



Investigation and Analysis on Residents' Cognition and Acceptance of Polylactic Acid Degradable Mask

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Abstract: At present, compared with traditional disposable masks, polylactic acid degradable masks have higher price, technical bottlenecks, low popularity and low consumer awareness. In view of the current situation of public cognition, popularization, influencing factors and difficulties of polylactic acid degradable masks, we launched this survey. Through the investigation, the following conclusions are found: (1) The vast majority of residents have a low understanding of polylactic acid degradable masks and other materials, and most of them are in a state of half understanding. (2) Gender, age and educational background will affect residents' cognition of polylactic acid degradable masks. (3) Polylactic acid degradable masks are not attractive enough for residents, and five groups have distinct cognitive characteristics. In addition, we also found that the main reasons for the failure to popularize polylactic acid degradable masks are: the R&D of production technology is not optimized, the sales price is too high, and the treatment mechanism is not perfect.

Keywords: Polylactic acid; Degradable mask; Cognitive level; Willingness to accept.

1. Introduction

The market scale of the mask industry in China has fluctuated annually in 2017-2019 years. But in 2020, COVID-19 consumption increased and the number of masks consumption increased by 102 billion 500 million in 2020. With the slowdown of the

epidemic, the consumption of masks decreased slightly to 71.3 billion in 2021. The epidemic has strengthened people's awareness of protection, and masks have gradually become an indispensable necessity for people's life, so the output of masks will basically not return to the production level before the epidemic. The non-woven fabric made of polypropylene material is the raw material of ordinary disposable masks, which is also the most commonly used type of masks.

Under the background of the increasing consumption of masks all over the world, mask waste has become a major hidden danger. 90% of non-degradable masks made of plastic materials are difficult to recycle, which has a significant impact on the earth's ecology. Internationally, since the 21st century, there has been a global trend of degradable plastics, and plastic restriction and prohibition regulations have been issued intensively. The introduction of plastic restriction and prohibition regulations in various countries is shown in the table. Limiting the use of non-degradable plastics has become a global consensus, and the era of global plastic prohibition has come. In China, with the gradual strengthening of people's awareness of environmental protection and the support of the plastic ban order, domestic degradable plastics will usher in an explosive growth in demand and have broad development prospects. China has issued a series of policies to strongly support the development of degradable plastics.

Carbon neutralization refers to the total amount of carbon dioxide or greenhouse gas emissions directly or indirectly generated by the state, enterprises, products, activities or individuals within a certain period of time, which can offset their own carbon dioxide or greenhouse gas emissions through afforestation, energy conservation and emission reduction, so as to achieve "positive and negative offset" and achieve relative "zero emission". Under the background of "carbon peak" and "carbon neutralization", in order to reduce carbon emissions, emerging fields such as degradable plastics are expected to lead the new development of low-carbon chemical industry, and the development of degradable plastics has great prospects [1].

Polylactic acid (PLA), as a main variety of biodegradable plastics, is a globally recognized degradable material. It is a high molecular polymer obtained by polymerization with lactic acid as the main raw material. Its physical and chemical properties are similar to those of traditional plastics and can be completely degraded under certain conditions. Due to its unique properties, it has been widely studied in recent years. Polylactic acid source takes renewable plant resources as upstream raw materials, which has the advantage of environmental friendliness. The whole process can fully enter the ecological cycle, which well meets the requirements of social sustainable development [2].

At present, compared with traditional disposable masks, polylactic acid degradable

masks have higher prices, technical bottlenecks, low popularity and low consumer awareness. In view of the current situation of public cognition, popularization, influencing factors and difficulties of polylactic acid degradable mask [3]. We launched this survey, taking Bengbu City as the research site, investigated the cognition of people of all ages, different occupations and different income conditions on polylactic acid masks, and conducted relevant data analysis based on the survey results to understand the cognitive status, influencing factors and difficulties of popularization of polylactic acid degradable masks, and put forward reasonable suggestions to obtain a broader market of polylactic acid degradable masks, To promote sustainable social development.

