Statistical Studies on the Influencing Factors of College Students' Mystery Box Consumption Based on Path Analysis: A Case Study of Guangzhou

Hua He[1,a], Wangling Feng[1,b]

lotus@stu.scau.edu.cn[a], 201823180403@stu.scau.edu.cn[b]

College of Economics and management, South China Agricultural University, No. 483, Wushan Road, Tianhe District, Guangzhou, Guangdong, China[1]

Abstract: Based on the theory of behavioral economics, this paper explores the influencing factors of mystery boxes, a new popular commodity that college students are keen on buying. In this paper, PLS-PM model, Apriori correlation analysis and logistic regression are adopted to further explore the psychological perceived value that can approximately represent the mystery boxes sold by college students. The research shows that college students' mystery boxes consumers pursue personal satisfaction and rarely blindly follow the trend of consumption. They care most about the "surprise" brought by opening mystery boxes. At the same time, the research results show that for mystery boxes, increasing the social popularity, enhancing their IP cultural attributes, and increasing the variety of rare or special products can effectively enhance consumers' purchase intention to mystery boxes. Finally, since the consumption mental account is set for mystery boxes in advance, college students will unconsciously consume the mystery boxes irrationally.

Keywords: Mystery Boxes, Behavioral Economics, Factor Analysis, PLS PM, Association Analysis, Logistic Regression.

1 INTRODUCTION

Mystery boxes, a new type of goods equipped with IP culture, have become popular among young consumers in recent years. Mystery boxes+ is becoming a common marketing method, with companies in different fields launching mystery boxes. In 2016, Pop-Mart, whose main business is fashionable toy IP incubation operation, began to introduce mystery boxes related products into China. According to the fashionable toy industry research report of a number of securities companies, the market size of fashionable toy has reached 80 billion in 2022, of which mystery boxes represented by Pop-Mart account for 40% of it. However, it is important to note that mystery boxes economy suffers from false advertising, poor quality products, etc. In addition, mystery boxes hide limited editions in marketing, which is very easy for speculators to exploit loopholes for windfall profits, and the price of products is several times the original price, causing market chaos. College students, as a group that pursues fashion and is prone to impulsive consumption, lead to a challenging topic at the moment when mystery boxes are hot: what exactly attracts people to consume and buy again behind the mystery boxes economy.

2 LITERATURE REVIEW

Fashionable toy is an adult toy that integrates the multi-element concepts of art, design, trend, painting, sculpture and so on. Mystery Boxes is an innovative fashionable toy that is popular for carrying a rich and diverse trend culture.

In the new era of consumption, consumers pay more attention to the emotional support brought by products, and mystery boxes have the unique "social and fashionable" properties of toys, which will meet the needs of consumers in the new era. At the same time, in the process of purchasing and opening mystery boxes, consumers get a pleasant feeling, which makes the whole purchase process more interesting [1].

However, the "hidden limit" mechanism in mystery boxes is very easy to lead to the confusion of "mystery boxes", which can be easily used by speculators [2]. For consumers, in real life, it is inevitable to be influenced by intuition, situation, habits, customs and other factors, and make some irrational economic behaviors that violate the economic operation law [3].

3 THE ESTABLISHMENT OF RESEARCH METHODS AND MODELS

3.1 Research Design

3.1.1 Research Content

This paper studies mystery boxes economy with perceived value. Perceived value refers to the overall evaluation of a product or service by customers after comparing the perceived utility of the product or service with the sacrifice they have made in obtaining the product or service [4]. From the perspective of mystery boxes economy, perceived value is the value given to mystery boxes by consumers who experience them from mystery boxes. It is directly reflected in the overall satisfaction, cost performance and psychological gap of consumers on mystery boxes, and these three points directly reflect the psychological feelings of consumers after purchase.

Based on the Perceived Value of mystery boxes consumers, This paper proposes independent consumption, group psychology, symbolic consumption, Fashion Consumption, Operate conditioning:

Group psychology refers to the psychology that when people make decisions, their choices are easily influenced by the behavior and thinking styles of other decision makers, so as to weaken the significance of such decisions for individuals. Most college students are far away from their parents, have a growing sense of self, and have a certain income, so they are more independent in the process of consumption. Symbolic consumption refers to consumers not only consume the goods themselves, but also some cultural significance symbolized by the consumption of these goods, including the mood, aesthetic feeling, atmosphere, and emotion obtained by consumption. Fashion Consumption refers to the psychological experience that people pursue the forefront of the trend in the process of consumption, take the initiative to understand product information at the first time or pursue the latest products, hoping to have new and different and leading the trend. The Operate conditioning system refers to the

dependence of consumers on mystery boxes, which is similar to that of tobacco and alcohol. The uncertain incentive of mystery boxes positively affects the willingness of consumers to continue to purchase.

