

Original Research Articles

Factors Influencing Consumer Willingness to Consume Giant River Prawn (*Macrobrachium rosenbergii*): An Empirical Analysis in Jiangsu Province, China

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Keywords: *Macrobrachium rosenbergii*, consumer willingness, influencing factors, Logistic model

<https://doi.org/10.46989/001c.141325>

Israeli Journal of Aquaculture - Bamidgheh

Vol. 77, Issue 2, 2025

Against the backdrop of global food security strategies and the construction of a Diversified Food Supply System, giant river prawn (*Macrobrachium rosenbergii*), a key freshwater aquaculture species in China, plays a critical role in ensuring the supply of high-quality protein through industrial development. Using the Theory of Planned Behavior (TPB) as the theoretical framework, this study empirically examines the factors influencing consumers' intention to consume *Macrobrachium rosenbergii* based on a questionnaire survey of 352 respondents in Jiangsu Province, China, employing a binary logistic regression model. The results reveal that product attributes ($\beta = 0.846$, OR = 2.331), health awareness ($\beta = 0.797$, OR = 2.218), behavioral attitude ($\beta = 0.556$, OR = 1.743), subjective norms ($\beta = 0.476$, OR = 1.610), and perceived behavioral control ($\beta = 0.780$, OR = 2.182) significantly and positively affect consumption intention, while households with elderly members or children ($\beta = -1.674$, OR = 0.187) and low-income families ($\beta = -2.897$, OR = 0.055) exhibit a significant negative impact. Based on these findings, the study proposes designing price-friendly and convenient consumption solutions for low-income groups, strengthening communication about product attributes and health benefits to enhance consumer recognition, and optimizing the industrial chain and distribution channel layout to improve market accessibility and purchasing convenience, aiming to establish a consumer-driven development model for the giant river prawn industry and promote its integration into the national diversified food supply system.

INTRODUCTION

Global aquatic product consumption is undergoing a structural transformation, with increasing consumer demand for high-protein, low-fat aquatic foods.¹ As a key species in China's freshwater aquaculture, giant river prawn (*Macrobrachium rosenbergii*)—renowned for its short growth cycle and high nutritional value—has become a vital protein source for ensuring food security. According to FAO data, global production of *Macrobrachium rosenbergii* reached 313,800 metric tons in 2021, with China accounting for 54.4% of this output.² Jiangsu Province, a major production region, yielded 61,500 metric tons in 2023, representing

31% of the national total, and has developed a specialized industrial cluster integrating seed breeding, ecological farming, processing, and distribution.³

However, the *Macrobrachium rosenbergii* consumption market faces dual challenges: on the supply side, issues such as germplasm degradation, frequent diseases, and lagging processing technologies persist; on the demand side, barriers include low consumer awareness, price sensitivity, and concerns about cooking convenience.⁴ Under the policy guidance of the “grand food vision,” which emphasizes diversified food supply, understanding consumer behavior and enhancing consumption intention have become critical for the industry's sustainable development.

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This study focuses on consumers in Jiangsu Province to uncover the mechanisms influencing their willingness to consume *Macrobrachium rosenbergii*. Using the Theory of Planned Behavior (TPB) framework, we combine quantitative analysis to examine the interactive effects of psychological variables (e.g., product attributes, health awareness) and demographic characteristics. The findings not only enrich micro-level research on aquatic product consumption behavior but also provide scientific insights for optimizing market strategies in production regions, contributing to the construction of a “production-consumption” dual-driven industrial ecosystem.

THEORETICAL ANALYSIS AND HYPOTHESIS FORMULATION

THEORY OF PLANNED BEHAVIOR

The Theory of Planned Behavior (TPB), proposed by Ajzen & Fishbein (1975), posits that behavioral intention is determined by three core constructs: attitude toward behavior, subjective norms, and perceived behavioral control (PBC).⁵ This framework has been widely applied to food consumption studies, particularly for high-involvement products like seafood, where consumer decisions are influenced by complex factors such as product handling, safety, and nutritional value.⁶ For *Macrobrachium rosenbergii*—a premium live aquatic product—the TPB’s emphasis on PBC is critical for capturing practical barriers like cooking complexity (37.8% of non-purchasers cite “troublesome preparation”) and limited market accessibility, which traditional models like the Theory of Reasoned Action (TRA) overlook.⁷ Meta-analytic evidence shows TPB explains up to 40% of behavioral intention variance, with PBC alone enhancing explanatory power by 13% compared to TRA, making it suitable for analyzing decisions involving non-volitional barriers.⁶

INTEGRATION OF PRODUCT ATTRIBUTES AND HEALTH AWARENESS INTO TPB

This study extends TPB by integrating two context-specific antecedents: product attributes and health awareness. Product attributes—encompassing safety, nutritional value, taste, and convenience—operationalize TPB’s “behavioral beliefs” by shaping consumers’ evaluations of product utility. For example, perceived “high-protein, low-fat” nutrition reinforces positive attitudes toward purchasing, while pre-processed formats (e.g., peeled shrimp) reduce perceived preparation difficulty, directly influencing PBC.⁸ Health awareness, defined as consumers’ concern for personal and family health, interacts with TPB by amplifying both attitudinal and normative influences. Health-conscious individuals are more likely to associate product consumption with health goals, strengthening behavioral attitudes, and are more sensitive to social recommendations about nutritious foods, enhancing the impact of subjective norms.⁹

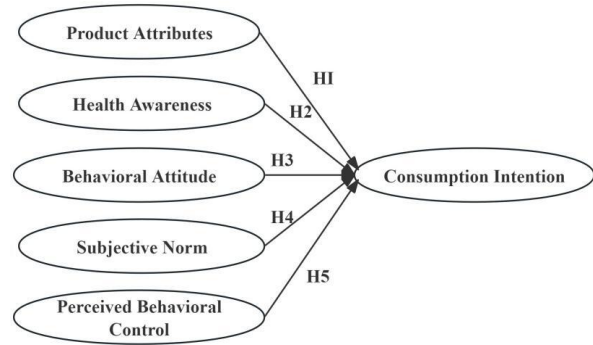


Figure 1. Theoretical Model.