2. Investigation Planning and Implementation

2.1 Questionnaire and scale design

2.1.1. Questionnaire design

The main contents of this survey include: the current situation of Bengbu residents' cognition of polylactic acid degradable masks, the current situation of the use of ordinary masks, the restrictive factors of choosing ordinary masks instead of polylactic acid degradable masks, and Bengbu residents' expectations of polylactic acid degradable masks in the future.

The questionnaire includes four parts: basic information of the surveyed residents, the use status and cognitive status of polylactic acid degradable masks in Bengbu City, analysis of potential users of polylactic acid degradable masks, and analysis of improvement of polylactic acid degradable masks. The basic information includes the gender, age, educational background, occupation, average monthly income, frequency of use of ordinary masks and post-treatment methods of the surveyed residents; Analysis of existing consumers of polylactic acid degradable masks, including understanding channels of polylactic acid degradable masks, disadvantages and advantages of polylactic acid degradable masks, etc. Analysis of potential consumers of polylactic acid degradable masks: reasons for not using; The improvement analysis of polylactic acid degradable mask includes the improvement of the function, style design and price range of polylactic acid degradable mask in the future [4].

2.1.2. Scale design

In order to more accurately explore Bengbu residents' views on the problems encountered in the promotion of polylactic acid degradable masks and the advantages of polylactic acid degradable masks, we developed a five-point scoring scale for both parts in the questionnaire design, and set five answers from "dissatisfied" to "very satisfied" for each statement, scoring 1 / 2 / 3 / 4 / 5 respectively. The main part of the scale includes 12 variables.

Table 1. Statistical table of problems in promotion

Vriable	Definition
Effect of polylactic acid degradable mask	Cost and price of polylactic acid degradable mask
Sales mode	There are few manufacturers and a single way of purchasing
Technology orientation	Technology research and development can not keep up
Behavior orientation	Ordinary masks are sufficient for daily needs
Appearance design	The style is single, and the appearance is not beautiful enough
Environmental factor	After the outbreak, the demand for masks decreased
Recycling mechanism	After use, the treatment mechanism is not perfect, and the mask pollution can not be effectively solved

Compared with ordinary masks, if residents need to choose polylactic acid degradable masks, there must be a reason to choose this product. In view of this, we are optimistic about the advantages of polylactic acid degradable mask as a variable. In order to better highlight the advantages of masks, the original definitions of the following variables are modified to enhance the pertinence of the research. The new definition and specific explanation of variables are shown in Table 2.

Table 2. Advantages of polylactic acid degradable mask

Variable	Definition
Environment	Compared with ordinary masks, the popularization of polylactic acid degradable masks can effectively solve the pollution of masks
Energy conservation	The production of all raw materials of ordinary masks needs to consume crude oil. Polylactic acid degradable masks can reduce fossil energy consumption and greenhouse gas emissions
Easy to obtain materials	Raw materials are made from straw to reduce the environmental pollution caused by straw combustion
Security	It has strong virus isolation ability and high security
Convenient	Comfortable and breathable, without chemical smell, sensitization and fuzzing

2.2 Sampling design

In order to ensure the scientificity and accuracy of sampling, we have adopted different sampling methods for pre survey and formal survey. In the process of pre survey, simple random sampling is mainly adopted. In the formal survey, stratified sampling and equidistant sampling are adopted.

(1) Simple random sampling. Simple random sampling has certain randomness and

blindness. It is only used as a sampling method in the pre-survey process to have a basic understanding of the use of degradable plastic bags by individual industrial and commercial households in Bengbu. During the pre-survey, team members entrusted the online questionnaire to relatives and friends in Bengbu City by means of WeChat and QQ.

(2) Stratified sampling. In the process of formal investigation, we refer to the population density of the six districts of Bengbu City on the Internet and distribute it in proportion, which improves the accuracy of the overall index estimation. According to the calculation, 100 questionnaires should be distributed in Bengshan District, 127 in Longzihu District, 190 in Yuhui District, 166 in Huaishang District, 161 in the economic development zone and 36 in the high tech Zone.

(3) Equidistant sampling. According to the previous pre-survey, we calculated the number of questionnaires that should be distributed in each municipal district in proportion. We selected the first sample unit in six cities, and then selected the remaining sample units in sequence. According to the determined sampling interval, we determined the total number of surveyed communities and distributed questionnaires. A community is randomly selected from the jurisdiction. The number of communities can be determined and a questionnaire can be issued according to the population density of each community and the number of communities.

