

NO HAMBURGERS FOR THE ELDERLY? BASED ON REGRESSION ANALYSIS METHOD

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ABSTRACT

Since the 21st century, China has become a super aging society, and researchers have focused on societal burdens from a problem perspective, as well as new market opportunities attuned to the perspectives and needs of the elderly, creating a new mode of life, smart products and services. However, product development trends indicate a need for adaptation, affordances, and an inclusive design approach. This paper presents a case study of elderly ordering meals in the hamburger shop through the self-service ordering machine, aims to research the differences in user interface requirements between the elderly and young people by combining the consumption characteristics of the elderly learned from the literature. In this paper, I issued the questionnaires to get the evaluations of the elderly and young people on the satisfaction of the design of the hamburger shop's self-service ordering interface, and further concluded the differences in user interface requirements between the elderly and young people in the same scenario with some practical suggestions after finding out the difference in operation interfaces for the elderly and young people through linear regression method. We hope that this paper will draw the attention of the market and merchants to make optimization, thus improving the dining experience and the user proportion of the elderly in the restaurant market.

Keywords: *The Elderly; Super Aging; Interface Design; Elderly UI; Linear Regression Analysis; Kiosk*

1. INTRODUCTION

According to the UN's standards, a region is considered to enter the aging society when the proportion of the population aged 65 and above exceeds 7% or when the percentage of the population aged 60 and above exceeds 10%. Based on this standard, China has entered the aging society since 2000. According to the data released by the National Bureau of Statistics, the number of the elderly aged 60 and above in China reached 254 million at the end of 2019, accounting for 18.1% of the total population, and the number of the elderly

aged 65 and above reached 176 million, accounting for 12.6% of the total population. Following the current population trends in China, the aging rate in China will rapidly rise in the future, as predicted in an article published by the China Development Research Foundation[1], by around 2022, the population aged 65 and above in China will account for 14% of the total population, and China will enter the super-aged society.

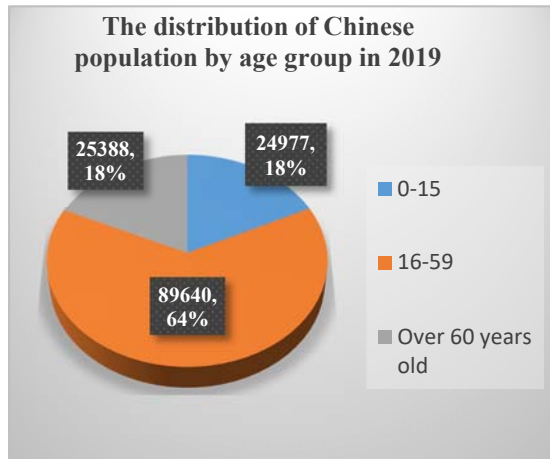


Figure 1: The distribution of Chinese population by age group in 2019. Data Sources: [1]

The proportion of the elderly in worldwide is increasing, and is estimated to reach about 2.1 billion in 2050, accounting for 22% [2]. It can be seen from a great number of studies and data that population aging will bring great challenges to the industrial structure and consumption structure. Under the increasing development of the society, China's right-age laborers are decreasing, the industrial structure is gradually transforming from a traditional labor-based mode to a technology-based and intelligent-based mode. With the continuing economic development, China's overall consumption level has increased. Due to the lower consumption demand and consumption power of the elderly than that of the young people, the population aging may lead to lower consumption levels, which also affects productivity [3].

On the other hand, although the population aging has brought new burdens on the society in various aspects, the increasingly growing group of the elderly also becomes a consumer group with great potential, the "senior market" has attracted the attention of all sectors of society. In recent year, there are more and more products focusing on the demands of the elderly, especially the watches, mobile phones and other electronic products that are

specific to the health care of the elderly [4]. Such smart products start a new and intelligent life for the elderly. However, due to the great differences in consumption habits and consumption power between the elderly and young people, nowadays, there are many researches on products specially developed and produced for the elderly by studying the demands of the elderly [5][6], but these researchers have neglected whether the adaptation degree of the total social demand is reasonable for the elderly, and whether we need to optimize the existing consumption scenarios to improve the consumption level of the elderly in the current market.

With the development of technology and economy, many manual operations at the offline scenarios have been replaced by intelligent machines, therefore, in addition to the online C-end products, the offline smart products should also be adapted for the elderly as much as possible. In this research, I discuss the issue in a detailed offline scenario that the elderly make orders through the self-service ordering machine in a hamburger shop. There are three reasons for me to discuss the issue in this scenario:

I. Catering industry accounts for a large proportion in the consumption market with an obvious growth trend. According to the data of the current hamburger shops in China, young people are the main customers in the fast food industry, which is speculated that most of the domestic hamburger shops and other fast food restaurants currently adopts the self-service ordering machine as the main ordering methods, with a higher operative difficulty for the elderly to make orders.

