


Article

Consumer Preference for Yogurt Packaging Design Using Conjoint Analysis

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Abstract: With the growing consumption market of yogurt products, the continuous innovation of packaging design has become the major means of enterprise marketing for fast-moving consumer goods. Because different combinations of packaging design elements affect the consumers in different ways, the contradiction between the product packaging design and consumer demand has impacted the further development of these products' marketing. To explore the relationship between the constituent elements of yogurt packaging design and consumer preferences, four kinds of factors to the purchased products' attributes were selected from the packaging design, including the graphics, packaging colors, packaging shapes and label texts. The consumers' preferences for different attributes of yogurt packaging design were quantitatively evaluated by the Conjoint Analysis Method (CAM). Consumers showed the strongest preference for yogurt packaging shapes (39.017%), and were the most satisfied with the concrete graphics of cool colors (31.330%); the level combination of attributes most preferred by consumers is that of concrete graphics, cool colors, gable-top boxes and simple labels. The packaging design satisfying consumer preferences gave rise to positive purchase attitudes. Such research results facilitated the understanding of the consumption market and provided the theoretical support necessary for the development of yogurt packaging design to match the consumers' preferences.

Keywords: package design; consumer preferences; conjoint analysis; yogurt packaging; consumer demand



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1. Introduction

Chinese society has already entered the middle-income stage [1]. Under the dual influence of consumption upgrades and food culture, the food consumption structure has been significantly transformed [2]. According to the data of the National Bureau of Statistics, the per capita consumption of dairy products in 2020 was 2.6 kg higher than that in 2019, with a growth rate of 2.8%, and showed a steady increase [3]. In the field of liquid milk, the general situation of the dairy industry tends to stabilize after the reshuffle. With raised standards of residents' selections, premium milk has become a new favorite in the dairy market. The category of yogurt products, especially, has gradually increased, and the consumer demand has gradually strengthened [4]. As a healthcare food, yogurt is one of the few industries with growing income against the depression from the epidemic, and it becomes increasingly attractive among consumers all over the world. It is estimated that by 2024, the global market value of yogurt will reach \$51 billion [5]. In fact, yogurt has already been the most common food in the European diet, and nearly 50% of the global yogurt market is occupied by Europe [6]. However, since China owns more abundant resources and inclusive regional cultures of foods, its consumption of yogurt products should anticipate a much broader prospect. The penetration rate of liquid milk in first-tier cities of China has just exceeded 90% [7]. According to the 2020 report of Bright Dairy

Corporation, the sales volume of yogurt has reached 662,400 tons, almost twice that of fresh milk. With the growth of Generation Z, the young Chinese are expected to quickly catch up with the global consumption of yogurt. In the long run, this product is bound to become a new growth engine under the approaching trend of new consumption [8].

Apparently, the design linguistics and aesthetics of yogurt packaging are being constantly updated with consumers' pursuit of a better life [9]. For the change of consumption concept from quantitative to qualitative, consumers' demands for packaging design have been incessantly rising [10]. There is still a significant gap between the current packaging of yogurt products and consumer satisfaction. DuPont's law indicates that 63% of consumers decided to buy goods because of their packaging [11]. In 2018, Tetra Pak's white paper "Eternal Success Begins with Packaging" demonstrated that 80% of consumers recognized the key role of food packaging design in their purchase decision-making [12]. Different yogurt packaging also provides consumers with different design schemes as the differentiation strategy. These schemes are composed of graphic designs, color tonalities, textual descriptions, packaging materials, and else. Different combinations of attributes result in the consumers' diverse preferences for their purchase choices. Therefore, strengthening the cognitive guidance of packaging design to meet consumer needs is a practicable and efficient strategy for stimulating consumption, improving sales and establishing brand image.

