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Organic food consumption in China: food safety concerns, perceptions, and purchase behavior under the moderating role of trust

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Introduction: In tandem with economic growth and enhanced individual income levels, the demand for superior food quality has seen a significant uptick, leading to increased consumer interest in organic food products. However, studies focused on organic food consumption reveal a strikingly low conversion rate of this interest into actual purchasing behavior, particularly in the context of China. It is, therefore, crucial to implement effective strategies to bridge this gap, thereby fostering the growth of China's organic food sector.

Methods: This research introduces the theory of perceived values and innovation resistance into the stimulus-organism-response (SOR) theoretical model, exploring the interrelationships among various facets of food safety concerns, perceived values, perceived risks, and organic purchasing behavior. Furthermore, the moderating influence of trust in these relationships is taken into account. Employing structural equation modeling, data from 352 organic food consumers in China's premier cities were analyzed.

Results and discussion: Findings substantiated the significant interplay between perceived values and risks with food safety concerns. It was also observed that perceived values had a positive and significant impact on purchasing behavior, while perceived risks exerted a negative and significant influence. Importantly, the relationship between nutritional value and risk barrier with purchase behavior was found to be moderated by the level of trust. This study may help organic food producers, retailers, and policymakers bridge the consumers' intention-behavior gap.

KEYWORDS

food safety concerns, perceived values, perceived risks, organic food, SOR theoretical model

1 Introduction

Despite the remarkable achievements of modern agriculture in eliminating agricultural poverty and bolstering the food supply, its unintended repercussions on food quality and safety cannot be overlooked. Issues stemming from overexploitation of agricultural resources, excessive pesticide and fertilizer use, heavy metal contamination, and the application of novel technologies (including hormones, ripening agents, and antibiotics) have raised significant food safety and environmental protection concerns. As a result, consumers are increasingly prioritizing high-quality, safer, and more environmentally-friendly green food (Rana and Paul, 2020; Mai et al., 2023).

Organic food, as a typical representative of green food (Rana and Paul, 2020), is attracting more and more consumers' attention and also propelling the global growth of the organic food industry (Le-Anh and Nguyen-To, 2020). The global market value of organic food in 2020 was estimated at 120.6 billion euros, marking a substantial increase from the 15.1 billion euros reported in 2000 (Willer and Lernoud, 2022). However, previous studies have highlighted a paradox: although consumers exhibit strong intentions to buy organic food, the actual conversion of these intentions into purchasing behavior is disappointingly low (Rana and Paul, 2017; Kushwah et al., 2019; Tandon et al., 2020). This gap is particularly pronounced in China, where the intention-to-purchase conversion rate is even lower (Liu et al., 2021a). As reported by Willer and Lernoud (2022), China's total organic food market value in 2020 was ∼10.2 billion euros (the fourth highest globally). Despite this, the per capita consumption of organic food in China was a mere seven euros, less than half of the global per capita consumption (15.8 euros). Therefore, this study aims to investigate the discrepancy between consumer purchasing intentions and actual purchasing behavior in relation to organic food, with the goal of proposing viable solutions, thereby offering practical implications for research.

The importance of food safety in promoting organic consumption has been highlighted in various studies (Pham et al., 2018; Saraiva et al., 2021; Chu et al., 2023). Previous research has primarily explored the link between consumers' concerns about the safety of organic food production processes and their purchasing decisions (e.g., Rana and Paul, 2017; Le-Anh and Nguyen-To, 2020). In addition, some scholars have emphasized that food safety regulatory authorities must implement strict and transparent regulatory measures to ensure the compliance of organic food production and sales enterprises, thereby allowing consumers to purchase and consume organic food with confidence (Rana and Paul, 2020). Moreover, advancements in science, technology, and the food industry have led to the emergence of various technologies, such as food preservatives, anti-staling agents, and mold inhibitors. However, the addition of these substances during food storage, packaging, and transportation has resulted in numerous food safety issues throughout the supply chain. For instance, the "stinky overnight meat washed and resold" incident at RT-Mart, a major supermarket chain (www.315djjd.com) in 2021, drew significant attention to food safety concerns at different stages of the food supply chain. Despite this, previous research has paid limited attention to the impact of various dimensions of food safety concerns on purchasing decisions in the organic food supply chain. Examining the effects of different dimensions of food safety concerns on organic purchasing decisions could provide valuable insights to enrich existing research on organic consumption and address the inconsistency between consumers' intentions and behaviors regarding organic food.

In addition to food safety factors, psychological factors have also been recognized as influential in consumer decision-making (Teng and Lu, 2016; Khan et al., 2022). Scholars have employed the stimulus-organism-response (SOR) theoretical framework to elucidate the relationship between psychological factors and organic purchasing behavior. Especially, perceived values have been recognized as one of the most important psychological factors driving consumers to purchase organic food (Tandon et al., 2020). Furthermore, individuals' inner perceptions can have both positive and negative impacts on consumer decision-making (Verhagen and van Dolen, 2011). Additionally, Kushwah et al. (2019) applied the innovation resistance theory to investigate the barrier effect of psychological factors on organic purchasing behavior. Despite the extensive research on various psychological factors influencing consumers, few studies have examined the influence of both positive and negative psychological factors on organic purchasing decisions. By focusing on the impact of both positive and negative psychological factors on consumers' decisions to buy organic food, valuable insights can be gained to address the inconsistencies between consumers' intentions and behaviors regarding organic food purchases.

Furthermore, scholars have identified consumers' lack of trust in organic food as a key factor contributing to the gap between their intention to buy organic products and their actual purchasing behavior (Gracia and De-Magistris, 2016; Nguyen and Dang, 2022). Vega-Zamora et al. (2019) posited that consumers' trust in the authenticity of organic labels, as well as the standardization and rigor of organic food certification procedures, play a crucial role in their decision-making when choosing organic food. Additionally, Sultan et al. (2020) revealed that trust could moderate the relationship between behavioral motivation and organic procurement behavior. So, can trust increase consistency between buyers' perceived values and procurement behavior or improve inconsistency between perceived risks and procurement behavior? Clarifying these issues is extremely helpful in addressing the discrepancy between buyer motivation and the behavior of organic purchasing.