The purpose of this is to make the high content part of the population more likely to be selected, which can improve the representativeness of the sample.

2.3 Basic information composition of survey samples

(1) Investigate the gender distribution of the sample. According to the collected questionnaire data, the proportion of men and women in the sample is 30.9% and 69.1%, mostly women.

(2) Investigate the age distribution of the sample. The proportion of samples aged 18-30 is the largest, accounting for 84.98%, 1.72% under 17 years old, 6.01% between 31-40 years old, 6.87% between 41-50 years old and 0.43% over 51 years old.

(3) Investigate the education distribution of the sample. The majority of the sample education in this survey is undergraduate, accounting for 85%, followed by senior high school / technical secondary school / vocational school, junior college, master's degree or above and junior high school or below, accounting for 5%, 5%, 3% and 2% respectively.

(4) Investigate the monthly income of the sample. In this survey, we can find that the monthly income of most samples is 5000-8000 yuan, accounting for 64.29%, followed by 2000-5000 yuan, accounting for 26.19%, while those below 2000 yuan and above 8000 yuan account for a small number, accounting for 4.76%.

3. Citizens' Cognition of Polylactic Acid Degradable Masks

3.1 Sample basic information and cognitive status based on descriptive statistics

3.1.1. Cognitive status

This questionnaire investigated the cognitive status of samples on polylactic acid degradable masks. One of the questions is "has the sample heard of polylactic acid degradable masks?". 60% chose "never heard of it", 38% chose "heard of it, but never used it", and only 2% chose "heard of it and used it", which shows that most people still don't know about polylactic acid degradable masks. Even if they heard of it, few people use it, which reflects that most people are still unfamiliar with polylactic acid degradable masks.

3.1.2. Understanding channels

Among those who have heard of polylactic acid degradable masks, we further investigated the ways to understand them. It was learned that 52% of people learned about polylactic acid degradable masks through websites / media / advertisements, 24% through supermarket merchants / others, 19% through school education and 5% others. We can find that the vast majority of people have come through websites, media and advertising channels, which shows that it is more effective to publicize polylactic acid degradable masks through this channel.

3.1.3. Understanding of relevant policies

Divide the understanding degree into five grades, and give 1-5 points respectively, and let the samples rate their understanding of polylactic acid materials. Among them, 1 point corresponds to not knowing at all, 3 points corresponds to half understanding, and 5 points correspond to very understanding. Through the distribution of broken line chart, we can see that most people have 3 points, followed by 1 point, and other scores account for a relatively small proportion. At the same time, we can conclude that the average value of understanding is 2.29 points, close to 3 points. Therefore, the vast majority of people know little or even little about the relevant policies of polylactic acid materials.

3.1.4. Mask demand

According to the data, we can find that after the epidemic, the frequency of using masks has increased significantly, and masks have become one of the essential daily necessities. 55.36% of the samples use 4-7 masks per week, 29.18% of the samples use 1-3 masks per week, 12.88% of the samples use 8-14 masks per week, and 2.58% of the samples use more than 14 masks per week. This fully proves the necessity of masks, and the polylactic acid degradable mask itself has the blessing of environmental protection, which can help green development. Its emergence solves the pollution problem of traditional masks.

3.1.5. Purchase intention

The survey found that about 90% of people are willing to buy polylactic acid degradable masks, which is not well known, reflecting that there is a potential huge market for polylactic acid degradable masks. However, due to various reasons such as insufficient publicity and funds, the development of polylactic acid degradable masks has been limited.

3.2 Cognitive status of Bengbu residents based on contingency table

3.2.1. Gender and cognitive status of polylactic acid degradable mask

Through the contingency table analysis by SPSS, we obtained the chi square test of gender and polylactic acid degradable mask. The p value corresponding to Pearson chi square independence test = $0.024 < 0.05$. If the original hypothesis is rejected, there is a significant correlation between gender and the cognitive status of polylactic acid degradable mask.