HYPOTHESIS DEVELOPMENT

Based on this integration, five hypotheses are proposed. H1 posits that higher evaluations of product attributes (safety, nutrition, convenience) positively influence consumption intention, drawing on Lancaster’s (1966) consumer theory of product attributes and empirical evidence from natural food studies.^{8,10} H2 suggests stronger health awareness enhances intention, supported by research linking health consciousness to risk-sensitive choices and post-safety-incident preferences.⁹ The remaining hypotheses align with TPB’s core predictions: H3 (positive behavioral attitude drives intention), H4 (subjective norms positively influence intention), and H5 (higher PBC strengthens intention), consistent with prior food consumption research.^{11–15}

THEORETICAL MODEL

The integrated model (Figure 1) depicts direct effects of product attributes (H1) and health awareness (H2) on intention, alongside traditional TPB paths (H3–H5). Health awareness is positioned as a moderator, reflecting its role in strengthening the relationships between subjective norms/behavioral attitude and intention—especially relevant for risk-sensitive choices like live seafood.⁹ This structure maintains TPB’s theoretical integrity while addressing unique challenges in *Macrobrachium rosenbergii* consumption, such as safety concerns and handling complexity.

DATA BASIS

DATA COLLECTION AND SAMPLE CHARACTERISTICS

This study employed stratified random sampling across 13 prefecture-level cities in Jiangsu Province, aligning regional proportions (southern: 46.3%, central: 20.5%, northern: 33.2%) with provincial population distribution ($\pm 6\%$ margin). Data from 352 valid questionnaires collected via Wenjuanxing (February–March 2024) included: 1) consumption patterns (frequency/channels), 2) Theory of Planned Behavior constructs (22-item Likert scale: product attributes, health awareness, attitude, norms, perceived control), and 3) demographics. The sample met regional representative-

Table 1. Descriptive statistics of individual characteristics of consumers who made purchase behaviors.

Statistical Characteristics	Classification Indicators	Number (n)	Proportion (%)	Cumulative Proportion (%)
Gender	Male	197	55.97	55.97
	Female	155	44.03	100
Age	18–25 years old	82	23.30	23.30
	26–40 years old	196	55.68	78.98
	41–55 years old	53	15.06	94.03
	Above 55 years old	21	5.97	100
Education Level	High school or below	122	34.66	34.66
	Junior college	101	28.69	63.35
	Bachelor's degree	119	33.81	97.16
	Master's degree or above	10	2.84	100
Occupation	Enterprises, institutions, government departments	90	25.57	25.57
	Private enterprises	99	28.13	53.69
	Self-employed	69	19.60	73.30
	Retired	20	5.68	78.98
Living with elderly or children at home	Unemployed or student	74	21.02	100
	Yes	252	71.59	71.59
	No	100	28.41	100
Household annual income (total income of family members)	Below 50,000 RMB	36	10.23	10.23
	50,000–100,000 RMB	87	24.72	34.94
	100,000–200,000 RMB	149	42.33	77.27
	200,000–400,000 RMB	48	13.64	90.91
	Above 400,000 RMB	32	9.09	100
Marital Status	Married	234	66.48	66.48
	Unmarried	92	26.14	92.61
	Divorced or widowed	26	7.39	100
Region	Southern Jiangsu (Nanjing, Suzhou, Wuxi, Changzhou, Zhenjiang)	163	46.31	46.31
	Central Jiangsu (Yangzhou, Taizhou, Nantong)	72	20.45	66.76
	Northern Jiangsu (Xuzhou, Lianyungang, Suqian, Huai'an, Yancheng)	117	33.24	100

ness criteria and scale validity requirements (Cronbach's $\alpha > 0.8$).

As shown in [Table 1](#), a total of 352 valid questionnaires were recovered, with the following sample characteristics: 55.97% were male, 55.68% were middle-aged and young individuals aged 26–40, approximately 37% had a bachelor's degree or above, about 42% had a household annual income of 100,000–200,000 RMB, and 71.59% of households lived with elderly or children.

Jiangsu was selected as a major production region (31% of national output in 2023) with a mature consumption market, ideal for analyzing production-area consumer behavior. The sample covers all Within the province prefecture-level cities, balancing economic diversity (southern, central, northern Jiangsu). However, production-area consumers' frequent product exposure and convenient access

may lead to different perceptions of price and freshness compared to non-production regions, requiring caution when generalizing to less developed, non-coastal areas.

From the perspective of consumption status, consumers mainly purchase fresh *Macrobrachium rosenbergii* (66.8%). Purchase locations are concentrated in supermarkets (36.7%) and farmers' markets (36.4%), with consumption scenarios dominated by daily family meals (40.3%) and gatherings with relatives and friends (37.5%). Purchase frequency shows a bimodal distribution: 70.2% of consumers buy 1–2 times per week, while 29.8% purchase quarterly or annually, indicating that high-frequency consumers have formed stable demand.