II. The consumption power of the elderly currently has been greatly improved compared with that before. With the improvement of living standard, many elderly people has shed the traditional image of pinching and scraping, but gradually improves

their consumption and purchasing power, they purchase products more and more for the purpose of meeting their curiosity and other spiritual needs rather than just the rigid demand for such products, therefore, more and more elderly people decided to eat out, and the restaurants are necessary to expand the elderly consumer group.

III. From the view of intelligent applications, With the increasing growth of the elderly people, smartphone and other smart electronic products are more and more common for the elderly people, however, the smart products in many offline consumption scenarios are more suitable for the using habit of young people, which are more difficult for the elderly to operate, therefore, the elderly are less likely to spend money in such scenarios.

If this study could prove that there is a lack of awareness of the need to make products more suitable for the elderly, then the issue will need to be addressed.

The rest of this paper is organized as follows: In the section chapter of this paper, Combined with the research content of this paper, I studied a large number of literatures and analyzed them, summarized the experience of other scholars and found out the deficiencies. Chapter 3 applies the method, Chapter 4 presents the data analysis and results of hypothesis test results and then discusses the research results ,discuss the limitations of this paper and details opportunities for future research in Chapter 5.

2. LITERATURE REVIEW

2.1 Elderly Market

According to the research of the Mei Yong, Yan Xiang, Guo Pei, many scholars had already discovered and paid attention to the potential of the

senior market in 1999[7], in addition, I have learned a technical term of "market segmentation" from the article of Zhang Hongkai, which means that The overall market of a product is divided into several sub-markets that focus on different customer groups or customer groups with different demands[8], in other words, segment target users in detail, to provide more accurate services for each user group, and the merchants can also extend their market shares. Inspired by this principle, I through of whether the product interfaces applied currently should be different based on the age group, to improve customer satisfaction.

LUXUEJUN said that the elderly group has the characteristics of large market size, higher demands and increasing growth of consumption power[9]. Nowadays, as the country with the largest number of elderly people in the world, China has a very large senior market, coupled with the generally increased national income and educated population under the background of fast development of society and economy, the elderly in the new era have increased their consumption demand and changed their consumption habits to adapt to the development and progress of the society, and their consumption power has significantly increased. However, according to [10], currently, China's senior market is still in the early stage, the elderly in the new era pursue high-quality consumer experience, however the quantity of products and the quality of the services provided to the elderly in the market are far from meeting the demands of the elderly, There must be unlimited development space for such a huge demand market, but in this paper, I mainly discuss the actual situation of the insufficient development of products that are specific for the elderly, and put forward suggestions for creating more excellent brands of products for the elderly. There are many studies with similar research subjects as this paper. In 2013, Pang Maoqian proposed [11] that products specific to the

elderly occupies a lower market share, and cannot meet the demands of the elderly, in addition, the population aging should be solved from the view of the mode of life of the elderly. After reading a large number of documents, I found that the senior market mainly focuses on the research and development of the specialized products and services for the elderly, however, there is little research on the optimization and improvement of the adaptations of the existing products in the market for the elderly, thus bringing me with the inspiration to do this research.

2.2 Consumption Psychology And Consumption Habits Of The Elderly

According to Xiao Jiang, the consumption psychology of the elderly has gradually become an important guidance for the marketing mode of the market[12], moreover, we can predict the future development orientation of the service industry based on the characteristics of the consumption psychology of the elderly, which shows that the consumption psychology and consumption habits of the elderly have a positive effect on the development of the senior market. Zhang Mengmei summarized that the elderly tend to choose simple, practical, and easy-to-operate goods and to reduce the behaviors that would be physically and mentally taxing[13]. Similar to Zhang Mengmei, Zhu YongMing said that due to the weaker strength and energy, the elderly are more likely to pursue to simple and convenient during the consumption, high challenge in merchandise selection and operation will reduce the consuming desire of the elderly[14].

2.3 Study On Interaction Design For Elderly-Related Interfaces

According to Chen Jianjun, design plays an important role in the development of the industry[15], we can improve our living quality through innovation in product design. Nowadays, with the increase of the elderly group, we should pay

much attention to the demands of the elderly during the product design. So, there are many researches focusing on the design of elderly-related products. For example: Zhu Jianchun said in his articles in 2018 that when designing smart products for the elderly[16], we should pay attention to designing the products based on the cognitive ability of the elderly, namely, we should consider the strength of the cognitive ability of the elderly and reduce the design requirements for recession function in the process of product design, which greatly lower the level of difficulty of the elderly in the use of the product. [17] in addition, when designing the products based on the physiological and psychological characteristics of the elderly, the operation logic should be simple and direct, icon layout should be simple, chart meaning should be lucid with strong directive and high color identification. Zhang Yanzhu more systemically researched and analyzed the characteristics of the interactive design of the elderly-related products, and established a relatively systemic design principle of the interactive interface for the elderly group based on the researches for solving the problem that the interface design of the current products is not suitable for the elderly group[18], which has been highly informative for my research on this topic.