According to the questionnaire data, women in the collected samples have never heard of polylactic acid degradable masks, and the percentage of gender is slightly higher than that of men, but there is little difference. It may be because the publicity and popularization that women usually contact involves other aspects.

3.2.2. Understanding channels of age and polylactic acid degradable mask

According to the chi square test of age and understanding channels of polylactic acid degradable masks, we can find that the p value corresponding to Pearson chi square independence test = $0.000 < 0.05$. Therefore, it can be deduced that there are significant differences in understanding channels of polylactic acid degradable masks among people of different ages.

Most of the channels for people of all ages to know about polylactic acid degradable masks are websites / media / advertisements, which continue to be subdivided. Some people over the age of 50 learn about them from other channels such as exhibitions, while a considerable number of people aged 18-30 and 41-50 learn about them through the recommendation of others, except those under the age of 17 and over the age of 50. Others in other age groups learned from school education about the use of polylactic acid degradable masks.

3.2.3. Educational background and understanding of policies related to polylactic acid materials

Through contingency table analysis on the understanding degree of educational background and policies related to polylactic acid materials, it is obtained that the corresponding p value of Pearson chi square independence test is = $0.000 < 0.05$. The original hypothesis is rejected, and it is concluded that there are significant differences in the understanding degree of policies related to polylactic acid materials among different educational backgrounds. According to the contents presented in the

cross table, it can be found that most of the samples who have only a half understanding of the policies related to polylactic acid materials are those with high school / technical secondary school / vocational school education. It can be seen that education has a certain impact on the understanding of the policies, but the degree is not deep.

3.3 The cognitive characteristics of polylactic acid masks based on cluster analysis
 In order to more fully understand the cognitive characteristics of Bengbu residents on polylactic acid degradable masks, we conducted K-means cluster analysis on the samples. According to their different cognitive characteristics, we divided them into four groups.

3.3.1. Variable selection

The selected variables are shown in the following table.

Table 3. Variable selection

Dependent variable	Relevant questionnaire questions
Mask demand	How many masks do you use each week?
Cognitive status	Have you heard of polylactic acid degradable mask?
Advantage scoring	Please rate the advantages of the following degradable masks
Purchase intention	Are you willing to buy polylactic acid degradable mask after knowing the relevant information?
Development prospect	What do you think of the development prospect of degradable masks?

3.3.2. Result analysis

Import the data into SPSS for k-means clustering, and the classification results are as follows:

(1) Group A. Such people have little demand for masks, and their understanding of polylactic acid degradable masks is very low. They are not too willing to buy polylactic acid degradable masks. They think that the advantages of polylactic acid degradable masks are not obvious and there is no good development prospect. Such people usually have little demand for masks and less demand for polylactic acid degradable masks, and hold a relatively negative attitude towards the masks.

(2) Group B. Such people have a great demand for masks. They don't know much about polylactic acid degradable masks, but they think they have strong advantages and good prospects. They are more willing to buy polylactic acid degradable masks. Although such groups have a low level of understanding, they hold a more positive attitude towards polylactic acid degradable masks, which is convenient for the further promotion of polylactic acid masks.

(3) Group C. Such people have a small demand for masks, but they hold a more positive attitude towards the understanding of polylactic acid degradable masks, their willingness to buy them, their advantages, or their development prospects. It is possible that such people are more interested in polylactic acid materials, not just polylactic acid masks.

(4) Group D. Such people have a great demand for masks and know more about polylactic acid degradable masks, but they have little willingness to buy them. They don't think the masks have great advantages and are not very optimistic about their future development. Such people have relevant needs, but they do not focus on polylactic acid degradable masks.

(5) Group E. Such people have little demand for masks, are unfamiliar with polylactic acid degradable masks, and their purchase intention is not strong. However, they believe that polylactic acid degradable masks have obvious advantages and good prospects in the future. The ideas of this group refer to group C, which may be more interested in other polylactic acid materials.

4. Willingness of Bengbu Residents to Accept Polylactic Acid Degradable Masks

4.1 Consumer portrait of polylactic acid degradable mask based on K-means clustering

Consumers' correct understanding and support of polylactic acid masks are the basis and driving force for the development of polylactic acid masks. Understanding consumers' cognition of polylactic acid masks is of great significance for polylactic acid mask manufacturers to formulate relevant strategies and polylactic acid mask enterprises to carry out marketing activities. This paper uses the method of cluster analysis to divide the interviewed polylactic acid mask consumers into groups, and combines the needs and concerns of each category of consumers, in order to refine the target population and expand the target market.