In terms of consumption intention, 80.4% of consumers expressed "willingness to purchase," but their willingness to recommend (74.4%) was slightly lower, suggesting that

consumption experiences have not fully translated into social communication motivation. Among non-purchasers, 37.8% cited “troublesome cooking process,” 32.9% were limited by “market availability,” and 15.9% indicated “lack of product knowledge,” highlighting convenience and awareness as key barriers.

VARIABLE MEASUREMENT

To determine the specific measurement dimensions and items for each variable, this study drew on validated mature scales from relevant domestic and international research fields. Through this process, the measurement content of each variable was obtained, and appropriate adjustments and applications were made according to the specific needs of this study. A 5-point Likert scale was used for measurement. The scale items and Cronbach's α coefficients are shown in [Table 2](#). The Cronbach's α coefficients for all variables were greater than 0.800, and the overall Cronbach's α coefficient of the scale was 0.936, confirming the basic conditions for further data analysis.

In this paper, 352 valid questionnaires were used as the research sample, and SPSS 22.0 software was used to analyze the reliability of the main latent variables, among which the KMO=0.931 and significant Bartlett test ($p<0.001$) confirmed factor analysis suitability. Six factors explaining 72.9% variance were extracted, with all seven product attribute items (including price) loading on the first factor (loadings 0.700–0.784), indicating price does not form an independent factor. Therefore, it indicates that the construct validity of the scale in this study is good.

EMPIRICAL ANALYSIS

CONSUMER WILLINGNESS TO CONSUME MACROBRACHIUM ROSENBERGII

Consumer willingness to consume *Macrobrachium rosenbergii* was directly measured via a binary single-choice question (“Willing” vs. “Unwilling”), aligning with TPB's focus on behavioral intention formation (existence vs. absence). To validate consistency, two 5-point Likert items measured purchase/recommendation willingness (e.g., “I am willing to recommend...”).

Descriptive results show 80.4% chose “Willing” in the binary question, consistent with 75.28% scoring ≥ 4 on the Likert scale (“Somewhat/Strongly willing”). This convergence supports using the binary response in logistic regression, which effectively identifies key influences like family structure ($\beta = -1.674$) and income ($\beta = -2.897$), critical for targeted strategies.

DIFFERENTIAL ANALYSIS

Chi-square tests showed that the proportion of families living with elderly or children who had no consumption intention (23.8%) was significantly higher than that of families without elderly or children (9.0%, $\chi^2=9.963$, $p=0.002$), possibly due to differences in dietary preferences across generations and increased cooking costs. Income stratification

exhibited clear differentiation: the proportion of low-income families (annual income $< 50,000$ RMB) with no consumption intention reached 23.2%, eight times higher than that of high-income families (annual income $> 400,000$ RMB) ($\chi^2=19.316$, $p<0.001$), validating the inhibitory effect of economic constraints on consumption intention ([Table 3](#)).

CONSTRUCTION OF BINARY LOGISTIC MODEL AND VARIABLE DEFINITION

Although consumption intention was measured using a 5-point Likert scale, this study employs a binary logistic regression model for two key reasons: (1) The research focuses on the existence of consumption intention (willing vs. unwilling) rather than its intensity, aligning with the core logic of the Theory of Planned Behavior (TPB), which emphasizes whether a behavioral intention is formed to drive actual behavior. (2) Descriptive data show a clear dichotomy between willing (75.28%) and unwilling (24.72%) groups. Pre-testing also revealed that the proportional odds assumption of ordinal logistic regression was violated, making the binary model more valid for accurate estimation of key influences.

The dependent variable is a discrete binary variable, where “willing to repurchase” is defined as $Y=1$ and “unwilling to repurchase” as $Y=0$. Therefore, binary logistic regression analysis is used to examine the impact of explanatory variables on consumers' purchase intention:

$$\text{Logit}(P) = \ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + \varepsilon_i \quad (1)$$

In the above equation, P represents the probability that consumers are willing to repurchase *Macrobrachium rosenbergii* (i.e., the probability of $Y=1$), $X_1, X_2, X_3, X_4, \dots, X_n$ denote the independent variables influencing consumers' consumption intention, β_0 is the constant term of the regression equation, $\beta_1, \beta_2, \beta_3, \dots, \beta_n$ are the regression coefficients corresponding to the independent variables, and ε_i is the disturbance term following a standard normal distribution. [Table 4](#) presents the variable definitions, assignments, and expected directions of effect.

RESULTS OF BINARY LOGISTIC REGRESSION

Binary Logistic regression analysis was performed using SPSS 27.0, with product attributes, health awareness, behavioral attitude, subjective norm, and perceived behavioral control as independent variables. Demographic variables found to have significant effects in the Chi-square test—whether there are elderly family members or children living at home and household annual income (sum of family members' income)—were included as control variables. The dependent variable was consumers' intention to repurchase giant river prawn (*Macrobrachium rosenbergii*). The results are presented in [Tables 5](#).

Table 2. Scale Items and Cronbach's α Coefficients.