The above literatures have demonstrated that the senior market has attracted attention in many industries, however, the elderly group, subject to the long-standing habits of frugality and hygiene, has been a secondary group in the restaurant industry. Internet technology has been developing in recent years and combined with many traditional industries, the catering industry has applied the electronic ordering machine, the customers can make orders and settle accounts and the servants can confirm the menus and services through such machine. The electronic ordering machine greatly improves the dining management efficiency of the restaurants,

saves the labor cost and increase the efficiency and initiative for customer to making orders, however, there are few researches on the interface design of the ordering system for the elderly, relevant UI design and interface design for ordering system for the elderly eating out. After reading a large number of literatures, I have realized that relevant researches mainly focus on how to integrate more advanced technology into the ordering system in a better way to emancipate the productive forces and meet the ordering demands of young people, but neglect the studies on interactive process, operation mode and user experience in the process of making orders by the elderly. And during the research, I found that there are many studies focusing on optimizing the interface design and simplifying the operation of the elderly, but the research subjects of such studies are relatively dispersed, so I decide to discuss this issue in the detailed offline scenario of the hamburger shop. In addition, I hope that we can find out the demands of the elderly in this scenario and solve this problem through this paper in combination with the existing research on the interfaces of smart products for the elderly group. Therefore, I hope to verify whether the satisfaction of the elderly for using the operating system of the ordering system in the hamburger shop has any effect on the consumption power of the elderly on hamburgers through this research.

3. RESEARCH METHODOLOGY

3.1 Quantitative research

Quantitative analysis refers to an analytical method to study and investigate the interconnection and effect between objects with a mathematical method from a quantitative aspect in the field of social sciences [19].

What mostly characterizes the quantitative analysis is that it analyze issues from a quantitative

aspect. It firstly quantifies the issue to reduce its uncertainty, and then study the data by mathematical and statistical methods to find out the interconnection between objects, such as causality and dependency.

Quantitative analysis method should interpret how to realize each research target. To ensure to provide sufficient research details, the quantitative research generally includes four phases of data acquisition, identification of analysis objectives, data analysis and analysis report, to make readers to make an informed evaluation of the methods used to obtain results relevant to the issue to be studied [20] [21]. This research aims to study the influence of the young people and the elderly people on the satisfaction of the ordering system applied in the hamburger shops, so the investigation method for quantitative research is appropriate to be used. Analytical procedures based on the quantitative research: firstly, issue the questionnaires to the sampled groups and collect relevant data, then predict the analysis result, and analyze the data collected through proper analysis method, and finally, get the analysis result.

This paper researches and analyzes the research subject through questionnaire analysis for the following reasons:

1. MICHAEL SENGPIEL researched the technology using differences in the design of computer products for different age groups through regression analysis method[18], and this research also focuses on the difference of a certain dependent variable for different age groups, therefore, I decided to research this subject through the regression analysis method.

2. For this scenario, the conclusion whether it is necessary to distinguish the UI interfaces for the elderly and young people should be fully verified. If my hypothesis fails, it means that the operative

difficulty of the ordering system is not the mainly reason for the lower consumption power of the elderly in this scenario and is not the main pain point of the merchants. Since the conclusion is not applicable to every scenario, we need to further research, verify and practice the conclusion in this scenario. After verifying the hypothesis, we should collect and analyze the data about the cognitive function of the elderly to select and extract the functions suitable for the elderly, and add new function to improve the utilization rate and satisfaction of the elderly to the ordering UI system.

3.2 Research hypotheses

Research hypothesis is a kind of speculative judgment and hypothetical explanation made by the author about the rules or causes of the research objective based on the empirical facts and scientific theories, and is a preconceived, tentative conclusion before the research is conducted[19]. In other words, to better understand the results of this research, the author firstly presents a hypothetical view, which should be verified during this research, namely, this research aims to verify this hypothesis. Through the research hypothesis, the logical relationship between the independent variable and dependent variable has been established, which is equivalent to setting the target for the further analysis.

Based on the literatures and my predictions of the results, it was expected that :

- H1: Age will cause a negative effect to customer satisfaction with the hamburger ordering interface
- H2: Age will not affect the customer satisfaction with the hamburger ordering interface.
- H3: Income will not affect the customer satisfaction with the hamburger ordering interface .
- H4: If there are differences for users of different age groups to increase the number of times they go to the hamburger shops after optimizing the hamburger ordering interface, it is predicted that the older they are, the more likely they are

to increase their visits .

