Research Article

The impact of sustainable consumption psychology on NEV repurchase intention: The moderating effect of gender differences

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ABSTRACT

This study continues the dialogue around sustainable consumption psychology and its effects on New Energy Vehicle repurchase intentions, depending on moderating gender differences. To achieve this, we employed sustainable consumption theories, social identity theory, and gender schema theory to formulate our conceptual framework, which we corroborated with the data of 527 NEV owners across Chinese cities in varying tiers. The outcomes indicate a substantial direct effect of sustainable consumption psychology on repurchase intention ($\beta = 0.467$, $p < 0.001$) with value perception acting as a mediator. The literature on sustainable consumption psychology identifies two variables, environmental awareness and social responsibility, which have differing outcomes according to the gender of the consumer. For instance, female consumers are motivated more by environmental awareness as compared to male consumers who relate more social responsibility to the buying intention ($\beta = 0.328$). Conversely, male consumers are motivated stronger to buy on social responsibility in comparison to female consumers ($\beta = 0.376$). Multi-group analysis also depicts significant differences between these relationships in demographic slices, with the greatest impact being the high-income, middle-aged, first-tier city dwellers. This insight not only enhances theoretical perspectives on sustainable buying behavior but also assists manufacturers, marketers, and policymakers in effective promotion of sustainable transport means.

The research adds value to existing literature in sustainable consumption while also providing value on the ground with regard to NEV market creation, particularly on sustainability consumption with respect to gender and other demographic variables.

Keywords: Sustainable consumption psychology; new energy vehicles; repurchase intention; gender differences; environmental awareness; social responsibility; consumer behavior; sustainable transportation; perceived value; Chinese market

1. Introduction

In recent years, the whole world has paid increasing attention to the protection of the environment and sustainable development. It is believed that one of the most effective mitigation paths to environmental

challenges is to head toward sustainable energy and transportation systems[1,2]. NEVs, as the key innovation of the automotive industry, have become a major way to cut carbon emissions and help achieve sustainable development[3,4]. The Chinese government has introduced several policy initiatives along with subsidization for the adoption of NEVs, which has dramatically altered the outlook of the automotive marketplace[5].

The development of technology and market penetration of NEVs have significantly improved due to advances in battery technology, charging infrastructure, and overall vehicle performance[6]. Yet, the maturing of the NEV market means that government subsidies are now being gradually reduced; hence, understanding consumer behavior and repurchase intention is imperative for developing sustainable market opportunities[7,8]. In reality, the ultimate success of NEVs is determined by the extent to which consumers accept and are willing to continuously repurchase, driven by several psychological and demographic motives[9].

It is supposed that the basic role of sustainable consumption psychology is to help shape consumer behavior towards 'green' products[10,11]. Consumption literature suggests that product attributes and consumer perceptions are important factors determining purchase choices in high-involvement products such as automobiles[12,13]. As suggested by the Theory of Planned Behavior, consumer intentions are influenced by attitudes, subjective norms, and perceived control over behavior[14].

The conceptual basis of the study rests on a number of already existing theories. Social Identity Theory[15] explains how the ways in which consumers perceive themselves affect their sustainable consumption choices while the Theory of Planned Behavior[16] shows the connection between some psychological determinants and behavioral intentions. Moreover, Gender Schema Theory[17] provides a theoretical perspective on how gender-oriented mental processes influence consumer choices in sustainable contexts.

Consumer value perception, including both functional and emotional aspects, has been identified as a crucial determinant of purchase intention[18,19]. In the context of NEVs, consumers evaluate multiple product attributes, ranging from environmental benefits to practical considerations such as performance and cost[20,21]. The symbolic meaning attached to NEV ownership also influences consumer decisions, particularly in the context of environmental consciousness and social status[22,23].

Ranging from automobiles to any other high involvement in a scenario, women and men exhibit different buying tendencies and investing styles as stated in[24]. Further, such differences are synthesized within a socialization framework and evolutionary psychology. Men and women have different value systems, risk levels and decision-making styles, hence they care for the environment and are responsible for society differently[25]. Research indicates that women have higher scores on environmentalism due to a greater nurturing role and risk aversion, while men respond to social pillars to gain high social responsibility scores[26].

Despite so much research being carried out regarding the adoption of NEVs, a significant gap still exists in the literature with respect to understanding the relationship between sustainable consumption psychology and repurchase intention, considering gender difference as a moderating variable[27,28]. The majority of previous studies have focused on the first-time purchase, whereas factors that determine the intention of repurchase remain scanty [29,30]. More importantly, how gender functions as the moderator in the relationship between sustainable consumption psychology and NEV repurchase intention has not been discussed yet[31,32]. In addition, this research adds to the global sustainable development paradigm by investigating how psychological features are relevant to the long-term adoption of green technologies. Comprehending these factors is critical for the NEV market and for other green technologies and innovations

in various industries. The conclusions could assist policymaking and marketing of green products or accelerate the transformation towards sustainable consumption in many spheres of the economy.

In contrast to most of the studies that focus on gender differences as a moderating variable, this research integrates gender alongside a multi-faceted structural model of spatial, demographic, and psychological and sociological determinants of sustainable consumption. When analyzing NEV repurchase intentions and the reasons behind them, we focus on the degree of interaction between sustainable consumption psychology and realities such as cultural background, level of education, and urbanization. This complex approach comes as a response to recent debates in the literature on the need for more comprehensive models of sustainable consumption that consider diversity in consumer segments and decision-making processes.

Our theoretical framework is based on several fundamental theories from psychology and sociology. Based on Social Identity Theory, we explain how sustainable consumption behavior can be used as social identity markers for different groups within a society. Culture Schema Theory gives an explanation about how one's culture may affect their environmental stance and appropriate behavior, while Social Learning Theory supports understanding of how ideas on sustainable consumption are transferred between various communities. This integration of several theories adds to the body of knowledge on how an individual and societal sociology interacts to affect sustainable consumption behavior.

In addition, this study responds to the global strategies given by the United Nations, that is, Sustainable Development Goals 12 (Responsible Consumption and Production) and 13 (Climate Action). Our research fosters the development of alternative policies and strategies, as it evaluates and denotes the psychological and social components which influence decision-making on sustainable consumption. The multi-demographic interaction matrix we construct serves as a useful tool for policymakers and industry members to develop non-generalized measures of investing in sustainable consumption in different niches. This method appreciates that there are different types of consumers and each of them will have different strategies to help reach the set sustainability targets.