The current investigation aims to answer the following questions: (i) Can different dimensions of food safety concerns ameliorate the inconsistency between organic purchase intention and consumer purchase behavior? (ii) How do different dimensions of perceived values and perceived risks influence consumers' organic purchase behavior? (iii) Can trust improve consistency between consumers' perceived values and purchase behavior? and (iv) Can trust improve inconsistency between consumers' perceived risks and purchasing behavior?

This study makes several key contributions. While previous research has discussed the relationship between consumers' concerns about the safety of organic food production processes and their purchasing decisions, limited attention has been given to the impact of different dimensions of food safety concerns along the organic food supply chain on organic purchasing behavior. Thus, this paper investigates the effects of consumers' food safety concerns in three distinct dimensions of the organic food supply chain (i.e., concerns toward organic producers, retailers, and public departments) on their organic purchasing behavior. This not only enriches the existing research on organic consumption but also provides new insights into addressing the inconsistency between consumers' intention to purchase organic food and their actual purchasing behavior. Moreover, previous studies have rarely focused on the influence of both positive and negative psychological factors on organic purchasing decisions. To contribute to the existing research, this paper introduces the theory of perceived values and innovation resistance into the SOR

theoretical framework to comprehensively examine the impact of consumers' internally perceived positive psychological factors (perceived values) and negative psychological factors (perceived risks) on organic purchasing behavior. This may not only provide a new perspective for existing organic consumption research, but also offer important insights for finding solutions to the discrepancy between consumers' intention to buy organic food and their actual purchasing behavior. Additionally, the findings and insights from this study can provide valuable recommendations for organic producers, retailers, and policymakers.

2 Theoretical background

2.1 Perceived values

Values refer to the beliefs and concepts that govern specific ideal states, which in turn influences behavior (Schwartz and Bilsky, 1987). Besides influencing individuals' attitudes and behaviors, values also aid in differentiating between objects, scenarios, and events (Long and Schiffman, 2000). Values have been recognized as a significant predictor of consumer decision-making (Sheth et al., 1991), and perceived values theory has been extensively utilized for this purpose. Perceived values encompass the comprehensive evaluation made by consumers regarding the worth of products (Zeithaml, 1988), involving a balance between what they receive and what they give in exchange.

Sheth et al. (1991) introduced the theoretical framework of perceived values and suggested that dividing perceived values into dimensions could enhance the prediction of consumer decision-making. Khan and Mohsin (2017) classified perceived values into various dimensions, such as environmental value, functional value, and emotional value, to predict consumers' organic purchasing behavior. Their findings indicated that environmental value and functional value had significant positive impacts on consumers' organic purchase behavior. Additionally, nutritional value was identified as a vital factor influencing organic purchasing behavior (Tandon et al., 2020). Building upon the aforementioned studies and considering the focus of this research, our study aims to investigate organic consumption behavior by examining two dimensions of perceived values: environmental value and nutritional value.

2.2 Innovation resistance theory

The theory of innovation resistance identifies two types of barriers—functional barriers and psychological barriers—that reflect consumer resistance (Kaur et al., 2020; Talwar et al., 2020). Functional barriers arise from changes in consumption patterns that significantly impact consumers' perceptions, encompassing usage, risk, and value barriers (Ram and Sheth, 1989). On the other hand, psychological barriers stem from conflicts between consumers' pre-existing beliefs and specific products, including tradition and image barriers (Ram and Sheth, 1989). The theory of innovation resistance has been widely applied across various research domains, such as social media (Lian and Yen, 2013; Chen and Kuo, 2017), online purchasing (Molesworth and Suortti, 2002), smart products and services (Chaouali and Souiden, 2019; Juric and Lindenmeier, 2019), and organic consumption (Kushwah et al., 2019; Tandon et al., 2020).

The choice of the innovation resistance theory for this study is based on the observation that while there is increasing acceptance of the benefits of organic food, such as environmental protection, nutrition, and safety (De-Magistris and Gracia, 2016; Nguyen and Dang, 2022), some consumers still harbor doubts regarding these benefits (Kushwah et al., 2019). This skepticism may arise from the obstacles faced by consumers during the process of purchasing organic food. As previous studies suggested, consumers may be suspicious or distrustful of organic food available in the market (image barrier), leading to perceived risks associated with buying and using organic food (Misra and Singh, 2016; Kushwah et al., 2019). Furthermore, convenience issues and difficulties in finding organic food and relevant information have been highlighted as concerns (Smith and Paladino, 2010), compounded by limited availability in organic food specialty shops and supermarkets (Pham et al., 2018). Additionally, consumers perceive the high price of organic food and express uncertainty regarding labeling and certification procedures, contributing to risk barriers in the purchase process (Tandon et al., 2020). Consequently, this study will investigate organic consumption behavior by examining three factors from the innovation resistance theory: image, usage, and risk barriers.

2.3 The stimuli-organism-response theoretical model

The SOR theoretical model, rooted in environmental psychology, posits that various aspects of the environment play a stimulating role (S), influencing individuals' internal state (O), and subsequently prompting behavioral responses (R) (Mehrabian and Russell, 1974). According to this model, the psychological changes in organisms are influenced by external environmental factors and settings, which, in turn, elicit behavioral responses. Furthermore, the model explains how external stimuli can affect individuals' internal states (Eroglu et al., 2001). Previous research suggested that the impacts of individuals' internal state can be both detrimental and favorable (Verhagen and van Dolen, 2011). Ultimately, individuals make choices based on their internal state and then respond behaviorally (Mehrabian and Russell, 1974).

The SOR theoretical model is relevant to this study for two reasons. Firstly, it has been widely employed in previous research on consumer behavior (Konuk, 2019; Tandon et al., 2020; Liu et al., 2021b). For example, Konuk (2019) used the SOR model to investigate consumer behavior related to social media, specifically word-of-mouth, and revisiting. Tandon et al. (2020) explored whether environmental stimuli can promote consumers' organic purchasing behavior using the SOR model as a basis. Secondly, considering the significant influence of environmental factors on consumer behavior, the SOR model offers a concise and structured approach to evaluate how environmental stimuli impact the psychological parameters (e.g., emotion, cognition, perception) of consumers. It further examines the effects of consumers' psychological parameters on their organic purchasing behavior.

Thus, in this study, we apply the proposed SOR model to examine organic consumption behavior.