2. Literature Review

According to the existing research, packaging design played an important role in positively affecting consumers' attitudes [13–16]. Rebollar et al. (2019) [17] believed that specific images in packaging design would influence the consumers' sensory experiences and purchase intentions. Sousa et al. (2020) [18] asserted that the color and shape elements in the packaging label design significantly impacted the consumers' sensory expectations, and the packaging designs fitting the products could receive consumers' higher preferences and purchase intentions. Coulthard et al. (2017) [19] found that consumers exhibited a universal preference for upward labels of round shape in food packaging design, as a result of applying an eye tracker to collect consumer reactions to different label shapes and angles. The research by Huang Jing et al. (2018) [20] demonstrated that color also played a vital role in the product packaging design, and explained the action mechanism of colors on consumers. Wu (2018) [21] adopted the theory of neuro-cognitive science to analyze the scientificity of styles, emotional contents and folk connotations of illustration art in packaging design, facilitating the consumers' understanding of the products more comprehensively. From the perspective of consumer psychology and the aspects of usefulness, usability, friendliness and beauty, Zhu (2017) [22] elaborated the effects of packaging design under the user experience concept for enabling the product value-addition.

However, the above studies focused more on analyzing the index attributes of consumers' cognition and experience from partial contents of the packaging design. These researchers mainly adopted the stated preference method to study the consumers' behavioral intentions, in order to predict and evaluate the consumers' preferences of single characteristics [23]. According to the consumer behavior theory, their cognition of products will be influenced by various factors during the process of searching for and purchasing products [24]. When cognition is impacted by media information, the consumers will be especially prone to purchase behaviors. If the actual behaviors of consumers to buy products cannot be consistent with the stated preferences, then the analyses of market demand and positioning based on the survey and research assumptions will deviate as a consequence. Therefore, understanding the relations between consumers' stated preferences and actual purchase behaviors for yogurt products, and finding which combination of elements significantly affected the consumers, would be conducive for enterprises and designers to make accurate upfront designs for yogurt packaging, and of critical reference significance to the packaging design of yogurt products.

To meet the above demands, scholars Luce and Tukey (1964) proposed a statistical method of breaking down the product attributes for quantitative analysis of consumer

preferences, that is, the Conjoint Analysis Method (CAM) [25]. Compared with other research methods, the CAM is more suitable for measuring the different combinations of product attributes and generates more realistic and reliable results because of its similarity to the actual product attributes. After the market simulation, the demand data of products can be acquired to provide effective decision support for subsequent product strategy formulation, target market, product R&D and product packaging design [26]. Therefore, CAM is often applied to estimate the impact on product utility of various information combinations on consumers' purchase intentions and preferences [27]. Nuri & Ali (2017) [28], Li Yi (2018) [29], Ren Yingli (2021) [30] and other scholars calculated the utility values of combining key elements like visual shapes, functional attributes and interactive experiences for the app interface design of smart wearable devices, analyzed the user preferences and proposed the corresponding design strategies: Preference research on brands, prices, certifications and other attributes of alternative grains [31], smoked cheeses [32], customized foods [33], fresh agricultural products [34], fashion designs [35], service optimizations [36] and other products are widely applied as well. In addition, the adoption of CAM also involves research on hotels [37], medical treatments [38] and the funeral industry [39].

To sum up, researchers have conducted preference analysis and extensive research on various products affecting the consumers' choices. As for the packaging design, it was found that the current studies were relatively focused on tobacco, alcohol and medicine, but lacked investigation on liquid milk, yogurt and other products closely related to the residents' diets. The existing literature mainly concentrated on technical development, marketing and materials of dairy products, and the few on packaging design also faced the problems of regionality, timeliness, preciseness and others. Moreover, the majority of scholars adopted the speculative research method to advise about the implementation path of packaging design, whereas empirical research with CAM to measure the packaging element combinations have been found to be uncommon after reviewing works of this literature, hence this paper took yogurt packaging design as the research objective.

