

Integrating the Health Belief Model and Theory of Planned Behavior to Explain Green Food Purchase Intention among Higher Education Students in Wuhan, China

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ABSTRACT: Green food consumption is increasingly connected with food quality, personal health, and sustainable production, yet favorable public attitudes do not ensure routine purchasing among students. This study integrated the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) to explain green food purchase intention among higher education students in Wuhan, China. Using convenience and purposive sampling, this study collected 570 valid responses from full-time university students aged 18 years or above in Wuhan who had previously purchased certified green food through online and on-campus surveys. Structural equation modeling was employed to analyze the data and test the proposed relationships. The results uncover that perceived severity and perceived benefits positively predicted attitude, whereas perceived barriers had a negative effect. Perceived susceptibility was not significant. Attitude, subjective norm, and perceived behavioral control positively predicted purchase intention, explaining 56.1% of its variance. Attitude mediated the effects of perceived severity, perceived benefits, and

perceived barriers, but not perceived susceptibility. The findings indicate that students' purchase intention is shaped more strongly by credible benefits, manageable sacrifice, and purchasing capability than by generalized vulnerability. The results support coordinated action by certification bodies, universities, producers, retailers, and digital platforms to improve verification, affordability, availability, and informed choice.

Keywords: *Green food; purchase intention; Health Belief Model; Theory of Planned Behavior; higher education students; China.*

1. Introduction

Food consumption sits at the intersection of public health, environmental pressure, agricultural production, and household expenditure. Governments and consumers increasingly expect food systems to deliver not only adequate quantity but also reliable quality, responsible resource use, and transparent information. These expectations are especially visible in China, where green and high-quality agricultural development has become an important policy direction and certified Green Food has been promoted as a recognizable market category (Chinese Government, 2022, 2025; Ministry of Agriculture and Rural Affairs of China, 2025). In the present study, Green Food refers specifically to products certified under China's Green Food certification system and carrying an authorized mark. It is not treated as a synonym for organic food or as a general label for any environmentally friendly product.

Despite policy support and expanding product availability, the decision to purchase certified green food remains difficult for many young consumers. Benefits such as confidence in production standards, traceability, food quality, and environmental responsibility must be weighed against price premiums, limited availability, search effort, and uncertainty about whether a label is authentic. Reviews of sustainable and organic food consumption repeatedly identify this tension between favorable evaluation and practical sacrifice (van Bussel et al., 2022; Parashar et al., 2023). In China, the problem is intensified by the coexistence of official certification, commercial green claims, different quality labels, and uneven consumer knowledge. Clear certification can strengthen perceived value, but difficult verification can weaken trust and make the certified option less attractive (China Consumer Association, 2024; Sultan et al., 2021).

Higher education students are a particularly relevant population for examining this problem. Their food choices are frequent and personally consequential, while their budgets, access to retail channels, and living arrangements differ from those of established households. Many students express concern about health and environmental issues, but they also depend on campus canteens, nearby supermarkets, delivery platforms, and price-sensitive meal choices. Wuhan provides a useful setting because it is one of China's largest higher education centers, with diverse public, private, vocational, undergraduate, and postgraduate institutions (Hubei Provincial Department of Education, 2024; Wuhan Municipal Bureau of Statistics, 2024). The city's student population represents a substantial current market and a future consumer group whose food habits can influence longer-term demand.

The student setting also exposes a practical inconsistency that cannot be explained by awareness alone. A student can understand the meaning of healthier or more sustainable consumption yet choose a conventional product because it is cheaper, closer, more familiar, or easier to verify. Conversely, a student with only moderate environmental concern can choose certified green food when the quality information is clear and the price difference is manageable. The research problem is therefore not simply whether students support green consumption. It is how health-related beliefs, personal evaluation, social approval, and perceived purchasing capability combine to form a specific intention toward certified Green Food.

Existing research offers valuable but incomplete explanations. The Theory of Planned Behavior (TPB) explains intention through attitude, subjective norm, and perceived behavioral control (Ajzen, 1991). Studies of sustainable, organic, and green food generally support these predictors, although their strength varies across products and populations (Shen et al., 2022; Arya et al., 2024; He & Sui, 2024). TPB is therefore useful for identifying the immediate psychological conditions of intention. However, it does not specify one universal set of domain beliefs that explains why consumers form a favorable or unfavorable attitude toward certified green food. A student can approve of sustainable consumption in principle while remaining unconvinced that a particular certified product offers enough personal value.

The Health Belief Model (HBM) provides a complementary explanation. It distinguishes perceived susceptibility and severity, which describe threat appraisal, from perceived benefits and barriers, which describe the value and cost of protective action (Janz & Becker, 1984; Rosenstock et al., 1988). Food consumption can be interpreted as a health-relevant action because individuals evaluate exposure to food-safety concerns, the seriousness of possible consequences, the benefits of certified alternatives, and the barriers to choosing them. Recent studies have combined health beliefs with food-purchase models, but much of this evidence concerns organic food or broad sustainable consumption rather than China's regulated Green Food category (Pang et al., 2021; Parashar et al., 2023; Singh et al., 2025).

Three research gaps follow from this literature. First, empirical studies often place health consciousness, perceived value, risk, or environmental concern beside TPB variables without clarifying how these beliefs enter the intention process. Treating all predictors as parallel direct effects overlooks the possibility that health beliefs first shape attitude and then influence intention. Second, threat appraisal and action appraisal are not always separated. Personal susceptibility, perceived seriousness, expected benefits, and practical barriers can have different roles, especially for a routine purchase that occurs repeatedly rather than for a one-time medical decision. Third, evidence focused on Chinese higher education students is growing, but limited work has tested an integrated HBM-TPB mechanism for certified green food while distinguishing attitude from perceived behavioral control and using bootstrapped indirect effects (He & Sui, 2024; He et al., 2025; Singh et al., 2025).

Accordingly, this study had three objectives. The first was to examine the effects of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers on attitude toward purchasing green food. The second was to test the effects of attitude, subjective norm, and perceived behavioral control on green food purchase intention. The third was to determine whether attitude mediates the relationships between the four HBM constructs and purchase intention. The study used survey evidence from 570 higher education students in Wuhan who had prior purchasing experience with certified green food.