Variable	Measurement Items	Reference	Cronbach's α Coefficient
Product Attributes	The impact of safety on my purchase of <i>Macrobrachium rosenbergii</i>	Maesano et al. (2020) ¹⁶ Piester et al. (2020) ¹⁷	0.913
	The impact of nutritional value on my purchase of <i>Macrobrachium rosenbergii</i>		
	The impact of brand on my purchase of <i>Macrobrachium rosenbergii</i>		
	The impact of origin on my purchase of <i>Macrobrachium rosenbergii</i>		
	The impact of taste/texture on my purchase of <i>Macrobrachium rosenbergii</i>		
	The impact of freshness on my purchase of <i>Macrobrachium rosenbergii</i>		
	The impact of price on my purchase of <i>Macrobrachium rosenbergii</i>		
Health Awareness	I am concerned about the health status of myself and my family	Pieniak et al. (2010) ¹⁷	0.822
	My health awareness is high, and I pay attention to the nutritional value of food		
	I am worried about the quality and safety of <i>Macrobrachium rosenbergii</i>		
Behavioral Attitude	I think purchasing <i>Macrobrachium rosenbergii</i> is a wise choice	Batra and Ahtola (1990) ¹⁸	0.848
	I think purchasing <i>Macrobrachium rosenbergii</i> is beneficial		
	I think purchasing <i>Macrobrachium rosenbergii</i> is necessary		
Subjective Norm	My family and friends approve of purchasing <i>Macrobrachium rosenbergii</i>	Yadav et al. (2016) ¹⁹	0.817
	My family and friends often purchase <i>Macrobrachium rosenbergii</i>		
	My family and friends are satisfied after purchasing <i>Macrobrachium rosenbergii</i>		
Perceived Behavioral Control	The types of <i>Macrobrachium rosenbergii</i> available are diverse and selective	Yadav et al. (2016) ¹⁹	0.862
	The price of <i>Macrobrachium rosenbergii</i> is not very high, and I can buy it if I want		
	There are many purchase channels for <i>Macrobrachium rosenbergii</i> , making it convenient to buy		
Consumption Intention	There are many promotions such as advertisements for <i>Macrobrachium rosenbergii</i>	Arvola (2008) ²⁰	0.865
	Consumption Intention I am willing to purchase <i>Macrobrachium rosenbergii</i>		
	I am willing to recommend <i>Macrobrachium rosenbergii</i> to others		

POSITIVE INFLUENCING FACTORS

Product attributes ($\beta = 0.846$, $p < 0.001$, $OR = 2.331$): Each one-unit increase in product attributes elevates the purchase odds ratio to 2.331 times, reflecting the critical role of safety (factor loading 0.759), nutritional value (0.784), and price (0.741) in consumer decisions. Survey data show 66.8% of consumers prioritize quality and price when purchasing from supermarkets/wet markets, while 37.5% focus on taste/texture for family meals, aligning with Chakraborty & Dash's (2022) natural food attribute theory.¹⁰ This indicates that transparent communication of product attributes—such as “low-fat, high-calcium” labeling—strengthens quality trust and purchase confidence for premium aquatic products like *Macrobrachium rosenbergii*.

Health awareness ($\beta = 0.797$, $p < 0.001$, $OR = 2.218$): A one-unit increase in health awareness boosts the odds ratio to 2.218 times, driven by consumers' rising concern for nutrition and safety (e.g., 72.3% prefer traceable freshwater products amid nuclear-contaminated water risks). This aligns with Siddiqui et al. (2023)'s findings on organic food,²¹ where health awareness reduces perceived risk and enhances nutritional cognition. For *Macrobrachium rosenbergii*, positioning as a high-protein, low-fat alternative to red meat can leverage this trend, particularly among middle-income consumers prioritizing dietary health.

Behavioral attitude ($\beta = 0.556$, $p = 0.02$, $OR = 1.743$): Behavioral attitude significantly influences intention, with each unit increase raising the odds ratio to 1.743 times. Measured by statements like “buying is a wise choice” (fac-

Table 3. Results of Chi-Square cross-tabulation analysis of individual characteristic variables

Statistical Characteristics	Classification Indicators	Consumption Intention		χ^2	P
		YES	NO		
Gender	Male	156(55.12%)	41(59.42%)	0.416	0.519
	Female	127(44.88%)	28(40.58%)		
Age	18–25 years old	64(22.61%)	18(26.09%)	3.277	0.351
	26–40 years old	157(55.48%)	39(56.52%)		
	41–55 years old	42(14.84%)	11(15.94%)		
	Above 55 years old	20(7.07%)	1(1.45%)		
Education Level	High school or below	95(33.57%)	27(39.13%)	3.03	0.387
	Junior college	81(28.62%)	20(28.99%)		
	Bachelor's degree	97(34.28%)	22(31.88%)		
	Master's degree or above	10(3.53%)	0(0.00%)		
Occupation	Enterprises, institutions, government departments	67(23.67%)	23(33.33%)	6.216	0.184
	Private enterprises	79(27.92%)	20(28.99%)		
	Self-employed	61(21.55%)	8(11.59%)		
	Retired	18(6.36%)	2(2.90%)		
Living with elderly or children at home	Unemployed or student	58(20.49%)	16(23.19%)	9.963	0.002
	Yes	192(67.84%)	60(86.96%)		
	No	91(32.16%)	9(13.04%)		
	Below 50,000 RMB	20(7.07%)	16(23.19%)		
Household annual income (total income of family members)	50,000–100,000 RMB	70(24.73%)	17(24.64%)	19.316	<0.001
	100,000–200,000 RMB	121(42.76%)	28(40.58%)		
	200,000–400,000 RMB	42(14.84%)	6(8.70%)		
	Above 400,000 RMB	30(10.60%)	2(2.90%)		
Marital Status	Married	184(65.02%)	50(72.46%)	1.587	0.452
	Unmarried	78(27.56%)	14(20.29%)		
	Divorced or widowed	21(7.42%)	5(7.25%)		
	Southern Jiangsu (Nanjing, Suzhou, Wuxi, Changzhou, Zhenjiang)	137(48.41%)	26(37.68%)		
Region	Central Jiangsu (Yangzhou, Taizhou, Nantong)	55(19.43%)	17(24.64%)	2.623	0.269
	Northern Jiangsu (Xuzhou, Lianyungang, Suqian, Huai'an, Yancheng)	91(32.16%)	26(37.68%)		

tor loading 0.812), this construct captures consumers' functional benefits (e.g., nutritional value) and emotional appeal (e.g., family health). Consistent with Batra & Ahtola's (1991) attitude-behavior consistency theory,¹⁸ 80.4% of respondents with positive attitudes exhibit higher purchase intention, highlighting the need to reinforce product necessity through targeted messaging (e.g., "essential for balanced diets").