Therefore, this study aimed to focus on the combination of Chinese consumers' attention and preferences from their social and individual characteristics for various elements in the packaging designs of yogurt products, in order to understand their market opportunities and challenges at present. Compared to previous research, the innovations of this paper are as follows: Firstly, this paper will emphasize yogurt as the specific product with the most innovative vitality in dairy foods. Under the market background of large volumes, multiple categories, accurate positioning, fierce homogeneous competitions and rapid product renewals, this paper will discuss the diverse elements of yogurt packaging design. Secondly, this study will apply CAM to evaluate the consumers' selection behaviors and will analyze which combination of packaging shapes, elements and materials the consumers with diversified needs would prefer. This will be conducive to raising people's awareness of these products. Although a lot of studies on the consumer attitudes to yogurt products have been conducted in different regions of the world, the number of works on the development of yogurt packaging design in China remains limited. This study will also be devoted to exploring the impact of yogurt packaging design on product marketing and consumer cognition, according to the theory of consumer purchase decision-making. This will be helpful for design companies to understand the consumers' preferences for different attributes of product packaging and fill the gaps in relevant market research, analysis and packaging design method, resulting in promoting both the development and innovation of yogurt packaging design.

3. Research Design

3.1. Research Methods

This study adopts CAM, which has been widely used in market research [26]. It is a multivariate method of statistical analysis based on the decomposition model [40], applicable for studying the influences of product factors on consumers' purchase preferences [41]. The basic assumptions of CAM include: Firstly, the product is defined to be composed of a

series of basic attributes and levels [40]; Secondly, the virtual product profiles with high similarity to the real products are simulated according to the different product attributes and levels. This step imitates the consumer's decision in real life, while the investigation and acquisition of data are both relatively simple and effective. The consumer's preference for yogurt product packaging will be investigated by quantitative research, and then the product packaging profiles will be accordingly scored or sorted [26,42,43]; finally, mathematical statistics analysis will be applied to quantitatively evaluate the utility values and relative significances of specific attribute levels in simulated products, so that we can make an estimation of consumers' preferences based on the model [44,45].

3.2. Attribute Selection

Evaluating the consumer preference for yogurt packaging design is essential for distinguishing the design factors that significantly affect the consumers' purchase decisions and differentiating the corresponding levels of attributes. Through literature reviews and market research, it is found that during the process of consumer purchasing, the elements which attracted high attention to product packaging mainly included the visual sensory attributes like graphics [46], colors [47,48] and shapes [49]; the technical index attributes [16,50] like materials, capacities and preservation; and the price attribute [51]. To study the operability of the analysis, this paper integrated the opinions of yogurt marketing experts, before evaluating, analyzing and re-ranking the significances of the above attribute information about packaging design, and finally selected four attributes including graphic, packaging color, packaging shape and label text, as shown in Table 1.

Graphic attributes can quickly and accurately convey information to consumers from different types of packaging design [52]. In some cases, graphics represent the real images of products and intuitively exhibit the content of packaging to the consumers. They prefer to see the visual contents rather than the untouchable ones like the taste, feeling, smell and sound [53]. The increase of pictures on the package facilitates consumers to improve their attention levels when searching for products [54]. From the graphic attribute, three categories are selected: abstract graphics, concrete graphics (photographs) and textual graphics. These attribute levels reflect the design elements that often appear in the packaging of local yogurt products.

Secondly, the packaging color scheme also affects the consumers' cognition, preferences and purchase intentions [55]. Reasonable choice of color plays an important role in influencing the consumers' attitudes. Choosing the appropriate color scheme for different types of products increases the possibility of consumers' purchase. Psychologists divide the colors into warm and cool ones [56]. The temperature characteristics of color vary from person to person, and different people have different feelings about even one color. Therefore, the attribute level of packaging color takes into account the cool ones (like blue, green, etc.) and the warm ones (like red, yellow, etc.).

