

# Deconstruction and Empirical Insights into the Key Factors of Elderly Household Product Purchasing Decisions in Anhui Province

Yu Zhou<sup>1,2, a, \*</sup>, Ali Khatibi<sup>2, b</sup>, Jacqueline Tham<sup>2, c</sup>

<sup>1</sup> Anhui Xinhua University, Hefei 230000, Anhui, China

<sup>2</sup> Postgraduate Centre, Management & Science University, Shah Alam, 40100, Selangor, Malaysia

<sup>a, \*</sup>Email: zhoyuxinhua@126.com, <sup>b</sup>Email: alik@msu.edu.my, <sup>c</sup>Email: jacqueline@msu.edu.my

**Abstract:** Against the backdrop of the accelerated aging process globally and in China, especially the significant increase in the elderly population in Anhui Province, the market for elderly household products presents both opportunities and problems. In this study, 518 elderly people from 16 prefecture-level cities in Anhui Province were sampled. Through methods such as questionnaire surveys and structural equation models, an in-depth analysis was conducted on the impacts of cognitive ability, product characteristics, usage scenarios, and product usability on the purchasing decisions of elderly household products. The results show that cognitive ability, product characteristics, and usage scenarios are significantly positively correlated with purchasing decisions, and product usability plays a crucial mediating role. Moreover, significant differences exist in these factors among elderly people with different demographic characteristics. This study innovatively reveals the internal mechanism of the purchasing decisions of elderly household products in Anhui Province and provides targeted strategies for enterprises and the government.

**Keywords:** Anhui Province; Elderly Household Products; Purchasing Decisions.

## 1. Research Background

Aging society has already arrived in Anhui Province, where the population aged 65 and above accounts for 12.97% of the total population, and this proportion is still on the rise. With the transformation of family structures, such as the popularization of the "4-2-1" family model and the increasing phenomenon of empty-nest elderly, home-based care for the aged has become a dominant pension model<sup>[1]</sup>. This trend has gradually driven up the demand for home products among the elderly, especially those that can meet their needs for living convenience and safety.

Multiple factors influence the purchasing decisions of home products among the elderly. For instance, perceived factors (such as perceived ease of use and perceived usefulness) have a significant impact on the purchase intention of the elderly, while perceived risks and prices tend to suppress their purchasing behaviors. Additionally, individual characteristics of the elderly (such as gender, health status, and urban or rural residence) also affect their purchasing decisions<sup>[2]</sup>. In rural areas, the elderly are more inclined to choose home products that can meet their basic living needs. Due to more prevalent health problems, they have higher requirements for the functionality of home products<sup>[3]</sup>.

Meanwhile, the consumption behaviors of the elderly are also influenced by social and psychological factors<sup>[4]</sup>. For example, the opinions of family members and friends, as well as the support systems within the community, all play important roles in the purchasing decisions of the elderly. Moreover, with the popularization of the Internet, the elderly have gradually started to embrace online shopping. However, they still face issues such as unclear product categorization and unfamiliarity with shopping platforms<sup>[5]</sup>.

## 2. Research Objectives

This research aims to comprehensively and in-depth explore various factors influencing the purchasing decisions of elderly household products in Anhui Province. Through rigorous theoretical analysis and empirical research, it precisely analyzes the internal relationships and action mechanisms among these factors. It focuses on analyzing how factors such as cognitive ability, product characteristics and user scenarios directly or indirectly affect the purchasing decisions of elderly household products, and the crucial mediating role played by product usability. Thus, it provides scientific and accurate guidance for enterprises to develop household products that meet the needs of the elderly, and promotes the prosperity of the elderly consumer market and the sustainable development of the social economy.

## 3. Research Methodology

### 3.1. Questionnaire Design and Data Source

Based on the preliminarily selected indicators, a questionnaire was designed in combination with the Likert five-point scale, where the values 1 - 5 represent "strongly disagree", "disagree", "neutral", "agree", and "strongly agree" respectively. The questionnaire content includes 7 questions about the basic information of the respondents and 33 questions for objective evaluation. The research targeted the elderly living at home in Anhui Province. The data collection was carried out from February to April 2024. The elderly population in Anhui Province is widely distributed, covering groups with different regions, economic levels and living environments. To ensure the representativeness of the sample, stratified sampling was adopted according to the number and proportion of the elderly population in each prefecture-level city in Anhui Province in the seventh national census data.

