Heritage Science

RESEARCH

Research on the mechanism of emotional design in Chinese cultural and creative products

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Abstract

Motivation: The empowerment of design for cultural and creative products in the digital media era is further amplified by social media platforms,its emotional and subconscious impact on users is important and profound. The development of the network economy has promoted this trend. At the same time, this trend has further promoted the growth of cultural and creative products market. However, too obscure appearance design can hardly arouse the resonance of different cultural groups in a short time. As an effective method to bridge the cultural gap between consumers, emotional design has become an important driving force for the development of cultural and creative products.

Purpose: The purpose of this study is to understand the impact of emotional factors on the willingness and preferences of ordinary consumers to buy Chinese cultural and creative products, and to further explore whether there are cognitive differences between the emotional design standards defined and promoted by professionals and the excellent design recognized by consumers according to their life experience and personal subjective emotional preferences.

Design/methodology/approach: Through the construction of the emotional design model, this study selects four award-winning products in the cultural and creative product design competition and four commercial products with high sales volume in the online stores as research cases. Through 176 valid questionnaires conducted by non-professionals, this study makes an analysis by using the structural equation.

Conclusions: The study found that consumers' preference and purchase intention of Chinese cultural and creative products are affected by emotional design standards, but the impact results depend on the interaction of many factors. At the same time, there are also significant differences in cognitive paths between them.

Keywords: Product design, Emotional design, Purchase intention, Preference

Introduction

Since the early 1990s, the global economy has shifted from an industrial era to a knowledge-based economy, and the trend towards a "beauty economy" has emerged in the early twenty-first century. In the field of economics, Jay [1] sees the beauty economy as a combination of tradition and modernity, culture, craft and beauty in the global market. Liu [2] points out that the rise of the knowledge economy and the beauty trend and the combination of culture and design has brought about a profitable cultural consumer market. In the study of cultural and creative products, most studies tend to describe the external characteristics of the products through their appearance, but too vague designs hardly resonate with different cultural groups in the short term [3]. Verganti [4] pointed out that the meaning of a product comes from the interaction between the user and the product. Lin Rongtai [5–7] argues that cultural and creative

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products use cultural elements as a source of originality to meet the needs of users' spiritual dimension. Therefore, in addition to cultural elements, China's cultural and creative product design should also integrate emotions into the design so that the product can be identified with different cultural groups around the world while its ethnicity is being maintained [8].

Purpose of research

With the advent of China's post-industrial era, China's product design has changed from globalization to seeking differentiation. Relying on China's profound cultural heritage, aided by human emotional needs, will enable China's cultural and creative products to better develop the international market and spread Chinese culture at the same time [9, 10], cultural confidence and cultural strategy are also concerned by more and more scholars [11]. However, overly subtle and emotional creations are difficult to resonate with different cultural groups in a short period [12, 13]. With the development of the Internet, it has become imperative to strengthen China's industry, shape its brand image, and cultivate designers who are more in tune with market demand [14, 15]. As Samiee [16] points out, if consumers have brand awareness, they may still have positive perceptions of unfamiliar products, so it is important to shape brand images and nurture emerging products and designers under the umbrella of branding [17].

In reviewing the past literature, the emotional design has almost always been discussed in the field of design [18, 19], while the research literature related to consumer purchase intentions and preferences has also focused on the field of marketing. These two fields are different. With the development of today's market, consumers' choices of products are becoming more diverse and abundant [20]. Therefore, enterprises must adapt to the direction of market development to gain a competitive advantage. To address this research gap, this paper explores the impact of emotional design on consumers' purchase intentions and preferences. Using "preference" as a mediator, this paper explores whether the "emotional design" of creative products affects consumers' "purchase intentions" and explores the differences in recognition between past award-winning creative products and those that sell well on the Internet. Since most of the existing design evaluations focus on award-winning designs in professional fields, it is one of the objectives of this study to investigate whether the design excellence identified by consumers from non-professional backgrounds based on their life experiences and subjective preferences differs from the criteria identified by experts and professionals, so as to understand the core elements required for good design and the design elements that meet contemporary

needs, and to build a rational evaluation system for emotional design in China to meet the emotional needs of consumer groups. Moreover, this study is used to guide designers to understand the current focus of product design and integrate it into future teaching in order to cultivate design talents that better meet today's market needs and provide a reference basis for related industries to enter the beauty economy market.