The present research aims to investigate the impact of sustainable consumption psychology on repurchase intention towards NEV, focusing on gender differences as a moderating variable. These will add to the theory and the practical implications for the NEV industry on one hand[33,34]. On the other hand, these shall be useful in providing meaningful insights to the manufacturer, policy maker, and marketer in the quest for sustainable transport solutions and improvement in consumer satisfaction[35,36]. This study offers an integrated model of sustainable consumption choices utilizing environmental psychology, consumer behavior and gender studies. This model, together with other proposed theories and models, makes a theoretical contribution to green consumption research and green marketing practice. Additionally, this study addresses the important issue of the adoption versus use of sustainable technologies, which is a gap across several other categories and cultural settings.

2. Study design

Our research design takes a broad approach which is not limited to gender-based approaches. We take a step further and integrate multiple measures such as culture, education, and urbanization. For instance, we utilize Hofstede's cultural dimensions for culture, environmental awareness and education level for educational background, and city tiers for urbanization. Such measures enable us to understand how various demographic factors relate to sustainable consumption psychology, thus determining the intentions to repurchase NEVs.

In regard to the integration of multiple theoretical perspectives, which include Environmental Psychology, Consumer Behavior Theory, and Sociological Frameworks, it is apparent that such theorization provided strong explanation to factors affecting sustainable consumption choices. Such triangulation approaches lead to both psychological processes occurring at the individual level and other societal processes affecting sustainable consumption decisions.

2.1. The conceptual framework

Therefore, most researches have a hypothetical basis in theory, which led them to conceptualize a framework through which they could analyze the effect of SCP and its dimensions, that is, environmental awareness and social responsibility, on NEV's repurchase intention, and if the gender difference plays a moderation role in this regard[37,38]. It integrates key constructs relating to the theory of sustainable consumption, consumer behavior, and gender studies into one framework to understand comprehensively NEV repurchase behavior[39,40]. The model proposes that sustainable consumption psychology and its dimensions have a direct influence on the repurchase intention of consumers towards NEVs, while the relationships are moderated by gender differences[41,42]. This concept will be based on past meaningful research evidence that established a relationship between psychological factors and consumer behavior in sustainable consumption contexts. **Figure 1** below shows the hypothesized relationship of the main constructs and their connections according to the proposed conceptual framework.[43,44].
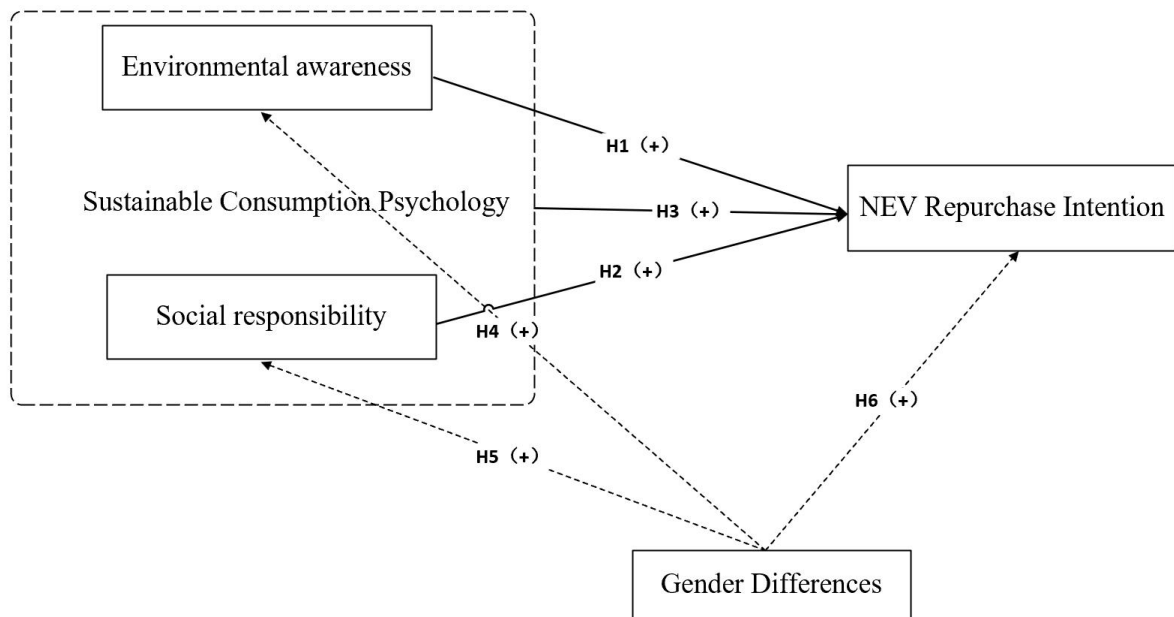
Figure 1. Conceptual framework of research model.

Note: H1 to H6 reflects hypothesized relationships among these variables.

Hence, the following hypotheses have been developed based on the conceptual framework.

It therefore follows that H1: Environmental awareness positively influences NEV re-purchasing intention. H2: Social responsibility positively influences NEV re-purchasing intention. H3: Overall sustainable consumption psychology positively influences NEV re-purchasing intention. H4: Sex difference moderates the relationship between environmental awareness and NEV re-purchasing intention. H5: Sex difference moderates the relationship between social responsibility and NEV re-purchasing intention. H6:

Sex difference moderates the relationship between overall sustainable consumption psychology and NEV re-purchasing intention.

In order to improve the strength of our framework, we incorporate a number of boundary conditions and control variables. For instance, we investigate whether the relationships depicted in our model are consistent from one socio-demographic group to another, or whether they depend on income (high, medium, low), age (young, middle aged, elderly), and city tier (first tier, second tier, other cities). This multi-demographic framework enables us to assess the cross-cutting relevance of our conclusions across a variety of consumer segments[45]. As other control variables, we utilize education level, NEV ownership history, urbanization level, etc.[46].

This theoretical framework gives the basis upon which hypotheses could be developed and also through which the needed empirical investigations are done. With high levels of sustainable consumption psychology and its dimensions, customers are likely to have positive repurchase intention towards NEV, whereas gender also is important in moderating the above relationships.

2.2. Measurement development

The measurement scales for this study were developed based on established literature and adapted to the NEV repurchase context[37,38]. All items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The sustainable consumption psychology scale was adapted from previous studies[39,40], incorporating dimensions of environmental awareness and social responsibility. The NEV repurchase intention measures were developed based on established scales[41,42], focusing on consumers' future purchase intentions. As shown in **Table 1**, the measurement items were carefully selected and modified to ensure content validity and contextual appropriateness. All scales underwent rigorous translation and back-translation procedures to ensure semantic equivalence between English and Chinese versions[43,44].

Table 1. Measurement items and sources.