3.1.2 Research Scheme

This paper first explored the influence of each factor on perceived value, analyzed and determined the influencing factors, and established the PLS-PM model to explain the correlation of factors according to the results. Then, the five association rules with the highest confidence were mined from the 15 variables through Apriori association analysis, and the eight factors involved in the five association rules were regarded as independent variables for logistic regression with purchase behavior, so as to find the influence degree of each variable on the dependent variable. Then, 15 variables were directly trained by random forest dichotomies to verify the logistic regression results. Finally, suggestions are given from three perspectives.

3.2 Sample Selection and Data Sources

3.2.1 Sampling Survey

In this paper, a self-designed questionnaire is used to collect data based on the theory of perceived value and the actual situation of mystery boxes consumption. The questionnaire is divided into six parts: personal information, mystery boxes consumption, consumption intention, post-purchase psychology, subjective judgment of mystery boxes and factors affecting consumers' "perceived value".

A random survey was conducted among students from different universities and grades in Guangzhou. The minimum sample size was determined to be 384 after pre-survey.

The official survey was sent out online. After screening, 435 questionnaire samples were collected, and the proportion of valid samples in the questionnaire was about 92.55%, which was in line with the expectation of the minimum sample size.

When exploring the perceived value of participating in the mystery boxes economy and its influencing factors, the data analysis object will be narrowed down to 251 samples of mystery boxes consumers. In the remaining chapters, a complete set of 427 valid questionnaires will be selected. The data samples filled by the respondents will be included in the analysis whether buying mystery boxes or not, so as to explore the characteristics of consumer groups.

3.2.2 Quality Control

Reliability and validity tests on questionnaire scales found that all Cronbach's alpha coefficients exceeded the minimum acceptable level of 0.7 and were internally consistent. The Cronbach's alpha coefficient value of the total scale is 0.894, greater than 0.7, and the questionnaire reliability is good. The KMO statistical analysis value is 0.832, and the spherical test result is significant ($p<0.001$), which is suitable for factor analysis.

3.3 PLS-PM Model Establishment

This paper explores the influence of various factors on the perceived value of the research group and establishes the PLS-PM model as shown in Figure 1.
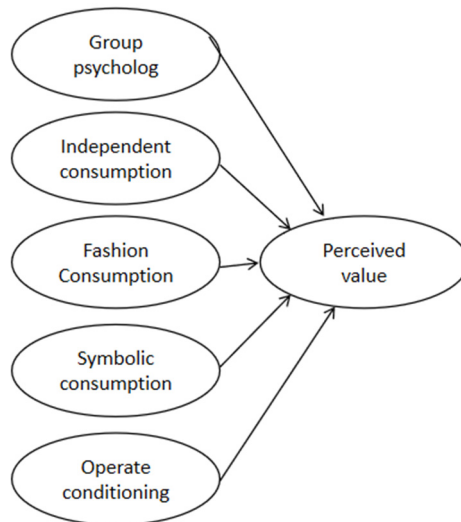
FIG. 1 Influencing factor model of mystery boxes consumption of college students' mystery boxes consumer groups

The results of principal component analysis showed that the cumulative variance of the first six factors was 80.996%, greater than 80%, so it was appropriate to select six factors. Each index corresponds to 3 research variables, a total of 18, as shown in Table 2. In order to better obtain the research results, the influence degree of each factor is quantified through 1 to 5, 1 means the influence degree is small, and 5 means the influence degree is large.

Table 1 Description of measurement factors

Factor	Description of measurement factors
Group psychology	Group psychology1. My view of the behavior of others buying mystery boxes Group psychology2. Someone around me buying mystery boxes will cause me to buy mystery boxes Group psychology3. Social trends may drive me to buy mystery boxes
Symbolic consumption	Symbolic consumption1. I'd be inclined to buy certain ips from mystery boxes Symbolic consumption2 "I" will be attracted to mystery boxes that offer rare or special items and buy them Symbolic consumption3. The cultural and emotional sense of belonging brought by mystery boxes will make "I" strengthen the desire to buy mystery boxes
Independent consumption	Independent consumption1. After becoming a college student, my consumption is completely controlled by myself Independent consumption2. The proportion of mystery boxes that I buy increases with the amount of money available Independent consumption3. If I had my own independent income, I'd be willing to use it to buy mystery boxes
Fashion Consumption	Fashion Consumption1. "I" am a trendsetter Fashion Consumption2. I think buying mystery boxes is trendy