Research methodology

Research process

The research focuses on exploring the differences between the consumer market demand for cultural and creative products and the award-winning results, and exploring the content and essence of cultural and creative product design. The research process is divided into four stages (see Fig. 1). The first stage is the summary of literature, and the second stage is the questionnaire design. The scale composition was established through theoretical summary and analysis. The third stage is the selection and testing of the research subjects. The fourth stage argues the research hypothesis through the validation of the questionnaire results and data analysis, and finally presents conclusions and recommendations.

Research hypothesis

The paper is based on relevant theories and mainly conducts a validation study, and its research hypotheses are mainly as follows:

(1) Emotional design significantly affects consumers' purchase intention and preference in the sales of Chinese cultural and creative products.
(2) Preference mediates between purchase intention and emotional design of creative products, and emotional design of products can influence consumers' preference and increase purchase intention.
(3) There are significant differences between award-winning and best-selling products.
(4) Consumers pay different attention to the emotional cognition of award-winning products and best-selling products.

The following is the conceptual model of the article (see Fig. 2).

Selection and testing of research objects

According to the research objectives, the study mainly selects the award-winning products to refer to the excellent cultural and creative products defined by experts and professionals, and selects the best-selling products to refer to the excellent design recognized by consumers according to their life experiences and personal
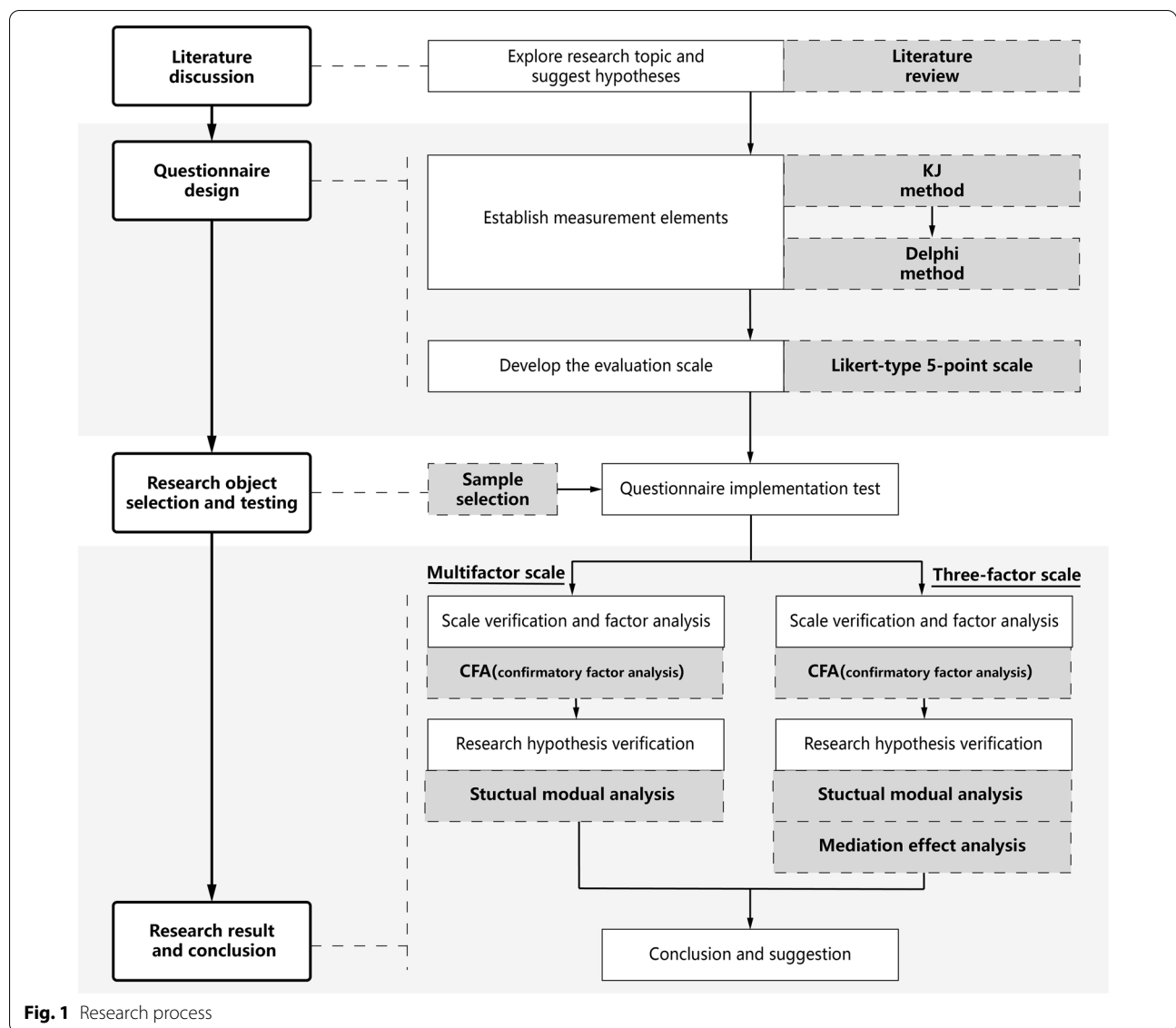
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Fig. 1 Research process