Subjective norm ($\beta = 0.476$, $p = 0.03$, OR = 1.610): A one-unit increase in subjective norm elevates the odds ratio to 1.610 times, underscoring the role of social influence (e.g., "family/friends recommend," factor loading 0.795). Survey data show 74.4% of consumers with positive subjective norms intend to purchase, versus 52.3% with negative norms, aligning with Yadav & Pathak's (2016) social influence theory.¹⁹ This highlights word-of-mouth as a critical

driver for new product adoption, suggesting that influencer collaborations and user-generated content can effectively reduce decision uncertainty for *Macrobrachium rosenbergii*.

Perceived behavioral control ($\beta = 0.78$, $p < 0.001$, OR = 2.182):PBC strongly predicts intention, with each unit increase raising the odds ratio to 2.182 times, driven by perceived purchase convenience (factor loading 0.775) and cooking ease (0.762). A key finding is the supply-demand mismatch: 66.8% prefer fresh products, yet 37.8% of non-purchasers cite "troublesome cooking" due to limited processed options (<10%). Guangdong's industrial park model addresses this by increasing processed products to 30% (e.g., 5-minute ready-to-cook shrimp balls), reducing preparation time and enhancing PBC—consistent with 18. Giampietri et al. (2018)'s emphasis on accessibility in organic food purchases.²²

Table 4. Variable Definitions, Assignments, and Expected Directions of Effect.

Type	Variable	Definition	Mean	Standard Deviation	Expected Direction
Dependent Variable	Consumption Intention	0 = No intention, 1 = Have intention	0.8	0.398	--
Independent Variable	Product Attributes	1 = Extremely unimportant, 2 = Unimportant, 3 = Neutral, 4 = Important, 5 = Extremely important	3.75	1.02	Positive
	Health Awareness		3.71	1.14	Positive
	Behavioral Attitude	1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree	3.69	1.14	Positive
	Subjective Norm	3.71 1.14 Positive	3.7	1.09	Positive
	Perceived Behavioral Control		3.69	1.04	Positive
Control Variable	Living with elderly or children at home	0 = No, 1 = Yes	0.72	0.452	Uncertain
	Household annual income (total income of family members)	1 = Below 50,000 RMB, 2 = 50,000 - 100,000 RMB, 3 = 100,000 - 200,000 RMB, 4 = 200,000 - 400,000 RMB, 5 = Above 400,000 RMB	2.87	1.07	Uncertain

NEGATIVE INFLUENCING FACTORS

Family structure ($\beta = -1.674$, $p = 0.042$, $OR = 0.187$): Households with elderly members or children have an odds ratio of purchasing *Macrobrachium rosenbergii* that is only 0.187 times that of families without them, explained by family life cycle theory and intergenerational needs. “Full nest” families (Murphy & Staples, 1979), in their peak responsibility phase, prioritize budgets for elders’ healthcare (e.g., chronic disease management) and children’s education (e.g., nutrition and extracurricular training), reducing spending on premium proteins like *Macrobrachium rosenbergii*.²³ Among non-purchasers, 18.9% cite “troublesome preparation,” and NHC data show that over-60s cook 2.3 more homemade meals daily than younger groups.²⁴ Balancing elders’ soft-food preferences and children’s nutrition, these families face higher processing burdens (e.g., peeling), amplifying convenience barriers and lowering intent. This reflects strategic resource allocation, not just economic constraints.

Low-income households ($\beta = -2.897$, $p = 0.028$, $OR = 0.055$): The purchase probability of low-income households is only 5.5% of the high-income reference group (annual income > 400,000 RMB), showing a significant consumption inhibition effect, explained by economic constraints and protein substitution. Zhou et al. (2015) show low-income groups, facing price sensitivity, prefer low-cost proteins like pork/fish over high-priced *Macrobrachium rosenbergii* (a 1% price increase reduces fish consumption by 0.37%).²⁵ Among non-purchasers, 37.8% cite “troublesome cooking,” 32.9% “limited market access,” and low-income households, often in areas with poor fresh food channels, perceive stronger purchase inconvenience (lower perceived behavioral control scores). This “budget constraint-substitution-convenience barrier” overlap

makes them prioritize price rationality (factor loading 0.741) over nutritional value (0.784), significantly reducing consumption intention.

While production-area consumers show strong intent, non-production regions may face challenges: 1) inconvenient access leading to lower freshness perception and price sensitivity (low-income families: $\beta = -2.897$); 2) unfamiliarity-driven barriers (37.8% of non-purchasers cite “troublesome preparation”). The significant “subjective norm” effect ($\beta = 0.476$) in production areas highlights local word-of-mouth, which may require educational efforts to replicate in non-production areas.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Against the backdrop of global food security challenges and China’s implementation of the “grand food vision,” *Macrobrachium rosenbergii*—a key high-protein freshwater aquaculture species—plays a strategic role in ensuring high-quality animal protein supply and building a diversified food system. Using the Theory of Planned Behavior (TPB), this study empirically analyzes 352 consumers in Jiangsu Province, systematically revealing the key factors and mechanisms influencing consumption with the intention of giant river prawns, providing theoretical and empirical support for understanding high-value aquatic product consumption behavior. The core contributions of this study are as follows:

Table 5. Results of Binary Logistic Regression.