- H5: Age will cause a positive effect the user's attention to the ease of operation of the ordering interface .

4. RESULT

4.1 Questionnaire background

This questionnaire mainly aims to research the relationship between age and customer satisfaction with the hamburger ordering interface, as well as the relationship between variables that may affect satisfaction with the ordering interface and the dependent variable. Through the regression analysis method, we can realize the significant relationship between the independent and dependent variables and the strength of the effect of multiple independent variables on a dependent variable. Since the dependent variable is a continuous variable, in this paper, I apply the linear regression model to analyze the factors that affect the satisfaction of the ordering system

4.2 Data sources and sample description

Since the investigation sample range is relatively wide by issuing questionnaires online, during the research, I have issued the online questionnaires to people of all ages in all regions of China from November to December 2020 and investigated and collected the data. to study the customer satisfaction of the people of different age groups to the hamburger ordering interface in China that has wide geographical areas, I hope that the investigated samples can cover as many geographical areas as possible to avoid the research error due to geographical factors. With total 350 questionnaires collected, after removing the invalid questionnaires and the questionnaires with incomplete answers, there were total 321 valid questionnaires, accounting for 91.7%, the results are shown in Tab. 1.

Table 1: Descriptive Analysis

Items	OPTIONS	Frequency	Percent (%)	Cumulative Percent (%)
1、 Your age:	Under 30	120	37.38	37.38
	31~40	33	10.28	47.66
	41~50	32	9.97	57.63
	51~60	41	12.77	70.40
	Over 60	95	29.60	100.00
2、 Your Gender:	female	129	40.19	40.19
	Male	192	59.81	100.00
3、 Your income?	1500~4500	130	40.50	40.50
	Under 1500	22	6.85	47.35
	Over 4500	132	41.12	88.47
	No income	37	11.53	100.00
4、 How many people usually eat together?	Two	78	24.30	24.30
	More than two	104	32.40	56.70
	Yourself	139	43.30	100.00
Total		321	100.0	100.0

According to Tab. 1, the research samples are generally balanced in terms of gender, with a male predominance, accounting for 59.81%. In terms of the distribution of age groups, the sample clusters of young and old groups are predominant with similar proportions while the sample cluster of the middle-aged group is relatively small, which is in line with the need of this research to take the elderly and young groups as samples.

4.3 Reliability Analysis

Before analyzing the results of the questionnaires, the reliability analysis is needed. When the result of the reliability analysis is within the acceptable range, the results of the questionnaires are meaningful and valuable, the higher the reliability coefficient, the more stable and reliable the results of the survey. In this paper, the common reliability measures, Cronbach's alpha

coefficient, acting as the measurement index, is used to test the reliability of the seven indicators of satisfaction for Question 9 in the questionnaire.

Table 2: Reliability Statistics

Cronbach's Alpha	N of Items
0.978	7

The higher the values of Cronbach's α coefficient, the stronger the internal consistency. According to the previous studies, the consistency between items is good when the Cronbach's α coefficient is larger than 0.7. It can be known from the foregoing table: the reliability coefficient is 0.978 (above 0.9), manifesting high reliability quality of the research data.

Validity refers to the closeness degree of the measured value to the actual value. The higher the validity, the more the results of the study reflect the

contents of the investigation.

Conversely, the lower the validity, the less the results of the study accurately reflect the contents of the investigation. The factor analysis is applied to analyze the validity of the questionnaire. Before factor analysis, the KMO test and Bartlett's test should be conducted on the data to determine whether the data are suitable for the factor analysis. During the test, KMO test indicates the common factors among variables, and its value range is 0-1. Wherein, the closer the KMO is to 1, the more suitable the variable is for factor analysis. The Bartlett's test is used to determine whether the data are from a general population that follows the multivariate normal distribution. Generally, when the KMO value is higher than 0.6, and Bartlett's test is lower than 0.05, the variable is suitable for factor analysis.

Table 3: KMO and Bartlett's Test

KMO		0.941
Bartlett Test Sphericity	Approximate chi-square	3386.303
	df	21
	p value	0.000

After the validity verification through KMO test and Bartlett's test, it can be seen from the

foregoing table that The KMO value is 0.941 (the closer the KMO is to 1, the more suitable the variable is for factor analysis), (above 0.8), indicating an excellent validity of research data. The p value of Bartlett's test is $0.000 < 0.05$, indicating this variable is suitable for factor analysis.