During the sampling process, full consideration was given to the regional differences and population structure characteristics of the 16 prefecture-level cities in Anhui Province. The number of questionnaires was allocated according to the proportion of the elderly population in each prefecture-level city. A total of 600 questionnaires were distributed. The questionnaire distribution methods included on-site visits to communities, elderly activity centers and other places for face-to-face interviews and on-site questionnaire distribution. Trained investigators introduced the research purpose and questionnaire filling methods to the elderly in detail to ensure that the elderly understood and voluntarily participated in the survey. Finally, 550 valid questionnaires were recovered, with an effective recovery rate of 91.67%.

### 3.2. Hypothesis Testing

This research established a research framework as shown in the figure 1 based on theoretical analysis and research purposes, and put forward a series of hypotheses. The main hypotheses are as follows:

- H1: Cognitive ability has a significant positive impact on purchasing decisions;
- H2: Product characteristics have a significant positive impact on purchasing decisions;
- H3: User scenarios have a significant positive impact on purchasing decisions;
- H4: Product usability has a significant positive impact on purchasing decisions;
- H5: Cognitive ability has a significant positive impact on product usability;
- H6: Product characteristics have a significant positive impact on product usability;
- H7: User scenarios have a significant positive impact on product usability;
- H8: Product usability plays a mediating role between cognitive ability and purchasing decisions;
- H9: Product usability plays a mediating role between product characteristics and purchasing decisions;
- H10: Product usability plays a mediating role between user scenarios and purchasing decisions.

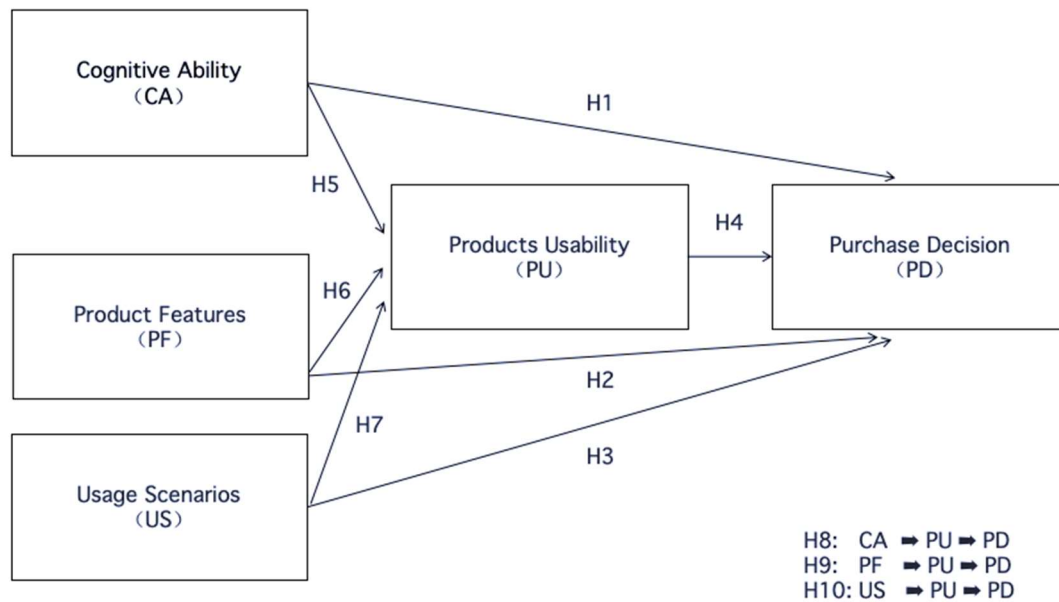


Figure 1. Conceptual Framework

During the data analysis process, these hypotheses were verified through the structural equation model. In the model construction, cognitive ability, product characteristics, and user scenarios were set as exogenous independent variables, product usability was set as a mediating variable, and purchasing decisions were set as endogenous dependent variables, and the corresponding path relationships were set. The rationality and fitness of the model were evaluated by analyzing the model fitting indices. If the model fitting indices reach or are better than the preset standards, it indicates that the model can better explain the relationships between variables on the whole. For each hypothesized path, the significance of the path coefficient (p-value) was tested to determine whether the hypothesis was valid. If the path coefficient is significantly non-zero ( $p < 0.05$  or  $p < 0.01$ , and the significance level is determined according to specific circumstances), the corresponding hypothesis is supported; otherwise, the hypothesis is rejected. For example, if the path coefficient from cognitive ability to purchasing decision is

significantly positive and  $p < 0.001$ , it proves that Hypothesis H1 is valid, that is, cognitive ability has a significant positive impact on purchasing decisions.