	Variables	β (Regression Coefficient)	Standard Error	Wald	df (Degrees of Freedom)	P (Significance)	OR (Odds Ratio)	95% Confidence Interval for OR	
								Lower Limit	Upper Limit
Independent Variable	Product Attributes	0.846	0.260	10.629	1	0.001	2.331	1.401	3.876
	Health Awareness	0.797	0.244	10.698	1	0.001	2.218	1.376	3.575
	Behavioral Attitude	0.556	0.238	5.453	1	0.020	1.743	1.093	2.779
	Subjective Norm	0.476	0.219	4.721	1	0.030	1.61	1.048	2.474
	Perceived Behavioral Control	0.78	0.243	10.282	1	0.001	2.182	1.354	3.515
Control Variable	Whether there are elderly family members or children living at home (Reference group: No elderly family members or children living at home)								
	Living with elderly or children at home	-1.674	0.825	4.121	1	0.042	0.187	0.037	0.944
	Household annual income (total income of family members)								
	Below 50,000 RMB	-2.897	1.321	4.812	1	0.028	0.055	0.004	0.735
	50,000–100,000 RMB	-1.531	1.272	1.449	1	0.229	0.216	0.018	2.616
	100,000–200,000 RMB	-0.406	1.222	0.11	1	0.740	0.667	0.061	7.305
	200,000–400,000 RMB	0.2	1.303	0.024	1	0.878	1.222	0.095	15.716
	Reference group: 400,000 RMB or above			13.359	4	0.010			
	Constant	-7.652	1.547	24.473	1	0	0		

DRIVERS OF CONSUMPTION INTENTION FROM A PSYCHOLOGICAL PERSPECTIVE

Context-specific variables such as product attributes ($\beta=0.846$, $OR=2.331$) and health awareness ($\beta=0.797$, $OR=2.218$) exert multi-level positive effects on consumption intention by shaping behavioral attitude ($\beta=0.556$, $OR=1.743$), subjective norms ($\beta=0.476$, $OR=1.610$), and perceived behavioral control (PBC, $\beta=0.780$, $OR=2.182$). Specifically, “safety,” “nutritional value,” and “convenience” in product attributes directly influence consumers’ functional value judgments, while health awareness amplifies the effects of attitudinal and normative beliefs by reinforcing health risk perception and nutritional needs. These findings expand the application of TPB in live aquatic product consumption, confirming the supplementary explanatory power of context-specific variables for traditional behavioral theories.

DIFFERENTIAL IMPACTS OF FAMILY CHARACTERISTICS AND ECONOMIC FACTORS

Family structure and income level exhibit significant negative moderating effects: multi-generational households have 81.3% lower consumption intention ($OR=0.187$) than childless/elderless households, reflecting the inhibition of premium protein consumption due to intergenerational budget reallocation; low-income households (<50,000 RMB annual income) have a purchase probability only 5.5% of high-income households ($OR=0.055$), highlighting the dual constraints of price sensitivity and protein substitution on consumption decisions. These conclusions enrich the application of family life cycle theory in food consumption research, revealing the complex influence pathways of structural factors on high-value agricultural product consumption.

PRACTICAL IMPLICATIONS FOR INDUSTRIAL DEVELOPMENT

The study offers precise optimization pathways: promote pre-processed products (e.g., ready-to-eat shrimp tails), increase processed products to over 30% as in Guangdong, reducing preparation costs; establish a “low-fat, high-protein” certification system and disseminate scenario-based recipes via short videos to strengthen health perception; for low-income groups, implement “pond-to-community” direct distribution to cut costs by 15–20%, improving affordability and accessibility.

RECOMMENDATIONS

DEVELOP PRICE-FRIENDLY AND CONVENIENT PRODUCT FORMATS FOR BUDGET-CONSTRAINED HOUSEHOLDS

Given the significant negative impact of low income on consumption intention ($\beta = -2.897$, $OR = 0.055$)—where low-income households (annual income < 50,000 RMB) exhibit a purchase probability only 5.5% of high-income counterparts—the following evidence-based actions are

proposed: (1) Promote pre-processed and value-added products to address the “troublesome cooking” barrier (cited by 37.8% of non-purchasers) and align with perceived behavioral control (PBC, $\beta = 0.780$). This includes developing peeled shrimp tails, ready-to-cook seasoning kits, and frozen semi-processed products, utilizing liquid nitrogen freezing to extend shelf life to 12 months and reduce household preparation time. (2) Optimize supply chains for cost efficiency via “pond-to-community” direct distribution models, reducing intermediate costs and retail prices by 15–20% compared to traditional channels. This targets the price sensitivity embedded in product attributes (price factor loading = 0.743) and improves market accessibility for low-income groups, addressing “limited market availability” (32.9% of non-purchasers).

OPTIMIZE INDUSTRIAL CHAIN AND CHANNEL STRATEGIES TO IMPROVE ACCESSIBILITY AND CONVENIENCE

Leveraging the critical role of perceived behavioral control (PBC, $\beta = 0.780$) and addressing channel dependency (66.8% of consumers purchase from supermarkets/wet markets): (1) Expand processed product production in main cultivation regions (e.g., Gaoyou, Taizhou), modeled after Guangdong’s pre-cooked food industrial park, to increase processed products (e.g., ready-to-eat shrimp paste, frozen shrimp meat) to over 30% of total output. This diversifies product forms, caters to time-constrained households, and enhances PBC by reducing reliance on labor-intensive fresh products. (2) Integrate online and offline channels to enhance market reach and consumer experience: Online platforms: Utilize e-commerce and livestreaming (e.g., Douyin) for direct sales with cold-chain logistics, ensuring product freshness and accessibility in non-production areas. Offline experiences: Establish “experience kitchens” in supermarkets to provide on-site cooking demonstrations, reducing perceived preparation difficulty (e.g., peeling, seasoning techniques) and boosting PBC—particularly relevant for “full nest” families ($OR = 0.187$), who face higher cooking burdens.

