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Beyond Sensory Boundaries: Innovative Applications of Synesthetic Design in Shaping Deep Brand Perceptions and Experiences

Lin Zhang[1]

Abstract

With the development of modern technology and concepts, the object of design expands from material form to non-material form, and the product modeling design gradually develops towards all-round perception and experience. Products are not only the carrier of function, but also the medium of emotional communication. In an era of information overload and short consumer attention spans, building deep and lasting brand perceptions has become a major challenge for marketers. The researcher explores the innovative application of synesthetic design principles, clarifies the role of synesthetic imagery interoperability and design expressions, constructs a design translation path of synesthetic imagery interoperability with the product as the medium and emotion as the dominant, and explores the process and verification method of the application of synesthetic imagery interoperability in the product styling design, so that synesthetic design can be used as a strategic tool that transcends the boundaries of the traditional sensory marketing, and thus cultivates deep brand experience and cognition. We use the generic design as a strategic tool to transcend the boundaries of traditional sensory marketing, thus cultivating profound brand experience and cognition. By integrating multi-sensory experiences and utilizing the inherent cross-modal correspondences between different sensory modalities, synesthetic design facilitates comprehensive and immersive brand interactions. Through a combination of theoretical exploration and empirical analysis, the researchers demonstrate how synesthetic design can significantly enhance brand memorability, differentiation and emotional resonance. It further explores how the experience of empathy influences consumer behavior and brand loyalty through underlying psychological mechanisms. The results emphasize the potential of synesthetic design in building deeper and more intuitive connections between consumers and brands. The application of synesthetic imagery interoperability to product styling design can elevate users' sensory experience to emotional experience through the use of synesthesia, which provides a new path for product styling design application research.

Keywords: *Synesthetic Design, Brand Perception, Sensory Marketing, Consumer Behavior, Cross-Modal Correspondence, Brand Loyalty*

INTRODUCTION

Research Background

After entering the era of experience economy, consumers' demand for designed products is no longer limited to general aspects such as function, material, and appearance, but focuses more on designers integrating more comprehensive thinking into the process of product design, so as to provide users with a richer and fuller experience full of new ideas. In the process of product design, with the cross-fertilization of psychology, semiotics and other related disciplines, it further evolves and expands to the level of user experience design, which requires designers to focus on the user's sensory experience. With the popularization of digital media and the increasing number of ways for consumers to access information, people's attention is becoming more and more dispersed, which not only aggravates the pressure of competition between brands, but also makes traditional sensory marketing strategies gradually lose their effectiveness. In order to break through in this complex environment, a new approach is needed that can profoundly influence consumer perception and behavior. Synesthetic design, as an innovative design concept, provides a path beyond traditional visual and auditory marketing tools. Especially under the increasing emphasis on users' emotional needs, the application of synesthetic design, which focuses on the transformation of the five senses, can give products a richer and more practical emotional experience. Therefore, designers need to understand the actual needs of users, and reasonably encode their perceptions, and guide users to decode them smoothly in the process of using the product through semantic programs. Research has shown that synesthetic design can significantly enhance consumers' emotional resonance and loyalty to a brand. By creating a comprehensive and immersive brand experience, synesthetic design helps build a more intuitive and personalized connection between consumers

[1] Krirk University, Bangkok, Thailand Email: 18366910551@163.com

and brands. This approach not only increases brand differentiation, but also provides a lasting competitive advantage for the brand.