Table 4 :Principal Component Analysis, PCA

Comp onent	Characteristic Root			Principle component extraction		
	Charact eristic Root	expla nation rate of the Varian ce %	Cumula tive %	Charact eristic Root	expla nation rate of the Varian ce %	Cumula tive %
1	6.199	88.55 5	88.555	6.199	88.55 5	88.555
2	0.214	3.054	91.609	-	-	-
3	0.196	2.797	94.406	-	-	-
4	0.112	1.602	96.008	-	-	-
5	0.105	1.502	97.511	-	-	-
6	0.099	1.410	98.921	-	-	-
7	0.076	1.079	100.000	-	-	-

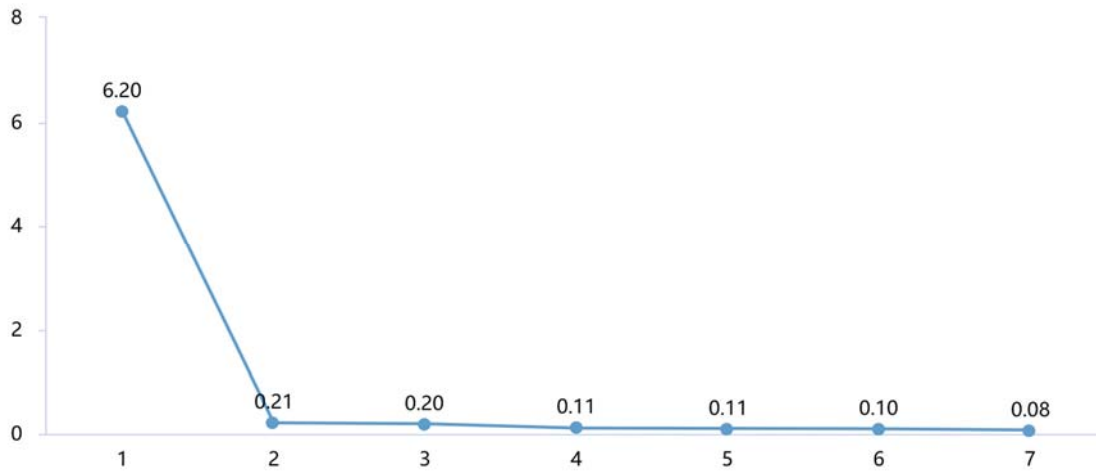


Figure 2. Scree plot

To repeatedly and effectively use the data, and replace the old variables with fewer indicators, The PCA method is applied in this research to conduct the factor analysis on a total of 7 items in the table. Combined with the sample features and existing research results, the number of factors in this research is determined by the eigenvalue of factor numerator, variance explanation and contribution rate and scree graph. According to the data in the foregoing table, the factor eigenvalue of the first item is greater than 1, explaining 88.555% of the total variance of the variables, which meets the criterion of greater than 60% required for the study. After analyzing the scree graph, it can be seen that the trend of the scree graph flattens out from the 2nd factor. Combining the above analyses, 1 factor is extracted. 19

4.4 Regression analysis and hypothetical testing

To study the differences in satisfaction of different age groups with the existing hamburger ordering interface, the scores of the seven secondary indicators (page aesthetics, font size, product browsing/finding, understandability of the menu semantics (name), accuracy of the menu image guidance function, complexity of operation and complexity of checkout operation) related to the customer satisfaction of the hamburger ordering

interface are averaged as the sample satisfaction with the hamburger ordering interface based on the results obtained from the above PCA method, and are analyzed by linear regression model.

Table 5: Regression Coefficient Analysis

Model	Unstandardized coefficients		Standardized Coefficients		t	Sig.	CI of B's			Collinearity Statistics			
	B	Std. Error	Beta	t			95%		zeroth order	Partial	Local	tolerance	VIF
							lower limit	upper limit					
1.(Constant)	3.465	.193		17.966	.000	3.086	3.844						
1. Your age: =31~40	-.227	.168	-.069	-1.353	.177	-.557	.103	.139	-.077	-.062	.819	1.221	
1. Your age: =41~50	-.807	.174	-.240	-4.632	.000	-1.149	-.464	-.042	-.254	-.212	.782	1.278	
1. Your age: =51~60	-.543	.153	-.180	-3.561	.000	-.843	-.243	-.009	-.198	-.163	.821	1.217	
1. Your age: =Over 60	-1.378	.117	-.624	-11.761	.000	-1.608	-1.147	-.518	-.555	-.539	.745	1.343	
2. Your gender? =Female	.281	.104	.137	2.697	.007	.076	.486	.155	.151	.124	.817	1.224	
3. Your income: =1500~4500	-.090	.158	-.044	-.571	.569	-.400	.220	-.033	-.032	-.026	.356	2.810	
3. Your income: =Under1500	.060	.226	.015	.268	.789	-.384	.505	-.092	.015	.012	.653	1.532	
3. Your income: =Over 4500	.014	.162	.007	.085	.932	-.306	.333	.085	.005	.004	.333	2.999	
4. How many people usually eat together? =Two	-.037	.133	-.016	-.275	.784	-.298	.225	.061	-.016	-.013	.655	1.526	
4. How many people usually eat together? = myself	-.084	.118	-.041	-.711	.478	-.316	.148	-.069	-.040	-.033	.623	1.605	