Thirdly, packaging shape is another effective means for consumers to identify the uniqueness of the product. Evidently, the shape features of product packaging could convey people's expectations for product tastes [57]. The degree to which consumers are influenced by the packaging shape is the most important [58]. According to a market survey, the present packaging shapes of yogurt products generally include the bag, bowl, bottle and gable-top [59].

Finally, label text is also one of the most common attributes in yogurt packaging design. As a supplementary form of packaging, label text can explain the product contents literally. The complexity of label contents is very crucial for consumers to identify the existing products. It can derive different responses to product cognition, and simpler label texts may enhance the understanding of products more effectively [60]. Two levels are considered for the label content design, namely the complex text and the simple text.

Table 1. Description of significant attribute levels in yogurt packaging.

Attribute Level			No.
Graphic	Mainly abstract		1
	Mainly concrete		2
	Mainly text		3
Packaging Color	Cool		1
	Warm		2
Packaging Shape	Square-bag		1
	Bowl		2
	Bottle		3
	Gable-top		4
Label Text	Complex		1
	Simple		2

3.3. Questionnaire Design and Data Collection

3.3.1. Questionnaire Designs

Through the above analyses, this study established four packaging attribute factors that significantly affect the consumers' purchases of yogurt products, and divided them into specific attribute levels. See Table 1 for details. In theory, 48 possible profiles of product packaging design ($3 \times 2 \times 4 \times 2$) can be generated by different level combinations of these four attributes. Research showed that decision fatigue would occur when consumers had

to choose from a large number of product profiles. The theoretical quantity had grown far beyond the rational judgment range of consumers. To minimize the participants' burden, reasonably reduce the implementation difficulty and improve the response accuracy of the survey, this paper adopted the orthogonal arrangement method to lower the number of combination profiles. According to the formula of Curry [61] for calculating the minimum number of combination profiles, $NC = NL - NA + 1 = (3 + 2 + 4 + 2) - 4 + 1 = 8$, where NL represents the total number of attribute levels and Na is the total number of attributes. To ensure reliability, statistical analysis software was adopted for the orthogonal test design. By cross-combining the product attributes and different attribute levels of each factor, the orthogonal test could reduce the number of combination profiles before obtaining a balanced and orthogonal combination of attributes. Curry's advice was also adopted to simplify the design of product packaging to 1.5–2 times the minimum number of combination profiles, by applying the orthogonal design module of SPSS 25 software to finally screen out the pointless combinations and obtain 16 representative stimuli. Each one represented a scheme of product packaging design for simulation [55]. Moreover, this study conducted a questionnaire survey according to the simulated product combination. To reflect the accuracy of consumers' evaluation of product profiles, this study adopted the 9-point Likert scale to assess the simulated products. The higher the score, the higher the possibility to purchase the product, and vice versa. The questionnaire was distributed in the form of an online survey. After ruling out the invalid replies with incomplete data, 311 valid ones were retained. The research participants were recruited by snowball sampling through the researcher's social network to customers who often patronize supermarkets for yogurt products. The research time was from August to September 2021. The sampling method was aggregated by similar groups, which facilitated improving the investigation efficiency [62]. The corresponding attributes and level characteristics are shown in Table 2.

Table 2. Combination profiles of simulated yogurt packaging design based on orthogonal design.

No.	Factor 1	Factor 2	Factor 3	Factor 4
1	Textual graphic	Cool color	Bottle	Simple
2	Concrete graphic	Cool color	Bowl	Complex
3	Textual graphic	Warm color	Bowl	Simple
4	Abstract graphic	Cool color	Bottle	Simple
5	Abstract graphic	Warm color	Bowl	Simple
6	Abstract graphic	Warm color	Bottle	Complex
7	Abstract graphic	Warm color	Square-bag	Simple
8	Concrete graphic	Warm color	Bottle	Complex
9	Concrete graphic	Warm color	Square-bag	Simple
10	Abstract graphic	Cool color	Bowl	Complex
11	Abstract graphic	Warm color	Gable-top	Complex
12	Textual graphic	Cool color	Bowl	Simple
13	Abstract graphic	Cool color	Gable-top	Simple
14	Abstract graphic	Warm color	Gable-top	Complex
15	Concrete graphic	Cool color	Gable-top	Simple
16	Textual graphic	Cool color	Square-bag	Complex