## 4. Data Analysis and Results

### 4.1. Data Screening and Sample Characteristics

After the data collection was completed, the data was first strictly screened. As mentioned before, a total of 600 questionnaires were collected. After the preliminary screening, 50 samples that were not answered completely or had exactly the same answers were deleted, leaving 550 questionnaires. Further inspection found that 32 questionnaires had individual data missing. The median method was used to fill in these missing values to ensure the integrity of the data. Subsequently, an outlier test was carried out. The standard z-score of a single variable and the Mahalanobis distance method of multiple variables were used

for screening. Finally, 8 outliers were identified and deleted, and 518 valid samples were obtained for further in-depth analysis.

A detailed analysis of the demographic characteristics of the sample shows that in terms of gender, there were 251 females, accounting for 48.5%, and 267 males, accounting for 51.5%, with a balanced proportion. In terms of age distribution, 195 people aged 60 - 64 accounted for 37.6% and were the main group, those aged 65 - 69 accounted for 23.9%, those aged 70 - 74 accounted for 24.9%, and those aged 75 and above accounted for 13.5%. In terms of educational attainment, 218 people with primary education and below accounted for 42.1%, 249 people with secondary education accounted for 48.1%, and 51 people with higher education accounted for 9.8%. In terms of monthly income, 201 people with an income less than 2,000 yuan accounted for 38.8%, 270 people with an income between 2,000 and 6,000 yuan accounted for 52.1%, and 47 people with an income higher than 6,000 yuan accounted for 9.1%. The occupations before retirement were widely distributed, with farmers accounting for 18.7% and workers accounting for 13.1%. In terms of family structure, 205 people living with their spouses accounted for 39.6%, 183 people living with their children accounted for 35.3%, and there were various other types. These data indicate that the sample has diversity and representativeness, laying a foundation for subsequent

research.

#### 4.2. Reliability and Validity Analysis

Reliability test is an important part of evaluating the reliability and stability of the questionnaire. In this study, Cronbach's  $\alpha$  was used to measure the internal consistency reliability of each scale. Generally speaking, if the Cronbach's  $\alpha$  is greater than 0.9, it indicates that the internal reliability of the scale is extremely high; if it is between 0.7 and 0.9, it means that the reliability is relatively good; if it is between 0.5 and 0.7, it shows that the reliability is acceptable; if it is less than 0.5, it implies that there may be major problems in the scale design and it needs to be reexamined and revised.

The results calculated by SPSS 25.0 software show that the Cronbach's  $\alpha$  coefficients of the Cognitive Ability, Product Features, Usage Scenarios, and Purchase Decision scales are 0.861, 0.845, and 0.857 respectively, all of which are greater than 0.7, indicating that the reliabilities of these scales are relatively good. The Cronbach's  $\alpha$  coefficient of the Products Usability scale is 0.948, which is greater than 0.9, indicating that the reliability of this scale is excellent. The CITC value of each measurement item of each scale is greater than 0.4, and deleting any item cannot further improve the Cronbach's  $\alpha$  value of the scale. Therefore, there is no need to delete any items.

