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A Study on the Satisfaction Degree of High School Graduates with the New College Entrance Examination under the Influence of Multiple Factors

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ABSTRACT. *This paper discusses the opinions of high school graduates in Hangzhou on their satisfaction with college entrance examination under the influence of many factors. On the basis of the sample data collected from the questionnaire survey, the contingency table was used to determine the influencing factors on the satisfaction degree of high school graduates in choosing courses. On this basis, a binary logistic regression model was established to predict the satisfaction degree of high school graduates in choosing courses according to the equation.*

KEYWORDS: *The new college entrance examination reform, Degree of satisfaction, Independence test, Logistic regression analysis*

1. Introduction

With the deepening reform of the college entrance examination system, the new college entrance examination scheme in Zhejiang province has the following four characteristics: no subject in arts and science, high school academic level examination is more important, candidates' choice and admission opportunities are increased, and the number of subjects in the college entrance examination is reduced and the exam opportunities are increased. Among them, the most prominent change is that examinees can choose the subjects of the college entrance examination independently, which has also become one of the important factors to measure high school students' satisfaction with the new college entrance examination reform [1][2]. Through the investigation and analysis of the satisfaction degree of high school graduates, the defects of this measure in the current college entrance examination reform can be found and some Suggestions are put forward.

Therefore, from the perspective of statistics, sociology and other disciplines, this study draws on the results of previous studies, conducts a questionnaire survey with the fresh graduates of Hangzhou high school as the object, USES contingency table

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analysis to find out the factors affecting the degree of satisfaction with subject selection, and establishes a binary logistic regression model to predict the opinions of different candidates on the degree of satisfaction with subject selection.

2. Set of the Questionnaire

This survey mainly obtained data through questionnaire survey, which designed a total of four items, including the basic information of the respondents, the choice of "7 to 3" subjects, the support of two exams a year and the satisfaction with the new college entrance examination reform. A total of 786 questionnaires were issued and 734 valid questionnaires were collected, with an effective rate of 93.4%.

3. Contingency Table Analysis of Satisfaction of "7 Choose 3" Subjects under the Influence of Multiple Factors

Under the influence of multiple factors, high school graduates' satisfaction with "7 choose 3" will show different differences. Through the contingency table, we will analyze and study the correlation between interest and hobby, subject influence, subject competition pressure and life planning influence on the satisfaction of subjects selected in the college entrance examination.

3.1 The Contingency Table Analysis of Interests' Satisfaction with "7 Choose 3" Subjects

People with different degrees of influence differ greatly in their satisfaction with "7 choose 3" subjects. Therefore, different high school graduates have different degrees of influence on their interests and hobbies, and their ideas are also different. The specific analysis is as follows:

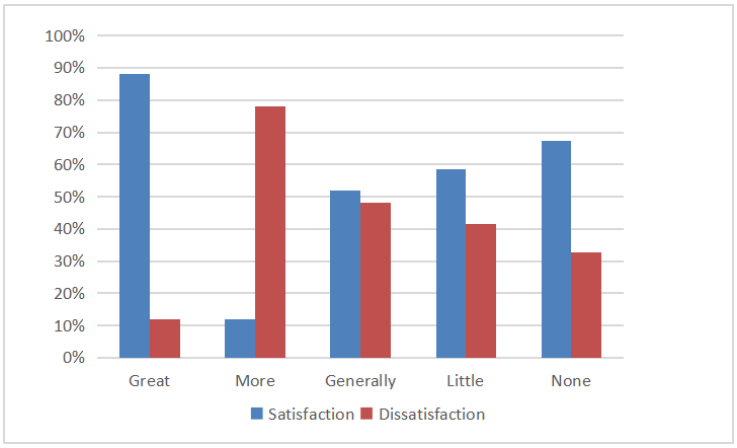

Fig.1 Bar Chart of Interest Satisfaction with "7 Choose 3" Subjects

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Table 1 Contingency Table Of Interest Satisfaction for "7 Choose 3" Subjects

Influence degree			The influence of hobbies and interests on the satisfaction of "7 to 3" subjects		Total
			Satisfied	Unsatisfied	
Influence degree	Very large	count	22	3	25
		Percentage of rows	88%	12%	100%
	larger	count	2	7	9
		Percentage of rows	12%	78%	100%
	general	count	50	46	96
		Percentage of rows	52%	48%	100%
	weak	count	65	46	111
		Percentage of rows	58.6%	41.4%	100%
	None	count	70	34	104
		Percentage of rows	67.3%	32.7%	100%
Total		count	191	154	345
		Percentage of rows	55.4%	44.6%	100%
Pilson's chi-square test for p 0.000					

