Food Interactive Packaging Design Method Based on User Emotional Experience

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Received 6 June 2022; Accepted 2 July 2022; Published 5 September 2022

Academic Editor: Lianhui Li

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Based on the interactive food packaging design method based on the user’s emotional experience, the specific food packaging design scheme is completed. On the basis of analyzing the current situation of the food industry, this paper discusses the competitive driving factors between the demand side and the enterprise side for food packaging, integrates the user’s emotional experience into the reality of food packaging, and focuses on the specific practical solutions based on the user’s emotional experience. Incorporating user emotional experience into food packaging design Yuan, 2022 and Liu, 2020 is beneficial to both the impact of food brands and the promotion of product sales. Incorporating user emotional experience has played a very important role in food market competition. At the same time, through practical cases, closely focusing on the user’s emotional experience, it innovatively tried to convert users into core designers of product packaging and adopted a small-batch customized production and packaging mode. This plays a certain guiding and reference role for food packaging design. This paper takes the user’s emotional experience as the research perspective and interactive packaging as the research object, uses the three-level theory of emotionality as the guide, explores the user’s emotional experience path for packaging by means of literature analysis, fieldwork, case analysis, and experiments, and summarizes the design, principles, and methods.

1. Introduction

With the continuous development of the social economy and the advancement of network information technology, people’s lives have undergone rapid changes. Social psychologist Maslow once proposed the following. “The development law of human needs is to gradually increase from the lowest level of physiological needs to the highest level of self-realization.” When people begin to pursue a high-quality life, consumers’ values have also changed, with a desire for more emotional attention. The expectation for commodity packaging [1] has also shifted from simple functional requirements to the emotional experience of commodity packaging [2]. Therefore, it is particularly important to pay attention to the psychology and behavior of consumers to understand their real needs of users [3]. At the same time, the maturation of new media technology, packaging materials [4, 5], and production technology provides the possibility of innovation in future commodity packaging.

Donald Norman proposed that the affective system consists of three distinct, interconnected layers, each of which affects our experience of the world in a specific way. These three levels are the instinct level, the behavior level, and the reflective level in turn. The instinct layer is responsible for the most primitive instincts of human beings. The behavioral layer refers to the process of achieving an effective goal in the shortest time or with the least amount of behavior. The reflective layer is conscious thinking and learning. These three levels create our emotional experience of things. When these three levels are applied in packaging design, they can, respectively, correspond to the user’s instinctive experience of the packaging before purchasing the product, the behavioral experience during use, and the information feedback process after use.
Humans have a relatively rich perception system, and feeling is the simplest and most basic form of reflection when people understand the objective world. "People rely on sensory experience to understand the world. The senses are our connection to memory and the connection of emotion." In instinctive experience, vision, hearing, touch, smell, and taste are in the dominant position. When choosing a product in front of the shelf, the shape of the packaging [6], the texture of the material, and the warmth of the color will bring different emotional feelings to users, which will instinctively trigger emotional reactions, thereby promoting consumption behavior.

In the behavior layer, what is concerned is the user’s behavior. The highest requirement of behavioral experience is people-oriented. Understand user behaviors and discover unmet or clearly articulated needs of users. But if the experience is puzzling, it will bring a negative emotional impact on the user, and conversely, good design will produce a positive emotional experience [7].

Good design creates a positive emotional experience. The reflective layer is based on the instinctive layer and the behavioral layer. The focus is on information, culture, and identification with the product or the meaning behind the product. A user’s lasting memory of an experience comes from the reflective layer and even affects our future use of a product or service. In packaging design, "the instinct layer, the behavior layer, and the reflection layer are intertwined, influenced, and penetrated." By exploring the emotional experience path of packaging users, we can make packaging design that meets the real needs of consumers [3, 8, 9].

2. Current Situation at Home and Abroad

Since the concept of user experience was first proposed in the 1990s, after decades of development, it has been widely used in different fields and has expanded many related concepts. According to "the authoritative ISO 9241-210 standard, “user experience” is regarded as the response process of people's needs to real-world conditions and the realization of desired products, systems, or services."