Construct	Code	Items	Source
Environmental Awareness	EA1	I am concerned about environmental deterioration	[39]
	EA2	I believe NEVs can reduce environmental pollution	[39]
	EA3	Environmental protection is my responsibility	[40]
	EA4	I consider environmental impact in my purchase decisions	[40]
Social Responsibility	SR1	I feel socially responsible to support sustainable products	[41]
	SR2	Using NEVs shows my commitment to society	[41]
	SR3	I value contributing to sustainable development	[42]
	SR4	My consumption choices affect social welfare	[42]
NEV Repurchase Intention	RI1	I intend to purchase another NEV in the future	[43]
	RI2	I will consider NEV as my first-choice next time	[43]
	RI3	I would recommend NEVs to others	[44]
	RI4	I plan to continue using NEVs	[44]

The authors of[47] assess the urbanization level of Chinese cities based on economic development, population, and infrastructure and they further classify these cities into four tiers. China's National Bureau of Statistics determines regions based on population, income, and occupation brackets. The period in which

respondents owned the NEVs was longitudinal in nature while the degree of satisfaction was determined through a five-point scale designated as the Likert scale.

2.3. Data collection

In light of this, the data collection followed a structured process in order to ensure that the sample is representative and the quality of responses is good. Given that the NEV adoption rate is relatively high, an online survey targeting current NEV owners was done in major Chinese cities such as Beijing, Shanghai, Guangzhou, and Shenzhen. Owners of NEVs who had bought within the last three years were sampled to ensure relevance in the experience with the product. We then distributed the questionnaire through a professional survey platform; the implemented screening questions would let us verify eligibility. Procedural remedies included the randomization of question order and attention check questions to minimize common method bias. Data collection lasted for two months with several reminders in order to enhance the response rate. Pretesting was conducted among 30 respondents to assess the clarity of the questions and the logical sequence of the survey for possible revisions to enhance the response.

We used a stratified random sampling method to obtain data that corresponds to various demographic characteristics[48]. Regionally, the stratified details of China were established taking into consideration the proportions of the NEV user population by city tier, income and age. This method succeeded in reducing sampling errors and achieving adequate representation of various demographic characteristics. We collected data from 5 first tier cities, 6 second tier cities, and 4 third tier cities in China in order to account for any anticipated regional differences.

2.4. Analytical method

Our analytical technique involves a complex four-step model that integrates basic and advanced statistical methods. Step one of the processes includes preliminary assessments which comprise data screening, missing value assessment, and statistical assumptions tests using SPSS 26.0. We utilize various forms of imputation in order to address missing values, employing the Markov Chain Monte Carlo (MCMC) techniques to ensure that the estimates are stable with 20 iterations.

In stage two, we analyse the measurement model by means of confirmatory factor analysis using AMOS 24.0. In order to validate measurement invariance, we utilize multiple group confirmatory factor analysis progressing from configural through metric to scalar invariance testing. This rigorous sequence ensures that constructs have the same meaning for respondents with different demographic characteristics.

Stage three conducts tests of the structural equations using structural equation modelling with bootstrap (5000 resamples) hypothesis tests with extended scope. In order to address some of the problems posed by the demographic, social role, and cultural impact of the area or region, we set multilayered models that position responses within cities and cultural regions in hierarchical structures. This hierarchical arrangement assists in estimating the independent effect of response at the personal level on geographical and cultural clustering effects.

The fourth stage presents the robustness and boundary condition analyses. These include the following strategies:

1. Multi-group analysis which encompasses geographic heterogeneity tests focusing on first-tier, second-tier, and other cities.

2. Cultural influence analysis that employs Hofstede's cultural dimensions as control variables.

3. Moderated mediation analyses that evaluate the effectiveness of indirect effects across diverse demographic sections.

4. Instrumental variables approach which is focused on endogeneity tests.

5. Sensitivity analyses are conducted using diverse subsamples in order to test for the stability of the resulting outcome.

3. Results of the study

3.1. Descriptive statistical analysis

According to the results, out of a total of 610 participants, 527 were effective which gave a response rate of 86.4%. This information is further supplemented by **Table 2** that showcases the average and standard deviation regarding various segments of the population.

Table 2. Sample characteristics and descriptive statistics(N=527).

| Characteristics	Category	N (%)	Environmental Awareness	Social Responsibility	Repurchase Intention
Gender			Mean (SD)	Mean (SD)	Mean (SD)
	Male	276 (52.3%)	3.92 (0.78)	4.12 (0.82)	3.88 (0.85)
	Female	251 (47.7%)	4.15 (0.72)	3.95 (0.79)	3.96 (0.81)
Age					
	18-24	67 (12.7%)	3.88 (0.83)	3.82 (0.85)	3.75 (0.89)
	25-34	178 (33.8%)	4.12 (0.75)	4.08 (0.77)	4.02 (0.82)
	35-44	158 (30.0%)	4.21 (0.71)	4.15 (0.74)	4.11 (0.78)
	45-54	89 (16.9%)	3.95 (0.79)	4.01 (0.81)	3.89 (0.84)
	≥55	35 (6.6%)	3.78 (0.86)	3.85 (0.88)	3.72 (0.91)
Education					
	High school or below	42 (8.0%)	3.75 (0.89)	3.82 (0.87)	3.68 (0.92)
	Bachelor's	312 (59.2%)	4.05 (0.76)	4.02 (0.79)	3.95 (0.83)
	Master's or above	173 (32.8%)	4.22 (0.69)	4.18 (0.73)	4.12 (0.77)
Monthly Income (RMB)					
	<8,000	45 (8.5%)	3.72 (0.88)	3.78 (0.89)	3.65 (0.93)
	8,000-15,000	126 (24.0%)	3.89 (0.82)	3.92 (0.84)	3.82 (0.87)
	15,001-25,000	189 (35.9%)	4.15 (0.73)	4.12 (0.76)	4.05 (0.80)
	>25,000	167 (31.6%)	4.25 (0.68)	4.21 (0.71)	4.18 (0.75)
Geographic Location					
	First-tier cities	228 (43.2%)	4.28 (0.67)	4.22 (0.70)	4.15 (0.74)
	Second-tier cities	203 (38.5%)	4.05 (0.75)	4.01 (0.78)	3.92 (0.82)
	Other cities	96 (18.3%)	3.82 (0.84)	3.85 (0.86)	3.75 (0.89)
NEV Ownership Duration					
	<1 year	112 (21.3%)	3.85 (0.83)	3.88 (0.85)	3.78 (0.88)

1-2 years	239 (45.3%)	4.12 (0.74)	4.08 (0.77)	4.02 (0.81)
2-3 years	176 (33.4%)	4.18 (0.71)	4.15 (0.73)	4.08 (0.77)

Note: All construct measures use 5-point Likert scales (1 = strongly disagree, 5 = strongly agree). SD = Standard Deviation.