2.3.1 Stimuli (S)

Stimulus refers to various environmental factors that individuals encounter (Jacoby, 2002). In recent times, China has experienced several food safety incidents, such as the "earth pit" pickled cabbage incident involving suppliers of Master Kang and Uni-President in 2022, as well as the "lean" events of Shuanghui (Hsu and Chen, 2014). These food safety issues, originating from different nodes of the food supply chain, can influence consumers' internal perception. Previous studies have also demonstrated the significant impact of food safety concerns on consumer perception (Pham et al., 2018; Liu et al., 2022). Therefore, in this study, we examine organic consumption by focusing on the entire supply chain of organic food and constructing three dimensions of food safety concerns: safety concerns toward organic producers, safety concerns toward organic retailers, and safety concerns toward public departments, as the "stimulus."

2.3.2 Organism (O)

Organism refers to the internal perception of each individual (Eroglu et al., 2001), which encompasses both detrimental and favorable factors (Verhagen and van Dolen, 2011). Previous studies have highlighted the importance of perceived values and risks as key components of consumers' internal perception. These factors not only drive consumers to select or avoid specific products but also serve as primary predictors of consumer purchasing behavior (Tandon et al., 2020). Therefore, in this study, we consider the positive and negative aspects of consumers' internal perception, specifically perceived values and perceived risks, as the "organism" in order to investigate organic consumption.

2.3.3 Response (R)

Response refers to the ultimate outcome and decision made by consumers based on their internal perception, which may involve either approach or avoidance behavior (Sherman et al., 1997). Verhagen and van Dolen (2011) emphasized that consumers' internal perception has both positive and negative effects on purchasing behavior. Therefore, this study examines the influence of positive factors (perceived values) and negative factors (perceived risks) of consumers' internal perception on their organic purchasing behavior.

3 Hypothesis development

3.1 Food safety concerns, perceived risks, and perceived values (S-O)

Food safety concerns refer to consumers' apprehensions regarding pesticide residues, chemical fertilizers, veterinary drug residues, heavy metals, pollutants, and the use of agricultural biotechnology in food production practices (Teng and Lu, 2016). Previous studies on organic food consumption have indicated that food safety concerns are linked to consumers' perceived values (Pino et al., 2012; Kareklas et al., 2014; Teng and Lu, 2016; Liu et al., 2022). For example, Pino et al. (2012) noted that the production process of organic food often leads people to believe that it has higher nutritional and environmental protection value compared to traditional food, as organic food production avoids the use of harmful pesticides or chemicals (Kareklas et al., 2014). Moreover, consumers' concerns about food safety have increased due to frequent food safety issues (Çabuk et al., 2014), leading individuals to seek safer food options to avoid consuming substances that are detrimental to human health (Hsu and Chen, 2014). Consequently, consumers who prioritize food safety may perceive lower risks associated with organic food. Liu and Zheng (2019) found that consumers' safety concerns toward organic producers can enhance their understanding of organic food. Based on these findings, the following hypothesis can be proposed:

H1a−1b: Safety concerns toward organic producers (SCOP) positively influence environmental value (EV) and nutritional value (NV).

H1c−1e: Safety concerns toward organic producers (SCOP) negatively affect image barrier (IB) as well as usage barrier (UB) and risk barrier (RB).

Furthermore, Pham et al. (2018) highlighted that food safety concerns also encompass worries about the addition of preservatives and enzymes during storage, packaging, transportation, and other stages of the food supply chain. Additionally, scholars have pointed out that consumers are also concerned about the regulatory measures implemented by authorities governing food production and sales enterprises (Kushwah et al., 2019; Li et al., 2021). Therefore, this study not only examines the effects of safety concerns toward organic producers on perceived values and perceived risks but also considers the impacts of the other two dimensions of food safety concerns, namely safety concerns toward organic retailers and safety concerns toward public departments, on perceived values and perceived risks. Based on this, the following hypothesis can be proposed:

H2a−2b: Safety concerns toward organic retailers (SCOR) positively influence environmental value (EV) and nutritional value (NV).

H2c−2e: Safety concerns toward organic retailers (SCOR) negatively affect image barrier (IB) as well as usage barrier (UB) and risk barrier (RB).

H3a−3b: Safety concerns toward public departments (SCPD) positively influence environmental value (EV) and nutritional value (NV).

H3c−3e: Safety concerns toward public departments (SCPD) negatively affect image barrier (IB) as well as usage barrier (UB) and risk barrier (RB).

3.2 Perceived values, perceived risks and purchase behavior (O-R)

Perceived values represent the comprehensive evaluation made by purchasers regarding the worth of related products (Zeithaml, 1988) and are considered crucial predictors of consumer