**Table 1.** Reliability Analysis

Scale	Items	Revised item-total correlation	Cronbach's Alpha after deleting items	Cronbach's Alpha
Cognitive Ability	CA1	0.704	0.825	0.861
	CA2	0.715	0.820	
	CA3	0.672	0.838	
	CA4	0.741	0.810	
Product Features	PF1	0.697	0.801	0.845
	PF2	0.624	0.821	
	PF3	0.643	0.816	
	PF4	0.627	0.820	
	PF5	0.668	0.809	
Usage Scenarios	US1	0.656	0.850	0.870
	US2	0.677	0.846	
	US3	0.666	0.848	
	US4	0.717	0.839	
	US5	0.662	0.849	
	US6	0.632	0.854	
Products Usability	PU1	0.713	0.944	0.948
	PU2	0.753	0.943	
	PU3	0.729	0.944	
	PU4	0.774	0.943	
	PU5	0.772	0.943	
	PU6	0.789	0.943	
	PU7	0.738	0.944	
	PU8	0.672	0.946	
	PU9	0.712	0.944	
	PU10	0.678	0.945	
	PU11	0.760	0.943	
	PU12	0.710	0.945	
	PU13	0.708	0.945	
	PU14	0.720	0.944	
Purchase Decision	PD1	0.642	0.842	0.857
	PD2	0.738	0.802	
	PD3	0.686	0.823	
	PD4	0.736	0.802	

Validity analysis mainly includes exploratory factor analysis (EFA) and confirmatory factor analysis (CFA),

aiming to examine whether the scale can accurately measure the concepts and variables under study and whether the

structural relationships among the variables are reasonable.

Firstly, exploratory factor analysis was carried out. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were calculated to judge whether the data were suitable for factor analysis. In this study, the KMO value was 0.953, which was much larger than the recommended standard of 0.7, indicating a strong correlation among the variables and that the data were highly suitable for factor analysis. The approximate chi-square value of Bartlett's test of sphericity was 10250.632, with 528 degrees of freedom and a significance level of 0.000, which was less than 0.05, further indicating that the data were suitable for factor analysis.

The principal component analysis method was used to extract factors, and the maximum variance method was used for factor rotation. According to the principle that the cumulative contribution rate exceeded 50% and the eigenvalue was greater than 1, five main factors were successfully extracted from the scale. The cumulative

variance contribution rate of these five factors reached 63.243%, indicating that the extracted factors could better explain most of the information of the original variables and that the factor analysis results were reliable. From the rotated component matrix, it could be clearly seen that CA1 - CA4 had relatively large loadings on factor 4, so it was named the Cognitive Ability factor; PF1 - PF5 had relatively large loadings on factor 3, so it was named the Product Features factor; US1 - US6 had relatively large loadings on factor 2, so it was named the Usage Scenarios factor; PU1 - PU14 had relatively large loadings on factor 1, so it was named the Products Usability factor; PD1 - PD4 had relatively large loadings on factor 5, so it was named the Purchase Decision factor. Moreover, each factor loading was greater than 0.5, and there was no serious cross-loading among the items. Each measurement item could be well grouped under the corresponding factor, which fully demonstrated that the scale had good structural validity.

**Table 2.** Rotated Component Matrix

	Component				
	1	2	3	4	5
CA1				0.792	
CA2				0.772	
CA3				0.758	
CA4				0.775	
PF1			0.759		
PF2			0.704		
PF3			0.746		
PF4			0.679		
PF5			0.758		
US1		0.716			
US2		0.744			
US3		0.713			
US4		0.756			
US5		0.730			
US6		0.717			
PU1	0.723				
PU2	0.764				
PU3	0.759				
PU4	0.789				
PU5	0.788				
PU6	0.779				
PU7	0.735				
PU8	0.667				
PU9	0.686				
PU10	0.653				
PU11	0.759				
PU12	0.674				
PU13	0.674				
PU14	0.674				
PD1					0.660
PD2					0.740
PD3					0.753
PD4					0.765

In the confirmatory factor analysis, AMOS 24.0 software was used to test the convergent validity and discriminant validity of the scale. In terms of convergent validity, it was

judged by observing the standardized factor loadings (standard regression weights), composite reliability (CR), and average variance extracted (AVE) of each item. Generally, it

is required that the standardized factor loadings are greater than 0.5, the composite reliability is greater than 0.7, and the average variance extracted is greater than 0.5. Taking the cognitive ability scale as an example, the standardized loading values of its items CA1, CA2, CA3, and CA4 are [specific values], all of which are greater than 0.5; the composite reliability is 0.862, which is greater than 0.7; the average variance extracted is 0.610, which is greater than 0.5, fully meeting the requirements of convergent validity. Other scales such as product characteristics, user scenarios, product usability, and purchase decision scales also meet the requirements of convergent validity, indicating that the measurement items of each scale can effectively measure the

corresponding latent variables.