SPSS25.0 software is used for the linear regression of the sample data, the factors, including age, gender, income and number of diners, are set as the dummy variables, with the 30 years old below as the reference for the factor of age, male as the reference

for factor of gender, no income as the reference for the factor of income and more than two diners as the reference for the factor of the number of diners. The VIF of each variable in the model is lower than 10, indicating that there is no covariance problem.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change statistics					Durbin-Watson
					R Square	F variation	df 1	df 2	Sig.F variation	
1	.591 ^a	.349	.328	.826686194946282	.349	16.648	10	310	.000	1.868

According to the test of goodness of fit of the model, $R^2 = 0.349$, and the adjusted $R^2 = 0.328$, indicating that the linear regression model is of good goodness of fit. In addition, in the F test, $p < 0.05$, indicating the model passes the F test, and the model construction is meaningful.

See Table 5 for detailed impact relations. According to the regression results, the age and gender P (significance) < 0.05 are statistically significant, while the income and the number of diners P (significance) > 0.05 fail the significance test.

Compared with the reference of the group of 30 years old below, the 31-40 age group has no positive linear correlation with satisfaction; for the age group of 41-50 years old, $p = 0.000 < 0.05$, and $Beta = -0.240$, indicating that the age group of 41-50 years old is negatively correlated with satisfaction, and with lower satisfaction compared that of the age group of 30 years old below; for the age group of 51-60 years old, $p = 0.000 < 0.05$, and $Beta = -0.180$, indicating that the age group of 51-60 years old is negatively correlated with satisfaction, and with lower satisfaction compared that of the age group of 30 years old below; for the age group of 60 years old above, $p = 0.000 < 0.05$, and $Beta = -0.624$, indicating that the age group of above 60 years old is negatively correlated with satisfaction, and with lower satisfaction compared that of the age group of 30 years old below; The above results verify that Hypothesis 1 is valid, and the satisfaction with the ordering interface tends to decrease as the age increases, Indicating that it is necessary for the

hamburger ordering interface to make adjustments to make it suitable for the elderly to make orders.

Compared with the reference of male group, for the female group, $p = 0.007 < 0.05$ and $Beta = 0.137$, indicating that female group is positively correlated with satisfaction, with higher satisfaction than that of the male group. So, the Hypothesis 2 is not valid. Since the differences between different genders are not the focus of this research, so it will ignore the study on the effect of gender on satisfaction with the ordering interface.

In addition, there is no significant difference in the satisfaction for different income level and different number of diners, indicating that the Hypothesis 3 is also not valid.

Table 7: Chi-square test

Items	Classification	Groups					χ^2	p
		Under 30	31-40	41-50	51-60	Over 60		
If you only improve the ordering page, do you want to increase the frequency of eating in the burger restaurant	No	92	20	1	4	3	180.627	0.000**
	Might be	21	8	7	10	33		
	Definitely	7	5	24	27	59		