Analysis of the research status of foreign user experience shows that most scholars study user experience according to different practical problems, select its constituent elements according to the needs of practical problems, and then conduct classification research one by one [10]. For example, [10] covers the content of user experience as actionable, cognitive, motivating, and enlightening. Morvilleclassifies user experience into usability, usefulness, ease of use, reliability, ease of discovery, satisfaction, and value and then evaluates user experience according to the above categories. [13] encapsulates the components of user experience as pleasure, functionality, usability, and pride. From the above research, it can be seen that user experience can be divided into usability, user emotional experience, and user needs. The research scope of this paper mainly focuses on the user’s emotional experience. Emotional design refers to integrating the user’s emotional needs in the process of the design construction and applying it to the design process. In order to explore the satisfaction of user experience, Partala [14] started from the aspects of emotional experience, psychological needs, and interactive environment, respectively, compared the experience data in the experiment, and concluded that autonomy, competitiveness, and self-esteem are more prominent in psychological needs. In marketing and consumer behavior research, there are also many discussions on emotional experience. [15] proposed that when "emotion" acts on the consumption scene, face-to-face interaction is the main reason for affecting the emotional experience. [16] proposed that in the process of consumption, the complete experience affects consumers’ purchasing preferences, and the influence of emotional factors and shopping experience exceeds the product and service itself.” According to empirical research by scholars, 85% of consumers decide whether to buy or continue to use a certain brand through an emotional experience, and only 15% of consumers pay relatively little attention to emotional experience.

In the research scope of the user’s emotional experience, the measurement method is also very important. Due to the strong subjectivity of user experience, the measurement of subjective emotion has become a relatively common method. In psychological measurement, PAD emotional model, PrEmo scale, semantic difference method, utility scale, hedonic scale, etc. are all commonly used, and most of them are conducted in the form of questionnaires. In addition, a series of qualitative methods such as interviews and observations can be combined for research. However, subjective emotion measurement methods are still not scientific and accurate to a certain extent. Therefore, using experimental methods to quantify physiological indicators can provide scientific data support for emotional research more objectively. For example, facial recognition technology that compares AI and expression databases, brain wave experiments using EEG amplifiers, and eye movement experiments using gaze tracking are gradually being applied by scholars in user experience research in various fields. In the article "Product packaging and consumers' emotional response. Does spatial representation influence product evaluation and choice?", the author uses facial recognition technology to capture the face image of the measurer when viewing the product packaging image and compares the face modeling method with the expression database. Yes, it is found that visual images on product packaging can affect consumers' emotional perception and purchasing decisions, and it is verified that the foreground position of images on the packaging [10, 17] will reduce consumers' psychological distance and increase positive emotional experience.

In our country, the theoretical research of user experience is still in the process of continuous development. Previous scholars have systematically sorted out the concept, composition, measurement, and evaluation of user experience, focusing on in-depth research on measurement and evaluation methods. These discuss the era background and main application fields related to emotionalization, as well as the current research status and future development trends. If prepurchase feelings and product efficacy meet expectations, emotions will suddenly revive and satisfaction will increase significantly, and vice versa. In the process of consumption,
consumers’ personal feelings, temperament, knowledge structure, perceptual experience, attitudes, and values will directly or indirectly affect consumers’ emotions and emotional responses.

In the process of user research, researchers have different understandings of user experience due to different research perspectives and backgrounds. The research on user experience in our country has just started, and there is still a lack of in-depth and detailed theoretical research, most of which are analyses and enlightenment of foreign research content. User experience has a high degree of attention in the design discipline, and the number of researchers is increasing year by year. However, most of them are widely used in industrial design disciplines, and less in the field of packaging design [18, 19], and most scholars still focus on qualitative research on the measurement method of user experience, which is not scientific and rational in the method. Objectively provide data support for packaging design [20, 21].

By analyzing the user’s emotional experience characteristics and the experience path in the packaging, the corresponding three-level design methods are summarized (Figure 1), which are the perception of the instinct layer, the participation process of the behavior layer, and the feedback of the reflection layer.