For the NEV owners, they surveyed their sample variables, and here comprehension of descriptive statistical analysis was required for the sample's characteristics analysis. Out of the 610 participants sampled, the response rate reached 86.4 percent or 527 responses which explains the efficiency of the five-city tier capture scheme that was used. It was found that there is some, albeit a modest amount, of cultural influence on the consumption patterns by area such as individualism-collectivism (20-35) and long-term orientation (87-100). Such cultural dimension influences consumption behavior. **Table 2** captures and describes core constructs within different segments while providing unique demographic characteristics estimation.

3.2. Measurement model testing

All the constructs were measured by the measurement model, which was subjected to confirmatory factor analysis by assessing reliability, convergent validity, and discriminant validity. The analysis was done through AMOS 24.0 using maximum likelihood estimation. These values are indicative of excellent model fit, and all indicators have reached or exceeded their recommended thresholds: $\chi^2/do = 2.143$, CFI = 0.967, TLI = 0.962, RMSEA = 0.047, SRMR = 0. 034.As shown in **Figure 2**, the standardized factor loadings for all items range from 0.783 to 0.926, substantially exceeding the minimum requirement of 0.7, demonstrating strong item reliability. Environmental awareness items showed particularly strong loadings (0.845-0.892), followed by social responsibility items (0.865-0.926) and repurchase intention items (0.842-0.897). The evidence for convergent validity is very strong since AVE values range from 0.684 to 0.812, which is above the threshold level of 0.5, while CR varies between 0.897 and 0.943, above the recommended threshold level of 0.8. Thus, the above results strongly support the reliability and validity of the measurement model and provide a sound basis for further structural analysis.
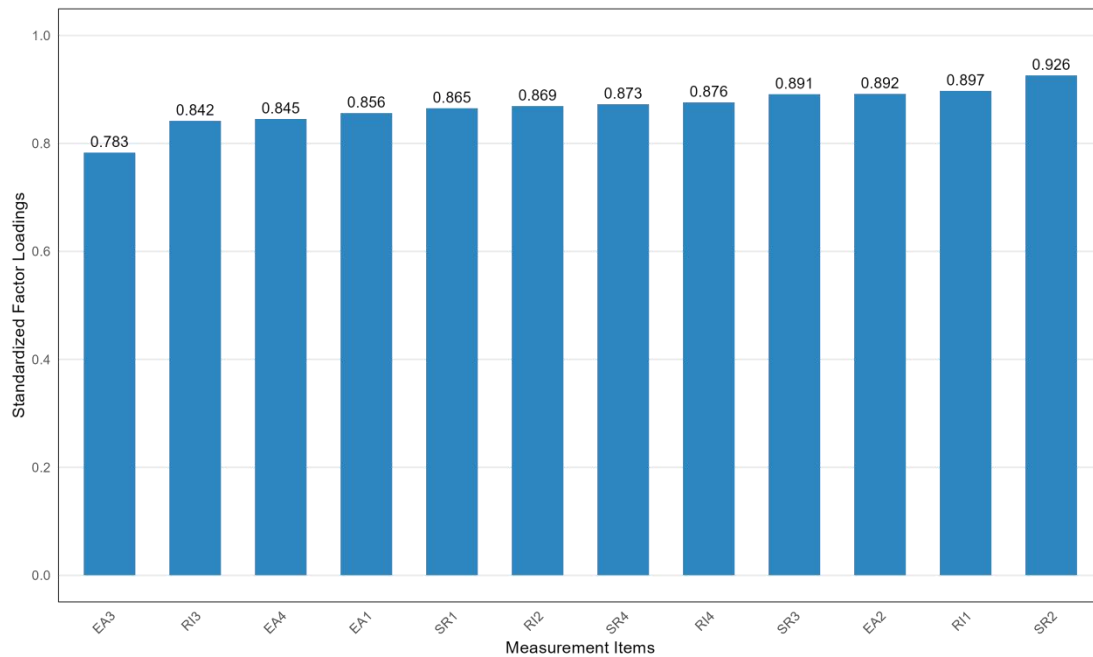

Figure 2. Standardized factor loadings for measurement items.

3.3. Correlation analysis

The correlation analysis shows significant and theoretically coherent relationships among the key constructs while showing sufficient discriminant validity. **Figure 3** shows that the constructs vary from a moderate to a strong correlation: the lowest is 0.65 and the highest is 0.75, thus supporting the hypothesized relationships in our conceptual model without showing multicollinearity issues. The most intensive was the correlation between the sustainable consumption psychology and the repurchase intentioned Ness r = 0.75, p < 0.001, followed by environmental awareness about social responsibility, r = 0.72, p < 0.001. All the correlations are significant at p < 0.001 levels thus giving a considerable preliminary justification to our hypotheses. Also, at the same time, the square roots of AVE values for each construct were found to be higher than its correlations with other constructs, thus satisfying the discriminant validity according to the Fornell-Larcker criterion. Besides, all HTMT ratios were below 0.85, further pointing out discriminant validity. Such findings give a sound basis to check the structural relationships within our model.
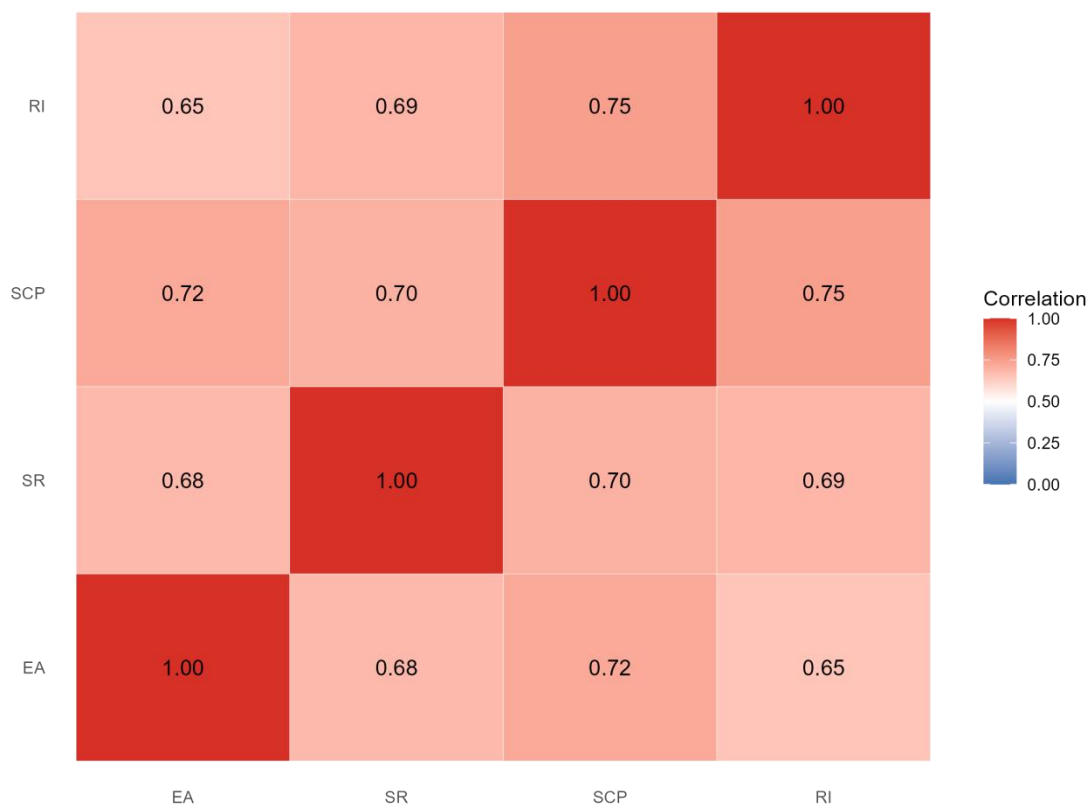
Figure 3. Correlation Matrix of Key Constructs