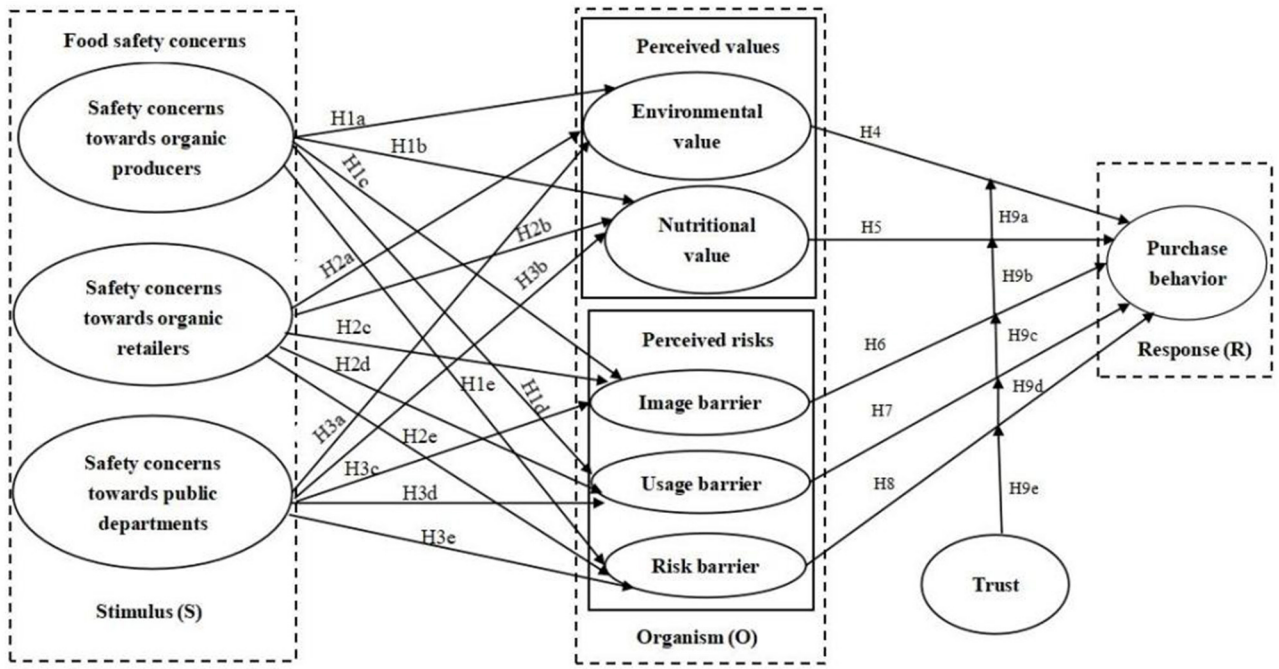

FIGURE 1
The hypothesized model.

purchasing behavior (Sheth et al., 1991). Furthermore, Sheth et al. (1991) highlighted that perceived values intrinsically explain why consumers choose specific products. In previous studies, perceived values have been categorized into various dimensions based on the research focus. For instance, Khan and Mohsin (2017) classified perceived values into six dimensions, including functional, environmental, social, emotional, conditional, and epistemic values. In alignment with the theme of our current research, we categorize perceived values into two dimensions: nutritional and environmental values. Based on this, we propose the following hypothesis:

H4: EV has a positive influence on purchase behavior (PB).
H5: NV has a positive influence on PB.

Previous research has indicated that consumers harbor doubts about the benefits of organic food, leading them to perceive certain risks when making organic food purchases (Bryła, 2016; Kushwah et al., 2019). To mitigate these perceived risks and encourage organic food purchases, scholars have employed the innovation resistance theory to explore the internal factors that discourage consumers from buying organic food (Kushwah et al., 2019; Tandon et al., 2020). For example, Kushwah et al. (2019) examined the impact of risk barriers and image barriers on organic purchase intentions using the innovation resistance theory and found that these barriers significantly and negatively affect organic purchase intentions. Additionally, the usage barrier has been identified as a crucial factor that impedes consumers from buying organic food (Bryła, 2016; Pham et al., 2018). Consequently, in this study, we adopt the innovation resistance theory to investigate three dimensions of perceived risks (i.e., image, usage, and risk barriers) in relation to organic purchasing behavior. Based on this, the following hypotheses are proposed:

H6: IB has a negative influence on PB.
H7: UB has a negative influence on PB.
H8: RB has a negative influence on PB.

TABLE 1 Demographic data of the survey respondents ($N = 352$).

		n	%
1. Age	18–30	113	32.1
	31–40	147	41.8
	41–50	68	19.3
	>50	24	6.8
2. Gender	Female	214	60.8
	Male	138	39.2
3. Income (RMB/month)	≤3,000	3	0.9
	3,001–5,000	25	7.1
	5,001–8,000	84	23.9
	8,001–12,000	110	31.3
	>¥12,000	130	36.9
	Postgraduate and above	45	12.8
4. Education	Junior college or undergraduate	290	82.4
	High school or technical secondary school	16	4.5
	Junior high school and below	1	0.3

3.3 The moderating effect of trust

Trust is widely recognized as a crucial factor influencing consumers' decision to purchase organic food (Vega-Zamora et al., 2019; Nguyen and Dang, 2022). Previous studies have highlighted that consumer suspicion or lack of trust in organic food hinders the growth of the organic food industry (Gracia and De-Magistris, 2016; Nuttavuthisit and Thogersen, 2017; Carfora et al., 2019). Additionally, Tung et al. (2012) suggested that trust can bridge the gap between intention and actual behavior in organic food purchases. Furthermore, Sultan et al. (2020) revealed that trust could moderate the relationship between behavioral intention and organic purchase behavior. Therefore, in this study, we examined the moderating effect of trust on the relationship between perceived values (environmental value and nutritional value), perceived risks (image barrier, usage barrier, and risk barrier), and purchase behavior. Based on this, the following hypotheses are proposed:

H9a−9e: Trust moderates the effects of environmental value as well as nutritional value, image barrier, usage barrier and risk barrier on purchase behavior.

The comprehensive model incorporating all the aforementioned hypotheses is illustrated in Figure 1.

4 Methodology

4.1 Data collection

The present study conducted data collection from May to June 2022 using an online survey administered to participants residing in China's first-tier cities, including Beijing, Shanghai, Shenzhen, and Guangzhou. The data collection process was facilitated by Wenjuanxing (https://www.wjx.cn), a professional online questionnaire service company. The main reason for choosing these cities for the survey is that per capita organic food consumption in China lags behind the global average (Willer and Lernoud, 2022), with a majority of organic food consumers located in China's first-tier cities (Liu et al., 2021a). Therefore, collecting data online from these cities provided a more representative sample for the study. Prior to the formal survey, a pilot survey was conducted where 30 questionnaires were distributed online to ensure the clarity of the survey items and the appropriateness of data collection procedures. Based on the feedback received during the pilot survey, appropriate modifications were made to the questionnaire. In accordance with the relevant institutional and national guidelines and regulations in China, ethical approval was not required, and informed consent was obtained during the survey submission.

In addition, the questionnaire included a question asking participants if they had ever purchased organic food before. Twenty-eight participants responded "No" to this question and were subsequently excluded from the analysis since the focus of the present research was on organic purchasing behavior. Therefore, a total of 352 valid responses were obtained out of the 380 initial responses. As shown in Table 1, among the respondents, 32.1% were aged between 18 and 30 years, while 26.1% were aged above 40 years. The sample consisted of 60.8% female and 39.2% male respondents. Furthermore, 23.9% of the participants reported a monthly income per capita between RMB 5,001 and 8,000 yuan. Additionally, 82.4% of the respondents had received a junior college or undergraduate education.

