEA=0.163>0.06, GFI=0.584<0.9, AGFI=0.505<0.9, CFI=0.688<0.9, and NFI=0.671<0.9, none of which met the standard criteria. These results indicate that the single-factor model fits the data poorly, suggesting that all items do not belong in a single factor. Therefore, this study does not suffer from severe common method bias.

Table 4: Test results of sample normality

Variable	Question item	Mean	Standard deviation	Kurtosis	Standard error of kurtosis	Skewness	Standard error of skewness
Environmental Cognition	EC1	4.77	1.741	-0.539	0.227	-0.549	0.114
	EC2	4.70	1.630	-0.350	0.227	-0.616	0.114
	EC3	4.73	1.647	-0.296	0.227	-0.697	0.114
Environmental Guilt	EI1	4.94	1.675	-0.384	0.227	-0.745	0.114
	EI2	4.84	1.631	-0.239	0.227	-0.876	0.114
	EI3	4.86	1.759	-0.518	0.227	-0.728	0.114
Descriptive Norms	DN1	4.86	1.412	0.254	0.227	-0.836	0.114
	DN2	5.07	1.655	-0.240	0.227	-0.733	0.114
	DN3	4.81	1.527	-0.162	0.227	-0.683	0.114
Injunctive Norms	IN1	4.39	1.429	-0.139	0.227	-0.343	0.114
	IN2	4.46	1.472	-0.005	0.227	-0.356	0.114
	IN3	4.53	1.356	-0.108	0.227	-0.256	0.114
Self-efficacy	SE1	4.86	1.665	-0.314	0.227	-0.710	0.114
	SE2	4.81	1.536	-0.034	0.227	-0.862	0.114
	SE3	4.83	1.707	-0.464	0.227	-0.621	0.114
Controllability	C1	4.39	1.682	-0.659	0.227	-0.401	0.114
	C2	4.44	1.691	-0.671	0.227	-0.463	0.114
	C3	4.57	1.651	-0.590	0.227	-0.395	0.114
Green Purchase Intention	GPI1	4.93	1.710	-0.521	0.227	-0.570	0.114
	GPI2	4.76	1.571	-0.114	0.227	-0.749	0.114
	GPI3	4.83	1.629	-0.266	0.227	-0.780	0.114
Green Purchase Behavior	GPB1	4.88	1.650	-0.474	0.227	-0.760	0.114
	GPB2	5.05	1.837	-0.518	0.227	-0.780	0.114
	GPB3	4.99	1.733	-0.218	0.227	-0.872	0.114

The confirmatory factor analysis (CFA) primarily relies on model fit indices. These indices can be categorized into parsimonious fit indices, absolute fit indices, and comparative fit indices. For model fit diagnostics, this study selected X^2/df , RMSEA, GFI, AGFI, NFI, and CFI. The specific criteria for these indices are shown in Table 4.3. The model was tested using AMOS, and the results are shown in Table 5. Among them, the eight-factor model had the best fit, with an X^2/df value of 1.142 (less than 3), an RMSEA value of 0.018 (less than 0.06), a GFI value of 0.955, an AGFI value of 0.940, a CFI value of 0.997, and an NFI value of 0.975, all greater than 0.9. These results indicate that the model has good fit.

Table 5: Reference standards of model fit test indexes

Goodness-of-fit	Indicator	Reference Standard
Parsimonious Fit Index	X ² /df	Chi-square to degrees of freedom ratio. X ² /df < 3 indicates good model fit, X ² /df < 5 indicates acceptable model fit.
Absolute Fit Index	RMSEA	Root Mean Square Error of Approximation. RMSEA < 0.06 indicates good fit, RMSEA < 0.08 indicates acceptable fit.
	GFI	Goodness of Fit Index. GFI > 0.9 indicates acceptable model fit, with values closer to 1 indicating better fit.
	AGFI	Adjusted Goodness of Fit Index. AGFI > 0.9 indicates acceptable model fit, with values closer to 1 indicating better fit.
Comparative Fit Index	CFI	Comparative Fit Index. CFI > 0.9 indicates acceptable model fit, with values closer to 1 indicating better fit.
	NFI	Normed Fit Index. NFI > 0.9 indicates acceptable model fit, with values closer to 1 indicating better fit.

Table 6: Results of confirmatory factor analysis

Model	X ² /df	RMSEA	GFI	AGFI	CFI	NFI
One-factor model	13.213	0.163	0.584	0.505	0.688	0.671
Two-factor model	11.459	0.151	0.621	0.547	0.734	0.716
Three-factor model	9.683	0.138	0.664	0.595	0.781	0.762
Four-factor model	8.625	0.129	0.687	0.618	0.810	0.791
Five-factor model	6.485	0.109	0.742	0.680	0.865	0.845
Six-factor model	5.337	0.097	0.774	0.714	0.896	0.875
Seven-factor model	3.278	0.071	0.849	0.804	0.947	0.925
Eight-factor model	1.142	0.018	0.955	0.940	0.997	0.975

Note: One-factor model: EC+EI+IN+DN+SE+C+GPI+GPB;
 Two-factor model: EC, EI+IN+DN+SE+C+GPI+GPB;
 Three-factor model: EC, EI, IN+DN+SE+C+GPI+GPB; Four-factor model: EC, EI, IN, DN+SE+C+GPI+GPB;
 Five-factor model: EC, EI, IN, DN, SE+C+GPI+GPB; Six-factor model: EC, EI, IN, DN, SE, C+GPI+GPB;
 Seven-factor model: EC, EI, IN, DN, SE, C, GPI + GPB; Eight-factor model: EC, EI, IN, DN, SE, C, GPI, GPB

Based on the AMOS output results, X²/df = 1.222, the chi-square to degrees of freedom ratio meets the standard of being less than 3, indicating a very good fit. RMSEA = 0.022, the Root Mean Square Error of Approximation, meets the standard of being less than 0.06, also indicating a very good fit. GFI, AGFI, CFI, and NFI all meet the standard of being greater than 0.9, indicating a very good fit. Therefore, the fit indices of the structural equation model are all within acceptable ranges, and the model testing results are reliable. The specific fit index coefficients and path coefficients are shown in Table 7 and Table 8, respectively.