The remainder of the paper is organized as follows. Section 2 presents the theoretical foundations and develops the hypotheses. Section 3 explains data collection, measurement, analysis, and the pilot test. Section 4 reports the respondent profile, measurement assessment, structural paths, and indirect effects. Section 5 discusses the findings in relation to previous research and presents theoretical and practical implications and study boundaries. Section 6 concludes the paper. The references are followed by an appendix containing the complete measurement scale.

2. Literature Review

2.1 Theoretical Foundations

The TPB proposes that behavioral intention is formed through attitude toward the behavior, subjective norm, and perceived behavioral control (Ajzen, 1991). Attitude represents the individual's positive or negative evaluation of performing a specified action. Subjective norm captures perceived approval or expectation from important others. Perceived behavioral control concerns whether the person believes the action is manageable and within their capability. The theory is appropriate for green food purchasing because the behavior includes personal evaluation, social meaning, and practical constraints. Meta-analytic and recent empirical evidence supports its use in sustainable and organic food research, although attitude and perceived control often carry more weight than normative pressure (Carfora et al., 2021; Le & Nguyen, 2022; Shen et al., 2022; Arya et al., 2024; He & Sui, 2024).

The HBM explains protective action through beliefs about threat and response. Perceived susceptibility concerns the likelihood of being affected by a health problem, while perceived severity concerns the seriousness of its consequences. Perceived benefits represent the expected advantages of an action, and perceived barriers represent its monetary, informational, temporal, or practical costs (Janz & Becker, 1984; Rosenstock et al., 1988). In food purchasing, these constructs correspond to beliefs about exposure to food-safety or residue-related concerns, the seriousness of potential consequences, the value offered by certified products, and the sacrifices required to obtain them. Recent food research shows that health appraisal and practical value are closely connected to the evaluation of organic, natural, and sustainable products (Pang et al., 2021; Sultan et al., 2021; Parashar et al., 2023; Bazhan et al., 2023; Singh et al., 2025).

The two theories are integrated through attitude. HBM constructs provide domain-specific content that explains the formation of attitude, while TPB explains how attitude joins subjective norm and perceived behavioral control in shaping intention. This arrangement avoids treating health beliefs as an unrelated extension and gives each construct a defined position. Threat appraisal and action appraisal are expected to influence whether buying certified green food is viewed favorably; attitude then provides an evaluative mechanism connecting those beliefs with purchase intention. Subjective norm and perceived behavioral control retain their direct roles because social approval and capability can influence intention even after personal evaluation is considered.

This integration also preserves important conceptual boundaries. Susceptibility and severity both concern threat, but the first concerns personal likelihood and the second concerns seriousness. Benefits and barriers both concern the response, but one represents expected value and the other represents sacrifice. Perceived barriers are also distinct from perceived behavioral control. A student can consider a price premium burdensome while still believing that purchasing is possible, or can regard green food favorably while lacking access in the normal campus environment. Positioning barriers before attitude and control before intention allows these different psychological judgments to be tested rather than merged. The model therefore specifies an ordered belief-evaluation-intention process without removing the independent roles of social approval and capability.

The integration is especially appropriate for certified food. Certification converts unobservable production attributes into a market signal, but the signal is effective only when consumers understand it, trust it, and can act on it. HBM explains why health and action beliefs give the signal personal meaning. TPB explains whether that meaning becomes a favorable evaluation and a purchase plan. The combined framework thus addresses both the content of students' beliefs and the organization of their intention, which neither theory captures as completely on its own in this context.

2.2 Hypothesis Development

2.2.1 Perceived Susceptibility and Attitude

Perceived susceptibility gives a health concern personal relevance. Individuals who believe that food-safety or residue-related problems could affect them have a stronger reason to

evaluate protective alternatives. Personal exposure can increase attention to certification and production information. It can also make general health concerns more concrete during product comparison. Research integrating protection motivation, health consciousness, and food choice indicates that perceived exposure supports interest in safer or more responsible products (Pang et al., 2021; Parashar et al., 2023). Sustainable- food reviews further show that perceived health consequences frequently appear among the motives for choosing certified or organic products (van Bussel et al., 2022). HBM-based food research expects vulnerability to activate consideration of a protective response, especially when the response is recognizable and accessible (Singh et al., 2025). Although students often regard severe food-related harm as distant, greater perceived susceptibility should still make green food purchasing appear more prudent and personally relevant (Janz & Becker, 1984; Rosenstock et al., 1988). Therefore:

H1. Perceived susceptibility positively affects attitude toward purchasing green food.

2.2.2 Perceived Severity and Attitude

Perceived severity concerns the seriousness assigned to possible consequences rather than the likelihood of exposure. A food problem judged capable of disrupting health, study, or daily life gives consumers a stronger reason to consider protective food choices. Seriousness can increase the perceived importance of certification, traceability, and production controls. It can also shift green food from an optional ethical preference to a personally meaningful quality choice. HBM research consistently identifies severity as part of threat appraisal (Janz & Becker, 1984; Rosenstock et al., 1988). In food contexts, health consciousness and concern about negative consequences strengthen the evaluation of natural, organic, or responsibly produced alternatives (Pang et al., 2021; Sultan et al., 2021; Parashar et al., 2023). Recent integrated work likewise treats perceived severity as a reason consumers form a favorable evaluation of protective food purchasing (Singh et al., 2025). For students, the effect should remain positive even if severity is less influential than concrete benefits or price barriers. Therefore:

H2. Perceived severity positively affects attitude toward purchasing green food.

2.2.3 Perceived Benefits and Attitude

Perceived benefits represent the advantages consumers expect from choosing certified green food. These advantages include confidence in food quality, reduced concern about certain production inputs, useful certification information, and support for environmentally oriented production. Benefits give consumers positive reasons to prefer the certified product rather than merely reasons to avoid risk. Reviews identify health, quality, environmental value, and trust as central motives for organic and sustainable food consumption (Aertsens et al., 2009; van Bussel et al., 2022). Communication about verifiable food value can also increase favorable internal evaluation and purchase intention (Sultan et al., 2021). Health consciousness becomes behaviorally relevant when consumers connect it with concrete product advantages (Parashar et al., 2023). Chinese student studies report that perceived value and positive beliefs support green food intention (He & Sui, 2024; He et al., 2025). An integrated HBM-TPB account therefore expects benefits to be a strong positive foundation of attitude (Singh et al., 2025). Therefore:

H3. Perceived benefits positively affect attitude toward purchasing green food.

