

# Packaging for tea drinks of well-known brands Design Study

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**Abstract.** Tea beverages account for a large proportion of the market share, and the visual patterns of tea beverage packaging bottles influence consumers' choice of tea beverages. This paper follows the principle of perceptual engineering and uses the semantic differential method to analyze the perceptual factors in the packaging design of well-known tea beverages, to understand the psychological perceptions and needs of the mass consumers through the product packaging experience, and to provide a reference for designers to design tea beverage packaging that meets the perceptual requirements of consumers and enhance the design effectiveness.

**Keywords:** tea beverage packaging; semantic differential method; principal component analysis.

## 1. Introduction

Tea drinks have become one of the top three soft drinks, ranking second in market share among soft drinks in 2019, the [1] It will continue to grow in the future. The brand data research department has compiled information based on big data statistics and professional measurements based on artificial analysis and research based on changes in market and parameter conditions. [3] The top seven most popular brands on the market are "Master Kong", "Unity", "Wang Laoji", "Kadoorie "This is the result of big data, cloud computing and statistics that are truly objective. Tea beverage packaging is characterized by visual patterns attached to the plastic bottle and complex pattern styles. Through the analysis of consumers' visual perceptions, the most popular packaging in the market is obtained, and the visual effects of the popular packaging are studied to guide the designers' grasp of the packaging style. [2] This article adopts a questionnaire survey method for six tea beverage packaging, through the development of a form to test the questionnaire on the respondents to get the raw data for analysis, followed by the conversion of perceptual factors into data for quantitative analysis through a semantic differential scale [4] and finally using principal component analysis [5]. to obtain the loading relationships between the variables and the principal components.

## 2. Selection of samples

Through a preliminary screening of 7 brands of tea beverages through a questionnaire survey, the 6 most popular tea beverage packages in the market were selected, which are also the most popular tea beverages of each brand. This is shown in Figure 1 below.



Figure 1. The most popular tea drink packaging

### 3. Collecting perceptual vocabulary

A preliminary questionnaire survey was conducted on the consumer population to describe the visual perception of the six tea drink packages using adjectives. 68 questionnaires were returned, with 30 pairs of relevant adjectives, and then a search was conducted on the internet for adjectives to evaluate the tea drink packaging, resulting in a collection of over 100 adjectives.

### 4. Screening perceptual vocabulary

In this case, a mathematical statistical method was used to process the perceptual adjectives. The operation was carried out in two main steps: first a preliminary analysis of more than 100 adjectives, and finally the deletion of adjectives with close meanings and those not relevant to this study, resulting in 20 groups of adjectives with relative meanings [4] , these adjectives are shown in Table 1.

Table 1. 20 pairs of relative adjectives

Interesting - Uninteresting	Fresh - Muddy	Aesthetic-ugly	Cool - Sultry	Connotative - Superficial
Minimalist - Complex	Elegant - Vulgar	Fashionable - Outdated	Atmospheric - Chic	Featured - General
Rich - Monotonous	Appetizing - Non-appetizing	Creative - Mediocre	Traditional - Modern	Rhythmic - Disordered
Old-fashioned - raw	Delicate - Rough	Lovely - Bored	Cartoon - Realistic	Rhyming - boring

Table 1. 20 pairs of relative adjectives

The study was conducted on consumers who like to buy tea beverages. A questionnaire was used to select adjectives that accurately evaluate tea beverage packaging, and six pairs of adjectives were selected, as shown in Table 2.

Table 2 . 6 groups of perceptual evaluation adjectives

Interesting - Uninteresting	Minimalist - Complex	Old-fashioned - raw
Fresh - Muddy	Delicate - Rough	Creative - Mediocre

### 5. Building a semantic differential scale

The six selected pairs of adjectives were divided into seven semantic levels to create a basic semantic differential scale (e.g. Table 3). For example, "interesting-uninteresting" was divided into seven levels of "-3, -2, -1, 0, 1, 2, 3".