Table 7: Indexes of fit degree for full model test

Goodness of Fit Indicator	X ² /df	RMSEA	GFI	AGFI	CFI	NFI
Statistical value	1.222	0.022	0.952	0.937	0.995	0.973

Table 8: Path coefficients of full model test

Path relationship	Factor	S.E.	C.R.	P
Green Purchase Intention <--- Environmental Cognition	0.176**	0.062	2.865	0.004
Green Purchase Intention <--- Environmental Guilt	0.140*	0.060	2.318	0.020
Green Purchase Intention <--- Descriptive Norms	0.096	0.072	1.551	0.121
Green Purchase Intention <--- Injunctive Norms	0.160***	0.067	3.197	0.001
Green Purchase Intention <--- Self-Efficacy	0.269***	0.070	3.774	***
Green Purchase Intention <--- Controllability	0.073	0.068	1.106	0.269
Green Purchase Behavior <--- Green Purchase Intention	0.162***	0.048	3.206	0.001

Note: ***P<0.001, **P<0.01, *P<0.05.

This study includes four mediating pathways in the research model. Using Model 4 in the PROCESS macro, each pathway was tested individually while controlling for demographic variables such as gender, age, occupation, monthly income, and education level of the respondents. To assess the indirect effects, Bootstrap resampling with 5000 iterations and a 95% confidence interval was used. Significant effects were determined if the confidence interval did not include zero. The results, as shown in Table 9, indicate that the confidence intervals for all four mediating paths do not include zero, confirming that H1a, H2a, H4a, and H5a are supported. Furthermore, Green Purchase Intention mediates 42.83%, 28.18%, 46.52%, and 30.95% of the effects of Environmental Cognition, Environmental Guilt, Injunctive Norms, and Self-Efficacy, respectively, on Green Purchase Behavior. Specifically, the mediating effect of Green Purchase Intention is highest in the path from Injunctive Norms to Green Purchase Behavior and lowest in the path from Environmental Guilt to Green Purchase Behavior.

Table 9: Mediating effect test results

Intermediary Path	Effect	Effect Value	Boot Standard Error	95.0% confidence interval		Result	Relative Mediated Effect
				Lower limit	Lower limit		
EC-GPI-GPB	Total effect	0.579	0.039	0.503	0.656	Support	42.83%
	Indirect effect	0.248	0.033	0.184	0.314		
	Direct effect	0.331	0.043	0.246	0.416		
EG-GPI-GPB	Total effect	0.685	0.035	0.617	0.753	Support	28.18%
	Indirect effect	0.193	0.034	0.131	0.260		
	Direct effect	0.492	0.039	0.415	0.569		
IN-GPI-GPB	Total effect	0.531	0.041	0.451	0.611	Support	46.52%
	Indirect effect	0.247	0.033	0.185	0.313		
	Direct effect	0.284	0.042	0.201	0.366		
SE-GPI-GPB	Total effect	0.672	0.035	0.604	0.741	Support	30.95%
	Indirect effect	0.208	0.034	0.139	0.271		
	Direct effect	0.471	0.042	0.389	0.554		

Discussion

This study identifies several shortcomings that warrant further research in the future:

Firstly, the study examines environmental guilt as an emotional dimension of attitude and finds it positively influences both intention and behavior. Environmental guilt is generally perceived as a negative emotion by most scholars. Future research could explore comparative studies between environmental guilt and other positive emotions to discuss potential differences in their effects on intention and behavior. Additionally, this study reveals that the mediating effect of green purchase intention in the relationship between environmental guilt and green purchasing behavior is relatively weak, suggesting a need for further exploration into the underlying mechanisms of environmental guilt's impact on green purchasing behavior.

Secondly, the study on environmental guilt is rooted in China's indigenous traditional culture, which contains rich cultural connotations and psychological content. The rigorous yet singular quantitative approach of this study may not suffice to obtain in-depth qualitative insights. Qualitative research methods could potentially uncover more interesting conclusions.

Conclusions

This study, grounded in the Theory of Planned Behavior, thoroughly examines consumers' green purchasing behavior, exploring multifaceted influencing factors and their mechanisms, with a particular focus on the role of environmental guilt. Survey data was collected from general consumers using a questionnaire survey method, and empirical research methods were employed to test the hypotheses based on valid data, deriving research conclusions. The main findings of this study are as follows: Environmental Guilt Positively Promotes Green Purchase Behavior. Environmental Cognition Actively Promotes Green Purchase Intentions. Injunctive Norms Positively Influence Green Purchase Intentions. Higher Self-Efficacy Leads to Higher Green Purchase Intentions, While Controllability Only Acts Positively on Green Purchase Behavior: Self-efficacy, as a manifestation of personal will, not only influences individual intentions but also directly affects their behavior. The empirical test results of this study also confirm this point. When both dimensions simultaneously affect behavior intentions.

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