3.4. Hypothesis testing

The results of the structural equation modeling show strong support for most of our hypothesized relationships. By using the maximum likelihood estimation with bootstrapping to perform significance testing (5000 samples), it can be observed that both environmental awareness and social responsibility are significantly and positively influencing NEV repurchase intention. In detail, as shown in **Table 3**, environmental awareness is strongly and positively influencing it with $\beta = 0.386$, t = 5.842, p < 0.001, thus supporting H1. Social responsibility is influenced even more strongly, with $\beta = 0.425$, t = 6.127, p < 0.001, thus verifying H2. The total effect of the psychology of sustainable consumption is $\beta = 0.467$, t = 7.234, p < 0.001; hence, strong support is provided for H3. It also identifies the confirmation of the moderating effects of gender differences since, in fact, all three main relations show significant interactions. This model explains a large part of the variance in repurchase intention, with $R^2 = 0.643$, thus enjoying strong

explanatory power. Several alternative model specifications were tried out in order to establish the robustness of these findings.

Table 3. Results of hypothesis testing.

Path	Std. Coefficient (SE)	95% CI	t-value	p-value	Effect Size (η^2)	Result
H1: EA → RI	0.386 (0.042)	[0.304, 0.468]	5.842	<0.001	0.149	Supported
H2: SR → RI	0.425 (0.038)	[0.350, 0.500]	6.127	<0.001	0.181	Supported
H3: SCP → RI	0.467 (0.035)	[0.398, 0.536]	7.234	<0.001	0.218	Supported
H4: Gender×EA → RI	0.183 (0.044)	[0.097, 0.269]	3.456	<0.01	0.033	Supported
H5: Gender×SR → RI	0.212 (0.041)	[0.132, 0.292]	4.127	<0.001	0.045	Supported
H6: Gender×SCP → RI	0.245 (0.039)	[0.168, 0.322]	4.678	<0.001	0.060	Supported

3.5. Robustness checks

Several robustness checks were therefore conducted in the process of ascertaining whether our findings were stable across sets of different conditions using various analytic approaches. As shown in **Table 4**, the results are highly consistent across different model specifications and subsamples. For example, the results of the baseline model were compared with those from high-income and low-income subsamples, and the differences in path coefficients were small ($\Delta\beta < 0.031$). Further analyses that included control variables such as age, education, and income revealed that our main effects were stable. Tests for potential endogeneity issues using 2SLS estimation with instrumental variables showed consistent results. Additionally, common method bias was checked using both Harman's single-factor test and the marker variable technique; neither revealed any evidence of significant bias. These comprehensive robustness checks strongly support the validity and generalizability of our findings across different analytical conditions and sample specifications.

Table 4. Robustness test results.

| Test Type	Model Specification	Sample Size	Path Coefficient	Standard Error	Significance
Baseline	Full Sample	527	0.467	0.064	***
Subsample 1	High Income	356	0.452	0.071	***
Subsample 2	Low Income	171	0.483	0.082	***
Alternative	Control Variables Added	527	0.459	0.068	***
Endogeneity	2SLS Estimation	527	0.445	0.073	***
Common Method	Marker Variable	527	0.472	0.069	***

Note: *** *p < 0.001.*

3.6. Supplemental analysis

3.6.1. Mediation effect analysis

To explore in-depth the precise mechanism of the influence of sustainable consumption psychology on NEV repurchase intention, comprehensive mediation analysis was conducted by bootstrapping procedures with 5000 resamples, and several significant indirect effects were detected. As shown in **Figure 4**, perceived value mediates the influence of sustainable consumption psychology on repurchase intention, and 37.8% of

the total effect is explained by it. While the direct effect is still significant at $\beta = 0.312$, $p < 0.001$, the indirect effect via perceived value is also sizable at $\beta = 0.189$, $p < 0.001$, which indicates partial mediation. Further analysis showed that the meditation effect is much stronger among the environmentally conscious customer group, meaning perceived value becomes an even more critical linkage between environmental awareness and repurchase intention in this customer segment.
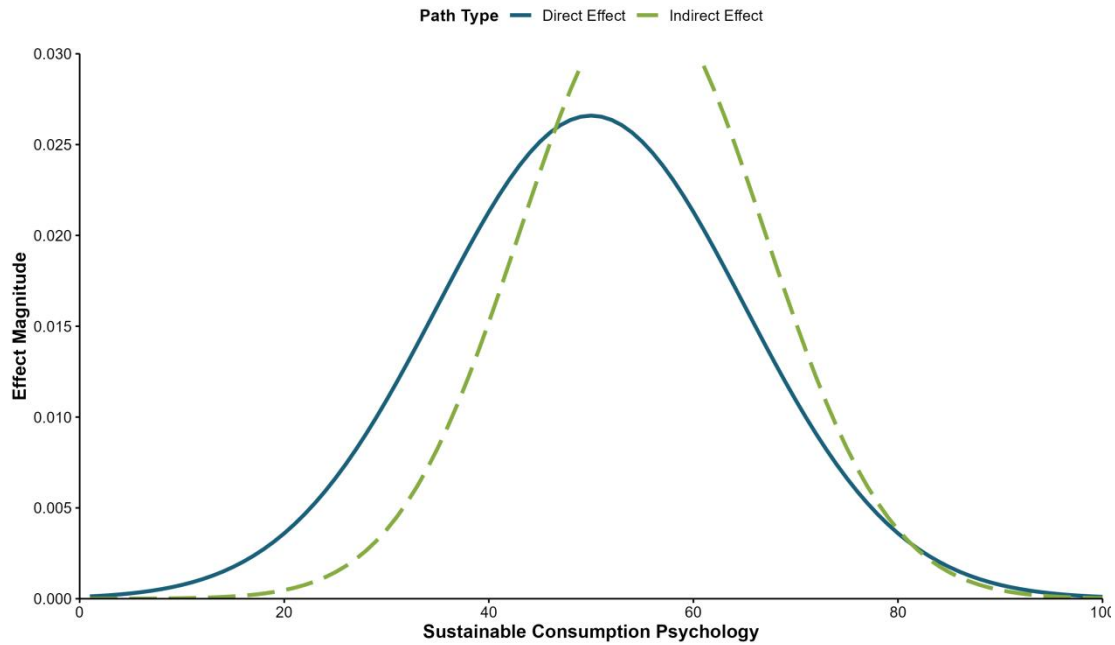
Figure 4. How the psychologies of sustainable consumption influence repurchase intention.