2.2.4 Perceived Barriers and Attitude

Perceived barriers capture the sacrifices associated with purchasing green food. A price premium can be substantial for students with limited living expenses. Additional search and verification effort can make purchasing inconvenient. Uncertainty about authentic certification can weaken the value of the label. Limited availability can also make the certified option seem impractical in everyday meal settings. Earlier work identified affordability and availability as central explanations of the gap between favorable sustainable attitudes and purchasing intentions (Vermeir & Verbeke, 2006). Price consciousness continues to inhibit organic food intention even among consumers with positive environmental beliefs (Saleki et al., 2019). More recent studies show that effort, access, trust, and financial sacrifice remain decisive in stated willingness and purchasing behavior (Talwar et al., 2021; van Bussel et al., 2022; Bazhan et al., 2023). Extended TPB research also treats practical obstacles as negative inputs into sustainable food evaluation (Arya et al., 2024; Singh et al., 2025). Therefore:

H4. Perceived barriers negatively affect attitude toward purchasing green food.

2.2.5 Attitude and Purchase Intention

Attitude captures whether purchasing green food is regarded as good, wise, favorable, and worthwhile. A positive evaluation provides the motivational basis for forming a purchase plan. It helps consumers prioritize the certified option when both green and conventional alternatives are available. It also summarizes multiple beliefs about health, quality, environment, price, and personal relevance. TPB identifies attitude as a proximal determinant of intention (Ajzen, 1991). Meta-analytic evidence confirms a strong attitude-intention relationship across sustainable food contexts (Shen et al., 2022). Studies integrating TPB with value, norms, or trust report the same positive pattern for organic and natural foods (Carfora et al., 2021; Le & Nguyen, 2022). Chinese evidence further shows that favorable attitudes increase green food intention among college students and other generations (He & Sui, 2024; Sui et al., 2024). Recent HBM-TPB research also positions attitude as the evaluative link between health beliefs and purchasing (Singh et al., 2025). Therefore:

H5. Attitude toward purchasing green food positively affects green food purchase intention.

2.2.6 Subjective Norm and Purchase Intention

Subjective norm reflects perceived approval from family, friends, classmates, teachers, and other valued referents. Food choices can express identity and responsibility, so support from important others can make green food purchasing appear legitimate and socially desirable. Family approval can reinforce health-oriented choice, while visible peer behavior can normalize certified products on campus. Recommendations can reduce uncertainty when consumers have limited product knowledge. TPB therefore expects normative approval to strengthen intention (Ajzen, 1991). Organic-food studies identify beliefs, social identity, and important referents as meaningful sources of intention (Bai et al., 2019; Carfora et al., 2021). Positive normative effects have also been reported in cross-national sustainable food analysis and organic food studies (Le & Nguyen, 2022; Gundala et al., 2022; Shen et al., 2022). Research among Chinese students confirms that social expectations support green food purchase intention (He & Sui, 2024; Singh et al., 2025). Therefore:

H6. Subjective norm positively affects green food purchase intention.

2.2.7 Perceived Behavioral Control and Purchase Intention

Perceived behavioral control concerns whether purchasing green food is regarded as feasible and manageable. Consumers are more willing to form an intention when they believe they can locate suitable products, understand certification, afford the purchase, and complete it within their normal routines. Control also matters because intention weakens when consumers expect that external conditions will prevent action. TPB gives perceived control a direct role in intention formation (Ajzen, 1991). Food studies show that opportunity, knowledge, and manageable effort support natural and sustainable purchase decisions (Carfora et al., 2021; Pang et al., 2021). Meta-analytic evidence confirms a positive control-intention relationship across sustainable food settings (Shen et al., 2022). Recent extended models report similar results when access, resources, and consumer capability are taken into account (Arya et al., 2024; He et al., 2025). Integrated HBM-TPB research likewise treats behavioral control as a distinct predictor beyond attitude and social approval (Singh et al., 2025). Therefore:

H7. Perceived behavioral control positively affects green food purchase intention.

2.2.8 Mediating Role of Attitude

Attitude provides the mechanism through which health beliefs can become purchase intention. For perceived susceptibility, personal exposure increases the relevance of a protective choice; relevance can improve evaluation; and a favorable evaluation can support intention. This sequence distinguishes concern about exposure from the motivational decision to buy. HBM theory supplies the vulnerability appraisal, while TPB explains why its influence depends on evaluation (Janz & Becker, 1984; Rosenstock et al., 1988). Integrated food research supports the connection between health appraisal, attitude, and intention (Pang et al., 2021; Parashar et al., 2023; Singh et al., 2025). Therefore:

H8a. Attitude mediates the relationship between perceived susceptibility and green food purchase intention.

Perceived severity can operate through the same evaluative sequence. Serious consequences increase the importance assigned to protective purchasing. That importance

can make certified green food appear wiser and more worthwhile. A favorable attitude then supports a future purchase plan. The indirect route recognizes that seriousness alone does not specify a market response; consumers must connect the concern with a positively evaluated action. HBM and TPB provide the two parts of this reasoning (Janz & Becker, 1984; Ajzen, 1991; Pang et al., 2021). Recent food studies connect health concerns with attitude and intention rather than assuming an automatic behavioral response (Parashar et al., 2023; Bazhan et al., 2023; Singh et al., 2025). Therefore:

H8b. Attitude mediates the relationship between perceived severity and green food purchase intention.

Perceived benefits are expected to produce a particularly strong indirect effect. Health, quality, certification, and environmental advantages provide positive material for attitude formation. Consumers who recognize these advantages are more likely to judge purchasing as useful and worthwhile. That evaluation then becomes a plan to choose the certified option. Research consistently links organic and sustainable food benefits with favorable evaluation and intention (Aertsens et al., 2009; Sultan et al., 2021; van Bussel et al., 2022). Perceived value and health consciousness have also been connected with attitude-based purchasing mechanisms (Parashar et al., 2023; Zheng et al., 2023). Chinese and integrated-model evidence supports the same sequence (He & Sui, 2024; Singh et al., 2025). Therefore:

H8c. Attitude mediates the relationship between perceived benefits and green food purchase intention.