4.2 Evaluation measures

The previously validated multiple-item scales were utilized for measuring the constructs in the proposed model. Minor modifications were made to ensure the face validity of these measures in the context of the current research. Supplementary Appendix A presents the construct items, which were assessed using a 7-point Likert scale, where 1 indicated "strongly disagree" and 7 indicated "strongly agree."

4.3 Analytical method

To assess the proposed model, this study utilized the two-stage method of structural equation modeling (SEM) as outlined by Anderson and Gerbing (1988). Model fit evaluation and hypothesis testing were conducted using AMOS 24.0. Additionally, hierarchical regression analysis was performed using SPSS 23.0 to examine the moderating effects of trust on the relationships between perceived values, perceived risks, and purchase behavior.

5 Results

5.1 Common method variance

To assess the potential influence of common method variance on the study, we conducted Harman's single-factor test as proposed by Podsakoff et al. (2003). The results of the test revealed that a single factor could only account for 35.1% of the total variance, indicating that the majority of the variance was not attributable to a single factor. Thus, it is unlikely that common method bias poses a significant concern in the present research.

5.2 Validity of measurement model

Confirmatory factor analysis (CFA) was conducted using AMOS 24.0 to assess the measurement model of the study. Model fit was evaluated based on various criteria, including degrees of freedom (df), chi-square (χ^2) value, χ^2/df ratio, root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), comparative fit index (CFI), and Tucker-Lewis index (TLI) following the protocols suggested by Jackson et al. (2009). However, due to non-multivariate normality, several fit statistics of the model did not meet their minimum acceptable levels. To address this issue, bias correction in the model fit statistic was performed using the Bollen-Stine bootstrap method (Bollen and Stine, 1992; Fisher and King, 2010). After a 2,000-times bootstrap correction, the resulting fit statistics (df = 327, $\chi^{2=}$ 396.712; χ^2/df = 1.21; RMSEA = 0.02; GFI = 0.93; CFI = 0.99; TLI = 0.99) met the acceptable criteria (Hu and Bentler, 1999).

TABLE 2 The coefficients determined for the measurement model.

Construct	No. of items	Cronbach's alpha	Variable	Std. factor loadings	SE	*t*-value	CR	AVE
Safety concerns toward organic producers	3	0.809	SCOP1	0.816	—	—	0.812	0.594
			SCOP2	0.853	0.061	16.789 (***)		
			SCOP3	0.623	0.055	11.817 (***)		
Safety concerns toward organic retailers	3	0.846	SCOR1	0.843	—	—	0.851	0.658
			SCOR2	0.885	0.063	17.807 (***)		
			SCOR3	0.693	0.055	13.886 (***)		
Safety concerns toward public departments	3	0.777	SCPD1	0.685	—	—	0.774	0.533
			SCPD2	0.769	0.103	10.622 (***)		
			SCPD3	0.735	0.101	10.534 (***)		
Environmental value	3	0.75	EV1	0.733	—	—	0.75	0.502
			EV2	0.757	0.1	10.955 (***)		
			EV3	0.629	0.095	9.862 (***)		
Nutritional value	3	0.802	NV1	0.761	—	—	0.804	0.579
			NV2	0.823	0.074	14.49 (***)		
			NV3	0.693	0.07	12.383 (***)		
Image barrier	3	0.848	IB1	0.795	—	—	0.848	0.651
			IB2	0.836	0.073	15.296 (***)		
			IB3	0.788	0.07	14.692 (***)		
Usage barrier	3	0.792	UB1	0.773	—	—	0.797	0.571
			UB2	0.848	0.088	13.157 (***)		
			UB3	0.629	0.074	10.99 (***)		
Risk barrier	3	0.874	RB1	0.798	—	—	0.876	0.702
			RB2	0.889	0.069	17.079 (***)		
			RB3	0.824	0.064	16.36 (***)		
Purchase behavior	4	0.915	PB1	0.904	—	—	0.911	0.72
			PB2	0.898	0.043	25.068 (***)		
			PB3	0.794	0.05	19.597 (***)		
			PB4	0.792	0.047	19.517 (***)		

***$p < 0.001$.

To assess the internal consistency reliability, convergent validity, and discriminant validity of the constructs in the proposed model, CFA was performed for all nine constructs (SCOP, SCOR, SCPD, EV, NV, IB, UB, RB, and PB). As shown in Table 2, the findings indicated that both Cronbach's alpha and composite reliability (CR) values exceeded 0.7, indicating acceptable internal consistency reliability (Nunnally, 1978). Moreover, the average variance extracted (AVE) values for all constructs were above the threshold of 0.5 (Fornell and Larcker, 1981). Convergent validity was supported by standardized factor loadings of all items exceeding the threshold of 0.6 (Hair et al., 2009). Additionally, the intercorrelation estimates between constructs were all below the square roots of their respective AVE, providing evidence for discriminant validity (Table 3) (Fornell and Larcker, 1981).

5.3 Hypothesis testing

Correlations among factors containing control variables, including age, gender, and education, were examined using SEM.

TABLE 3 Discriminant validity.

	1	2	3	4	5	6	7	8	9
1. SCOP	**0.771**								
2. SCOR	0.522**	**0.811**							
3. SCPD	0.220**	0.243**	**0.730**						
4. EV	0.435**	0.358**	0.201**	**0.709**					
5. NV	0.605**	0.439**	0.253**	0.474**	**0.761**				
6. IB	−0.355**	−0.322**	−0.222**	−0.213**	−0.349**	**0.807**			
7. UB	−0.355**	−0.350**	−0.103	−0.180**	−0.323**	0.718**	**0.756**		
8. RB	−0.185**	−0.187**	−0.164**	−0.115*	−0.276**	0.693**	0.664**	**0.838**	
9. PB	0.552**	0.539**	0.292**	0.427**	0.624**	−0.542**	−0.530**	−0.451**	**0.849**

The square root of AVE for discriminant validity is illustrated in bold font.
**p < 0.01.
*p < 0.05.

Bias correction in the model fit statistic was achieved through the Bollen-Stine bootstrap method, resulting in fit indicators of $\chi^2 = 520.692$, df = 441, χ^2/df = 1.18, CFI = 0.99, TLI = 0.98, GFI = 0.92, and RMSEA = 0.02. These indices indicate a well-fitting model that explains a significant 64.5% of the variation in purchase behavior.