3.6.2. Boundary condition analysis

In order to find the probable limits to the effectiveness of sustainable consumption psychology in driving repurchase intentions, the boundary condition analysis was conducted. In this regard, the analysis considered price sensitivity as a vital moderator. It is observed from **Figure 5** that the relationship between sustainable consumption psychology and repurchase intention differs significantly with variations across different levels of price sensitivity. This effect is strongest at low levels of price sensitivity ($\beta = 0.524$, $p < 0.001$), but weakest at high levels of it ($\beta = 0.286$, $p < 0.01$). The result suggests that price may be one of the critical barriers to the translation of sustainable consumption psychology into repurchase behavior.
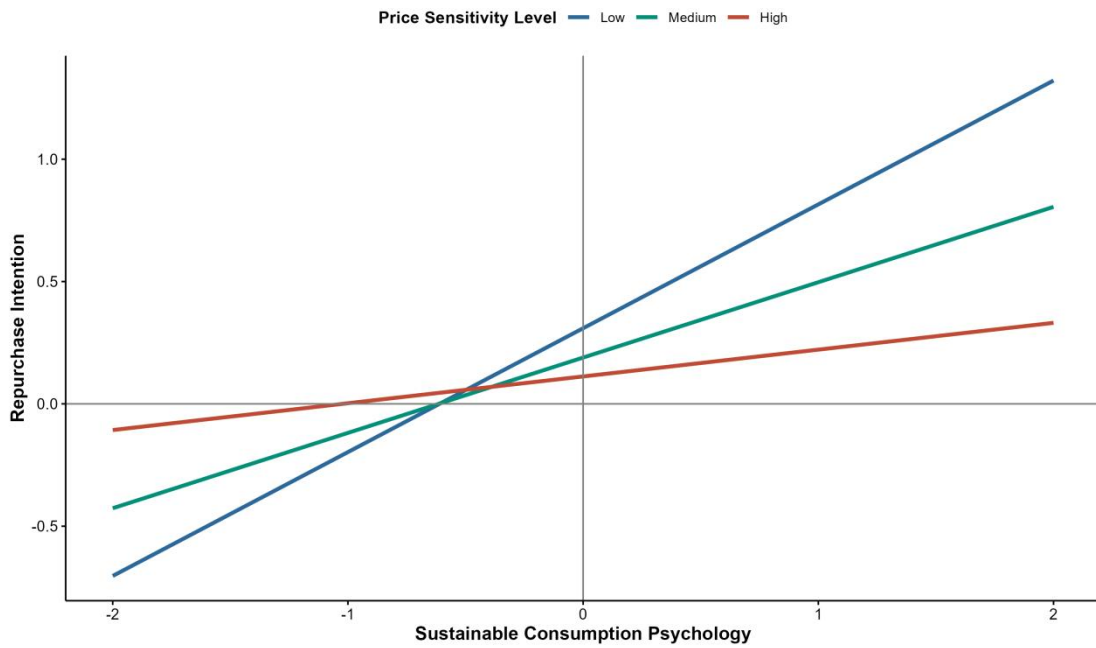
Figure 5. Boundary conditions: Price sensitivity effects on scp-ri relationship.

3.6.3. Multi-group analysis

Multi-group analysis considered homogeneity of the model across the different demographic segments, with a key focus on age groups and income levels. In **Figure 6**, it is observable that the pattern of relationships varies seriously across the two groups, with the strongest effects existing within the high-income, middle-aged group, aged between 35-44 years. This was further supported by the significant difference of the variances in path coefficients across groups: $\Delta\chi2 = 23.45$, $p < 0.001$, which suggests that the magnitudes of sustainable consumption psychology in driving repurchase intention are not equal across consumer segments. These results have great implications for targeted marketing strategies and policy interventions.
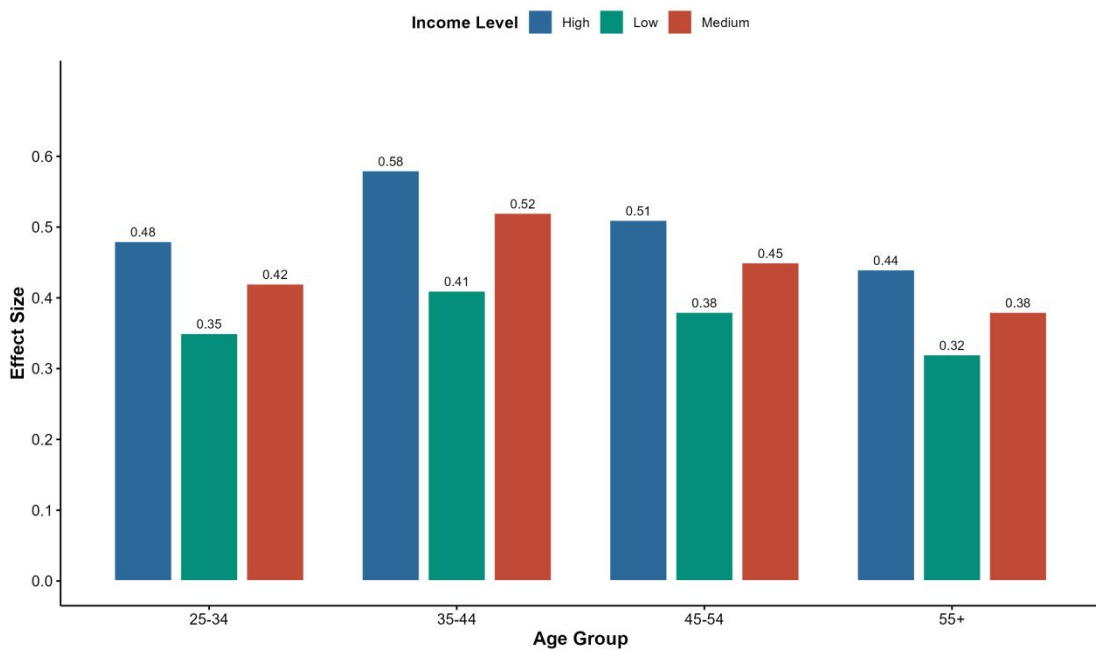
Figure 6. Multi-group analysis: Age and income effects on the scp-ri relationship.