STRENGTHEN MARKETING OF NUTRITIONAL AND SAFETY ATTRIBUTES

Building on the positive effects of product attributes ($\beta = 0.846$) and health awareness ($\beta = 0.797$) on consumption intention, the following strategies are recommended: (1) Establish a standardized nutritional certification system for *Macrobrachium rosenbergii*, labeling products with evidence-based health claims (e.g., “high-quality protein,” “low-fat”) tied to measured attributes (nutritional value factor loading = 0.784), avoiding unvalidated indicators (e.g., calcium). Collaborate with healthcare institutions to develop general healthy recipes (e.g., balanced family meals) and disseminate them through digital platforms to engage health-conscious consumers. (2) Enhance production transparency via livestreaming and traceability initiatives, showcasing water quality management, disease control, and harvesting practices to build trust in product

safety (safety factor loading = 0.759). This reinforces positive behavioral attitudes ($\beta = 0.556$) and encourages repeat purchases driven by perceived reliability.

TARGETED OUTREACH FOR HOUSEHOLDS WITH ELDERLY MEMBERS OR CHILDREN

Addressing the significant negative effect of multi-generational households on consumption intention ($\beta = -1.674$, OR = 0.187)—driven by intergenerational resource allocation and cooking complexity: (1) Design age-adaptive convenience products, such as pre-portioned family packs and “elderly-friendly” seasoning kits, to simplify meal preparation and align with the PBC construct’s emphasis on behavioral ease for households balancing diverse dietary needs. (2) Provide practical cooking resources through community centers and social media, offering tutorials and meal plans that emphasize quick, nutritious recipes suitable for all ages. These solutions directly reduce perceived barriers and align with the model’s finding that convenience is a key driver of consumption intention.

LIMITATIONS AND FUTURE DIRECTIONS

(1) This study’s regional scope (Jiangsu, a major production area) may limit generalizability to non-production regions with differing accessibility and product familiarity. Focusing on consumption intention rather than actual behavior, future research could use longitudinal data to validate intention-behavior mechanisms. (2) The binary treatment of intention overlooks nuances between “somewhat” and “strongly” willing consumers. Ordinal logistic regression or structural equation modeling could explore intensity drivers, e.g., motivations for family vs. social consumption. (3) Unexamined cultural/regional dietary preferences offer opportunities for cross-regional/qualitative studies to uncover deep-seated drivers, supporting a synergy-oriented aquatic industry.

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ACKNOWLEDGMENTS

This research was funded by the Open Project Foundation from Key Laboratory of Freshwater Aquaculture Genetic and Breeding of Zhejiang Province, Zhejiang Institute of Freshwater Fisheries (ZJK202417) and the Ministry of Agriculture of People’s Republic of China through the China Agriculture Research System (CARS-48).

AUTHORS’ CONTRIBUTION

Conceptualization: Fei Li, Shiwei Xu, Qiang Gao, Hongtao Jin, Zhikang Deng; Methodology: Jingjing Lei, Fei Li, Shiwei Xu, Qiang Gao; Writing - original draft preparation: Jingjing Lei, Fei Li; Writing - review and editing: Jingjing Lei, Fei Li, Shiwei Xu, Qiang Gao, Hongtao Jin; Funding acquisition: Hongtao Jin; Supervision: Fei Li, Shiwei Xu, Qiang Gao, Hongtao Jin, Zhikang Deng; Data curation: Jingjing Lei, Fei Li, Shiwei Xu, Qiang Gao, Hongtao Jin; Software: Jingjing Lei, Fei Li.

COMPETING INTEREST – COPE

No competing interests were disclosed.

ETHICAL CONDUCT APPROVAL – IACUC

This study did not involve any experimental research on animals or plants.

INFORMED CONSENT STATEMENT

All authors and institutions have confirmed this manuscript for publication.

DATA AVAILABILITY STATEMENT

All are available upon reasonable request.

Submitted: April 26, 2025 CST. Accepted: May 17, 2025 CST.

Published: June 26, 2025 CST.