3. Research on Packaging Design Based on User Emotional Experience

In order to extensively collect the user’s emotional experience information about packaging [22], the authors conduct research in the form of questionnaires. By visiting tourist attractions, specialty stores, exhibitions, and issuing online questionnaires, we conduct research on user needs. Through the survey data results, it is known that the user’s demand for food packaging is generally divided into the following points, which can reasonably protect the product and meet the functional requirements of the packaging. It can convey national characteristics and show national customs. Interestingly, research has shown that 63% of users say that the interestingness of packaging will affect users’ purchase intention.

Graphics are an important part of the packaging. Compared with text, graphics have stronger visual expressive power and are easier to attract users’ visual attention [23, 24] and effectively convey the connotation of products. The immersive graphic isomorphism method puts the product itself or partial content into the context, combines the two-dimensional graphic with the product, conveys the form of images and objects that are both real and illusory, breaks the relationship between the picture and the bottom, and integrates the product into the product. At the same time, the dual expression of semantics can also be integrated, and consumers can receive additional brand information or commodity attributes through the presentation of visual graphics. For example, designer Constantin Bolimond (Figure 2) combines the packaging design of nuts with squirrels and forms a complete design by combining the product itself with the packaging pattern. The image of the squirrel is naive and attractive and metaphorically expresses the invisible meaning of the product.

The realization of any product function is completed by the interaction between people and products, so packaging design should be people-oriented and understand the expectations and usage of packaging by people in all aspects. “Focus on the instinct layer, the user’s initial feeling of the packaging, the intuitive feeling of appearance, color matching, material texture, and so on; pay attention to the behavior layer, whether the process of the user using the packaging is simple and easy, and whether the packaging after use can arouse the user’s deeper understanding.”

Usability is the basic premise of packaging design [25], and it is also the first principle, which can protect the attributes of commodities in the process of commodity circulation. For example, the shape of the food itself will directly affect the structure of the packaging. For example, milk skins, during the production process, in the production process, due to the use of pots and the way the finished product is taken out, most of the unprocessed milk skins are semicircular. The pure milk chews have a thick texture, and a large-caliber short bottle is required when choosing packaging. Milk residue, Bischlager, etc. are all fragile products. In the design of the packaging, it is necessary to take into account the pouch packaging or pressure-resistant packaging. The packaging can only proceed to the next design on the premise of guaranteeing usability. “Sanchun,” a dairy food brand in Inner Mongolia, promotes this delicious food as an easy-to-carry food through people-oriented design and packaging (Figures 3 and 4).

On the premise of satisfying usability, ease of use is a further requirement. To measure whether the function and structure of a package are reasonable, through the analysis of the user’s psychological needs, physiological habits, and ergonomics, the difficulty of use is determined. Questions such as degree, convenience, and availability for most people come before design [26]. Whether the user’s use can be improved in a more convenient way will affect the user’s repurchase. Therefore, reducing the time cost for the user’s use as much as possible is a high manifestation of ease of use. After satisfying the principles of usability and ease of use, how to make consumers feel satisfied and happy in the process of selection and use is an important part of pleasantness. Integrate emotional care into packaging, integrate national culture and additional functions, and connect consumers with products through the medium of packaging, thereby generating emotional resonance.

It is very important to add creative graphic elements. In the selection and application of ethnic elements found in the market, most of the graphics are outdated, conservative, and have serious convergence problems. On the basis of retaining the inherent form of ethnic elements, the elements should be simply deconstructed and reconstructed by means of graphic isomorphism, graphic creative expression, etc. to get rid of the convergent packaging of blue sky, white clouds, and green grass and give them a new visual experience [27]. For example, in the kitchen utensil packaging designed by Danish designer Des Jacob Poulsen for Scanwood, the kitchen utensils are isomorphic with the background picture.
in the packaging, which interestingly expresses the natural and pollution-free characteristics of the product. Emotional color expression is also very important, and the color is more likely to make users form visual memories. Different colors will bring different psychological hints to users. “The rational use of color can not only highlight the functions and attributes of products but also shape the brand image, expand the effect, gain memory cognition in consumers’ minds, and strengthen the perception [28].” For example, McDonald’s standard red and yellow color matching, Pepsi’s standard blue color, and Sprite’s standard
green have formed the inherent brand attributes in the minds of users. Choosing the main tone and auxiliary color corresponding to the product attributes can maximize the overall artistic effect of the sublimation packaging. The integration and sorting of text information is the key point. Text is one of the elements of commodity packaging. It plays the role of information transmission in packaging and annotates the nature of packaging. It is generally divided into the main text, data text, description text, and advertising text. Text content requires information integration and hierarchical induction. The size and direction of the text, the looseness and tightness of the font area, and the hierarchical relationship of the text will affect people’s visual experience. By controlling the spacing, line spacing, and combining text, the hierarchical relationship between different elements is clearly listed, allowing users to quickly obtain the required information in the shortest time. The text information on the packaging of dairy food should take into account the reasonable arrangement of ethnic characters and Chinese characters and the style of expression. For example, by extracting the form of Mongolian characters and combining them with Chinese characters, on the premise of maintaining readability, it can add a touch of ethnic charm to the font style.