3.3.2. Data Collection

Table 3 shows the demographic data of this paper. The questionnaire survey results also revealed the demographic characteristics that female respondents (55.31%) were more numerous than male ones (44.69%), and the majority of them were early middle-aged at 21–35 years old (75.24%). These sample characteristics were consistent with the real-life fact that family shopping was dominated by females. The respondents also presented the characteristics of higher family income (58.19% with a monthly income of over RMB 5001) and generally higher education (56.26% with an undergraduate degree or above).

Table 3. Descriptive statistics of the respondents (n = 311).

Type	Category	N	%
Gender	Male	139	44.69%
	Female	172	55.31%
Age	Below 20 year-old	30	9.65%
	21–25 year-old	92	29.58%
	26–30 year-old	61	19.61%
	31–35 year-old	81	26.05%
	36–40 year-old	22	7.07%
	41–50 year-old	17	5.47%
	Beyond 51 year-old	8	2.57%
Education	Secondary school	15	4.82%
	High school or Secondary specialized school	121	38.91%
	College	80	25.72%
	Undergraduate	80	25.72%
	Postgraduate	15	4.82%
Monthly income	Below ¥2000 (\$315)	66	21.22%
	¥2001–5000 (\$316–790)	64	20.58%
	¥5001–8000 (\$791–1264)	55	17.68%
	¥8001–15,000 (\$1265–2370)	86	27.65%
	Beyond ¥15,000 (\$2371)	40	12.86%

4. Results

After ruling out the invalid ones with incomplete data, 311 valid results were finally accepted. Moreover, the software was run to analyze the reliability of the questionnaire. The results showed that the Cronbach's α value of the questionnaire was 0.943, reaching beyond 0.8 and indicating a good consistency and high reliability. The utility value and average importance of yogurt packaging attributes were calculated by the conjoint analysis module, and the consumer preferences for attributes like graphics, packaging color, packaging shape and label text were analyzed respectively. The results are shown in Table 4. From the relative importance of packaging design attributes, the most effective incentive for consumers to buy yogurt is identified as its packaging shape, with a relative importance of 39.017%, followed by the graphic attribute with a relative importance of 31.330%. The complexity of label text and the tonality of packaging color were found to exert little impact on consumer purchase.

Different attribute levels in the same attribute also lead to significant differences in consumers' utility value evaluation. The utility scores of attribute levels reflect the consumers' preferences for the particular content. From the general results, consumers showed a higher preference for the specific combination of yogurt packaging attributes including concrete graphics, cool colors, gable-tops and simple labels. For the graphics, the utility value of concrete ones was 0.041, significantly higher than those of the other two types. Furthermore, the utility value of graphic design based on textual description was higher than that of abstract graphics. In terms of packaging color, the utility value of cool color was 0.025. For the packaging shape, the utility value of the gable-top was 0.057. For the label text, the utility value of simple text was 0.027.

Table 5 represents the ranking of 16 stimuli. Among the 16 different stimulus combinations, the attribute level one of concrete graphics, cool colors, gable-tops and simple labels with integrated effects can indicate the highest consumer preference, that is, the No. 15 combination. On the other hand, this paper also finds the most unpopular preference to be the No. 6 combination of concrete graphics, warm colors, bottle shapes and complex texts.

Table 4. Utility value and relative importance of different attributes.