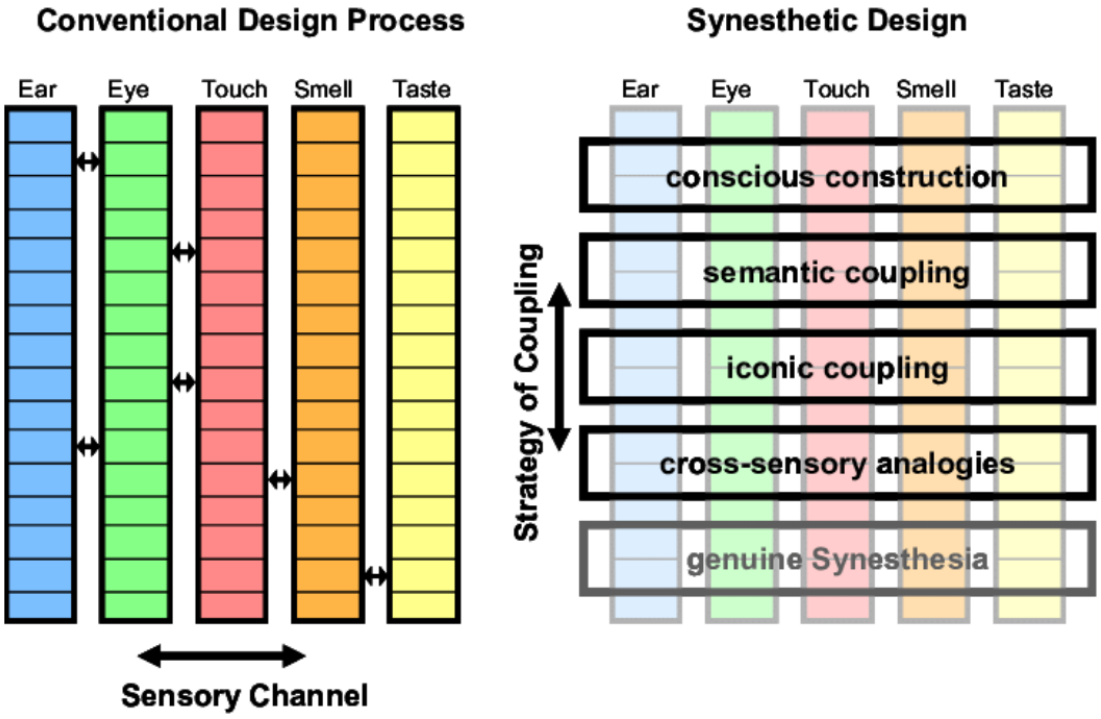

Figure 1 Principle of the synesthetic approach on product design

Product Design and Brand Recognition

Synesthetic design is a design strategy that crosses the boundaries of a single sense and enhances user interaction and brand memory by creating a cross-modal sensory experience. The application of artistic synesthetic design visual communication in packaging design not only attracts consumer attention, but also shapes the brand image and establishes a unique brand personality (Spence, 2020). Through consistent design language and sensory experience, consumers can easily recognize and remember the brand, and such brand recognition helps to enhance the status of the brand in the minds of consumers. Relying on the theories of psychology and cognitive science, synesthetic design stimulates consumers' multi-sensory experience by simulating or reinforcing the natural connection between the senses, thus forming a richer and longer-lasting brand impact in the mind. If the core brand values and brand story can be properly reflected, it can establish a deeper emotional connection with consumers and thus enhance loyalty (Pina & Dias, 2021). When consumers and brands have cultural and emotional resonance through packaging design, they are more likely to continue to choose the brand and become loyal consumers, even when faced with other competition and new options in the market.

Introducing artistic synesthetic design in packaging design can greatly enhance a product's competitive advantage in the marketplace. Since consumers are often first attracted to visual elements when shopping, packaging with artistic communication qualities can better attract their attention. When the generic elements are combined with consumers' emotional experience and memory, a unique purchase attraction will be constructed, which can make the product stand out from the shelves of various commodities, achieve the effect of integrating and optimizing the brand's sensory touchpoints, transcend the limitations of the traditional sensory marketing, and realize the brand's deep positioning in the hearts of consumers (Imschloss & Kuehnl, 2019). Packaging design that effectively utilizes artistic synesthetic design can stimulate consumers' senses and provide them with a unique buying experience. This experience often leaves a deep impression in the minds of

consumers. This not only helps to create a word-of-mouth effect, but also enhances product recognition and consumers' emotional connection to the brand(Bhatia et al., 2021;Wörfel, Frentz, & Tautu, 2022). In the long run, this will promote the brand image and enhance consumer loyalty, thus improving the market performance and sales of the product. The application of artistic synesthetic design in packaging design also promotes the re-recognition of product value. High-quality and innovative packaging design can map out the quality and brand value of a product, and can even give added value to the product (Zha, Foroudi, Melewar, & Jin, 2024). In addition, with the rise of social media, unique and attractive package designs are easier to share online and spread by word-of-mouth, thus expanding the influence of the product and marketing efficiency.