subjective emotional preferences.In the specific operation, one is really commercial products on the Taobao website, and the other is the cultural and creative products that won in the competition. Eight samples were selected for the questionnaire, four commercial products and four award-winning products. The commercial products were selected from the Taobao website, and the selection criteria were as follows: 1. The products should be commonly used in daily life; 2. The design inspiration should have a Chinese cultural connotation or regional cultural connotation; 3. The sales of the selected products should be more than 1000 pieces.

The criteria for the selection of the winning products are similar: 1. The products commonly used in life are selected; 2. The design inspiration of the products should

have Chinese cultural connotations or regional cultural connotations; 3. The products should have won awards in well-known competitions and achieved the ranking (See Table 1).

Research tools
In recent decades, many scholars have proposed different models for testing emotional design. For example, Green and Jordan [21, 22] argued that using the attractiveness of products to design pleasant products can make them seem more useful, thus proposing that product design must satisfy people's four pleasant feelings: conscious pleasure, social pleasure, physical pleasure, and psychological pleasure; Norman [23] argued that emotional design has three levels: the instinctive level,
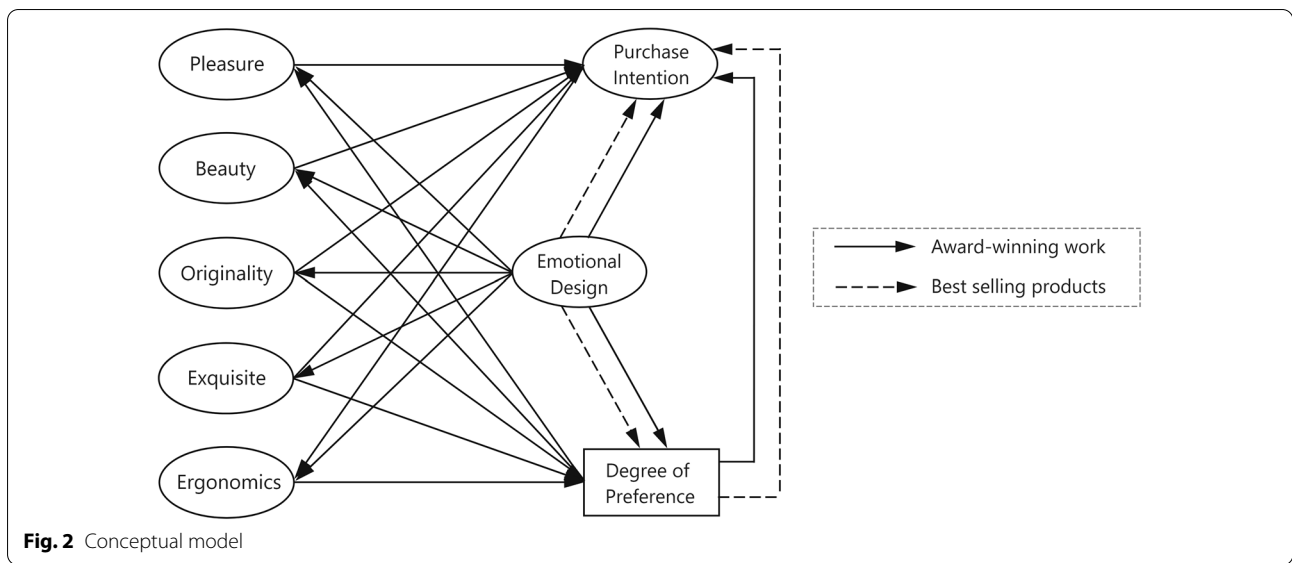
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Fig. 2 Conceptual model