Perceived barriers are expected to generate a negative indirect effect. High prices, limited access, verification difficulty, and extra effort can make green food purchasing appear less attractive. A less favorable evaluation weakens the likelihood of forming a purchase plan. This pathway shows that barriers can influence intention before the consumer reaches the point of action. Price and availability have long been associated with the sustainable consumption gap (Vermeir & Verbeke, 2006). Recent studies confirm that price consciousness, search cost, access, and uncertainty reduce organic food evaluation and willingness (Saleki et al., 2019; Talwar et al., 2021; van Bussel et al., 2022; Zheng et al.,

2023). HBM-TPB integration gives attitude a clear role in transmitting this negative appraisal (Singh et al., 2025). Therefore:

H8d. Attitude mediates the relationship between perceived barriers and green food purchase intention.

The hypotheses form an ordered model in which the four HBM constructs explain attitude, while attitude, subjective norm, and perceived behavioral control explain purchase intention. Figure 1 presents this theoretical arrangement. The solid paths represent H1-H7, and the four indirect propositions in H8 are tested through attitude.

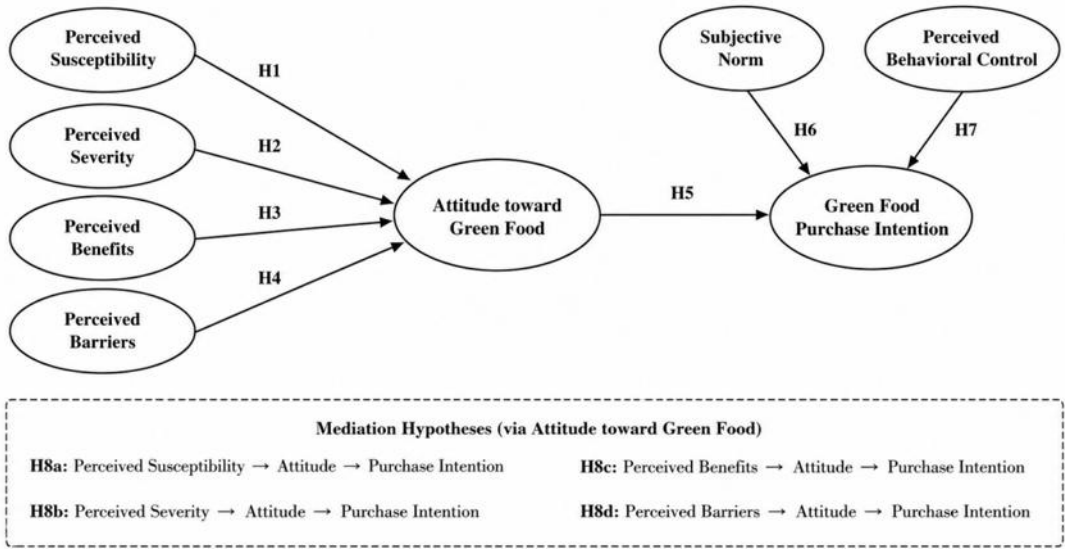


Figure 1. Integrated HBM-TPB research model.

3. Research Method

3.1 Data Collection

The target population comprised full-time students enrolled in higher education institutions in Wuhan, including vocational, undergraduate, master’s, and doctoral students. Eligible respondents were at least 18 years old, were currently enrolled in Wuhan, had heard of China’s certified Green Food label or were shown a neutral definition, had personally purchased certified green food at least once, and had made food or meal purchasing decisions during the previous three months. Requiring prior purchase experience ensured that participants evaluated a category they had encountered rather than an abstract description.

Participants were recruited through convenience and purposive procedures using both online and campus channels. The online questionnaire was distributed through student WeChat groups, university forums, postgraduate communities, and QR-code sharing. Offline recruitment occurred in high-traffic campus areas, including canteens, libraries, and nearby retail locations. Recruitment covered different institution types, educational levels, disciplines, and years of study. The survey was anonymous and did not request names, student numbers, telephone numbers, or other direct identifiers. Participation was voluntary, and respondents could stop at any point.

The electronic questionnaire required completion of all applicable items and restricted repeated submission. Responses were screened before analysis. Records were excluded when completion time was below 100 seconds, all scale items used the same response option, or a clear mechanical sequence such as a repeated 1-2-3-4-5 pattern was present. After screening, 570 valid responses remained. This sample exceeded common requirements for the eight-construct covariance-based structural model and provided adequate information for confirmatory factor analysis, direct-effect estimation, and bootstrapped indirect-effect testing (Hair et al., 2019; Kline, 2023).

3.2 Measurement

The questionnaire contained screening items, behavioral questions, 32 latent-variable items, and demographic questions. All constructs were represented by four items and measured on a five-point agreement scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items were adapted from established HBM and TPB research and revised to refer specifically to certified green food among students. The complete item wording is reported in Appendix A so that the empirical model and the reported results remain traceable to the questionnaire.

Questionnaire development proceeded from construct definition to item selection and contextual revision. Each item was checked to ensure that it represented one primary idea, used language understandable to students, and referred to purchasing certified green food rather than environmental consumption in general. Particular attention was given to separating susceptibility from severity, barriers from perceived behavioral control, and attitude from intention. The introductory definition stated that Green Food refers to China's

authorized certification category and did not imply that ordinary legally sold food is unsafe. This definition reduced the risk that respondents would answer according to different interpretations of the product category.

Perceived susceptibility measured personal exposure to food-safety or residue-related concerns. Perceived severity measured the seriousness assigned to possible health and daily-life consequences. Perceived benefits captured confidence in food quality and safety, useful certification information, reduced concern about production inputs, and environmentally oriented standards. Perceived barriers assessed budget sacrifice, information-search effort, authentication difficulty, and additional purchasing effort. These measures were informed by HBM research and recent applications in green and organic food settings (Rosenstock et al., 1988; Parashar et al., 2023; He & Sui, 2024; He et al., 2025; Singh et al., 2025).

Attitude assessed whether purchasing green food was good, wise, favorable, and worthwhile. Subjective norm measured approval and support from family, friends, classmates, and other valued people. Perceived behavioral control assessed control, capability, manageability, and confidence in choosing green food. Purchase intention referred to plans, likelihood, and priority during the following three months. These measures were based on TPB and recent food-consumption applications (Ajzen, 1991; He & Sui, 2024; He et al., 2025).