Table 3. Adjectives are divided into 7 semantic hierarchies

Interesting	-3 -2 -1 0 1 2 3	uninteresting
Minimalist	-3 -2 -1 0 1 2 3	Complex
Old-fashioned	-3 -2 -1 0 1 2 3	Stiff
Clean and fresh	-3 -2 -1 0 1 2 3	cloudy
Sleek	-3 -2 -1 0 1 2 3	Rough
Creative	-3 -2 -1 0 1 2 3	Mediocre

### 6. Sample Analysis

The second questionnaire was directed at tea drink-loving consumers, with perceptual adjectives rated on six tea drink packages and a rating scale graded on six sets of relative adjectives. The sample size should be selected on the basis of 3-5 times the number of people on the subscale that includes the most question items in the questionnaire, and the panel scale used to conduct the study should have no less than 30 samples. [6] The questionnaire on tea beverage packaging was set up with 46 questions and the sample size was appropriate between 138-230. 165 valid questionnaires were collected to measure the reliability of the scale question results of the tea beverage packaging questionnaire and the Cronbach's alpha coefficient value of the model was 0.97, indicating that the reliability of the questionnaire was good. [7]

Table 4 .Confidence Scale

Cronbach's alpha coefficient	Standardised Cronbach's alpha coefficient	Number of items	Number of samples
0.97	0.97	36	128

### 7. Data calculation

The mean values were calculated for the six sets of perceptual adjectives for the six brands, as shown in Table V below. Import all the data into spass for principal component analysis [8] , which yielded Table 6, Table 7, Table 8, Table 9 and Table 10.

Table 5 .Average value of perceptual adjectives

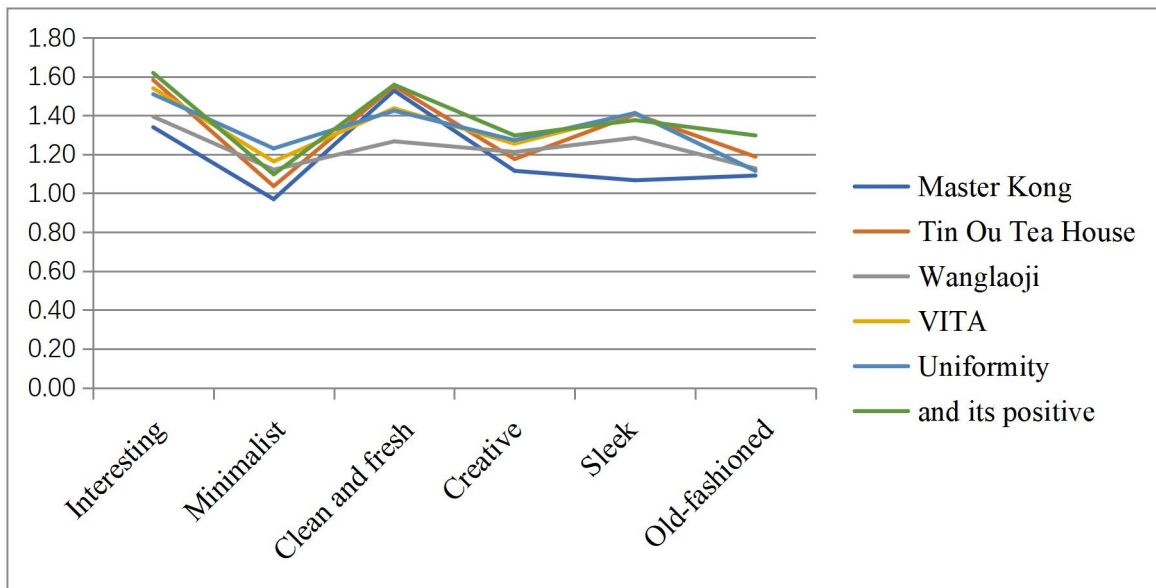


Table 6. KMO and Bartlett's test

KMO		0.868
Sampling suitability number		
Bartlett Sphericity Test	Approximate cardinality	1999.689
	Freedom	15
	Significance	0.000

Table 7. Correlation Matrix

	Interesting	Minimalist	Clean and fresh	Creative	Sleek	Old-fashioned
Interesting	1.000	0.454	0.536	0.525	0.498	0.419
Minimalist	0.454	1.000	0.407	0.477	0.477	0.463
Clean and fresh	0.536	0.407	1.000	0.430	0.509	0.440
Creative	0.525	0.477	0.430	1.000	0.409	0.497
Sleek	0.498	0.477	0.509	0.409	1.000	0.480
Old-fashioned	0.419	0.463	0.440	0.497	0.480	1.000

Table 8 .Common factor variance

	Initial	Extraction
Interesting	1.000	0.658
Minimalist	1.000	0.644
Clean and fresh	1.000	0.772
Creative	1.000	0.656
Sleek	1.000	0.623
Old-fashioned	1.000	0.645