the behavioral level, and the reflective level. McCarthy and Wright [24] view emotion as the process by which products and services enable people to experience them, encompassing the entire experience, the senses, emotions and the broad social and cultural context and real-time usage scenarios. Anderson [25] proposed levels of product design that are practical, reliable, usable, convenient, enjoyable and meaningful. Ji et al. [26] believed that the more obvious the sensory quality characteristics of the product, the higher the consumers' preference for the product, and proposed that the design vocabulary of cultural and creative products should be oriented towards the simple and clean design, fashionable and modern appearance, and meet the needs of different ethnic groups through the characteristics of charm, beauty and creativity; Bhandari et al. [27] established the correlation between product elements and users' perceptual images, and proposed the measurement standards with form, color, material and technology, and innovative function as the main attributes; Jagtap [28, 29] proposed product form attributes and emotional scales, arguing that product form is important in determining consumer response and product success, and that it triggers certain characteristics and emotions to help designers design their products.

From the above, it can be seen that the emotional design of a product is related to factors such as originality, beauty, pleasure, ergonomics and exquisite. However, in addition to the emotional appeals of originality and beauty, consumers usually make rational purchase decisions based on a comparison of product benefits and cost effectiveness [32]. Good product design not only captures consumers' attention and communicates with them, but

also increases their willingness to buy through the experience of using it [30]. The emotional design of a product is the focus of consumer preferences and purchase intentions. Therefore, the paper lists and analyzes the emotional design models proposed by different scholars and uses them to form a preliminary scale of emotional evaluation with originality, beauty, pleasure and ergonomics, and refinement as the main features (see Tables 2 and 3).

The paper explores and analyzes the relevant literature to form a preliminary questionnaire, and then explores the relationship between emotional design influencing consumer purchase intention and preference. In this paper, the results of previous literature review were coded and analyzed, and then the kj method was used to classify and name the 4 major metric elements and 15 subelements in the first round of Delphi expert questionnaire. Experts' opinions were conducted to select and evaluate the metric elements with high consensus, and the meaning descriptions of the subelements were revised according to the experts' suggestions. Through the repeated operation of the third round of expert opinions, the convergence of opinions was realized, and the measurement factors and sub-factors of creative product design were established. Finally, the product's ability to convey cultural connotation, the product's impressive appearance, and the product's fashionable taste are classified as the pleasure factor; the product's perfect proportion, the product's sense of design, and the product's pleasing appearance are classified as the beauty factor; the product's originality, the product's storytelling, and the product's creative use of materials are classified as the originality factor; the product's delicate workmanship, the product's exquisite structure, and the product's

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Table 1 Research subjects

Code Name	Name of the product	Photo of the product	Winning record or sales record	Remarks
P1	Lion guard		Best creative award of China digital creative design competition in 2019	The lion is the most common auspicious animal in our folk culture. It is the embodiment of wisdom and power, has the symbolic meaning of good luck, prosperity and incessant life, and symbolizes status, dignity and peace. The product is a mosquito lamp in the shape of a lion, which can help users sleep better at night
P2	The smart juyue lamp		Total sales: 5000 +	The moon in Chinese culture symbolizes beauty, reunion, eternity, lovesickness, etc. The product relies on gesture induction to control the switch and adjust the cold and warm light, and it can be operated remotely with the App. The Smart Juyue Lamp has simplified functions, fully expressing the artistic conception that this lamp wants to express
P3	The jade watch		Third prize in the 2019 Pinzhou Jade festival creative design competition	Jade culture has become an important part of Chinese national culture, and jade, as a beautiful spirit and intention, represents the faith and spiritual outlook of the nation. This product incorporates the material of jade into the watch so that users can have a different watch experience
P4	Forbidden city walking horse scented candles		Total sales:1682	A simple little scented candle can not only enhance the taste of home life, but also light up the love of life. The product combines the traditional Chinese pattern, the aroma of the Forbidden City's four gardens as the source of inspiration, through the lighting of the candle to give people to enhance the happiness of life
P5	Swordsman tea canister		Best style award of China digital creative design competition in 2019	Almost everyone in China has a dream of being a swordsman, which represents a focus on personal contribution to the world and is a personal view of good and evil that can be strong enough that the king cannot interfere.The product is designed so that the tea pot rests on the countertop, like seeing the image of a swordsman as he battles the world with his sword