4.1.1. Method selection

The second-order clustering analysis and mean analysis can be used to cluster the character difference portraits of polylactic acid mask consumers. The characteristic variables of the respondents were split independently and 0 - 1 recorded, including: ① Basic information of consumers (A1: age; A2: consumption of polylactic acid masks; A3: familiarity with polylactic acid masks); ② Consumer concerns (B1: recognition of current situation of polylactic acid mask; B2: influence of polylactic acid mask development); ③ Consumer demand (C1: polylactic acid mask demand). There are six variables in these three categories, and then the second-order cluster analysis is

carried out for the 20 new variables obtained from the split to obtain the number of cluster categories. Finally, under the condition that the number of clusters is 4, the clustering result is obtained by K-means cluster analysis, that is, the division of population characteristics.

4.1.2. Calculation process

(1) Number of clustering items

The second-order cluster analysis results are output by SPSS software. The number of clusters recommended by the software is 4, that is, consumers are divided into four items according to user characteristics. According to the class quality, good results can be achieved.

(2) Variable selection

Select factors as clustering variables, and select the following four total variables, that is, the independent variables corresponding to the five questions.

Table 4. Clustering variables

Dependent variable	Design questionnaire questions
Influence factor	Related or corresponding problems
Consumer Factors	Are you familiar with the polylactic acid mask industry?
	What was your first impression of polylactic acid mask?
Market factors	What do you think of the concept of degradable materials?
Capital flow factors	How much do you buy masks per week?
Environmental effect	What do you think of the impact of the policy on degradable masks?

(3) Result analysis

By SPSS cluster analysis, 741 respondents were divided into four categories. These four categories of residents are described, and the specific classification is shown in Table 5.

Table 5. Description of clustering results

Category	1	2	3	4
Polylactic acid mask industry heat	3	3	2	3
Image of polylactic acid mask industry	3	1	1	1
Directional heat of degradable material	1	1	1	1
Consumption frequency	1	1	3	1
Policy environmental impact	2	2	2	3

4.1.3. Consumer classification

According to the personal views of the investigators on the development of polylactic acid masks, we divide the residents into the following four categories: (1) The first

category of consumers. Aged 18-30, often buy degradable products and take a positive and optimistic attitude towards the promotion of polylactic acid masks. (2) The second category of consumers. Aged 30-45 years, know about degradable materials and use them occasionally, and support the development of polylactic acid masks. (3) The third category of consumers. Aged 45-60 years old, have a certain understanding of degradable materials, know little about polylactic acid masks, and take a neutral attitude. (4) The fourth category of consumers. Over 60 years old, do not know about degradable materials, almost do not know polylactic acid masks, and the demand for polylactic acid masks is weak. Cluster analysis was conducted on 741 valid questionnaires, and four types of consumer groups in Bengbu were obtained. At present, most of them have a positive attitude towards polylactic acid masks, are willing to buy degradable products, support the current popular degradable environmental protection materials, and show that polylactic acid masks have a broad market. But third, the fourth category of consumers lack of understanding polylactic acid masks and know little about degradable materials, so the publicity of polylactic acid masks needs to be strengthened, which is also a direction that polylactic acid mask enterprises need to strengthen, and strengthen the publicity of polylactic acid degradability.

4.2 Acceptance intention of polylactic acid mask based on principal component analysis

4.2.1. Quantification of acceptance evaluation index of polylactic acid mask

After knowing about Bengbu polylactic acid mask industry, we extracted the following core elements according to the current development of Bengbu polylactic acid mask: current situation awareness, recognition, prospect recognition, development limitation, contact frequency, environmental effectiveness and industrial development feasibility. In addition, 11 variables including cognitive status 1, cognitive status 2, cognitive status 3, status recognition 1, status recognition 2, prospect recognition 1, prospect recognition 2, limited development, contact frequency, environmental effectiveness 1 and environmental effectiveness 2 are defined as x_1 - x_{11} .