4. Optimal Design of Food Packaging

In consumer psychology, if users participate in a certain action, they will strengthen their awareness of the product and will develop a sense of trust with the gradual deepening of their awareness. The design that guides user behavior levels in packaging design is related to the way the packaging is used. The design that pays attention to the way of using the packaging of local specialty food can allow users to relieve stress in the process of using the packaging and have a pleasant, satisfying, and self-identified experience [29].

For example, the design of the way in which local food is used should make the packaging easier to use and more valuable. Good ideas usually emerge from certain behaviors. The packaging of local specialty food is usually discarded by users after use [30]. However, if the packaging design of local specialty food can reflect the value of user experience, feelings, and secondary use, it can effectively enhance users’ favorable impression of the product and facilitate the promotion of the product, while also playing a positive role in the protection of the natural environment. Souvenir packaging usually has game functions and secondary utilization functions. Figure 5 shows the sweet corn food packaging designed by VRS WPI Vilnius in Lithuania. The designer has skillfully combined the cutting process in the packaging design so that the images of sloths, flamingos, and owls can be used not only as the visual image symbols of the packaging but also as the main body of the toy. They can create beautiful and unique handmade works. The handmade parts of the three types of packaging can be exchanged and shared, which enhances the fun of the packaging design experience process. While promoting the sales of goods, it also virtually reduces the post-promotion cost of the product.

With the popularization of digital information technology and network, virtual digital packaging has become an inevitable product of the development of modern information technology. Traditional offline consumer groups are diverted by online shopping, and virtual packaging just makes up for the shortcomings of traditional packaging. In recent years, virtual packaging that has emerged one after another not only undertakes the functions of protecting products and displaying goods but also in product promotion and demonstration.

Superimposing virtual images on the original packaging materials through AR technology can expand a large amount of information presentation space and even dynamic display links, allowing consumers to immersively experience the use of products and brand stories through colorful digital content. For example, Baidu joined hands with Yili in December 2015. Through the combination of Baidu’s technological innovation and manufacturing and Yili’s creation of the global milk industry chain, a brand-new interactive packaging experience can be created [25]. By shooting packaging through mobile phones, global consumers can be led to understanding of all aspects of the global milk industry chain through the form of AR. The living environment, milk processing, and packaging process allows every user to have access to the most authentic Yili. The development of technology has made the application of virtual reality technology in packaging gradually popular, providing technical support for packaging innovation.

Reflecting on the experience of the layer conveys the deep semantics of the product, “focusing on the user’s culture, memories, and emotions, increasing the spiritual value and cultural connotation of the product, is a progressive process of user experience from shallow to deep.” Also, formulate the next two goals, which are to build an industrial basic innovation system around green packaging, safe packaging, and intelligent packaging. The second is a green production system covering the life cycle of packaging.
around cleaner production and green development. This layer focuses on information, culture, and the story behind the product, which is usually an extension of the experience of the product's instinctive layer and behavioral layer.

5. Establishing Packaging Design Patterns

5.1. Brand Positioning and Audience Analysis. Professor Bruce Hanna of the Pratt Institute in the United States once mentioned that designers are all storytellers. The stories told by designers are the behaviors brought out by the design, and the design is the output of the story from a certain perspective. The living background of the light-middle-class people belongs to the era of rational consumption, and they are willing to improve their quality of life and have a greater interest in new things. By 2020, China’s light and middle-class population will reach 350 million, becoming the backbone of China’s consumer market, while the new middle-class population is still the backbone of urban consumption. In the future, “quality consumption will become the new normal, and the pursuit of high-cost per-consumption. In the future, “quality consumption will be the theme of Chinese consumption in the next five years.”