### 4.3. Correlation and Structural Equation Model Analysis

To explore the relationships among the research variables, this study adopted the Pearson correlation analysis method. The value range of the correlation coefficient is between -1 and 1. The closer the absolute value is to 1, the stronger the correlation between the variables. A positive correlation indicates that the variables change in the same direction, while a negative correlation indicates that the variables change in the opposite direction.

**Table 3.** Correlation Analysis

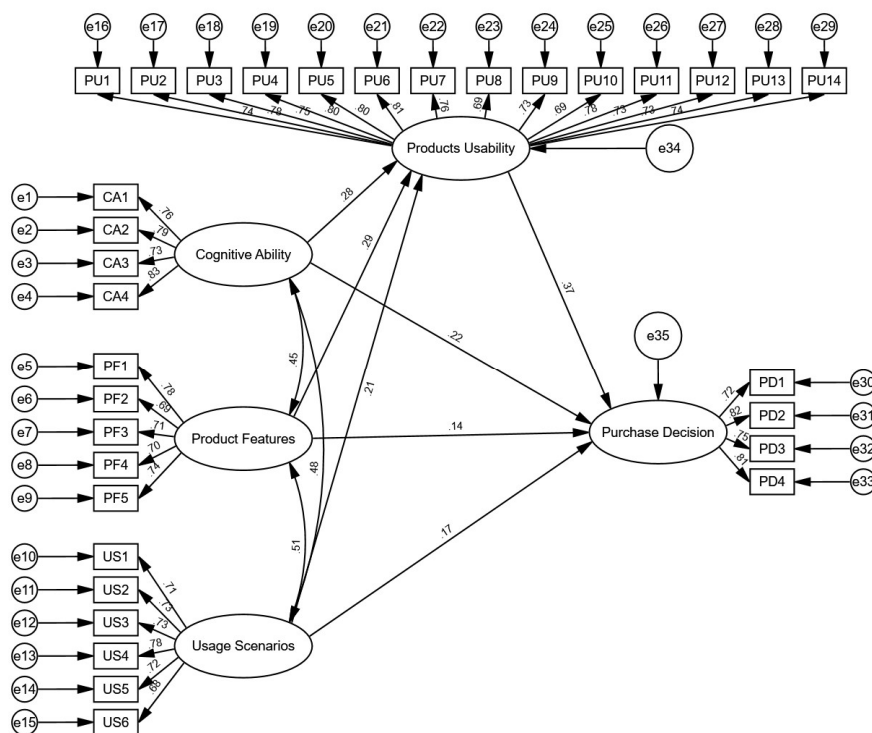
	Cognitive Ability	Product Characteristics	Usage Scenarios	Product Usability	Purchase Decision
Cognitive Ability	1				
Product Characteristics	.390**	1			
Usage Scenarios	.411**	.436**	1		
Product Usability	.464**	.467**	.451**	1	
Purchase Decision	.478**	.440**	.455**	.581**	1

Note: \*\* represents  $P < 0.01$

From the results of the correlation analysis, cognitive ability, product characteristics, usage scenarios, and product usability are all significantly positively correlated with purchase decisions. Among them, the correlation coefficient between cognitive ability and purchase decision is 0.478, indicating that the stronger the cognitive ability of the elderly, the more positive their purchase decision tendency is. The correlation coefficient between product characteristics and purchase decision is 0.440, suggesting that product characteristics have an important influence on the purchase decisions of the elderly. The correlation coefficient between usage scenarios and purchase decision is 0.455, showing that

the suitability of usage scenarios is closely related to purchase decisions. The correlation coefficient between product usability and purchase decision is as high as 0.581, highlighting the crucial role of product usability in the purchase decisions of the elderly.

In addition, there are also significant positive correlations among cognitive ability, product characteristics, usage scenarios, and product usability, with correlation coefficients of 0.464, 0.467, and 0.451 respectively. This indicates that good cognitive ability helps the elderly to better perceive and utilize product usability, and product characteristics and usage scenarios also affect the ease of use of the product.