Behavioral items recorded purchase frequency, main channel, most-purchased category, acceptable price premium, strongest purchase trigger, and strongest deterrent. Demographic items covered gender, age, educational level, year of study, discipline, monthly living expenses, and institution type. The behavioral module was not used as a substitute for the latent constructs; it was included to describe the purchasing context and interpret the structural findings.

3.3 Data Analysis

SPSS 26.0 was used for data screening, respondent frequencies, descriptive statistics, reliability diagnostics, and the unrotated single-factor check. AMOS 24.0 was used for confirmatory factor analysis and covariance-based structural equation modeling with maximum-likelihood estimation. Analysis followed the two-step procedure of evaluating

the measurement model before interpreting the structural paths (Anderson & Gerbing, 1988).

Internal consistency was assessed using Cronbach's alpha, McDonald's omega, and corrected item-total correlations. Convergent validity was assessed through standardized factor loadings, composite reliability (CR), and average variance extracted (AVE). Values above .70 for reliability and CR and above .50 for AVE were treated as satisfactory (Fornell & Larcker, 1981; Hair et al., 2019). Discriminant validity was evaluated using the Fornell-Larcker criterion and heterotrait-monotrait ratios (HTMT), with HTMT values below .85 providing additional evidence of construct separation (Henseler et al., 2015).

Model fit was evaluated using the normed chi-square, comparative fit index (CFI), Tucker-Lewis index (TLI), incremental fit index (IFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Interpretation considered the pattern across indices rather than a single threshold (Hu & Bentler, 1999; Kline, 2023). H1-H7 were evaluated from standardized structural paths. H8a-H8d were tested with bias-corrected bootstrapping based on 5,000 resamples. An indirect effect was considered significant when its 95% confidence interval excluded zero (Preacher & Hayes, 2008; Hayes, 2018).

Procedural steps used to reduce common method concerns included anonymity, neutral instructions, separation of construct sections, and the absence of identifying information. An unrotated factor analysis was also examined as a diagnostic. The first factor accounted for 28.6% of total variance, and no inter-construct correlation approached .90, indicating that one general response factor did not dominate the covariance structure (Podsakoff et al., 2003).

3.4 Pilot Test

A pilot test was conducted with 40 students before the formal survey. Participants reviewed item clarity, response burden, certification wording, and the distinction between Green Food and organic food. Because 40 observations were insufficient for a stable factor analysis of 32 items, the pilot assessment focused on internal consistency and corrected item-total correlations. Cronbach's alpha ranged from .762 for perceived susceptibility to .881 for purchase intention. Corrected item-total correlations ranged from .438 to .773, and

every construct exceeded the .70 reliability criterion. No item was removed. Minor wording adjustments were made to improve clarity and reduce overlap between susceptibility and severity and between barriers and perceived behavioral control.

4. Results

4.1 Respondent Profile and Consumption Context

Table 1 summarizes the most relevant demographic and purchasing characteristics of the 570 respondents. The sample was balanced by gender, and 78.4% were aged 18-23. Undergraduates represented 61.2%, while vocational and postgraduate groups were also included. Two-thirds reported monthly living expenses below RMB 2,500, confirming the relevance of affordability. All participants had purchased certified green food, but frequency varied from less than monthly to at least three times per week.

Table 1. Selected respondent and purchasing characteristics (N = 570).

Dimension	Category	n	%
Gender	Male	273	47.9
	Female	297	52.1
Age	18-20	192	33.7
	21-23	255	44.7
	24-26	91	16.0
	27 or above	32	5.6
Educational level	Vocational/junior college	101	17.7
	Undergraduate	349	61.2
	Master's	98	17.2
	Doctoral	22	3.9
Monthly living expenses	Below RMB 1,500	92	16.1
	RMB 1,500-2,499	286	50.2
	RMB 2,500-3,499	139	24.4
	RMB 3,500 or above	53	9.3
Purchase frequency	Less than once a month	126	22.1

Dimension	Category	n	%
	1-3 times a month	214	37.5
	1-2 times a week	157	27.5
	3 times a week or more	73	12.8

The additional behavioral questions clarified the purchase environment. Campus or nearby supermarkets were the main channel for 28.2% of respondents, followed by e-commerce or fresh-food delivery platforms at 26.5%. Vegetables and fruit were the most frequently purchased category (31.8%). Most respondents accepted a premium below 20%, whereas only 4.2% accepted more than 30%. Health or food-safety considerations were the strongest reported trigger (26.5%), followed by clear and trustworthy certification (23.9%). Excessive price was the most common deterrent (29.5%), followed by difficulty verifying certification (22.3%) and limited availability (17.4%). These distributions provide substantive context for the benefit, barrier, and control paths tested below.

The profile also shows why the sample is suitable for examining both value and constraint. Respondents were not limited to one university tier or educational level, and their purchasing frequencies ranged widely. At the same time, half reported living expenses between RMB 1,500 and 2,499, so price sacrifice was not a hypothetical concern. The coexistence of campus retail and digital delivery channels means that control involved more than physical distance; it also involved product search, label verification, and confidence in platform information. These contextual differences were retained in the descriptive analysis rather than treated as additional latent predictors.

4.2 Measurement Model

Table 2 reports the construct means and measurement-quality indicators. Perceived benefits had the highest mean ($M = 3.98$), followed by attitude ($M = 3.90$); subjective norm had the lowest mean ($M = 3.45$). Cronbach's alpha ranged from .786 to .889, and McDonald's omega ranged from .790 to .891. All 32 standardized factor loadings were significant and ranged from .662 to .878. CR ranged from .808 to .897 and AVE ranged from .514 to .687. The results therefore supported internal consistency and convergent validity.

Table 2. Descriptive statistics, reliability, and convergent validity.