Utility Scores of Attribute Levels and Relative Importance of Attributes in Yogurt Packaging Design			
Attribute	Attribute Level	Utility Value	Relative Importance (%)
Graphic	Abstract graphic	−0.026	31.330
	Concrete graphic	0.041	
	Textual graphic	−0.015	
Packaging color	Cool color	0.025	14.157
	Warm color	−0.025	
Packaging shape	Square-bag	0.026	39.017
	Bowl	−0.037	
	Bottle	−0.047	
	Gable-top	0.057	
Label text	complex	−0.027	15.495
	Simple	0.027	
(constant)		6.147	0.02
Person R	Significance	0.000	0.766
Kendall's tau	Significance	0.008	0.444

Table 5. Stimulus ranking.

No.	Graphic	Packaging Color	Packaging Shape	Label Text	Total	Ranking
1	Textual graphic	Cool color	Bottle	Simple	−0.01	8
2	Concrete graphic	Cool color	Bowl	Complex	0.002	5
3	Textual graphic	Warm color	Bowl	Simple	−0.05	12
4	Abstract graphic	Cool color	Bottle	Simple	−0.021	9
5	Abstract graphic	Warm color	Bowl	Simple	−0.061	14
6	Abstract graphic	Warm color	Bottle	Complex	−0.125	16
7	Abstract graphic	Warm color	Square-bag	Simple	0.002	6
8	Concrete graphic	Warm color	Bottle	Complex	−0.058	13
9	Concrete graphic	Warm color	Square-bag	Simple	0.069	3
10	Abstract graphic	Cool color	Bowl	Complex	−0.065	15
11	Abstract graphic	Warm color	Gable-top	Complex	−0.021	10
12	Textual graphic	Cool color	Bowl	Simple	0	7
13	Abstract graphic	Cool color	Gable-top	Simple	0.083	2
14	Abstract graphic	Warm color	Gable-top	Complex	−0.021	11
15	Concrete graphic	Cool color	Gable-top	Simple	0.15	1
16	Textual graphic	Cool color	Square-bag	Complex	0.009	4

5. Discussion

The CAM-based evaluation of consumers' purchase preference for yogurt packaging design can be applied to the design of new products and the determination of brand strategies. The purpose of this study is to compare the consumer preferences for various attributes of yogurt packaging design, select the appropriate graphic, packaging color, packaging shape and label text as the attribute factors influencing the consumers' purchase, and set up the corresponding attribute level.

The results show that the concrete graphic significantly affected the consumers' selection preference, while the utility values of text-based and abstract graphics were not high enough. The reason was that concrete graphics restored the appearance of the object itself, in comparison with the abstract one [63]. Its intuitive image was more consistent with the original characteristics of the described object, which enabled the consumers to associate the packaging with the reality [64] and generate a more positive response of emotions. But

abstract graphics, as a rational generalization, have been relatively deficient in meeting consumers' demands for product narratives. Arnheim believed that people's visual senses showed a weaker understanding of abstract graphics than that of concrete graphics [65]. As an abstract symbol, the text also presented certain disadvantages compared with the rapidity of image information transmission.

Secondly, a cool color package is another important factor to consumer selection of yogurt packaging design. At the present terminal market of yogurts, the products are mostly placed on the low-temperature shelves to reduce the metabolic activity of bacteria, maintain product quality and strengthen the selling attractions of freshness and healthiness. In the packaging design, the cool color of mainly blue-green is adopted to also enhance the fresh-keeping sense of the product. Yoto et al. (2007) [66] tested the EEG responses to different colors of paper, indicating that red might cause anxiety. In fact, the packaging image of cool colors has reduced sensory stimulation to consumers and made them feel calm. The cool-color design indicating low temperature has also been consistent with human cognitive habits. The cool color dominated by blue-green is more applicable to exhibit the ecologic and organic attributes of the product. Therefore, consumers prefer the cool-color design in the product selection.