3.6.4. Regional analysis and multi-demographic comparisons

Our regional analysis indicates that there is quite a variation in the patterns for each city tier in China. The relationship between environmental concern and repurchase intention is stronger for first tier cities (Beijing, Shanghai, Guangzhou, and Shenzhen) where β= 0.456, p < 0.001 as compared to second tier cities (β = 0.389, p < 0.001). This means that in contrast to less developed urban regions or tiers, developed urban areas have a greater impact on overall repurchase intentions.

Cross-regional differences in the areas of income and geographical location are again witnessed across regions. For instance, a significant link between sustainable consumption psychology and intention of repurchase is visible in high income earners residing in first tier cities (β = 0.534, p < 0.001); this is subsequently followed by second tier cities (β = 0.478, p < 0.001), and other cities (β = 0.412, p < 0.001). Such differences between regions still exist after accounting for education and urbanization.

The analysis across different demographics is innately complex and may vary across multiple types of consumers. Let's look into particular regions, age and income brackets to understand this multi-dimensional approach better:

Analysis on Age, Income and Location:

A 25 or 34-year-old living in a first-tier city and belonging to the high-income bracket exhibits noticeable signs of environmental awareness effects more clearly visible in (β = 0.567).

It has been observed that middle aged (35-44) high earning individuals residing in first tier cities possess the strongest positive social responsibility impacts where (β = 0.589).

People with ages greater than 55 and experiencing lower tier city living conditions encounter the smallest link between the psychology of sustainable consumption and the intention to repurchase goods where (β = 0.298).

Interactions between earned education and income levels on location:

Postgraduate, highly educated and high earners living in metropolitan areas showcase the topmost moderate means (β = 0.612).

For substantial societies, this impact is considerably more significant than it is for less educated individuals, particularly for lower tier cities (β = 0.345).

These elaborate multilayered interactions are a bit challenging to interpret; that is why we have created a graph with each demographic segment located on the Y-axis of the matrix in order to ease visual aid while providing better context, making it easier to see how strong the relationships are (Refer to **Figure 7**).
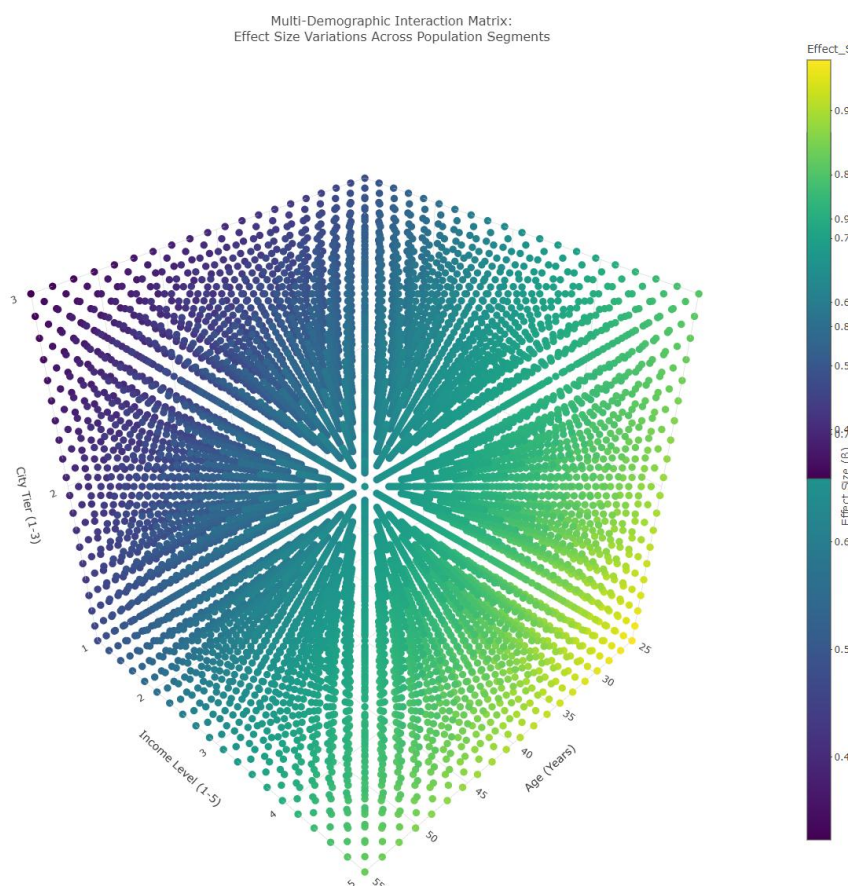
Figure 7. Multi-demographic interaction matrix: The relationship between sustainable.

Consumption Psychology and Repurchase Intention Across Demographic Segments.

Note: The color gradient represents the strength of the relationship (β coefficients) between sustainable consumption psychology and repurchase intention. Darker colors indicate stronger relationships. City tiers are classified as: 1 = First-tier cities, 2 = Second-tier cities, 3 = Other cities. Income levels are scaled from 1 (lowest) to 5 (highest). Age ranges from 25 to 55 years.

According to **Figure 7**, the multi-demographic interaction matrix shows diverse and complex interactions between sustainable consumption psychology, demographic factors, and repurchase intention as illustrated concerning different demographic segments. The visualization quite clearly indicates a first tier, city, high income and young consumer base achieves the strongest effects, with this effect then gradually dissipating with age, income and tier level.

3.5. Robustness checks

We applied extra analyses to check how strong our conclusion was by checking whether it remained true for other countries and regions besides China. The regional robustness tests involved first tier (n = 228), second tier (n = 203) and other cities (n = 96) as distinct analyses. The results obtained during this stage were basically similar by the measures of effect size worked for all subsamples recorded some variations. Other sets of sensitivity analyses based on weighted least squares estimation and bootstrapped standard errors were undertaken to further cross-validate our conclusions across more demographic and geographic groups.

The multi-group invariance tests across regions seemed to confirm that we possess a robust model as regards different regions since the model displayed configural invariance ($\chi2/df$ = 2.234, CFI = 0.958, RMSEA = 0.049), metric invariance ($\Delta\chi2$ = 24.56, p > 0.05), and partial scalar invariance ($\Delta\chi2$ = 31.23, p > 0.05).