Construct	M	SD	Cronbach's α	McDonald's ω	CR	AVE	$\sqrt{\text{AVE}}$
Perceived susceptibility	3.47	.71	.786	.790	.808	.514	.717
Perceived severity	3.83	.67	.821	.825	.846	.579	.761
Perceived benefits	3.98	.62	.856	.859	.868	.622	.789
Perceived barriers	3.59	.73	.814	.817	.835	.560	.748
Attitude	3.90	.65	.876	.878	.894	.679	.824
Subjective norm	3.45	.72	.838	.841	.858	.602	.776
Perceived behavioral control	3.71	.68	.852	.854	.870	.626	.791
Purchase intention	3.79	.70	.889	.891	.897	.687	.829

Discriminant validity was also satisfactory. For every construct, the square root of AVE exceeded its correlations with the other constructs. The highest correlation was between attitude and purchase intention ($r = .657$), below both diagonal square-root values. HTMT ratios were below .85, with the highest value again occurring between attitude and purchase intention (.76). These checks indicate that attitude was empirically distinct from intention and that perceived barriers were distinct from perceived behavioral control.

4.3 Structural Model and Hypothesis Tests

Table 3 presents the fit indices for the measurement and structural models and the explained variance of the endogenous constructs. The measurement model showed good fit, with CFI = .951, TLI = .945, RMSEA = .041, and SRMR = .045. The structural model also fitted the data satisfactorily, with CFI = .944, TLI = .938, RMSEA = .044, and SRMR = .050. The HBM constructs explained 47.6% of attitude, while attitude, subjective norm, and perceived behavioral control explained 56.1% of purchase intention.

Table 3. Model fit and explained variance.

Model/construct	χ^2/df	CFI	TLI	RMSEA	SRMR	R ²
Measurement model	1.953	.951	.945	.041	.045	-
Structural model	2.078	.944	.938	.044	.050	-
Attitude	-	-	-	-	-	.476
Purchase intention	-	-	-	-	-	.561

The direct-effect estimates are reported in Table 4. Perceived susceptibility did not significantly predict attitude, so H1 was not supported. Perceived severity and perceived benefits positively predicted attitude, supporting H2 and H3. Perceived barriers negatively predicted attitude, supporting H4. Attitude, subjective norm, and perceived behavioral control all positively predicted purchase intention, supporting H5-H7. Perceived benefits had the strongest positive HBM effect, while attitude had the strongest direct effect on purchase intention.

Table 4. Structural paths and direct-effect tests.

Hypothesis	Relationship	β	p	Decision
H1	Perceived susceptibility predicts attitude	.071	.147	Not supported
H2	Perceived severity predicts attitude	.143	.014	Supported
H3	Perceived benefits predict attitude	.409	<.001	Supported
H4	Perceived barriers predict attitude	-.286	<.001	Supported
H5	Attitude predicts purchase intention	.451	<.001	Supported
H6	Subjective norm predicts purchase intention	.201	<.001	Supported
H7	Perceived behavioral control predicts purchase intention	.289	<.001	Supported

Figure 2 visualizes the standardized path estimates and the explained variance. The dashed susceptibility path marks the only nonsignificant direct relationship. The figure also makes the relative effect ordering visible: benefits and barriers were more influential than the two threat beliefs in explaining attitude, and attitude was more influential than subjective norm or perceived behavioral control in explaining purchase intention.

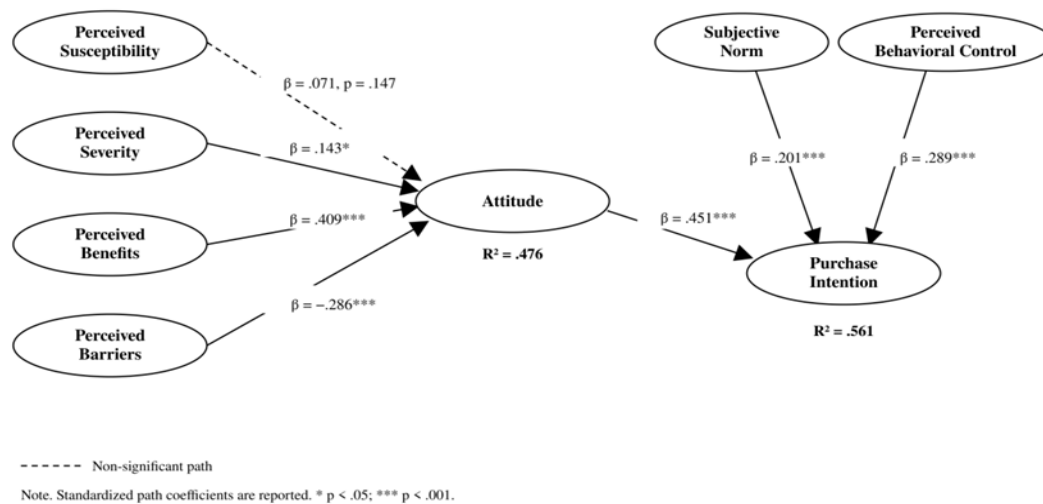


Figure 2. Standardized results of the structural model.

4.4 Indirect Effects

Table 5 presents the bootstrapped indirect effects. The confidence interval for perceived susceptibility included zero, so H8a was not supported. The indirect effects of perceived severity, perceived benefits, and perceived barriers excluded zero, supporting H8b-H8d. The benefit pathway was the largest positive indirect effect, while barriers produced a substantial negative indirect effect through attitude.

Table 5. Bias-corrected bootstrap indirect effects.

Hypothesis	Indirect relationship through attitude	Effect	95% CI	Decision
H8a	Perceived susceptibility and purchase intention	.032	[-.011, .079]	Not supported
H8b	Perceived severity and purchase intention	.065	[.017, .122]	Supported
H8c	Perceived benefits and purchase intention	.184	[.133, .243]	Supported
H8d	Perceived barriers and purchase intention	-.129	[-.181, -.083]	Supported

The direct and indirect results form a coherent pattern. Both unsupported hypotheses concerned perceived susceptibility. Severity, benefits, and barriers shaped intention through attitude, whereas susceptibility did not explain unique attitudinal variation after the other HBM beliefs were controlled. Nine of the eleven hypotheses or sub-hypotheses were supported.

5. Discussion

5.1 Health-Belief Foundations of Attitude

The first objective examined the four HBM antecedents of attitude. The strongest positive effect came from perceived benefits, followed by the negative effect of perceived barriers and the smaller positive effect of severity. Susceptibility was not significant. This ordering indicates that action appraisal was more influential than threat likelihood in the formation of attitude. Students evaluated certified green food mainly by asking what value it offered and what sacrifice it required.