4.2.2. Validity test

The KMO test can be used to verify whether our index sample data can be applied to principal component analysis and factor analysis. The value of KMO statistics is between 0 and 1. When the sum of squares of simple correlation coefficients between all variables is much greater than the sum of squares of partial correlation coefficients, the closer the KMO value is to 1, which means that the stronger the correlation between variables is, and the original variables are more suitable for factor analysis; When the sum of squares of simple correlation coefficients between all variables is close to 0, the closer the KMO value is to 0, which means that the weaker the

correlation between variables is, the less suitable the original variables are for factor analysis.

Among them, Kaiser gives a KMO inspection standard: ① $KMO > 0.9$, which is very suitable; ② $0.8 < KMO < 0.9$, suitable; ③ $0.7 < KMO < 0.8$, general; ④ $0.6 < KMO < 0.7$, not suitable; ⑤ $KMO < 0.5$, not suitable.

The statistics of Bartlett's spherical test are obtained from the determinant of the correlation coefficient matrix. It is a test method to test the degree of correlation between various variables. Bartlett's spherical test is usually performed before factor analysis to judge whether the variables are suitable for principal component analysis and factor analysis. Bartlett's spherical test is based on the correlation coefficient matrix of variables. Its original assumption is that the correlation coefficient matrix is a unit matrix (not suitable for factor analysis, the correlation between indicators is too poor and not suitable for dimensionality reduction), that is, all elements on the diagonal of the correlation coefficient matrix are 1 and all elements on the non-diagonal are 0. The statistics of Bartlett's spherical test are obtained from the determinant of the correlation coefficient matrix. If the value is large and the corresponding p value is less than the significance level in the user's mind (generally 0.05), the original hypothesis should be rejected and it should be considered that the correlation coefficient cannot be the unit matrix, that is, there is correlation between the original variables, which is suitable for factor analysis. On the contrary, it is not suitable for factor analysis. If the value is large and the corresponding p value is less than the significance level in the user's mind (generally 0.05), the original hypothesis should be rejected and it should be considered that the correlation coefficient cannot be the identity matrix, that is, there is correlation between the original variables, which is suitable for factor analysis. On the contrary, it is not suitable for factor analysis.

The above table is generated by SPSS software, $KMO = 0.812$, indicating that principal component factor analysis can be used; $SIG = 0$, indicating that the statistical significance of the sample data is strong. Because $KMO > 0.5$ and $sig < 0.05$ indicates the possibility of sharing factors among the above variables, follow-up analysis can be carried out.

4.2.3. Constructing principal component analysis model

(1) Common factor extraction

As shown in Table 6, as the basis for the classification and naming of factors, the classification and naming are as follows:

Table 6.Score coefficient of influencing factors

	Component				
	1	2	3	4	5
Cognitive status 1	-.132	-.402	-.198	.565	-.221
Current status recognition 2	.243	-.005	.398	.542	-.320
Contact frequency	.000	-.143	-.676	.238	.398
Cognitive status 3	.656	-.343	.343	.076	-.183
Current status recognition	.753	-.253	.125	-.002	-.141
Cognitive status 2	.645	-.443	.299	.131	.236
Prospect recognition	.765	-.118	.047	.040	.072
X limited development	.745	-.245	-.006	-.083	.244
Prospect recognition 2	.712	.167	-.221	-0.048	-.0.048
Environmental effectiveness 1	.789	.289	-.224	-.007	.004
Environmental effectiveness 2	.754	.387	-.232	-.082	-.167

The first factor comes from the current consumers' cognition of the characteristics of Bengbu polylactic acid mask, the recognition of the development of Bengbu polylactic acid mask, the recognition of the development prospect of Bengbu polylactic acid mask, and the policy support for the development of Bengbu polylactic acid mask. The interpretation rate of all information was 32.342%, which was named attention factor. The second factor comes from consumers' attitude and affirmation towards polylactic acid masks at the time of purchase. The interpretation of all information is 9.522%, which is named as consumption attitude factor. The third factor comes from consumers' understanding and first impression of polylactic acid masks under the action of various factors. The interpretation rate of all information is 7.450%, which is named familiarity factor. The fourth factor comes from the degree of purchase of polylactic acid masks by consumers, that is, the contact frequency of polylactic acid masks. The interpretation rate of all information is 5.875%, which is named frequency factor.