As presented in Table 4 and Figure 2, the results of hypothesis testing support 16 hypotheses (H1a–H1e, H2a–H2b, H2d, H3b–H3c, H3e, H4, H5, H6, H7, and H8). Notably, SCOP (H1a: $\beta = 0.234$, $p < 0.001$; H1b: $\beta = 0.456$, $p < 0.001$; H1c: $\beta = -0.346$, $p < 0.001$; H1d: $\beta = -0.363$, $p < 0.001$; H1e: $\beta = -0.252$, $p < 0.01$) shows a significant impact on EV, NV, IB, UB, and RB, respectively, supporting H1a, H1b, H1c, H1d, and H1e. Additionally, SCOR (H2a: $\beta = 0.093$, $p < 0.05$; H2b: $\beta = 0.112$, $p < 0.05$; H2d: $\beta = -0.232$, $p < 0.01$) exhibits a significant effect on EV, NV, and UB, respectively, supporting H2a, H2b, and H2d. Similarly, SCPD (H3b: $\beta = 0.168$, $p < 0.01$; H3c: $\beta = -0.313$, $p < 0.01$; H3e: $\beta = -0.294$, $p < 0.01$) significantly influences NV, IB, and RB, respectively, supporting H3b, H3c, and H3e. Moreover, EV, NV, IB, UB, and RB all have a significant influence on PB at various significant levels (EV: 1%, NV: 0.1%, IB: 0.1%, UB: 0.1%, RB: 5%), supporting H4, H5, H6, H7, and H8. However, SCOR does not have a significant effect on IB and RB, and SCPD does not have a significant effect on EV and UB. Consequently, H2c, H2e, H3a, and H3d are not supported.

To investigate the moderating effects of trust, a hierarchical moderation regression analysis was conducted using SPSS 23.0. The results, as presented in Table 5.1, indicated that trust could moderate the relationship between nutritional value and purchase behavior (H9b: $\beta = 0.071$, $p < 0.01$), as well as between risk barrier and purchase behavior (H9e: $\beta = 0.093$, $p < 0.05$). Thus, H9b and H9e were supported. Regardless of whether trust levels were high (95% confidence interval = 0.181, 0.437) or low (95% confidence interval = 0.037, 0.229), trust played a significant and positive moderating role between nutritional value and purchase behavior. Conversely, its moderating role between risk barrier and purchase behavior was significant and negative when trust levels were low (95% confidence interval = −0.224, −0.059; Table 5.2).

To further interpret the moderating effect of trust, the interactive effects were illustrated in Figures 3, 4. These figures demonstrate that trust strengthens the positive effect of nutritional value on purchase behavior and weakens the negative impact of the risk barrier on purchase behavior. Moreover, the slope between nutritional value and purchase behavior is notably positive for consumers with low trust ($\beta = 0.133$, $p < 0.01$) and significantly positive for consumers with high trust ($\beta = 0.309$, $p < 0.001$). Additionally, the slope between the risk barrier and purchase behavior is notably negative for consumers with low trust ($\beta = -0.141$, $p < 0.01$).

6 Discussion and implications

6.1 Discussion

Firstly, the study findings reveal the relationship between "stimulus" (food safety concerns) and "organism" (perceived values and perceived risks). The results indicate that safety concerns toward organic producers have a positive impact on environmental value and nutritional value, while negatively influencing image barrier, usage barrier, and risk barrier. These findings align with previous research (Kareklas et al., 2014). For example, Liu and Zheng (2019) found that consumers' safety concerns toward organic producers can enhance their perception of organic food. Additionally, the study shows that safety concerns toward organic retailers significantly affect environmental value, nutritional value, and usage barrier. However, they have no significant impact on image barrier and risk barrier. One possible explanation is that consumers primarily associate image barrier and risk barrier with producers and regulators in the organic food supply chain. Meanwhile, Li et al. (2021) argued that agricultural product traceability records from producers can greatly reduce purchase barriers, such as the risk barrier. Furthermore, safety concerns toward public departments are found to have a significant effect on nutritional value, image barrier, and risk barrier. This suggests that when public departments prioritize food safety supervision and implement strict regulations on organic food, consumers perceive the nutritional attributes of organic food more strongly and reduce their concerns regarding image barrier and risk barrier.

Secondly, regarding the relationship between "organism" (perceived values and perceived risks) and "response" (purchase behavior), the study results indicate that environmental value

TABLE 4 The results of the hypothesis test.

Hypothesis	Path	β	SE	t-value	p-value	Supported
H1a	SCOP → EV	0.234	0.044	5.361	***	Yes
H1b	SCOP → NV	0.456	0.056	8.213	***	Yes
H1c	SCOP → IB	−0.346	0.076	−4.569	***	Yes
H1d	SCOP → UB	−0.363	0.08	−4.523	***	Yes
H1e	SCOP → RB	−0.252	0.082	−3.074	**	Yes
H2a	SCOR → EV	0.093	0.044	2.117	*	Yes
H2b	SCOR → NV	0.112	0.052	2.16	*	Yes
H2c	SCOR → IB	−0.13	0.078	−1.664	0.096	No
H2d	SCOR → UB	−0.232	0.083	−2.79	**	Yes
H2e	SCOR → RB	−0.027	0.086	−0.316	0.752	No
H3a	SCPD → EV	0.102	0.054	1.896	0.058	No
H3b	SCPD → NV	0.168	0.064	2.617	**	Yes
H3c	SCPD → IB	−0.313	0.098	−3.182	**	Yes
H3d	SCPD → UB	−0.101	0.101	−0.997	0.319	No
H3e	SCPD → RB	−0.294	0.108	−2.722	**	Yes
H4	EV → PB	0.286	0.094	3.059	**	Yes
H5	NV → PB	0.583	0.076	7.678	***	Yes
H6	IB → PB	−0.183	0.045	−4.074	***	Yes
H7	UB → PB	−0.164	0.044	−3.718	***	Yes
H8	RB → PB	−0.089	0.038	−2.359	*	Yes

SCOP, safety concerns toward organic producers; SCOR, safety concerns toward organic retailers; SCPD, safety concerns toward public departments; EV, environmental value; NV, nutritional value; IB, image barrier; UB, usage barrier; RB, risk barrier; PB, purchase behavior.
***$p < 0.001$.
**$p < 0.01$.
*$p < 0.05$.

and nutritional value have a significantly positive impact on purchase behavior, while image barrier, usage barrier, and risk barrier have a significantly negative effect on purchase behavior. These findings align with prior literature, indicating that perceived values can promote consumers' organic buying behavior (Sheth et al., 1991; Khan and Mohsin, 2017), while perceived risks hinder organic purchasing behavior (Kushwah et al., 2019). This may help explain why consumers' intention to purchase organic products may not always translate into actual purchase behavior.