Theoretical Basis and Literature Review

Theoretical Foundation of Synesthetic Design

Cross-Modal Correspondence Theory

Spence's (2011) cross-modal correspondence theory explores in detail how different senses interact with each other through shared attributes or perceptual patterns. Providing a comprehensive review of the field of cross-modal correspondence, it explores the interconnections between different sensory attributes such as color, sound, and shape and their roles in perception and cognitive processing. The theory states that people tend to establish intrinsic connections between specific sensory attributes, such as associating high-frequency sounds with bright colors and sharp shapes. Qian Zhongshu (1962) proposed in The General Sense that human psychological sensations are "based on associations that give rise to a general sense". Human beings have accumulated a lot of practical experience through social practice and continuously established fixed sensory feedback standards, under the condition of continuous strengthening and stimulation of the senses, the brain has a basic response to the outside world and forms memories and cognitive laws of things, guiding human beings in imagining and associating the processing of the same kind of things, interpreting the analogization of the real things and the environment and forming the sensory cognitive standards, and finally forming the cognition of the human beings for the outside world and its intrinsic laws. The final result is one's cognition of the internal laws of external things. Kenya Hara (2006) puts forward "the construction of information" in "Design in Design", the physiological structure of human beings lays the foundation for the construction of mental activities, and the mental activities form memories and impressions of things under the constant stimulation of external information, and synesthetic design is the result that the cognitive subject combines and connects the impressions of many things and generates them through interconnections. The result is that the cognitive subject combines and connects the impressions of many things and generates the result.

Multi-sensory Integration Theory

The multi-sensory integration theory proposed by Meyer and Noppeney (2011) describes how the human brain processes and integrates information from different senses to form a unified and coherent perceptual experience. This process is particularly important for understanding the complex messages conveyed by brands, as it can increase the memorability and impact of the message. American cognitive psychologist Donald Norman (2015) explores three different levels of design in Emotional Design:the instinctive, behavioral and reflective levels. The idea of these three levels tells us how consumers emotionally relate to products". The instinctive layer is the basic sensory stimulation brought by the initial effect of the product shape to the user, which mainly affects the visual in the five senses; the behavioral layer attaches importance to the realization of the function aimed at focusing on the use of the product and the practicality of the product, which is inclined to the interaction of more than two senses; the reflective layer is similar to the highest level of Maslow's needs: the need for self-actualization, and the concept of the reflective layer simply means that it lets the human being and the product produce emotional resonance, using an empathetic approach to design the product(Campo, Rosato, & Battisti, 2022; Lee & Lim, 2022). Russell's Circumplex Emotion Theory discusses how to stimulate specific emotional states through visual, auditory and other sensory experiences. , which examines how emotional stimuli affect approach and avoidance responses through evaluative coding, provides a theoretical basis for understanding emotional resonance.

Application of Synesthetic Design in Brand Cognition

Visual and Gustatory Empathy

The application of visual and gustatory synesthetic design in visual communication design is mainly applied in visual design about food, which stimulates people's sense of taste by evoking their memories and experiences of a certain food through colors and graphics. For example, the most famous one is Naoto Fukasawa's Unconscious Concept Design, as shown in Fig. 2, which directly prints the outer skin styles of different fruits on the box, driving the taste memory with visual stimulation, and even driving the sense of touch, so that people can recall the touching feeling of touching this kind of fruits when they see it, and bringing in the scent of the nature, mobilizing the consumer's memory, and injecting the natural fruit aroma into the product in the form of flux, making people One look will feel that this is a pure natural fruit juice.

Figure 2 Naoto Fukasawa's Unconscious Concept Design

Visual and Auditory Generalization

In the human sensory world, vision and hearing are the most sensitive, and it is the fusion of these two senses that forms the "audio-visual empathy" in "art empathy"(Maki & Yanagisawa, 2019). There is a subtle and interdependent connection between painting and music. It is this bond that makes painting and music have an inseparable artistic relevance, and many painters and musicians have utilized such a relationship between painting and music to create many excellent works of art, such as Figure 3, Monet's Sunrise - Impressions and Debussy's Symphonic Sound Paintings "The Sea" is a clear example of this. From ancient times to the present, there has always been an inextricable link between vision and hearing, painting and music. The intertwining of the audience's visual and auditory senses of consciousness extends the single sensation to the visual, auditory, and even psychological enjoyment of the general senses. For example, the Siri of Apple system is a detailed design that makes users feel the sound through the visual element of wave stripes, which can stimulate the auditory perception from the vision. Audio-visual transformation is very common in literature, but the five senses are never separate, and the transformation of audio-visual should not only be a mutual transformation between the two senses of vision and hearing(Kock & Ringberg, 2019;Yoganathan, Osburg, & Akhtar, 2019).