* p<0.05 ** p<0.01

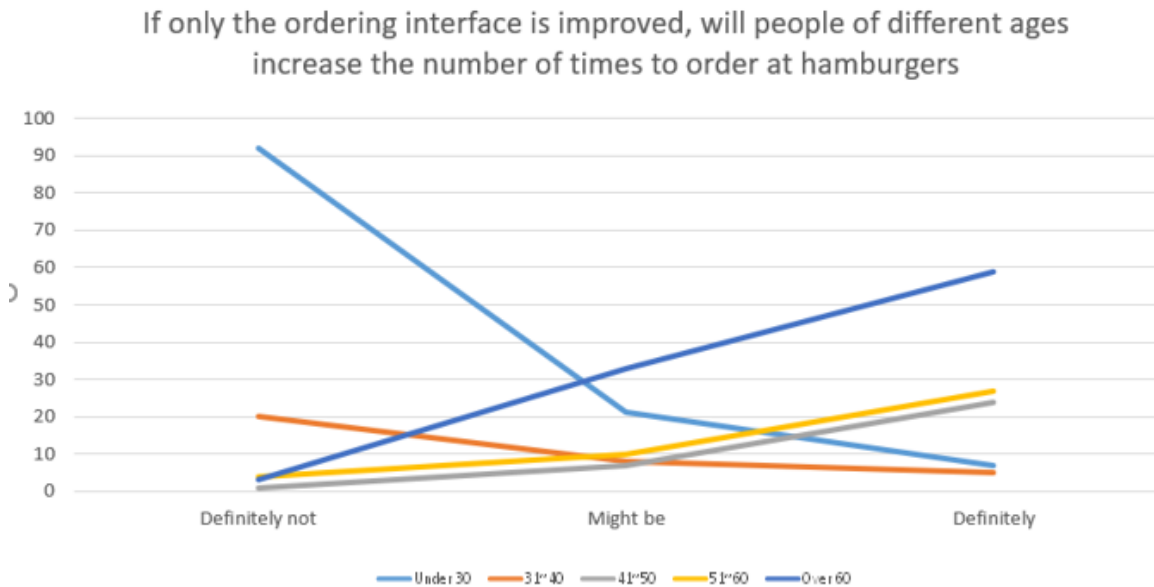


Figure 3: Broken Line Grap

The chi-square test is conducted to whether people of different age groups increase the number of visits to hamburger shops after improving the convenience of using the ordering page. According to broken line graph in Fig.3, the age groups show significant differences ($p=0.000<0.01$), and the older they are, the more likely they are to increase their visits to hamburger shops after improving the convenience of using the ordering page, indicating that the Hypothesis 4 is valid.

Table 8: Chi-square test

Item	Options	Groups					χ^2	p
		Under 30	31-40	41-50	51-60	Over 60		
Have you ever been to a burger joint?	No	15	5	7	6	36	53.021	0.000**
	Yes, but left because of the complicated ordering operation	0	0	3	2	12		
	Yes, but left for other reason	1	1	2	1	2		
	Yes	104	27	20	32	45		

* p<0.05 ** p<0.01

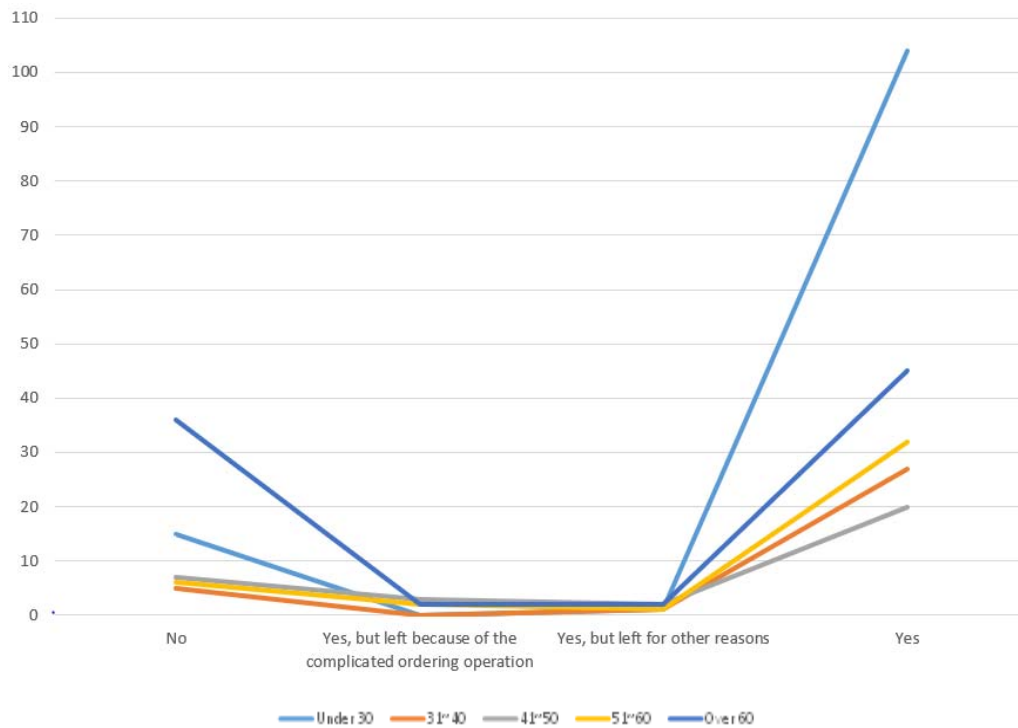


Figure 4: The age distribution of whether or not they went to a burger shop

The chi-square test is conducted for different age groups on whether they go to the hamburger shops. It is found that the age groups show significant differences, and as the age increases, the proportion of those who had not been there increases, while as the age decreases, the proportion of those who had been there increases significantly, Among which, for the option of "Been there but left because of the

complex ordering interface", almost no young people select this option, while more people aged 50 years old above select this option, which verifies that current hamburger ordering system is not suitable for the elderly. In addition, it also shows that people aged 50 years old above as the probationary elderly people have similar needs as those over 60 years old.