The benefit result agrees with research that identifies health, quality, information, trust, and environmental value as leading motives for sustainable food choice (Aertsens et al., 2009; Sultan et al., 2021; van Bussel et al., 2022; Parashar et al., 2023). It also fits the descriptive evidence: health or food safety and trustworthy certification were the two most common purchase triggers. In Wuhan's student market, certification becomes useful when it helps consumers compare alternatives, feel confident about product standards, and connect the product with health or environmental preferences. The coefficient shows that broad environmental approval is less important than benefits that can be recognized at the point of purchase.

The negative barrier effect is consistent with the sustainable consumption gap described by Vermeir and Verbeke (2006) and with later work on price, effort, availability, and information uncertainty (Talwar et al., 2021; van Bussel et al., 2022; Bazhan et al., 2023). Price was the leading deterrent in this sample, and most respondents accepted a premium below 20%. Difficulty verifying certification and limited availability were also common. The structural finding extends this descriptive pattern by showing that such barriers do not operate only after intention has formed. They influence whether the purchase is evaluated favorably in the first place.

Severity was significant but weaker. Students recognized that serious food-safety consequences matter, but threat appraisal did not dominate a repeated, budget-sensitive market choice. The nonsignificant susceptibility path refines this conclusion. Personal exposure to food-related risk correlated with attitude at the bivariate level, but it did not add unique explanation once severity, benefits, and barriers were modeled together. This differs from a simple HBM expectation that greater vulnerability necessarily produces a more favorable response. Among young consumers, food risks can be viewed as diffuse or controllable, whereas price, certification, and product value are immediate.

The new knowledge from the first objective is therefore not only that several HBM variables were significant, but that their relative roles changed in a routine certified-food context. Benefits were the principal positive foundation of attitude, barriers were a substantial negative foundation, severity was supportive, and susceptibility did not provide unique explanatory power. This pattern distinguishes routine food purchasing from protective actions in which personal vulnerability is the central trigger.

5.2 TPB Predictors of Purchase Intention

The second objective examined attitude, subjective norm, and perceived behavioral control. All three were significant, consistent with TPB and sustainable food research (Ajzen, 1991; Shen et al., 2022; Arya et al., 2024; He & Sui, 2024). Their relative strengths, however, reveal how intention is organized among Wuhan students. Attitude was the strongest predictor, perceived behavioral control was second, and subjective norm was third.

The attitude result confirms that students are more likely to plan a purchase when they view it as wise, favorable, and worthwhile. This agrees with Chinese college-student evidence and meta-analytic findings across sustainable food settings (Shen et al., 2022; He & Sui, 2024). The result also connects with the benefit and barrier findings: attitude summarizes the student's evaluation of credible value and manageable sacrifice. A campaign that increases awareness without improving evaluation is therefore unlikely to generate the same motivational effect.

The explained variance strengthens this interpretation. The four HBM constructs accounted for almost half of the variance in attitude, while the three TPB predictors accounted for

more than half of the variance in intention. These values show that the integrated model captures a substantial portion of the decision process without claiming that every food choice is psychologically identical. Taste, habit, prior satisfaction, and immediate promotion remain relevant, but the model identifies a stable structure linking health beliefs, evaluation, social influence, capability, and planned choice.

Perceived behavioral control added a substantial independent effect. Students need to believe that purchasing is within their control, that products can be found, and that the choice can be made within their resources. This agrees with studies that emphasize feasibility, opportunity, and consumer capability (Pang et al., 2021; Arya et al., 2024; He et al., 2025). The result also clarifies the difference between barriers and control. Barriers describe sacrifices that reduce favorable evaluation, while control describes whether the student believes the action can still be carried out. A smaller package can reduce financial sacrifice; regular campus availability can strengthen opportunity; a verification tool can strengthen capability.

Subjective norm was significant but weaker than attitude and control. Family, peers, and valued others can normalize green food purchasing and provide reassurance, as earlier organic and green food studies suggest (Bai et al., 2019; Carfora et al., 2021; He & Sui, 2024). Yet food choices are often executed individually and quickly. Social endorsement cannot compensate for an unattractive price or an unavailable product. The new knowledge from the second objective is that student intention is primarily evaluative and capability-based, with social approval providing support rather than control over the decision.

5.3 Attitude as a Selective Mediator

The third objective examined attitude as the mechanism connecting health beliefs with intention. Severity, benefits, and barriers had significant indirect effects, while susceptibility did not. Attitude therefore functioned as a selective mediator rather than a universal channel. This result is theoretically stronger than a pattern in which every proposed pathway is supported because it identifies which health beliefs are actually translated into motivational evaluation.

The benefit pathway was the largest indirect effect. Certification, health, quality, and environmental advantages influenced intention when students interpreted them as reasons

to evaluate purchasing positively. The result agrees with studies connecting food value and health consciousness with attitude and intention (Sultan et al., 2021; Parashar et al., 2023; Zheng et al., 2023). The negative barrier pathway shows the reverse mechanism. High prices, verification difficulty, and extra effort weakened intention partly because they made purchasing appear less favorable. The severity pathway was smaller but significant, indicating that serious consequences matter when they are connected with a positively evaluated protective choice.

Susceptibility did not reach intention through attitude because its first-stage effect was not significant. Messages designed only to increase students' sense of vulnerability therefore have limited support from the model. Health communication should not rely on generalized fear or imply that ordinary legally sold food is unsafe. It should connect accurate information with verifiable product benefits and feasible choices.

5.4 Theoretical and Practical Implications

The study enriches TPB by explaining the domain beliefs that form attitude toward certified green food. TPB identifies attitude as a predictor but does not prescribe one universal belief content. The HBM variables provide that content: benefits, barriers, and severity shaped evaluation, while susceptibility established a boundary. The study also distinguishes perceived barriers from perceived behavioral control. Barriers affected attitude as negative action appraisal, whereas control affected intention as perceived capability. Keeping the two constructs separate improves theoretical precision.

The HBM is developed by applying it to a repeated consumer choice and by showing that action appraisal carries more weight than generalized threat. Benefits and barriers were more influential than severity, and susceptibility was not significant. The mediation results also add an evaluative stage to HBM reasoning. Health beliefs did not automatically produce market intention; they became motivational when they changed attitude. The integration is therefore ordered rather than additive: HBM explains the content of evaluation, and TPB explains how evaluation, social approval, and capability organize intention.