Figure 3 Monet's Sunrise

Visual and Tactile Sense of Communication

Feeling the outer soft or rough nature of objects through contacting objects with different textures awakens diverse feelings and experiences in human subconsciousness. In visual communication design, it is most commonly associated with the sense of touch through visual texture, and at the same time, the visual-tactile association can also be reflected through the texture of materials. As shown in Figure 4, designer SHUHEI HASADO's Haptic Geta clogs are made with a variety of natural materials such as moss, wood, and gravel placed on the surface. These visual images and tactile textures give the sensory nerves on the consumer's feet the feeling of walking "barefoot" in nature. Visual and tactile communication can be combined with the interplay between color and temperature, such as the definition of warm and cool tones. The brightness of colors affects the perception of weight, with lighter colors giving a lighter feeling and darker colors giving a heavier feeling. For example, a holographic projection restaurant makes the taste experience richer and more immersive by complementing the visual and auditory senses. According to different ingredient flavors and dish themes, different immersive visual effects are varied to strengthen the overall dining experience (Motoki et al., 2019;Shukla, Singh, & Wang, 2022) .

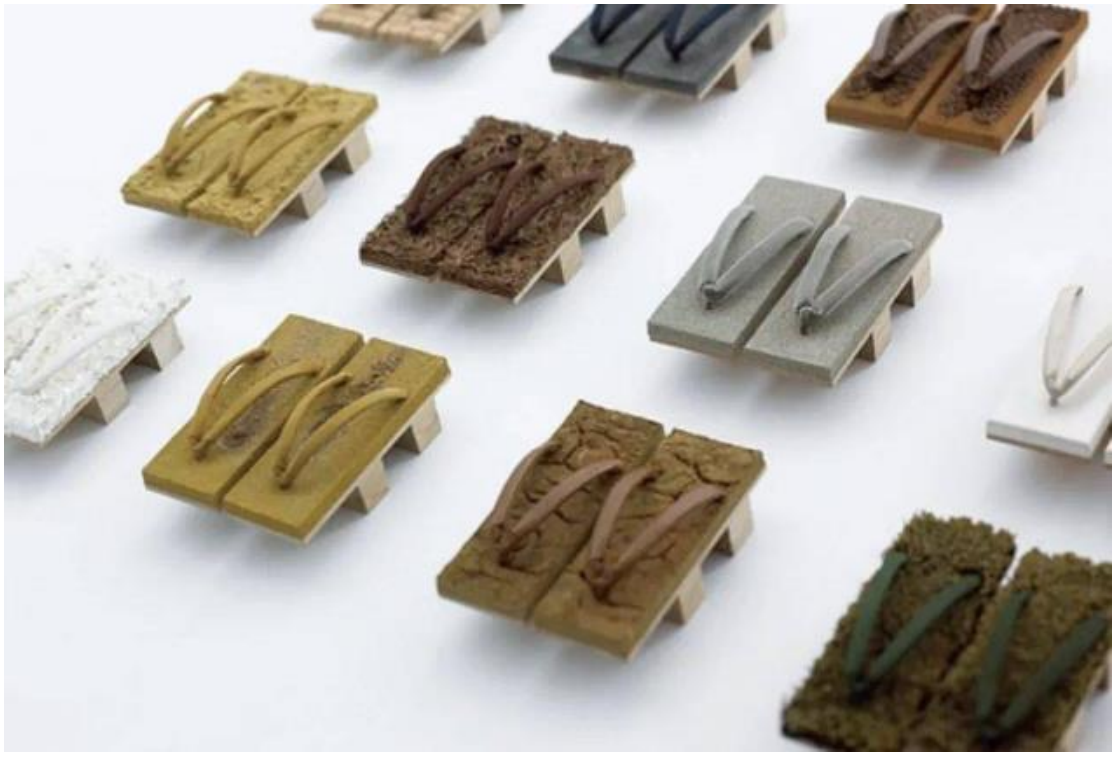

Figure 4 SHUHEI HASADO's Haptic Geta clogs

Visual and Olfactory Commonsense

The sense of smell always completes the process of expression silently, so that the audience can feel the information conveyed by the work inadvertently (Petit, Velasco, & Spence, 2019;Kaushik & Gokhale, 2021) . For example, adding a light product flavor to the packaging of perfume is easier for customers to accept and stimulate the desire to buy than the pungent feeling of directly sniffing the perfume. Another example is the use of friction-scented ink in magazines, which provides both visual and olfactory enjoyment when flipping through the contents of a food item. The smell through the sense of smell can leave a deep impression, and cause memories, the audience will unknowingly produce a stereotyped thinking.

RESEARCH METHODOLOGY