	Fashion Consumption3. "I" will get the latest information about mystery boxes for the first time
Operate conditioning	Operate conditioning1. When I buy mystery boxes, I think about how much I like them Operate conditioning2. I want to buy mystery boxes even when I'm short on time and money Operate conditioning3. I "will be slightly lost by not buying some mystery boxes
Perceived value	Perceived value1.. Overall satisfaction with mystery boxes purchased Perceived value2The value of mystery boxes Perceived value3 The difference between what I expect when I buy mystery boxes and what I see when I open them

4 RESEARCH PROCESS AND RESULTS ANALYSIS

4.1 Descriptive Statistical Analysis

The survey results show that nearly 90% of the respondents say that someone around them has purchased mystery boxes, with female consumers showing higher interest in mystery boxes. Most consumers purchase mystery boxes infrequently. More than 80% of mystery boxes consumers purchase mystery boxes 1-3 times per month, but there are still a few people who are addicted to Mystery boxes. College students don't spend much on mystery boxes, with only 3.5% of respondents reporting spending more than 1,000 yuan.

The top reason consumers buy is "mystery boxes opening surprise", with a weighting of 76.32%.In line with the public's curiosity psychology is the biggest marketing selling point of mystery boxes, its weighted proportion is up to 83.76%, in all the survey advantage attributes in a prominent leading position. Most of the respondents are satisfied with the mystery boxes, while many of them indicate that the price performance of mystery boxes is average or even low. Surprisingly, most respondents report that the actual product they get when they buy mystery boxes is not that different from what they expect.

In addition, the survey results show that 72.5% of people are willing to consume their favorite IP products, which indicates that most of the mystery boxes consumers are driven by symbolic factors. At the same time, nearly half said they were more fashionable. Thus, the foundation of the connection between Fashion Consumption and mystery boxes consumption is established.

4.2 PLS PM Model

This paper studies the complete multivariate correlation of the above six factors to construct a formative model that can effectively explain Perceived value of mystery boxes of college students' consumption and verify the validity of the research hypothesis. As can be seen from Table 1, the five influencing factors all have a significant impact on Perceived value (T>1.96). Among them, Fashion Consumption has the largest impact on post-purchase psychology (0.285), while Group psychology has the smallest impact on post-purchase psychology (0.136). The coefficients of all factors are greater than 0, that is, the hypothesis of this paper is valid.

Table 2 Effect table of PLS-PM model

Relationships			Path coefficient	T
Group psychology	→	Perceived value	0.136	3.397
Independent consumption	→	Perceived value	0.203	5.227
Fashion Consumption	→	Perceived value	0.285	6.424
Symbolic consumption	→	Perceived value	0.183	4.034
Operate conditioning	→	Perceived value	0.231	5.584

4.3 Apriori Association Analysis

Based on the 15 factors corresponding to the above five factors, the association rule mining method (Apriori) is used to mine the influencing factors that lead to a higher Perceived value in mystery boxes consumption. The top five association rules with the highest confidence can be obtained when 100%Perceived value has 100% probability to purchase mystery boxes and rule support is greater than 20.

People with characteristics such as "I will be attracted and bought by rare or special models introduced by mystery boxes products", "good empathy experience, that is, the cultural and emotional belonging brought by mystery boxes products will increase my desire to buy mystery boxes", and "If I have my own independent income, I am willing to use the money to buy mystery boxes" have the highest support among the top five groups.

4.4 Logistic Regression

After the previous correlation analysis, the specific impact degree of each factor affecting the consumption intention of mystery boxes is further explored, and logistic regression is conducted. Next, Group psychology1, Group psychology2, Group psychology3, Symbolic consumption2, Symbolic consumption3, Independent consumption1, Independent consumption3 and Fashion Consumption1 were used to construct the model. The inspection information is as follows in Table 3 and Table 4

Table3 Summary of comprehensive test of model coefficients

log likelihood	Cox & Snell R	Nagelkerke R
323.859	0.268	0.358

Table 4 Omnibus test of model coefficients

	Chi-square	Degree of freedom	Significant
Steps	94.440	8	0.000
Block	94.440	8	0.000
Model	94.440	8	0.000

From the summary of the model, the Cox & Snell R value is 0.268, and the Nagelkerke R value is 0.358. In the study of practical problems, the R2 value is large, indicating that the model is effective in fitting the original data. Due to the limitation of the questionnaire, there may be more variables that can explain the dependent variable that are not considered. Finally, it can be seen from the Omnibus test table of the model that when the significance level is 0.05 and the number of degrees of freedom df=8, the chi-square value of the model calculated by SPSS is 94.440, which is greater than the critical value of 15.51 under this degree of freedom. Therefore, the model passes the test when the significance level is 0.05.