Finally, trust is found to positively moderate the relationship between nutritional value and purchase behavior, as well as between risk barrier and purchase behavior. However, trust does not moderate other perceived values and perceived risks. This may be because many consumers prioritize personal factors, such as nutritional attributes and health benefits, when making organic food purchases, and the perceived risk associated with the higher price of organic food acts as a significant barrier preventing consumers from making organic purchases. Therefore, trust facilitates the conversion of consumers' perceived value (nutritional value) into organic purchase behavior and reduces the impediment of perceived risk (risk barrier) on organic purchase behavior.

6.2 Theoretical implications

The present study contributes to the existing literature in several ways. Firstly, it addresses a research gap by examining the relationships between different dimensions of food safety concerns and organic consumption. To address this gap, the study takes a comprehensive approach by considering three dimensions of food safety concerns: safety concerns toward organic producers, safety concerns toward organic retailers, and safety concerns toward public departments. Investigating the correlations between these dimensions and purchase behavior enhances our understanding of organic consumption. Secondly, while previous studies have explored the associations between perceived values and organic consumption, there is limited research on the connections between perceived values, perceived risks, and organic purchase behavior. To bridge this gap, this study differentiates "organism" (O) into positive internal perception (perceived values) and negative internal perception (perceived risks) of consumers, drawing on the SOR theoretical model, perceived values theory, and innovation resistance theory. By examining the relationships among perceived values, perceived risks, and organic purchase behavior, this study sheds light on the inconsistent relationship between intention and behavior in organic consumption and

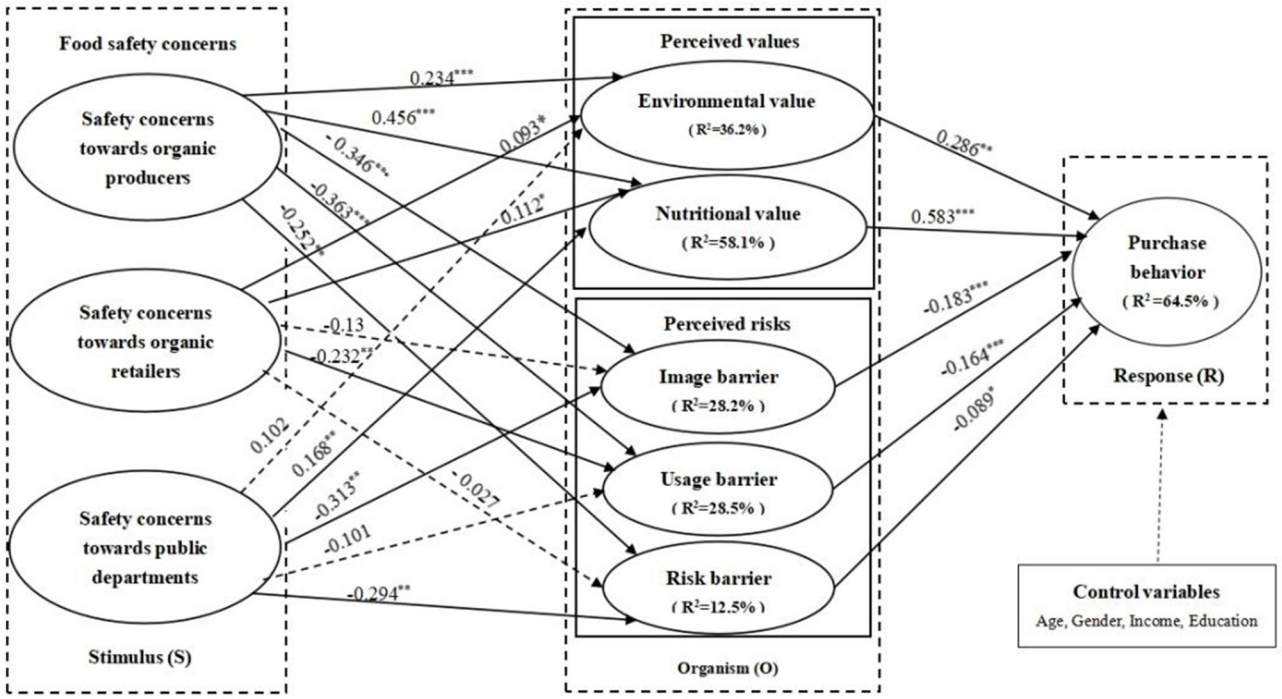

FIGURE 2
Tested model. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

offers a fresh perspective for understanding organic consumption. Thirdly, the study investigates the moderating role of trust in the relationships between perceived values, perceived risks, and organic purchase behavior. The findings reveal that trust moderates the relationships between nutritional value and risk barrier with purchase behavior. These findings have important implications for organic sellers, public departments, and even organic producers. Lastly, this study expands the emerging literature on the application of food safety concerns, perceived values, and perceived risks in the context of organic consumption, providing insights into unexplored associations. By examining the interplay among food safety concerns, perceived values, perceived risks, and purchase behavior, this research makes a specific contribution to the marketing literature.

6.3 Practical implications

The current study has important implications for practitioners in the field. Firstly, the findings highlight the significance of addressing food safety concerns to influence consumers' organic purchase behavior. Therefore, organic producers, retailers, and public departments should develop appropriate strategies to ensure that consumers feel confident and secure when buying organic food. For instance, they can collaborate to establish a comprehensive organic food traceability system, providing consumers with access to detailed information about the entire production process, including transportation, storage, and packaging. Public departments should rigorously supervise this system and effectively communicate regulatory information to consumers through authoritative media channels, thereby enhancing trust in the traceability system and meeting consumers' food safety concerns.