Table 9 .Total variance explained

Ingredients	Initial Eigenvalue			Extraction of sum of squares of loads	Total	Percent age variance	Cumulative %	Sum of squared rotating loads	Total	Percent age variance	Cumulative %
	Total	Percent age variance	Cumulative %								
1	3.341	55.682	55.682	3.341	55.682	55.682	2.022	33.701	33.701		
2	0.656	10.931	66.613	0.656	10.931	66.613	1.975	32.911	66.613		
3	0.595	9.920	76.533								
4	0.549	9.142	85.675								
5	0.456	7.596	93.271								
6	0.404	6.729	100.000								

Table 10 .Rotated component matrix<sup>a</sup>

	1	2
Interesting		0.721
Minimalist	0.755	
Clean and fresh		0.855
Creative	0.754	
Sleek		0.694
Old-fashioned	0.751	

### 8. analysis of data results

To determine whether the correlation of the quantitative data could be extracted as a principal factor, the KMO values were analysed and, as shown in Table 6, the KMO value was 0.86, a value greater than 0.6. The significance value of 0.000 is less than the value of 0.05, indicating a very good fit for principal component analysis.

Table 7 shows that the correlations between the perceptual quantitative data were high, with the strongest correlations being between "interesting" and "Clean and fresh ". For the principal component analysis, the higher the correlation between the variables, the more appropriate the principal component extraction, with the correlation matrix serving as a preliminary judgement of correlation. Table 8 shows the extracted features for the 6 pairs of adjectives. " Clean and fresh " extracted 77% of the features, which is a clear feature, indicating that " Clean and fresh " is very representative and suitable for generalisation of the overall features. Table 9 shows the spass system's judgement of the perceptual adjectives. 2 of the 6 sets of perceptual adjectives represent the overall perception and represent 66% of the main information, a value greater than 60%, indicating that the 2 sets of adjectives extracted represent the perception of the 6 sets of perceptual adjectives very well. Table 10 shows that the value of the rotated component matrix adjective

"minimalist" is 75.5%, the highest value for the first representativeness factor. The value for "Clean and fresh" is 85.5%, the second highest value for the representativeness factor. "minimalist" and "Clean and fresh" represent the overall perception that consumers prefer simple and fresh packaging styles. In Table 5, The highest values for "minimalist" and "Clean and fresh" correspond to the packaging of "Uniformity" and "and its positive" brands of tea drinks.

The most popular tea drink packaging of the "Uniformity" and "and its positive" brands are shown in Figure 1. "Uniformity" uses the elements of the king and the tea leaves, the image of the king is flattened and geometric, the king's clothes are embellished with geometric patterns and the tea leaves, the pattern is very integral and simple. The colours used are green, blue, golden yellow, white and black with no colour tendencies, usually used as neutrals, and no more than three colours are used in the pattern, making it simple and clear. Two levels of textual information are used, the information is prominent and the visual integrity of the whole image is evident, so that the consumer can perceive it efficiently and quickly.

The new product Ru Cha of "and its positive" brand. The main visual design of the box is half text and half illustration, breaking away from the traditional structure of centred text and leaving white areas for text messages, while the elements are illustrated in a Chinese style with rabbits and Luo Shen flower elements. The colour of the illustration is in line with the characteristics of black tea, using a large area of red. The combination of white and red on the background stands out from the wide range of tea drink packaging and evokes an emotional experience.

The packaging of tea beverages conveys the Chinese flavour and characteristics of tea, which is perceived to be refreshing. The designers used the Chinese style to depict the tea leaves, the raw materials of the product and other elements, with high bright colours to make the consumer feel fresh and to make it easier to gain the market's goodwill. Consumers prefer minimalist tea packaging. The designer uses three colours or less, a maximum of three headings for the text, simplified graphics, a high level of outline and a neat and clean image, making it easier to design packaging with a minimalist feel.

## Conclusion

When choosing tea beverage packaging, consumers mainly choose the product through visual perception. By analyzing the perceptual needs of consumers for tea beverage packaging design through the semantic differential method, the research and analysis of six well-known brands of tea beverage packaging reveal that consumers have the most vital perceptual needs for "minimalist" and "Clean and fresh" tea beverage packaging. The study analyses how to design tea beverage packaging that meets consumers' needs through the external visual effects of the corresponding tea beverage packaging styles. Tea beverages are designed with "minimalist" and "Clean and fresh" packaging to increase the product's competitiveness and gain a foothold in the market.

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