According to the Chi-square test, P =0.000, P <0.05, reject the null hypothesis, the conclusion: hobbies and interests are related to the satisfaction of "7 choose 3". As can be seen from the contingency table, 88% of the students who think that their interests and hobbies have a great influence on "7 choose 3" are satisfied with "7 choose 3", so their interests and hobbies have a great influence on "7 choose 3" satisfaction. When interests influence high school students tend to choose the subject to study conforms to their own interests, so for the satisfaction of his first choice on the high side, have students will take into account the reality of some reasons such as the employment outlook for the degree of difficulty and disciplines, etc., so they may be against the interests and choose to conform to the actual situation of subjects, so the choice of satisfaction is low, but general interests or weak, often for the purpose of the interest is not too great, so will choose a suitable subject for their performance is stable, the natural selection of satisfaction is high.

3.2 The Degree of Subject Difficulty Has an Influence on the Satisfaction Degree of "7 Choose 3" Subjects

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The difficulty of the subject will indirectly affect the effort required to study the subject, which will lead to a change in students' satisfaction with the subject. Due to the space limitation, the line chart and the contingency table are directly tested, and the specific analysis is as follows:

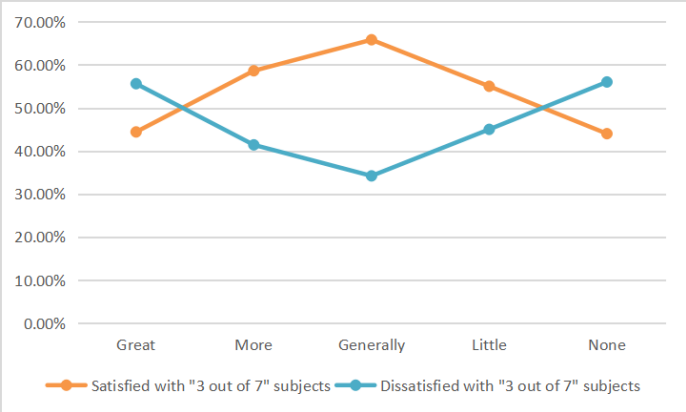

Fig.2 Line Chart of the Influence of Subject Difficulty on the Satisfaction Degree of "7 Choose 3" Subjects

According to the Chi-square test, P =0.029, P <0.05, reject the null hypothesis, that is, the degree of influence of subject difficulty on the choice of "7 choose 3" subject is related to the satisfaction degree of the selected subject of high school graduates. Think subject to affect a lot of people may choose to some modest subjects, but it may make students ignored the subject interest and cause for the selected subjects don't satisfaction, but more and more people tend to consider various factors, so that the choice of a more scientific, also makes them to the satisfaction of the selected subjects on the high side, so the overall graduates to choose the satisfaction of satisfaction on the high side.

3.3 The Influence of Competitive Pressure of Selected Subjects on the Satisfaction Degree of "7 to 3" Subjects

After selecting subjects, because some choice of course competitive pressure is too large, or the number of some famous universities students choose the subject more, will make the people who score below average or average pressure increase, because people rise in the quality of the competition, this will also indirectly affect their satisfaction of the chosen subject. The specific analysis is as follows:

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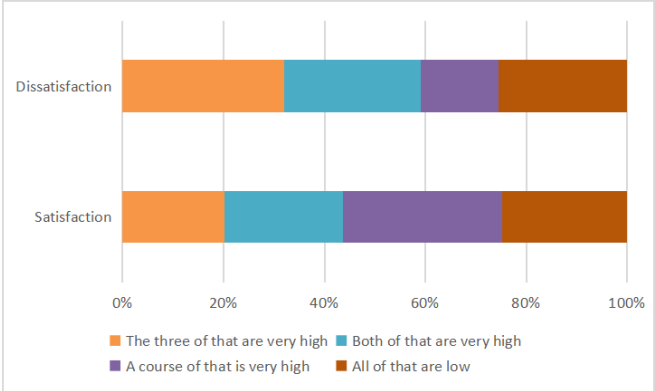

Fig.3 Bar Chart of the Influence of Competitive Pressure of Selected Subjects on the Satisfaction of "7 Choose 3" Subjects

According to the Chi-square test, P =0.006, P <0.05, reject the null hypothesis, the conclusion: that is, the degree of influence of the competitive pressure of the selected subjects on the choice of "7 choose 3" subjects is related to the satisfaction degree of the selected subjects of the fresh high school graduates. Select subjects are of great competitive pressure three tend to cause the students' inner pressure, the greater the competitiveness that accompany the greater the pressure, makes students in later fell to the satisfaction degree of the choice of subjects, two big door, have a more relaxed, relative to the three big people easily to a certain extent, also won't too much pressure, so for the selected course of satisfaction will rise, and a pressure there is motivation, but stress is not very big, this is one of the most suitable for learning status, so they will be very expensive to the satisfaction degree of the selected subjects, and all the people of the no pressure, People who lack motivation experience a slight decrease in satisfaction compared to those who are stressed.