Thirdly, this study generated a slightly unexpected result that the gable-top shape of yogurt packaging also exerted a significant effect on the consumers' purchase decisions. Brunazzi et al. (2014) [67] believed that food packaging, as a basic element in the process of food consumption, had already become the communication medium of value and information. With the gable-top structure becoming common for packaging modern dairy products, people showed a certain identification for this clean and sterile style. Because gable-top owns the advantages of advanced aseptic technology and strong structural stability, its packaging has been generally applied at the market for pasteurized milk for preserving good quality. Despite the fact that the gable-top's high cost was indirectly passed on to consumers at the end, most of them in this survey still chose it as their favorite packaging shape, indicating that people have presented higher requirements for both the qualities and packaging image aesthetics of yogurt.

Fourthly, consumers believe that a brief introduction in the label text is more appealing. Isa and Yao (2013) [68] and Jeddi (2010) [69] both verified that labeled foods have a positive influence on consumers' purchases. In addition, previous studies have shown that the fixation frequency and time for complex texts were higher than those for simple ones; consumers would have to pay excessive costs to search for information under the purchasing scenario. This is because complex texts require a stronger ability of cognitive processing by consumers. In the past, the text information was always unclear and difficult to understand. Consumers could not resolve their doubts by relying on static information. Therefore, they became unwilling to accept more complex perceptions, which resulted in a contradictory attitude of preferring simpler and clearer texts for the label. This result was also consistent with Sørensen's (2012) [70] view that consumers using a molded-search strategy in decision-making were more likely to filter out unnecessary information and tended to focus on fewer informative elements. Simultaneously, a large-volume arrangement of texts within limited typesetting space would lead to the font sizes being difficult for content recognition.

This study has played a positive role in introducing consumer preferences for yogurt packaging to designers. However, due to the restricted conditions, there must be some limitations. First of all, due to the impact of the COVID-19 epidemic, the research collected data through online questionnaires, which led to most respondents being in young and middle-aged groups (21–35 years old), hence the age distribution was limited. Moreover, the design of quantitative measurements of influencing factors to consumer purchase behavior based on the full profile method had failed to fully consider the varying characteristics of the analysis object in the real market environment, therefore it was difficult to investigate the interaction between various factors in more detail. Finally, in this study, the preference attributes of yogurt products were limited to only the broader features of packaging design.

In future research, a more detailed introduction to color, font, price and other contents will expand the results of this study on the preferences for yogurt packaging design.

6. Conclusions

According to the survey data from 311 consumers, and taking yogurt packaging as the study case, this paper selected four attribute factors affecting consumer purchases: graphics, packaging color, packaging shape and label text. Moreover, CAM and product virtualization were adopted to quantitatively analyze the consumers' preferences for packaging designs when purchasing yogurt products, and determined the most popular combination of packaging designs. The main conclusions are as follows: (1) Consumers presented the highest preference for yogurt packaging shape, followed by graphics, label text and packaging color; (2) The analysis results of product attribute levels showed that the concrete graphic, cool color, gable-top and simple label text were more likely to be the favorites of consumers; (3) The general results exhibited that the acquired packaging design prompted the consumers to generate a positive attitude for purchasing yogurt.

With increasing recognition of the commodity packaging concept by consumers, the results of relevant research on food packaging design have also accumulated to a certain extent in recent years. However, there remains a lack of certain theoretical methods and systems for specific product packaging. Manufacturers should launch products with different attribute combinations from various consumer preferences, provide accurate designs and meet the diversified consumer needs nowadays. At present, yogurt products are highly competitive in the increasingly saturated market. The results presented in this study will provide a commercial reference practical for enterprises to seek differentiation and branding and to shape the packaging images of existing products.

Author Contributions: F.W. performed the main conceptual design of the proposed system and wrote the manuscript. F.W. and H.W. mainly dealt with data analysis and experiments (i.e., configuration and realization of the proposed system). Supervision, J.H.C. All authors have read and agreed to the published version of the manuscript.

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