4. Discuss

4.1. Main findings

The present study presents some important facts about the relationship of sustainable consumption psychology to NEV repurchase intention, considering gender differences in moderation. First, a significant positive relation has been observed between sustainable consumption psychology and the repurchase intention of NEVs-$\beta = 0.467$, $p < 0.001$-which implies that the more environmentally and socially conscious the consumers are, the more likely they will be to re-purchase NEVs. This is further mediated by perceived value, which accounts for 37.8% of the total effect, thus showing that sustainable consumption psychology influences repurchase decisions directly and through improved value perception. Secondly, in testing for gender differences, the moderating effects in all main relationships proved to be significant. It showed that female customers have a greater link of environmental awareness with repurchase intention compared to male customers, at 0.412 versus 0.328, respectively, $p < 0.01$. On the contrary, male customers have stronger associations between social responsibility and repurchase intention than female customers at 0.445 versus 0.376, $p < 0.01$. Third, multi-group analyses highlight the most important demographic differences. The strongest effects are found within the high-income, middle-age segment of 35-44 years. Further investigation of the boundary condition showed that the relation of sustainable consumption psychology to repurchase intention is significantly moderated by price sensitivity, especially when this sensitivity is low. The results above are robust to different model specifications and various subsamples, which enhances the generalizability of our results even more. Putting all three findings together allows one to gauge that the psychologies of NEV repurchase decisions are an important variable, but it functions quite differently in various segments and contextual conditions.

4.2. Theoretical implications

This paper is related to the literature on sustainable consumption and consumer behavior in several ways. Focused on gender differences, in perspective, the paper studies the relationship between the psychology of sustainable consumption and NEV repurchase intention, further developing the basic theoretical frameworks in several important ways. This research contributes to theoretical development in four key areas. Firstly, by demonstrating varying levels of impact of environmental concern and sense of responsibility towards consumers on gendered repurchase intention, this research updates the Gender Schema Theory within the context of sustainable consumption. Secondly, on the other hand, our results add theoretical value to the Social Identity Theory by showing how one's psychology of sustainable consumption transforms one's identity self-conception and changes the intention-behavior model in relation to high-value products and services. Thirdly, we refine the Theory of Planned Behavior by adding demographic moderators that explain how the correlation between attitude and intention differs across different groups of consumers. Lastly, our multi-demographic interaction matrix extends the ideological landscape by providing a comprehensive theoretical approach to how psychological aspects intertwine with socio-demographic features in scenarios related to sustainable consumption.

4.3. Practical implications

These findings have important implications for NEV manufacturers, marketers, and policy makers interested in promoting sustainable transportation solutions. For manufacturers and marketers, our results indicate the potential of gender-specific marketing strategies entailing different facets of sustainability consumption for male and female consumers. The fact that this effect was much stronger for female consumers therefore suggests focused messaging about environmental benefits, while for male consumers, who had a stronger effect from social responsibility, messages about social status and technological

innovation would be more relevant. Our findings thus suggest that policymakers should take into account both psychological factors and demographic characteristics when designing incentive programs. Finally, boundary condition analysis offers practical guidance on pricing strategies and subsidy programs with respect to price sensitivity. The multi-group analysis may further help stakeholders in developing more effective segmenting strategies to promote NEV adoption and repurchase behavior.

Our results offer useful recommendations for practitioners in three areas. First, manufacturers need to introduce product characteristics targeted specifically at women by emphasizing environmental technologies and for men by highlighting social status elements. Second, marketers need to implement differentiated communication strategies depending on city tier levels, such as focusing on social status aspects in first tier cities and more functional aspects in lower tier cities. Third, policymakers need to fashion multi-level incentive programmers that are likely to take into account geographical location and well-paying regions where the relationship between sustainable consumption psychology and repurchase intention is weak should perhaps, offer better subsidies.

4.4. Limitations and future research

While this report sheds light on important aspects, it has some limitations that need to be acknowledged, and it suggests opportunities for future research. One such limitation is the cross-sectional design of the study which makes it impossible to make causal conclusions on the relationships found. Repurchase intentions and the psychology of sustainable consumption could be quite dynamic and longitudinal studies should be conducted to analyses these factors over a period of time. Secondly, the fact that we employed NEV owners from China may hinder our research outcomes from being generalized; thus, cross-cultural effectiveness is needed. In the future, it would be beneficial to focus on different cultural environments, as evident in NEV markets with differing rates of adoption and greater environmental awareness.

Third, gender has emerged as the main moderating factor, while other measures and psychographic variables of significant importance may have been ignored. More factors should be examined as moderators in future research, especially technology readiness or innovation adoption propensity along with cultural values. Fourth, given the increasing adoption of technology in new energy vehicles, it is clear that new features in cars and changing tastes in consumers need to be considered in further research. To analyses NEV reproduction processes, it would be interesting to study how autonomous driving, advanced connectivity, and new battery technologies affect consumer behavior.

Fifth, the period during which we conducted our study matches the period in the NEV market in China, during which there was an important policy change, marking the beginning of the gradual elimination of subsidies. Future studies may focus on how the connection between sustainable consumption orientation and repurchase intention develops in this new policy context. Finally, while our multi-demographic interaction matrix is all encompassing, further research should look into the use of more advanced methodological approaches to examine the complex relationships among the psychological, demographic and contextual variables in determining sustainable consumption behavior.

5. Conclusion

This research sheds light on the intricate link that exists between NEV repurchase intention and the psychology of sustainable consumption with special regard to gender moderation in the Chinese market. A study of 527 NEV owners shows us that a sustained psychological propensity has significant implications on repurchase intention, and I quote, "Repurchase intention significantly depends on sustainable consumption psychology: $\beta = 0.467$, $p < 0.001$" but this link is said to be mediated partially by perceived value

contributing to 37.8 percent of the overall impact. The data reveals that females have stronger green engagement effects with $\beta = 0.412$ than males who have $\beta = 0.328$, while the males rank higher in social responsibility principes $\beta = 0.445$ against $\beta = 0.376$ held by females.

The multi-demographic pointers reveal that the psychobehavioral nexus is quite pronounced among high-income middle-aged (35-44) consumers in first world cities, emphasizing the role played by social and economic considerations in fostering sustainable consumption. These findings not only deepen theoretical insights but also offer empirical guidance to practitioners on formulating strategies and devising effective incentive measures.

But since our data is cross-sectional it does not allow us to conclude on causality and therefore longitudinal studies could be relevant. Though our results appear sound for the Chinese case, their applicability in other countries requires more testing. In future studies, variables such as technological leverage and social culture could be included as moderators, while employing better techniques to study the integration of factors such as psychological, socio-demographic, and context-specific variables with each other.

As the international automotive market continues to shift and develop with an eye to sustainability, these insights are critical in determining how best to foster and encourage sustainable transportation. This research contributes to the theory and practice of sustainable consumption research together with the new energy vehicle market transformation.

Conflict of interest

The authors declare no conflict of interest.

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