**Figure 2.** Structural Equation Model

Although the correlation analysis preliminarily verifies the associations among variables, it cannot determine the causal relationships. Therefore, this study further constructs a structural equation model for in-depth analysis. The structural equation model shown in Figure 1 was constructed using AMOS 24.0 software. In the figure, the double-headed arrows represent the connection relationships among exogenous

variables, and the single-headed arrows represent the causal relationships between exogenous and endogenous variables. Cognitive ability, product characteristics, and usage scenarios are taken as independent variables, product usability is taken as a mediating variable, and purchase decision is taken as a dependent variable.

**Table 4.** Model Fitting Index Results

	<b>X2/df</b>	<b>RMSEA</b>	<b>IFI</b>	<b>TLI</b>	<b>CFI</b>
<b>Judgment criteria</b>	<3	<0.08	>0.9	>0.9	>0.9
<b>Fitting results</b>	2.285	0.050	0.938	0.932	0.937

Table 4 is the model fit index table. It can be seen from the table that the X2/df value is 2.285, which is less than 3. The value of RMSEA is 0.050, which is less than 0.08. The value

of IFI is 0.938, which is greater than 0.9. The value of TLI is 0.932, which is greater than 0.9. The value of CFI is 0.937, which is greater than 0.9. Overall, the model's index fit is ideal.

**Table 5.** Path Analysis

<b>Hypothesis</b>	<b>Path</b>		<b>Estimate</b>	<b>S.E.</b>	<b>C.R.</b>	<b>P</b>	<b>Result</b>	
H1	PD	<---	CA	0.218	0.045	4.210	***	supported
H2	PD	<---	PF	0.141	0.047	2.676	0.007	supported
H3	PD	<---	US	0.169	0.048	3.260	0.001	supported
H4	PD	<---	PU	0.366	0.049	6.798	***	supported
H5	PU	<---	CA	0.283	0.049	5.526	***	supported
H6	PU	<---	PF	0.285	0.052	5.405	***	supported
H7	PU	<---	US	0.209	0.053	4.002	***	supported

Note: CA=Cognitive Ability; PF=Product Features; US=Usage Scenarios; PU=Products Usability; PD=Purchase Decision;

It can be seen from the path analysis in Table 5 that the hypothesized paths of H1 - H7 are all supported.

**Table 6.** Test of the Mediating Effect of Products Usability in the Relationship between Cognitive Ability and Purchase Decision

	<b>Effect Value</b>	<b>Standard Error</b>	<b>95% CI</b>	
			<b>Upper Limit</b>	<b>Lower Limit</b>
<b>Total Effect</b>	0.321	0.058	0.211	0.436
<b>Direct Effect</b>	0.218	0.055	0.118	0.329
<b>Indirect Effect</b>	0.104	0.024	0.065	0.160

**Table 7.** Test of the Mediating Effect of Products Usability in the Relationship between Product Features and Purchase Decision

	<b>Effect Value</b>	<b>Standard Error</b>	<b>95% CI</b>	
			<b>Upper Limit</b>	<b>Lower Limit</b>
<b>Total Effect</b>	0.245	0.056	0.141	0.363
<b>Direct Effect</b>	0.141	0.053	0.035	0.247
<b>Indirect Effect</b>	0.104	0.026	0.060	0.165

**Table 8.** Test of the Mediating Effect of Products Usability in the Relationship between Usage Scenarios and Purchase Decision

	<b>Effect Value</b>	<b>Standard Error</b>	<b>95% CI</b>	
			<b>Upper Limit</b>	<b>Lower Limit</b>
<b>Total Effect</b>	0.246	0.055	0.129	0.350
<b>Direct Effect</b>	0.169	0.053	0.060	0.277
<b>Indirect Effect</b>	0.077	0.024	0.036	0.133

In terms of the mediating effect test, taking the mediating effect of product usability in the relationship between cognitive ability and purchase decision as an example, the Bootstrap method was adopted with 5,000 resampling times. The confidence interval level was set at 95%, and the bias-corrected nonparametric percentile method was used for sampling. The results show that the total effect of cognitive ability on purchase decision is 0.321, and the confidence

interval is [0.211, 0.436], which does not contain 0, indicating the existence of the total effect; the direct effect is 0.218, and the confidence interval is [0.118, 0.329], which does not contain 0, indicating the existence of the direct effect; the indirect effect is 0.104, and the confidence interval is [0.065, 0.160], which does not contain 0, indicating the existence of the indirect effect. This proves that hypotheses H8 - H10 are valid, that is, product usability plays a mediating role between

cognitive ability, product characteristics, user scenarios, and purchase decisions.