The dependent variable of model variables is defined as Y, which means Perceived value=1 (higher). The independent variable is X, which means perceived value of others buying mystery boxes =1 (higher) and other factors supporting the consumption of mystery boxes.

The eight factors involved in the five association rules are included into the independent variables, and logistic regression is conducted between them and purchase behavior. In these five association rules, the influence of each factor on purchase behavior can be found when other variables are the same.

In particular, when other variables are equal, "I" will be attracted by rare or special models launched by mystery boxes products and buy a higher degree of perceived value (=1) than "I" will be attracted to rare or special models launched by mystery boxes products and buy less likely (=0) 3.82 times; Perceived values that are willing to buy mystery boxes to a higher degree (=1) with their own independent income sources are 2.64 times more willing to use their own independent sources of income to buy mystery boxes to a lower degree (=0), etc.

4.5 Random Forest

Purchasing behavior is regarded as a dichotomous classified dependent variable, and the five factors mentioned above are used. The three independent variables under each factor are determined by the structure of the questionnaire. According to the statistical description analysis, gender factors and the attention paid to the promotion of mystery boxes have a significant impact on the result of purchasing mystery boxes, so there are 16 independent variables in total. Purchasing behavior is regarded as a dichotomous classified dependent variable, and the five factors mentioned above are used. The three independent variables under each factor are determined by the structure of the questionnaire. According to the statistical description analysis, gender factors and the attention paid to the promotion of mystery boxes have a significant impact on the result of purchasing mystery boxes, so there are 16 independent variables in total.

The results show that the degree of pursuit of fashion, the degree of autonomy in personal funds and the willingness to buy mystery boxes with their own independent income sources have significant effects on the purchasing behavior of mystery boxes fans, and the logistic regression results are verified.

5 STUDY THE CONSUMPTION BEHAVIOR OF MYSTERY BOXES FROM THE PERSPECTIVE OF BEHAVIORAL ECONOMICS

Behavioral economics is a discipline that studies economic phenomena under incompletely rational behavior. The introduction of psychology into economics increases the ability of economics to explain various economic phenomena in real life, thus providing a psychological cornerstone for economic analysis, making economic analysis closer to the reality of life and making policy formulation more reasonable.

5.1 Mystery Boxes Consumption under the Experience Economy

Experience economy, the extension of service economy, is the fourth economic type after agricultural economy, industrial economy and service economy. It emphasizes the satisfaction of customers' feelings and attaches importance to the psychological experience of customers when consuming behaviors occur [6]. Maslow(1943) divides human needs into five levels, namely physiological needs, safety needs, social needs, respect needs and self-actualization needs. Experience economy is the inevitable trend of the sublimation of human needs. As shown in FIG. 2, in the era of experience economy, consumers' consumption behaviors are shown as follows: From the perspective of consumption structure, consumers' emotional demand increases and their demand for personalized products and services becomes higher and higher. [7]

Self-actualization Needs	High level	Experience Economy
Respect Needs	Middle level	Service Economy
Social Needs		
Safety Needs	Low level	Product Economy
Physiological Need		

FIG. 2 Corresponding relationship between demand hierarchy and economic times

Today, mystery boxes, which license IP for upstream art and design, will lead the "fashionable toy IP economy. "Today, mystery boxes, which license IP for upstream art and design, will lead the "fashionable toy IP economy." The introduction of limited style and collection style can accelerate the creation of IP, meet consumers' desire for collection and improve consumers' identity in the cultural circle where they are interested. On the other hand, the stimulation of mystery boxes satisfies the instinct of human beings to pursue uncertainty. Everyone has their own consumption principles. For Gen Z college students, when their self-actualization needs are linked to consumption, they will naturally pursue individuation and differentiation in products and services to satisfy their higher emotional needs, reflecting the mystery boxes are products of the experience economy.