The unsupported susceptibility relationships are part of this theoretical development rather than a weakness to be hidden. If all four HBM constructs had produced similar effects, the

model would offer little guidance about the conditions under which threat appraisal matters. The present pattern shows that seriousness can inform evaluation while personal likelihood remains too diffuse to add unique explanatory power. It also warns against collapsing susceptibility and severity into one general risk variable. Keeping them separate reveals that students can recognize serious consequences without considering themselves especially exposed.

The mediation findings provide an additional distinction between information and motivation. Certification information, health claims, and environmental attributes do not strengthen purchase intention merely because they are available. They must be interpreted as benefits that improve evaluation. Likewise, price and verification problems do not only obstruct the final purchase; they can weaken intention by making the behavior less favorable in advance. Attitude therefore represents an evaluative conversion process, not simply another predictor placed beside the HBM variables.

For certification bodies and regulators, the findings prioritize clear recognition and rapid verification of the authorized Green Food mark. Mobile verification should display certification status, producer, category, validity period, and complaint channels. Visible action against misleading labels can strengthen the value of legitimate certification. Communication should explain standards accurately and avoid fear-based claims.

For universities, campus canteens and retail units can increase perceived control by offering visible, affordable, and consistently available certified options. Label-literacy activities can teach students how to identify the mark, verify products, and compare claims. Student associations can provide social reinforcement, but peer promotion should be paired with credible information and real access.

For producers, retailers, and digital platforms, product communication should translate certification into specific benefits. Smaller packages, entry-level lines, student discounts, and bundles can reduce price sacrifice. Product pages should display the official mark, verification access, origin, and certified attributes without requiring extensive searching. Multi-channel distribution is appropriate because students purchased through supermarkets, delivery platforms, canteens, and other routine outlets.

5.5 Study Boundaries and Further Research

The participants were higher education students in Wuhan who had already purchased certified green food. This criterion improved category familiarity but excluded non-purchasers. Convenience and purposive recruitment also mean that the sample does not represent every student in Wuhan or China. Further work can compare prospective, occasional, and frequent purchasers across cities and institution types.

Purchase intention was self-reported rather than matched with receipts or platform records. Future studies can combine questionnaires with shopping tasks, consented transaction evidence, or campus retail trials. Such work can test whether benefit messages, verification tools, price formats, and product placement change actual choice. Product categories also deserve separate attention because vegetables, dairy products, meat, staples, snacks, and beverages differ in familiarity, price, and perceived risk. Certification trust, taste expectation, habit, previous satisfaction, and objective campus availability can be added when they are measured as conceptually distinct constructs.

6. Conclusion

This study integrated the Health Belief Model and the Theory of Planned Behavior to explain certified green food purchase intention among 570 higher education students in Wuhan. Perceived benefits were the strongest positive antecedent of attitude, perceived barriers had a substantial negative effect, and perceived severity had a smaller positive effect. Perceived susceptibility was not significant. Attitude, subjective norm, and perceived behavioral control positively predicted purchase intention, with attitude carrying the largest effect. Attitude also mediated the effects of severity, benefits, and barriers, but not susceptibility.

The central conclusion is that student purchase intention depends more on credible value, manageable sacrifice, and practical capability than on generalized vulnerability. The results support an ordered theoretical account in which health beliefs shape evaluation and TPB constructs organize intention. They also support coordinated action across certification, campus provision, commercial communication, and consumer education. Green food purchasing becomes more plausible when students can understand the certification, verify

the product, afford the difference, find suitable options in routine channels, and receive informed social support.

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Appendix A. Measurement Scale

All items used a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Table A1 presents the complete English measurement instrument used for the eight latent constructs. The item codes correspond to the measurement and structural analyses reported in Section 4.

Table A1. Measurement items.

Construct	Code	Item
Perceived susceptibility	PS1	I think I could be personally exposed to food-safety or residue-related risks in everyday food consumption.
	PS2	I believe that food-safety or residue-related risks could affect me personally.

Construct	Code	Item
	PS3	Compared with someone who pays close attention to certified food, I may be more exposed to food-related safety concerns.
	PS4	I consider myself potentially vulnerable to food-related safety or residue concerns when choosing food.
Perceived severity	SE1	If a food-safety problem affected me, I would regard its health consequences as serious.
	SE2	I believe that serious food-safety problems could meaningfully disrupt my daily life and study.
	SE3	I regard the possible longer-term consequences of serious food-safety problems as important.
	SE4	I would take a food-safety problem seriously if it occurred.
Perceived benefits	BE1	Choosing certified green food can help me reduce concern about certain production inputs or residues.
	BE2	Choosing certified green food can provide me with greater confidence in food quality and safety.
	BE3	Green food certification can provide useful information when I compare food alternatives.
	BE4	Choosing certified green food can support my preference for food produced under more environmentally oriented standards.
Perceived barriers	BA1	Paying a higher price for green food would require a meaningful sacrifice from my student budget.
	BA2	Searching for reliable information about green food takes extra time and effort.

Construct	Code	Item
	BA3	Distinguishing authentic certified green food from similar products can be difficult.
	BA4	Considering green food when I buy food can add extra effort to my usual purchase process.
Attitude	AT1	For me, purchasing green food would be a good choice.
	AT2	For me, purchasing green food would be a wise choice.
	AT3	Overall, I evaluate purchasing green food favorably.
	AT4	I consider purchasing green food to be worthwhile.
Subjective norm	SN1	People who are important to me think that I should choose green food when appropriate.
	SN2	My family would approve of me purchasing green food.
	SN3	My close classmates or friends would approve of me purchasing green food.
	SN4	People whose opinions I value would support my choice of green food.
Perceived behavioral control	PBC1	Whether I purchase green food is largely under my control.
	PBC2	If I decide to purchase green food, I am capable of doing so.
	PBC3	For me, carrying out a decision to purchase green food is manageable.
	PBC4	I am confident that I can choose green food when I genuinely want to.
Purchase intention	PI1	I intend to purchase green food during the next three months.

Construct	Code	Item
	PI2	I plan to choose green food when I buy suitable food products during the next three months.
	PI3	It is likely that I will purchase green food during the next three months.
	PI4	When green food and conventional alternatives are both suitable, I intend to give green food priority.