To sum up, the results of the structural equation model analysis comprehensively verify the hypotheses put forward in this study, clearly revealing the influence mechanism of cognitive ability, product characteristics, and usage scenarios on the purchase decisions of elderly home products in Anhui Province through product usability.

## 5. Discussion

### 5.1. Interpretation of Results

This study systematically explored the key factors influencing the purchasing decisions of elderly home products through questionnaire surveys and in-depth data analysis of 518 home-dwelling elderly individuals across 16 prefecture-level cities in Anhui Province. The research findings indicate that there are significant positive correlations between factors such as cognitive ability, product characteristics, and usage scenarios, and the purchasing decisions of elderly home products. Moreover, product usability plays a vital mediating role. Specifically, when confronted with home products, elderly individuals with stronger cognitive abilities can more effectively understand and evaluate the functions and values of the products, thus making purchasing decisions more actively. In terms of product characteristics, products with sound functions, quality, and design are more likely to be favored by the elderly. Appropriate usage scenarios can enhance the practicality and suitability of products in the lives of the elderly, further boosting their purchase intention. Notably, product usability directly impacts the acceptance and usage experience of the elderly towards products. When products are easy to operate and understand, the elderly are more likely to make decisive purchasing decisions. Meanwhile, the study also reveals significant differences among the elderly in terms of age, educational level, income level, and family structure regarding these factors, which fully reflects the diversity and complexity of the elderly population and further underscores the importance of personalized product design and marketing strategies.

### 5.2. Research Contributions

The innovation of this study lies in systematically investigating the influencing factors of the purchasing decisions of elderly home products in Anhui Province and verifying the mediating effect of product usability via the structural equation model. It thus provides new perspectives and methods for the research on elderly home products. Compared with previous studies, this research places more emphasis on regional characteristics and comprehensive multi-factor analysis, filling the gap in the study of the elderly population in Anhui Province and offering empirical evidence and theoretical support for related fields.

### 5.3. Policy Recommendations

Based on the research results, the government and relevant departments can introduce a series of policies to promote the development of the elderly home products market. Firstly, supervision over the elderly home products industry should be strengthened, and relevant product standards should be formulated and refined to ensure product quality and safety and regulate market order. For instance, an elderly home products quality certification system could be established, and

products that meet the standards would be given certification marks to guide consumers to choose safe and reliable products.

Secondly, the government can adopt policy measures such as financial subsidies and tax preferences to encourage enterprises to increase their investment in the research and development of elderly home products, thereby enhancing the innovativeness and applicability of the products. For example, tax exemptions can be granted to enterprises developing smart home products specifically for the elderly, supporting them in carrying out design and R & D activities targeting the needs of the elderly.

In addition, the government should also strengthen the consumption education and guidance for the elderly, improving their consumption awareness and discrimination ability. Through means like community lectures and promotional materials, knowledge and skills regarding the selection of home products can be popularized among the elderly, helping them to better choose products suitable for themselves.

### 5.4. Limitations

Although this study has achieved certain results, it also has some limitations. Firstly, the samples were only collected from Anhui Province. Despite efforts to ensure diversity and representativeness during sample selection, it may still be unable to fully reflect the characteristics and needs of the elderly population across the country. Cultural differences and unbalanced economic development in different regions may lead to variations in the purchasing decisions of elderly home products. Future research needs to further expand the sample scope to cover the elderly in more regions.

Secondly, in terms of the selection of research variables, although the main influencing factors have been considered, there may still be some important factors that have not been included. For example, the cultural background and social interactions of the elderly may also have an impact on their purchasing decisions. In subsequent research, the research variables can be further expanded for a more comprehensive analysis.

Furthermore, this study used cross-sectional data, which cannot reflect the dynamic change relationships between variables. Future research could adopt a longitudinal research design to track the changes in the purchasing decisions of the elderly and related factors at different time points, so as to more deeply reveal the underlying causal relationships and development trends. Meanwhile, in terms of data collection methods, although questionnaires can obtain a large amount of information, there may be some subjectivity and recall bias. Subsequent research can combine methods such as interviews and observations to obtain richer and more accurate data.

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