4. Binary Logistic Regression Analysis of Degree Selection Satisfaction

4.1 Regression Prediction of Subject Satisfaction

(1) Establishment of binary Logistic regression model

Previously, the influencing factors of satisfaction with "7 choose 3" subjects were obtained through contingency table analysis. In order to make a more accurate and objective quantitative description, we plan to establish a logistic regression model:

a.Initial variable selection

According to the prophase of the independent variable and dependent variable (satisfaction) between through contingency table analysis, we picked out the interest

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hobby, degree of discipline, discipline, discipline resources, subject competition, subject job prospects and future career planning as the independent variable, whether to choose satisfaction as dependent variable, the binary logistic regression model is established, so as to predict the influence of different factors on the choice satisfaction purposes.

b.Definition of variables

We set students' satisfaction with subject selection as the dependent variable Y, where Y =1 represents satisfaction with subject selection; Y =0 represents dissatisfaction with subject selection. In order to avoid collinearity, we define a dummy variable for each independent variable [3].

Table 2 the Independent Variable We Set

variable		The assignment
Interest influence $\square_6$	$\square_{61}$	very large = 1, not very large = 0
	$\square_{62}$	larger=1,not larger=0
	$\square_{63}$	Normal =1, not normal =0
	$\square_{64}$	Weak =1, not belonging to weak =0
Influence of Academic Performance $\square_7$	$\square_{71}$	very large = 1, not very large = 0
	$\square_{72}$	larger=1,not larger=0
	$\square_{73}$	Normal =1, not normal =0
	$\square_{74}$	Weak =1, not belonging to weak =0
The degree of difficulty affects the subject $\square_{10}$	$\square_{101}$	very large = 1, not very large = 0
	$\square_{102}$	larger=1,not larger=0
	$\square_{103}$	Normal =1, not normal =0
	$\square_{104}$	Weak =1, not belonging to weak =0
Influence of discipline resources $\square_{11}$	$\square_{111}$	very large = 1, not very large = 0
	$\square_{112}$	larger=1,not larger=0
	$\square_{113}$	Normal =1, not normal =0
	$\square_{114}$	Weak =1, not belonging to weak =0
Subject competition pressure influence $\square_{12}$	$\square_{121}$	very large = 1, not very large = 0
	$\square_{122}$	larger=1,not larger=0
	$\square_{123}$	Normal =1, not normal =0
	$\square_{124}$	Weak =1, not belonging to weak =0

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Subject employment prospect influence $\square_{13}$	$\square_{131}$	very large $= 1$, not very large $= 0$
	$\square_{132}$	larger=1,not larger=0
	$\square_{133}$	Normal =1, not normal =0
	$\square_{134}$	Weak =1, not belonging to weak =0
Future career planning impact $\square_{14}$	$\square_{141}$	very large $= 1$, not very large $= 0$
	$\square_{142}$	larger=1,not larger=0
	$\square_{143}$	Normal =1, not normal =0
	$\square_{144}$	Weak =1, not belonging to weak =0

Therefore, we can define the following binary Logistic regression equation model:

$$ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_{11} + \beta_2 X_{21} + \beta_3 X_{22} + \beta_4 X_{23} + \beta_5 X_{24} + \beta_6 X_{25} + \beta_7 X_{31} + \cdots$$

Where p=P(Y=1) is the probability that high school students are satisfied with "7 choose 3".

c.Model building

With the help of SPSS, we used the backward method to filter out the independent variables one by one, which effectively guaranteed the predicted results. Our calculation results are shown in the table:

Table 3 Calculation Results

		B	S.E.	Wals	df	Sig.	Exp(B)
Step4	Interest influence			20.428	4	.000	
	Interest (1)	2.507	.671	13.981	1	.000	12.271
	Interest (2)	-.810	.856	.896	1	.344	.445
	Interest (3)	.855	.322	7.071	1	.008	2.352
	Interest (4)	.493	.320	2.376	1	.123	1.638
	Degree of difficulty of the subject			11.468	4	.022	
	Degree of difficulty of the subject (1)	.100	.429	.055	1	.815	1.106
	Degree of difficulty of the subject (2)	-.494	.486	1.033	1	.309	.610