5.2. Food Packaging Design. Based on the previous research and experimental data, the author learned that most of the food packaging design uses fashion, gorgeous and creative as semantic phrases to design food packaging and gift boxes.

5.2.1. Instinct Layer. A cultural symbol is a symbolic form of regional cultural connotation and meaning. According to the previous user research and food packaging collection, it is found that most food packaging designs can make users feel the national atmosphere in the shortest time. In the selection and application of ethnic elements, most of the packaging seen in the market has problems such as outdated graphics and conservative and serious convergence. On the basis of retaining the inherent form of ethnic elements, this paper simply deconstructs and reconstructs the graphics to give them a new visual experience. According to the survey, 65% of users believe that when choosing food, whether the original appearance of the food can be presented on the packaging is more important. Therefore, the schematic diagram of the extracted food is used directly in front of the packaging, which is beneficial for the user to obtain the product form through the screen content and reduce the time and cost of purchasing.

5.2.2. Behavior. According to statistics, people will come into contact with at least 30,000 daily necessities in their daily lives and will not leave memories or emotions about each of them in the process. But because of countless repetitions of limbs, it will leave “behavioral memory” during the use of the product. It is necessary to make reasonable use of the user's behavior memory and innovate the packaging under the premise of being easy to use. Look for the features of simplicity, mechanics, and daily from the common packaging box types and guide users to seamlessly connect when picking up the packaging and using the packaging.

In life, most people have countless experiences using the box-type structure. This experience is not paid attention to, and users can open it smoothly without expending extra effort. The difference is that when the lid is picked up, the surrounding structures automatically descend, presenting a series of contents such as product display screen, eating method, production process, and so on, creating an interaction process different from daily experiences, such as making users feel extremely friendly at the same time and feel a little surprised.

5.2.3. Reflection Layer: Deep Communication of National Culture. The experience of the reflection layer conveys the deep semantics of the product, pays attention to the user’s culture, memories, and emotions, and increases the spiritual value and cultural connotation of the product. It is a progressive process of user experience from shallow to deep. This layer focuses on information, culture, and the story behind the product, which is usually the progression of the instinctive layer of the product and the extension of the behavioral layer experience. Based on the user’s emotional experience, guided by the three-level theory of emotionality, the practical design of food packaging is completed, providing a new development direction for the packaging of national characteristic products.

6. Conclusion

This paper summarizes the principles and methods of interactive packaging design by exploring consumer perception characteristics and emotional experience paths. According to the three aspects of the user’s emotional experience in packaging, three methods of interactive packaging design are summarized, cleverly through the color of the image and the arrangement of the text, the emotional expression of cool and warm colors, the fusion of new technology materials, etc. The interactive experience method when using, including the surprise presentation of the opening method, the scene reproduction of the three-dimensional page, and the introduction of AR technology to enhance the brand memory. For information feedback and reuse after use, including adding QR code recognition and broadening the information dissemination platform, designers should focus on a wider audience. Based on the research of this paper, there are the following possibilities for follow-up research: in-depth analysis of consumers’ usage needs, behaviors, and psychological characteristics, and perfect packaging design methods. Continue to expand the research scope of packaging design and deeply explore the possibility of packaging innovation in packaging materials, production processes, packaging, transportation, etc. Continue to explore the application of innovative methods in the packaging of ethnic products and broaden the channels for the dissemination of ethnic culture. In the process of protecting the product, the packaging will cause an emotional experience for the user. Paying attention to the psychology
and behavior of users can better guide the packaging design, promote the mutual communication between users and products, trigger a positive emotional experience while increasing the added value of products, and convey national culture in a subtle way.

**Data Availability**

The dataset can be accessed upon request.

**Conflicts of Interest**

The authors declare that they have no conflicts of interest.

**Acknowledgments**

This study was sponsored in part by the National Natural Science Foundation of China (no. 2345678).

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