Research Design

This study adopts a quantitative research method based on a questionnaire survey to explore in depth the application of synesthetic design in shaping brand perception and experience and its effects. Students with a background in fine arts or design were selected for the study, taking into account the fact that this group has relatively high sensitivity and understanding of sensory elements and is more likely to give accurate feedback on the nuances of synesthetic design. This study designed a questionnaire based on six core research variables and hypotheses, which include: types of sensory stimuli (visual, auditory, and tactile), degree of sensory integration, strength of emotional resonance, brand memorability, perception of brand differentiation, and propensity for brand loyalty. By designing 42 questionnaire questions based on a 5-point Likert scale, the researcher expects to be able to comprehensively assess the impact of synesthetic design on enhancing brand experience and perception.

Study Sample and Sample Size Selection

The research sample was selected from 300 Fine Arts and Design students from Shenzhen, China, to ensure the sample's professionalism and sensitivity to the research topic. The sample consisted of 50/50 male and female students, with a concentration of 19 to 24 years old. This age group possesses a more innovative

perspective and a keen sense of brand experience, which helps to assess the effectiveness of synesthetic design from the perspective of young consumers. Subtle differences in brand perception and experience are captured through a carefully selected sample.

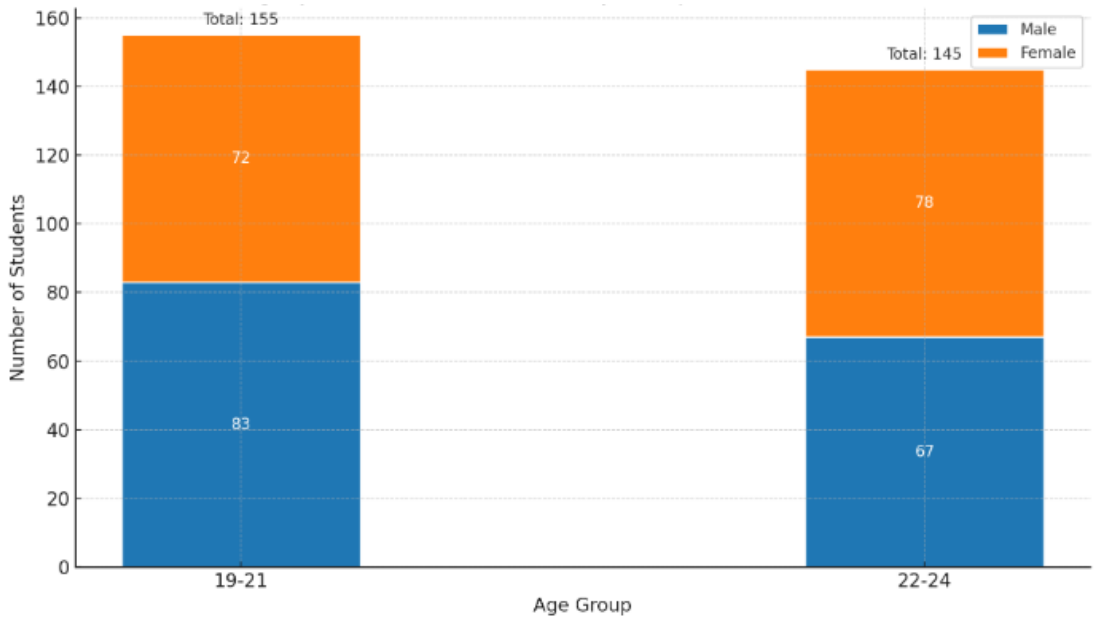

Figure 5 Demographic data

Data Collection and Analysis

In the data collection phase, the research team will distribute the questionnaire to the target sample group through electronic questionnaires to ensure efficient and extensive data collection. The questionnaire will be designed and distributed through a professional platform to ensure anonymity and data accuracy. In order to enhance the response rate and quality of the survey, the researcher has adopted a number of incentives including, but not limited to, the provision of small prizes, coupons, as rewards for completing the questionnaire.