Secondly, perceived values play a crucial role in shaping consumers' organic purchase behavior. To capitalize on this, organic producers and retailers should devise strategies to enhance the perceived values associated with organic food consumption. For example, organic producers can leverage new media platforms, such as TikTok short videos, to showcase various aspects of organic food production. Furthermore, organic retailers can organize experiential activities linked to organic food, such as advertising during important events and integrating rural tourism, to help consumers better understand the benefits of organic food in terms of safety, environmental sustainability, and nutrition.

Lastly, perceived risks have a significant negative impact on organic purchase behavior. Therefore, organic producers, retailers, and public departments should implement strategies aimed at reducing consumers' perceived risks when purchasing organic food, thereby promoting organic consumption. For instance, organic retailers can conduct market research and strategically increase the availability of organic food sales points based on consumer demand, making it more convenient for consumers to access organic products and reducing usage barriers. Additionally, public departments can adopt a two-pronged approach to supervise third-party organic food certification agencies. This entails strengthening regulatory oversight and management from government agencies while also mobilizing public participation in monitoring these certification agencies, thereby mitigating the risk barrier associated with purchasing organic food.

TABLE 5.1 Moderation analysis for trust.

Variables	Step 1		Step 2		Step 3		Collinearity	
	β	t	β	t	β	t	TOL	VIF
Gender	−0.112*	−2.124	−0.009	−0.319	0.005	0.205	0.932	1.073
Age	0.094	1.784	0.040	1.485	0.042	1.623	0.961	1.041
Education	0.103	1.859	0.006	0.194	0.011	0.380	0.858	1.166
Income	0.088	1.582	0.009	0.304	0.004	0.136	0.841	1.189
SCOP			0.050	1.343	0.047	1.278	0.494	2.026
SCOR			0.067*	1.969	0.060	1.796	0.598	1.672
SCPD			0.021	0.747	0.022	0.763	0.829	1.207
EV			0.045	1.416	0.055	1.725	0.650	1.539
NV			0.141***	3.720	0.175***	4.499	0.436	2.291
IB			−0.002	−0.050	−0.003	−0.063	0.340	2.943
UB			−0.102*	−2.410	−0.139**	−3.320	0.375	2.667
RB			−0.066	−1.619	−0.073	−1.803	0.400	2.500
Trust			0.587***	14.834	0.519***	11.697	0.334	2.992
EV* trust					−0.017	−0.617	0.760	1.315
NV* Trust					0.071**	2.741	0.471	2.124
IB* trust					0.024	0.563	0.281	3.553
UB* trust					0.070	1.628	0.335	2.989
RB* trust					0.093*	2.390	0.356	2.807
ΔR^2	0.047		0.714		0.020			
ΔF	4.232**		112.072***		6.118***			

***p < 0.001.
**p < 0.01.
*p < 0.05.

TABLE 5.2 The moderating impact of trust.

Path	Moderator	Level	Conditional effect	SE	*p*-value	Percentile 95% CI
NV→ PB	Trust	Low	0.133	0.049	**	0.037, 0.229
		High	0.309	0.065	***	0.181, 0.437
RB→ PB	Trust	Low	−0.141	0.042	**	−0.224, −0.059
		High	0.012	0.052	0.815	−0.091, 0.115

***p < 0.001.
**p < 0.01.

6.4 Limitations and prospects

Nevertheless, this study has certain limitations. Firstly, it relied on self-reported questionnaires and cross-sectional research data. Consequently, further investigations are required to extend the results to Chinese consumers. Nonetheless, the study took appropriate measures to ensure unbiased responses and included a sufficient sample size, thereby enhancing the robustness of the findings. Additionally, when examining the correlation between perceived values and purchase behavior, the study solely considered two dimensions of perceived values, namely nutritional value and environmental value, without exploring the impact of other dimensions on organic purchase behavior. Biswas and Roy (2015) argued that knowledge plays a crucial role in driving consumers to buy organic food. Moreover, as individuals increasingly prioritize food pleasure, it may also serve as a significant factor in promoting organic food purchases (Hyldelund et al., 2021). Therefore, future research should encompass other dimensions of perceived values, such as knowledge value and pleasure value.

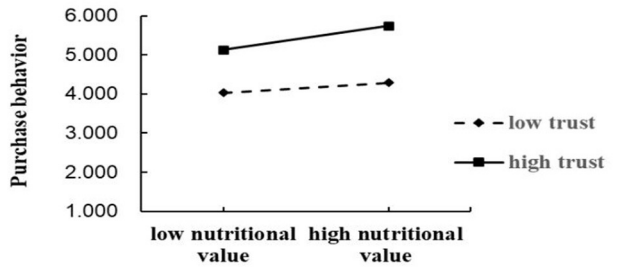

FIGURE 3
Moderation of trust on the relationship between NV and PB.

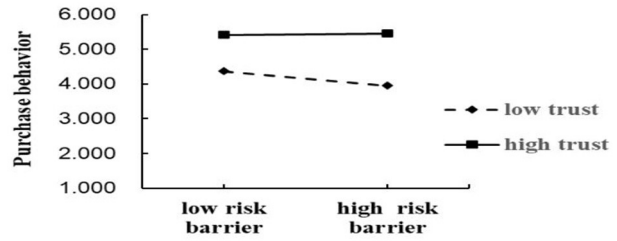

FIGURE 4
Moderation of trust on the relationship between RB and PB.

7 Conclusion

Based on the research findings, this study has made significant progress in exploring the interrelationships between food safety concerns, perceived values, perceived risks, and organic purchasing behavior. By introducing the theory of perceived values and innovation resistance into the SOR theoretical model, this research not only enriches existing research in the field of organic consumption, but also provides a new perspective to bridge the gap between consumers' purchase intention and actual behavior. In addition, this study also focused on the impact of positive and negative psychological factors on organic purchasing decisions. Therefore, for researchers, organic producers, retailers, and policymakers, this study has important practical significance and helps to fill the gap between consumer intention and behavior. These findings and insights provide valuable suggestions for the growth of the organic food market.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

DC: Conceptualization, Supervision, Writing—original draft, Writing—review & editing. QX: Data curation, Writing—review & editing. XY: Methodology, Writing—review & editing. YZ: Data curation, Methodology, Writing—original draft, Writing—review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fsufs.2023.1319309/full#supplementary-material

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