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	Degree of difficulty of the subject (3)	-.981	.355	7.620	1	.006	.375
	Degree of difficulty of the subject (4)	-.294	.374	.618	1	.432	.745
	How do you feel about the competitive pressure of your chosen subject			9.366	3	.025	
	How do you feel about the competitive pressure of your chosen subject (1)	.617	.623	.982	1	.322	1.853
	How do you feel about the competitive pressure of your chosen subject (2)	.549	.634	.751	1	.386	1.732
	How do you feel about the competitive pressure of your chosen subject (3)	-.458	.683	.450	1	.502	.632
	constant	-.739	.633	1.365	1	.243	.478

The final remaining independent variables after variable selection by the backward method are the influence of hobbies, academic performance and competitive pressure of selected subjects. Due to space limitation, we only show the final model selection results here:

Table 4 Hosmer and Lemeshow Tests

	chi-square	df	Sig.
Step 5	5.360	7	0.616

According to the parameter estimation table of variables, the P values of the three independent variables Wald test were all less than 0.05, which passed the significance test. In Hosmer and Lemeshow tests, Sig (P value) was greater than

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0.05, and the goodness of fit of the model met the requirements. Therefore, the binary logistic regression equation we obtained is relatively reliable. The specific binary logistic regression equation is as follows:

$$ln\left(\frac{\hat{p}}{1-\hat{p}}\right) = 2.507X_{61} - 0.810X_{62} + 0.855X_{63} + 0.493X_{64} + 0.100X_{101} - 0.494X_{102} - 0.981X_{103} - 0.294X_{104} + 0.617X_{121} + 0.549X_{122} - 0.458X_{123} - 0.793$$

(2) Interpretation of binary Logistic regression equation [4]

From the above regression simulation, we find that the satisfaction of fresh graduates on subject selection is mainly affected by three factors: interest, difficulty and competitive pressure. Generally speaking, the greater the influence of hobbies and interests, the more comprehensive the understanding of the subject's difficulty, the better the employment prospect of the chosen subject, and the higher the probability of subject satisfaction. Therefore, among the three influencing factors, hobbies and interests are the most important factor affecting the satisfaction degree of “7 to 3” subjects.

To further investigate the reasons, we believe that some students have a comprehensive understanding of the subject due to their interest in it and are happy to learn. Therefore, the difficulty of the subject and the pressure of competition have little impact on them. However, there are also some students who choose subjects based on their interest when they have no clear understanding of the subjects, but suffer setbacks when they encounter practical difficulties such as the difficulty of the subjects and fierce competition, thus doubting their self-choice and affecting their satisfaction in choosing subjects. By comparing the original sample analysis, we found that there was a large overlap between this part of the student group and the lower ranked student group, which also confirmed our inference from the side.

5. Research Results and Predictions

Based on the above model, we can make a specific analysis of the degree of satisfaction of certain high school graduates in Hangzhou as follows:

a. The survey situation of a student who felt that his/her interests and hobbies, the difficulty of the subject greatly influenced his/her choice of subject, and the competitive pressure of the subject he/she chose was as follows:

$$\ln(\frac{\hat{p}}{1-\hat{p}}) = 2.507\times1 + 0.1\times1 + 0.617\times1 - 0.793$$

At this point, P =91.92%, indicating that students who believe that interests and hobbies as well as the difficulty of subjects have a great influence on them tend to choose subjects that they are interested in and that are suitable for them based on these two points. Even though the subjects they choose are under great competitive pressure, the probability of their satisfaction with the subjects they choose is still

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about 91.92%.

b. The survey situation of a student who thinks that hobbies and interests have a general influence on the subject selection, the difficulty of the subject has a great influence on the subject selection, and the competitive pressure of the subject is as follows:

$$\ln(\frac{\hat{p}}{1-\hat{p}}) = 0.855\times1 + 0.1\times1 + 0.617\times1 - 0.793$$

At this point, P =77.90%, indicating that students who believe that hobbies have general influence, subject difficulty has great influence and subject competition has great pressure are about 77.90% likely to be satisfied with their chosen subject.

By comparing the above data, we can see that when the influence of hobbies and interests on subject selection drops from great to average, the probability of students' satisfaction with subject selection will decrease by about 14%. Therefore, we can find that the degree of influence of hobbies and interests on students' subject selection satisfaction does have a great impact.

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