5.2 Irrational Consumption under Mental Accounting

Due to the existence of consumer Mental Accounting, consumers tend to violate some simple economic algorithms when making decisions, thus making many irrational consumption behaviors. Mental Accounting is a fictional account that classifies and counts different consumption items according to the mental cognitive system and makes irrational economic

decisions. It will change the psychology according to the special changes of transaction items, and it will be guided and changed by the mental cognitive system. [8]

For example, no matter how much you spend on food that goes over your budget, it won't affect your desire to buy mystery boxes that day. This is the effect of placing the budget for eating in a different mental account than the budget for buying mystery boxes.
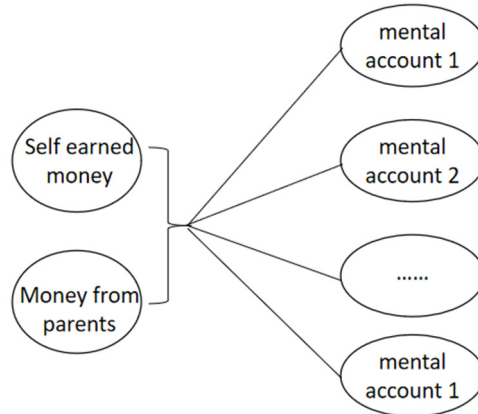
FIG. 3 Psychological accounts of college students

The disposable income of college students is divided into what their parents give and what they earn. Most of the unpaid income comes from parents. As for this part of income, college students can not reasonably estimate their psychological accounts because they have not paid their labor. If the various consumption items into the psychological account at random, resulting in irrational consumption.

6   CONCLUSIONS AND SUGGESTIONS

Experience economy is the inevitable trend of human needs upgrading. It is true that college students purchase mystery boxes to some extent to pursue personalized experience and satisfy emotional needs brought by materials. Every purchase of mystery boxes by a consumer is a psychological game against the enterprise. The joy of uncertain returns brought by buying unknown goods makes consumers happy in the "self-realization", the re-shaping of the value creation subject and the psychological pulse changes through memory utility, and experience the pleasure of opening the blind box.

College students' purchase of mystery boxes is a hedonistic act used to satisfy the psychological needs of the self in the process of consumption. The consumer needs of consumers and the attributes of mystery boxes are connected, making mystery boxes consumers willing to provide them with a separate and irreplaceable psychological account, hoping to get self-satisfaction in the consumption process of mystery boxes.

What has the greatest influence on the mystery boxes Consumption behavior of college students is Fashion Consumption, while the least influence is Group psychology. The exciting gameplay of mystery boxes and its products derived from the creation of IP are the most

attractive to consumers. College students' overall satisfaction with Mystery Boxes products is not low. College students who pursue social trends are more likely to buy mystery boxes.

To a certain extent, mystery boxes purchased by college students are indeed for the pursuit of personalized experience and the satisfaction of emotional needs brought by materials, but there is the possibility of irrational consumption based on psychological accounts.

For college students, they should look at the popularity of mystery boxes rationally and do not follow the trend of consumption, so as not to be hyped by stakeholders.For businesses, developing IP culture is an effective way to increase user engagement. Only with a variety of IP can users continue to buy. However, merchants should regulate their own behavior, so as not to consume consumers' preference for mystery boxes. For the regulatory authorities, they should standardize the operation order of mystery boxes, make it clear that "mystery boxes are used for entertainment rather than for speculation", and crack down on "scalpers" and fake goods according to law. For the regulatory authorities, they should standardize the operation order of mystery boxes, make it clear that "mystery boxes are used for entertainment rather than for speculation", and crack down on "scalpers" and fake goods according to law.

REFERENCES

[1]   Cao Jiahui, etc.. Blind Box Fun: Explore the business model and value creation analysis of the community's Generation Z IP boom -- based on POPMART research[J]. Inner Mongolia Statistics, 2022(2):3.

[2]   Qi Huaile, Liu Yanhong. Marketing Strategy Analysis Based on Generation Z Consumer Psychology -- A Case Study of Blind Box Consumption[J]. Global Brand Insight, 2020(9):4.

[3]   Han Xinyue. On the Mystery of Blind Box Economy from the Perspective of Behavioral Economics[J]. Magazine introduction, 2019, No.181(27):123-124.

[4]   Valarie A. Zeithaml．Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence [J]．Journal of Marketing，1988，52(3)：2-22．

[5]   Maslow, A. H.．A theory of human motivation.：Psychological Review, 50(4),，1943

[6]   Joseph Pine II, James H. Gilmore. Experience economy[M].BeiJiing ：China Machine Press,2002.

[7]   Lei Bingyin, Wang Yanxia.Consumer Demand and Marketing Strategy in the Age of Experience Economy[J].China Industrial Economics,2000,08:81-86.

[8]   Li Aimei, Ling Wenshuang.Psychological Accounts: Theory and Application Implications[J].Advances in Psychological Science,2007,15(5):727-734.