In the data analysis stage, descriptive statistics will be used to analyse the questionnaire data to obtain the basic distribution of each research variable. In addition, the study will employ multivariate analysis methods such as factor analysis, cluster analysis and path analysis to explore how different sensory stimuli, levels of sensory integration and emotional resonance affect brand memorability, brand differentiation perceptions and brand loyalty tendencies. Through these advanced statistical methods, the study will be able to reveal the specific impact of synesthetic design elements on deep brand perception and experience, providing a scientific basis and practical guidance for brand marketing strategies.

RESULTS AND ANALYSES

Variable	Cronbach's Alpha	N of Items
Types of sensory stimulation	0.911	7
Level of sensory integration	0.924	7
Emotional resonance intensity	0.916	7
Brand memorability	0.918	7
Brand differentiation awareness	0.897	7
Brand loyalty tendencies	0.896	7

	Types of sensory stimulation	Level of sensory integration	Emotional resonance intensity	Types of sensory stimulation	Brand memorability	Brand loyalty tendencies
Types of sensory stimulation						
Level of sensory	0.289					

integration						
Emotional resonance intensity	0.144	0.428				
Brand memorability	0.193	0.422	0.503			
Brand differentiation awareness	0.428	0.623	0.568	0.519		
Brand loyalty tendencies	0.423	0.698	0.541	0.535	0.750	

Reliability analysis is to ensure the validity of model fit evaluation and hypothesis testing, in this paper, Cronbach's reliability coefficient is used to check the degree of consistency of the questionnaire research variables on each measurement question item.Hair, Anderson, Tatham ,Black (2009) and Devellis (1991) argued that for the variables to have a good reliability then The above table shows the values of Cronbach's alpha coefficients for each of the study variables to test the internal consistency reliability of the scales. The researcher found that the alpha values of all the variables were around 0.9, ranging from 0.896 to 0.924, which is higher than the generally accepted critical value of 0.7. This indicates that the multi-item scales used in this study have high internal consistency in measuring the variables and the results are reliable. In particular, the alpha value of the variable "degree of sensory integration" was as high as 0.924, which indicates that the scale has an excellent level of reliability.

The heterogeneity-monomorphism ratio, which is the ratio of between-trait to within-trait correlations, was used. It is the ratio of the means of the correlation of indicators between different constructs relative to the mean of the correlation of indicators between the same constructs. The results are shown in the table below. The table shows that the HTMT values between every 2 variables in this study are below 0.85, which is also an indication of good discriminant validity between each variable. Distinguishing validity means that a construct should be sufficiently distinguishable from other constructs. From the correlation coefficient matrix in Table 2, although there is a certain positive correlation between most of the variables, the correlation coefficients are generally not high, with the highest being 0.750 (between brand differentiation perception and brand loyalty), and the rest are all lower than 0.7, which indicates that there is a certain degree of differentiation between the different variables, and that they can distinguish different potential constructs well, and that the discriminant validity is still acceptable.

Overall, the reliability and validity of this study can meet the requirements of the analyses and ensure the reliability and validity of the results of the subsequent analyses.

	N	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
Types of sensory stimulation	300	1.00	5.00	3.750	0.049	1.05219	-0.556	0.115	-0.844	0.229
Level of sensory integration	300	1.00	5.00	3.577	0.057	1.20509	-0.410	0.115	-1.216	0.229
Emotional resonance intensity	300	1.00	5.00	3.616	0.056	1.18813	-0.483	0.115	-1.099	0.229
Brand memorability	300	1.00	5.00	3.609	0.057	1.21992	-0.478	0.115	-1.160	0.229
Brand differentiation awareness	300	1.00	5.00	3.879	0.053	1.12228	-0.703	0.115	-0.859	0.229
Brand loyalty tendencies	300	1.33	5.00	3.829	0.053	1.12975	-0.596	0.115	-1.038	0.229