(2) Common factor analysis

Table 7.Variance contribution rate of common factors

Common factor	Variance contribution rate
Attention factor	0.248
Consumption attitude factor	0.07
Familiarity factor	0.452
Frequency factor	0.064

It can be seen from table 7 that in the comprehensive evaluation system of consumers for the development of important industries, the familiarity factor has the greatest impact on consumers' attitude, followed by the degree of attention factor, consumption attitude factor and frequency factor. At present, people lack

understanding of polylactic acid masks, and most people are not very familiar with polylactic acid masks. Therefore, the first step to make consumers accept polylactic acid masks is to make them famous. When people become more familiar with it, it will naturally promote industrial development, improve people's purchase intention, and finally drive the consumption of polylactic acid masks. Among them, the attention factors include the recognition of the development status and prospect of polylactic acid, and the support of national policies for the development of polylactic acid masks. Among the remaining factors, some are similar because the willingness to set questions in the questionnaire and the research depth of question setting are different, and consumers' attention to polylactic acid masks can only explain the large number of browsing.

(3) Comprehensive factor score analysis

Assuming that the standardized data of 11 variables such as cognitive status are $X_1 \sim X_{11}$, according to the principal component expression of the score coefficient table of influencing factors:

$$Y_1 = -$$

$$0.132X_1 + 0.243X_2 + 0.656X_4 + 0.753X_5 + 0.645X_6 + 0.765X_7 + 0.712X_9 + 0.789X_{10} + 0.754X_{11}$$

$$Y_2 = -0.402X_1 - 0.005X_2 - 0.143X_3 - 0.343X_4 - 0.253X_5 - 0.443X_6 - 0.118X_7 -$$

$$0.245X_8 + 0.167X_9 + 0.289X_{10} + 0.387X_{11}$$

$$Y_3 = -0.198X_1 + 0.398X_2 - 0.676X_3 + 0.343X_4 + 0.125X_5 + 0.299X_6 + 0.047X_7 - 0.006X_8 -$$

$$0.221X_9 - 0.224X_{10} - 0.232X_{11}$$

$$Y_4 = 0.565X_1 + 0.542X_2 + 0.238X_3 + 0.076X_4 - 0.002X_5 + 0.131X_6 + 0.040X_7 + 0.083X_8 -$$

$$0.083X_9 - 0.048X_{10} - 0.082X_{11}$$

$$Y_5 = -0.221X_1 - 0.320X_2 + 0.398X_3 - 0.183X_4 - 0.141X_5 + 0.236X_6 + 0.072X_7 + 0.244X_8 -$$

$$0.048X_9 + 0.004X_{10} - 0.167X_{11}$$

After calculating the above five principal components with the quantized variable value, the comprehensive evaluation index of the development impact of polylactic acid mask is constructed with the variance contribution rate of each principal component as the weight:

$$F = 0.32342X_1 + 0.09522X_2 + 0.07540X_3 + 0.05875X_4$$

The 741 questionnaires were summarized. Through the collected sample data as the evaluation of the development impact of polylactic acid mask, the comprehensive evaluation score was calculated. The data and visual results were displayed and analyzed by SPSS software as follows.

Table 8. Comprehensive evaluation

Score	Grade	Number of people
50-65	A	19
65.5-80	B	56
80.5-95	C	110

95.5-110	D	86
110.5-125	E	200
125.5-140	F	182
140.5-155	G	74
155.5-170	H	14

As shown in Table 8, the higher the grade, the more supportive the attitude of this group of people towards polylactic acid masks. According to the above table, most of the consumer groups reflected by the respondents' views on the acceptance willingness of polylactic acid masks are at the upper middle level, indicating that more people support the development of polylactic acid masks. Especially during the epidemic, it played a greater role than before. A few people may be affected by ordinary masks for a long time, and the publicity of polylactic acid masks is not enough. About one tenth of consumers are slightly dissatisfied with polylactic acid masks.

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