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REFERENCES

1. Costello C, Cao L, Gelcich S, et al. The future of food from the sea. *Nature*. 2020;588(7836):95-100. doi:[10.1038/s41586-020-2616-y](https://doi.org/10.1038/s41586-020-2616-y)
2. Pillai BR, Panda D. Global status of giant prawn, *Macrobrachium rosenbergii*, farming with special reference to India and measures for enhancing production. *Journal of Aquaculture*. Published online 2024;1-14. doi:[10.61885/joa.v33.2024.290](https://doi.org/10.61885/joa.v33.2024.290)
3. Department of Fisheries and Aquatic Wildlife, Ministry of Agriculture and Rural Affairs. *China Fisheries Statistical Yearbook 2024*. China Agriculture Press; 2024.
4. Zhang H, Guo J, Gao Q, et al. Study on the current status and countermeasures of China's giant river prawn (*Macrobrachium rosenbergii*) industry. *Chinese Fisheries Economics*. 2024;42(02):88-94.
5. Ajzen I, Fishbein M. A Bayesian analysis of attribution processes. *Psychological Bulletin*. 1975;82(2):261-277. doi:[10.1037/h0076477](https://doi.org/10.1037/h0076477)
6. Armitage CJ, Conner M. Efficacy of the Theory of Planned Behaviour: A meta-analytic review. *British Journal of Social Psychology*. 2001;40(4):71-499. doi:[10.1348/014466601164939](https://doi.org/10.1348/014466601164939)
7. Sobaih AEE, Algezawy M, et al. Adopting an extended theory of planned behaviour to examine buying intention and behaviour of nutrition-labelled menu for healthy food choices in quick service restaurants: Does the culture of consumers really matter? *International Journal of Environmental Research and Public Health*. 2023;20(5):4498. doi:[10.3390/ijerph20054498](https://doi.org/10.3390/ijerph20054498)
8. Lancaster KJ. A new approach to consumer theory. *Journal of Political Economy*. 1966;74(2):132-157. doi:[10.1007/978-3-642-51565-1_34](https://doi.org/10.1007/978-3-642-51565-1_34)
9. Raptou E, Manolas E. Consumption patterns and public attitudes toward organic foods: The role of climate change awareness. In: *Climate Change in the Mediterranean and Middle Eastern Region*. ; 2022:365-393. doi:[10.1007/978-3-030-78566-6_18](https://doi.org/10.1007/978-3-030-78566-6_18)
10. Chakraborty D, Dash G. Using the consumption values to investigate consumer purchase intentions towards natural food products. *British Food Journal*. 2022;125(2):551-569. doi:[10.1108/bfj-12-2021-1334](https://doi.org/10.1108/bfj-12-2021-1334)
11. Hughner RS, McDonagh P, Prothero A, et al. Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour: An International Research Review*. 2007;6(2-3):94-110. doi:[10.1002/cb.210](https://doi.org/10.1002/cb.210)
12. Spence M, Stancu V, Elliott CT, et al. Exploring consumer purchase intentions towards traceable minced beef and beef steak using the theory of planned behavior. *Food Control*. Published online 2018:138-147. doi:[10.1016/j.foodcont.2018.03.035](https://doi.org/10.1016/j.foodcont.2018.03.035)
13. Ham M, Jeger M, Frajman Ivković A. The role of subjective norms in forming the intention to purchase green food. *Economic Research-Ekonomska Istraživanja*. 2015;28(1):738-748. doi:[10.1080/1331677x.2015.1083875](https://doi.org/10.1080/1331677x.2015.1083875)
14. Wang O, Somogyi S. Consumer adoption of sustainable shellfish in China: Effects of psychological factors and segmentation. *Journal of Cleaner Production*. 2018;206:966-975. doi:[10.1016/j.jclepro.2018.09.189](https://doi.org/10.1016/j.jclepro.2018.09.189)
15. Ajzen I, Fishbein M, Lohmann S, et al. The influence of attitudes on behaviour. In: *The Handbook of Attitudes, Volume 1: Basic Principles*. ; 2018:197-255.
16. Maesano G, Di Vita G, Chinnici G, et al. The role of credence attributes in consumer choices of sustainable fish products: A review. *Sustainability*. 2020;12(23):10008. doi:[10.3390/su122310008](https://doi.org/10.3390/su122310008)
17. Piester HE, DeRieux CM, Tucker J, et al. "I'll try the veggie burger": Increasing purchases of sustainable foods with information about sustainability and taste. *Appetite*. 2020;155:104842. doi:[10.1016/j.appet.2020.104842](https://doi.org/10.1016/j.appet.2020.104842)
18. Batra R, Ahtola OT. Measuring the hedonic and utilitarian sources of consumer attitudes. *Marketing Letters*. 1991;2:159-170. doi:[10.1007/bf00436035](https://doi.org/10.1007/bf00436035)
19. Yadav R, Pathak GS. Intention to purchase organic food among young consumers: Evidences from a developing nation. *Appetite*. 2015;96:122-128. doi:[10.1016/j.appet.2015.09.017](https://doi.org/10.1016/j.appet.2015.09.017)
20. Arvola A, Vassallo M, Dean M, et al. Predicting intentions to purchase organic food: The role of affective and moral attitudes in the theory of planned behaviour. *Appetite*. 2007;50(2-3):443-454. doi:[10.1016/j.appet.2007.09.010](https://doi.org/10.1016/j.appet.2007.09.010)

21. Siddiqui M, Chakraborty D, Siddiqui A. Consumers buying behaviour towards agri-food products: A mixed-method approach. *Journal of Retailing and Consumer Services*. 2023;73:103349. doi:[10.1016/j.jretconser.2023.103349](https://doi.org/10.1016/j.jretconser.2023.103349)
22. Giampietri E, Verneau F, Del Giudice T, et al. A theory of planned behaviour perspective for investigating the role of trust in consumer purchasing decisions related to short food supply chains. *Food Quality and Preference*. 2018;64:160-166. doi:[10.1016/j.foodqual.2017.09.012](https://doi.org/10.1016/j.foodqual.2017.09.012)
23. Murphy PE, Staples WA. A modernized family life cycle. *Journal of Consumer Research*. 1979;6(1):12. doi:[10.1086/208744](https://doi.org/10.1086/208744)
24. Zhao LY, Ding GQ, Zhao WH, et al. *Report on Chinese residents' nutrition and health monitoring (2015–2017): Dietary intake and nutritional status*. People's Medical Publishing House; 2022.
25. Zhou L, Jin SH, Zhang B, Cheng GY. Determinants of fish consumption by household type in China. *British Food Journal*. 2015;117(4):1273-1288. doi:[10.1108/BFJ-05-2014-0182](https://doi.org/10.1108/BFJ-05-2014-0182)