From the data analysis in the table above, it can be seen that the results of the statistical analysis of the data of each topic contained in the questionnaire, including the number of cases, minimum value, maximum value, mean, standard deviation, skewness and kurtosis, are used to verify whether the information obtained from the survey obeys a normal distribution. Whether or not the data follow a normal distribution will have a crucial impact on the subsequent analyses. According to Kline (1998), when the absolute value of skewness is less than 3 and the absolute value of kurtosis is less than 10, it indicates that the sample basically follows a normal

distribution. The formal sample results in the table show that the absolute value of the skewness of each topic - are less than 3, the absolute value of the kurtosis are less than 10, the skewness and kurtosis satisfy the conditions of normal distribution, which indicates that each topic can obey the normal distribution. The data recovered from the questionnaire can be directly used in the later statistical analyses such as reliability and validity. The mean values of all the variables are centred between 3.5 and 3.9, which is between medium and high levels. The data suggests that synesthetic design has a certain positive effect in shaping brand perception and enhancing brand experience, which was evaluated more positively by the respondents.

Secondly, the standard deviation of each variable ranges from 1.05 to 1.22, which indicates that there is a certain degree of dispersion in the data, i.e., there are some differences in the perception of synesthetic design by the respondents. This may be due to the different sensitivities of individuals to sensory stimuli and the differences in subjective judgement of brand experience.

Next, the researcher found that the mean values of "Perceived brand differentiation" (mean 3.879) and "Propensity for brand loyalty" (mean 3.829) are relatively higher. This reflects that synesthetic design can effectively enhance the uniqueness of products and brands, make it easier for consumers to recognise and remember the brand, and then enhance consumers' loyalty to the brand. This is in line with the theory that synesthetic design can create a unique and immersive brand experience.

Another interesting finding is the relatively low mean value of Emotional Resonance Intensity (mean 3.616). This may indicate that although synesthetic design can stimulate consumers' sensory experience, there is still room for improvement in evoking deep emotional resonance. Brand marketers need to pay more attention to the emotional dimension of the design, through the carefully designed synesthetic design elements to touch the emotional hook of consumers, so as to establish a deeper brand personality and consumer identity.

Finally, the researcher observed that the skewness values of most of the variables were negative, and the kurtosis values were also mostly negative. This means that the distribution of the data is left-skewed and relatively flat. In other words, most of the respondents' evaluations of the synesthetic design are concentrated in the higher score range, and only a small number of them gave lower evaluation scores. This reaffirms the positive attitude of the respondents towards the use of synesthetic design in brand marketing.

Overall, the results of this study support the prospect of synesthetic design in brand awareness and experience marketing. However, brand marketers need to further explore how to evoke deeper resonance in consumers' hearts through the elaborate design of MX elements, so as to build unique and lasting brand personality and brand loyalty.

	SSO	Sum of squares of residuals（SSE）	Q^2 (=1-SSE/SSO)
Brand memorability	2712.000	1691.334	0.376
brand loyalty tendencies	2712.000	1682.176	0.380

Q^2 indicates the exogenous to endogenous variable interpretation prediction correlation, generally between 0-1, Q^2 is greater than 0, the model has the ability to predict, when Q^2 is less than 0 indicates no prediction, between 0.02-0.13 indicates small prediction, 0.13-0.26 indicates average, greater than 0.26 indicates strong, the results of this study are shown in the table below. The Q^2 of PI and PV were obtained as 0.376 and 0.380 respectively, which are both greater than between 0.26. It shows that the predictive relevance indicator Q2 of each explanatory variable of the research model is strong.

Specifically, the values of SSO (sum of squares of residuals), SSE (sum of squares of regressions), and predictive relevance indicator Q^2 for the variables of brand memorability and brand loyalty.

Firstly, the value of SSO is 2712.000, which is a fixed value representing the degree of dispersion of the overall data, and the values of SSE are 1691.334 (brand memorability) and 1682.176 (brand loyalty) reflecting the residuals of the degree of data dispersion under the regression model.

The Q2 values calculated were 0.376 (brand memorability) and 0.380 (brand loyalty). This result indicates that when brand memorability is used as the independent variable, it has a predictive power of 37.6% for the

dependent variable of brand loyalty; conversely, when brand loyalty is used as the independent variable, it has a predictive power of 38.0% for brand memorability.