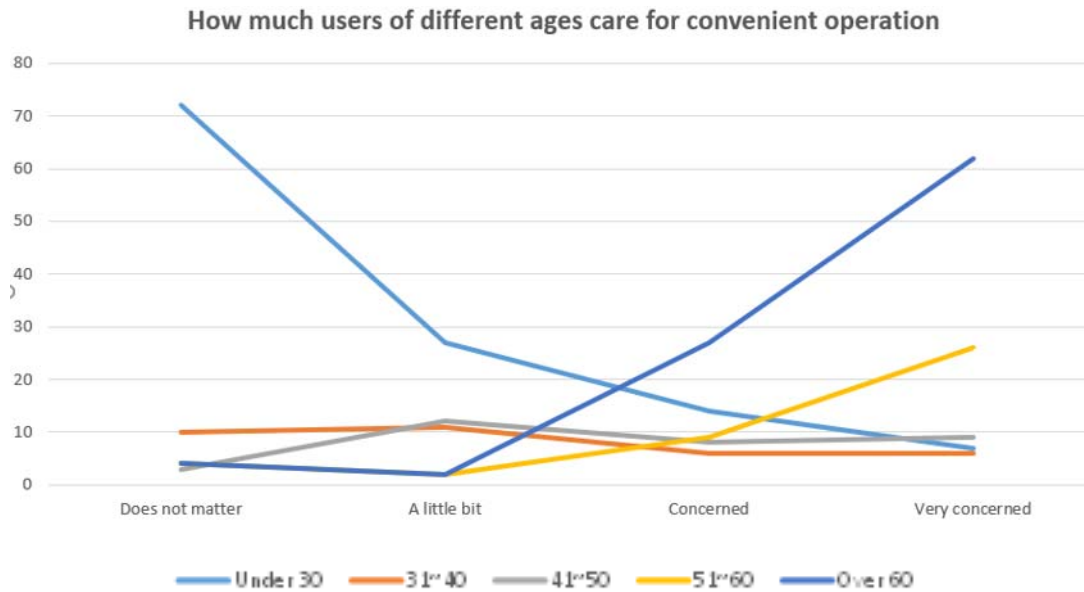


Figure 5. Broken Line Graph

Table 9: Summary of Hypothesis Testing of Analysis

Hypothesis	Description	Decision
H1	Age will cause a negative effect to customer satisfaction with the hamburger ordering interface	Accepted
H2	Age will not affect the customer satisfaction with the hamburger ordering interface	Rejected
H3	Income will not affect the customer satisfaction with the	Accepted
H4	If there are differences for users of different age groups to increase the number of times they go to the hamburger shops after optimizing the hamburger ordering interface, it is predicted that the older they are, the more likely they are	Accepted

	to increase their visits	
H5	Age will cause a positive effect the user's attention to the ease of operation of the ordering interface	Accepted

It can be seen from the broken line graph that the older they are, the more they care about the ease of operation, while the younger they are, the less they care about the ease of operation, indicating that the Hypothesis 5 is valid. It also reflects that the ordering interface greatly affects the ordering experience of the elderly, therefore, improving the using experience of the elderly is a way to promote the consumption power of the elderly in this scenario.

5. CONCLUSION

Through the research, it is found that the consumption psychology and consumption habits of the elderly have changed a lot compared with the previous years. The elderly begin to understand and use new products. In terms of diet, the frequency of the elderly eating out increases, and the range of choices of physical objects also widens. However, there is a big gap between the victory characteristics of the elderly and that of the young. Therefore, the existing products on the market should make corresponding adjustments to the improvement of the consumption power of the elderly.

In addition to developing products and service specific to the elderly, the products commonly used in most of existing consumption scenarios are required to carry out the adaptive adjustment to improve the ease of use for the elderly, which will not only expand the consumer market for the products and increase their market competitiveness, but also improve the convenience of the elderly in social activities, promoting the consumption power

of the elderly, thus greatly reducing the negative effects arising from the population aging. However, with the development of social economy and technology, the traditional order-making and account settlement are gradually being replaced by the electronic ordering system. According to the results of this research, the consumption power of the elderly is getting higher and higher, however, the complex operation of the electronic ordering system in hamburger shops and other catering scenarios discourages the consuming desire of the elderly.

Therefore, I hope that catering market and R&D and design staff of relevant products can pay attention to this issue, to subdivide the products to each scenario with full consideration of the demands of users of all ages. In addition, they can integrate the previous researches focusing on interactive product design for the elderly (for example, establish user interfaces for elderly users and young users) with their design to make it possible for the elderly to operate the machine more easily when making orders in the restaurants, which benefit to improve the consumption convenience and consumption experience of the elderly, and motivate the elderly to make consumption, thus promoting the development of the senior market, and maximizing its economic benefits. In this way, the economic pressures arising from the population aging will be relieved, meanwhile, the elderly can enjoy their later life through high-quality consumption experience.

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