Both Q^2 values are close to 0.4, indicating that there is a moderate positive relationship between brand memorability and brand loyalty. In other words, enhancing consumers' memory of a brand through synesthetic design can, to a certain extent, promote their loyalty to the brand; similarly, fostering brand loyalty will also lead to a deeper impression of the brand by consumers.

The evidence provided by the data is consistent with the theoretical viewpoint hypothesised in this thesis, that is, synesthetic design helps to establish a unique and long-lasting brand experience, which in turn enhances consumers' brand memory and loyalty. The results of the data analysis provide empirical evidence to support this view.

CONCLUSION

Through the study and analysis, the researcher suggests that the use of synesthetic design should be further developed in the following areas to help companies shape deep brand perceptions:

1. Integration of virtual reality (VR) and augmented reality (AR) technology Future synesthetic design can make full use of advanced technologies such as VR and AR to create a new immersive experience for consumers. For example, by implanting AR elements in product packaging, consumers can virtually experience the product production process or use scenarios through mobile phone observation, stimulating multi-sensory interaction.

2. Personalised customised experience Through artificial intelligence and big data analysis of consumer preferences, synesthetic design can be tailored to different target groups to create unique personalised experience solutions. For example, based on regional cultural differences, we can design synesthetic designs that incorporate local flavours and elements for specific regions.

3. Combine the synesthetic design with the concept of sustainable development, in the context of environmental protection and sustainable development, the synesthetic design can be closely integrated with the concept of green, recycling, low carbon, etc., the use of environmentally friendly materials, reduce waste, so as to convey the brand's social responsibility. At the same time, it allows consumers to feel the energy of nature in the brand experience.

4. Cross-border integration of art and technology elements Synesthetic design can boldly absorb the cutting-edge elements of art and technology, such as sound art, media art, bio-art and other novel concepts and the integration of traditional sensory experience, to open up a new field of perception, injecting more creativity and vitality for brand marketing.

5. Combination of synesthetic design with social media and new retail With the accelerated integration of online and offline channels, synesthetic design should also be closely integrated with social media, unmanned shops and other new retail modes, seamlessly integrating online and offline synesthetic experiences to create a unified brand perception of the whole scene, the whole time, and the whole chain.

Generative sense is not just a simple process of moving from one sense to other senses, but it is the process by which people perceive and associate things through senses, and reach the sublimation of perception from imagination. In product modelling design, synesthetic design turns tangible design into intangible emotional communication, and achieves the fusion between "meaning" and "image" from multi-dimensional sensory channels. By exploring the deep-seated needs of users, deepening the theme, extracting the elements of design expression, and realising the expression of emotion-product modelling, it not only helps the development of user's perceptual thinking, but also enriches the form of product modelling, and inspires the designers to enhance the connection between the users and the products through the way of emotional infiltration. The researcher's study verifies the positive role of synesthetic design in shaping brand perception and enhancing consumer experience through theoretical discussion and empirical analysis. The data show that synesthetic design can improve brand memorability, differentiated perception and consumers' brand loyalty tendency, which is highly consistent with the theoretical model foundation constructed in the article. Reliability and validity analyses show that the scales in this study have high internal consistency and reliability, and the

convergent and discriminant validity are at an acceptable level, which lays the foundation for the interpretation of the results of this study. However, there is still some room for improvement in terms of validity compared with reliability, and the scale design can be further optimised to enhance the discriminant validity in the future. The results of the Q2 predictive relevance indicator show that there is a moderate positive correlation between brand memorability and brand loyalty, i.e., synesthetic design can promote the synergistic growth of these two core marketing objectives to a certain extent. With the advancement of technology, artistic synesthetic visual communication has been given new possibilities in packaging design. The application of augmented reality (AR), virtual reality (VR), 3D printing and other technologies can make packaging design more interactive and vivid, and even simulate non-visual sensory experiences such as touch and smell through electronic sensing. These technologies not only provide designers with an unprecedented creative platform, but also bring consumers a new shopping experience. The immersive experience created with these advanced technologies can greatly enhance the emotional connection between brands and consumers, creating higher market value for brands. In the future, designers can continue to refresh the boundaries of shaping deep brand perceptions by constantly exploring and applying these new technologies.

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