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Table 1 (continued)

Code Name	Name of the product	Photo of the product	Winning record or sales record	Remarks
P6	Nine color deer paper carving lamp		Total sales:1200	The picture originates from the Mogao Caves Northern Wei Cave 257 fresco "Deer King Ben Sheng Tu". Paper carving is also known as paper relief. The product selects the nine color deer fragment in the fresco as the paper carving pattern, with three-dimensional paper carving as the logo, combining classical and fashionable double elements, with multiple combinations of multi-level image to bring three-dimensional visual experience. It is both a unique piece of classic and elegant play, and can create a warm atmosphere, adding a touch of coziness and warmth to the night
P7	Bamboo light		Gold Medal of the 4th "Zhenghe Cup" International bamboo product design competition	Chinese culture is very respectful and fond of bamboo. The beauty of bamboo is not only derived from its long and straight branches and verdant coat, but also from its noble, ethereal and far-away character, and the connotation of modesty and elegance has become a symbol of Chinese character and beauty spirit. The designer not only brings the characteristics of bamboo into play, but also makes people feel the unique beauty created by bamboo through the appearance of the product and reflects our ancient and long-standing oriental culture
P8	Potala palace creative ceramic cup		Total sales: 1435	The designer used the word "lotus" in the golden tablet of "The First Pond of the Lotus" written by Emperor Qianlong in the Qing Dynasty as the theme to create the body of the lotus cup. With five colors: yellow, green, red, white and blue, representing the five perceptions of the birth of the lotus flower, and also incorporating the auspicious eight treasures pattern of praying for good fortune, the cup not only expresses the ability to accommodate the emotional world born from the lotus flower, but also implies the ability to fill all the colors and scents of heaven and earth

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Table 2 Related patterns of emotional design

Scholars	Design mode	Measurement elements			
		Originality	Beauty	Ergonomics	Pleasure
Green and Jordan [21, 22]	Pleasurable experience factors	Social pleasure	Conscious pleasure	Physiological pleasure	Psychological pleasure
Norman [23]	Emotional design factors	Attraction, fun	Aesthetics beauty	Usability	Attraction, fun
McCarthy and Wright [24]	Emotional model	Overall experience	Sensory	Sensory, usability	Overall experience, emotion, social's cultural environment
Anderson [25]	Product design consideration level	Meaningful	Pleasurable	Practical, reliable, usable and convenient	Pleasurable
Jagtap [28]	Product modeling attribute and emotion scale	Innovation	Beauty, harmony, elegance, modernization	Utility, convenience, simplicity and high quality	Joy, satisfaction, interest, surprise, vitality, charm, calm, entertainment, happiness
Bhandari [27]	Correlation between product elements and users' perceptual images	Innovation function	Form, color	Innovation function	Form
Ji [26]	Sensory measurement model	Creativity, charm	Beauty	Exquisite, ergonomics	Charm

Table 3 Structure of the first Delphi expert questionnaire

Measurement elements	Sub-items	Evaluation Reference Source
Originality	C1 The product materials are original	McCarthy and Wright [24]; Norman [23]; Jagtap [28];
	C2 The product is original or innovative	
	C3 The product makes people feel special	
	C4 The product is novel	
Function	F1 The product is practical	McCarthy and Wright [24]; Norman [23]; Jagtap [28]
	F2 The product is safe to operate	
	F3 The product is easy to use	
Beauty	A1 The product has a fashionable taste	Ji [26]; McCarthy and Wright [24]; Norman [23]; Jagtap [28];
	A2 The product ratio is reasonable	
	A3 The colors of The product are used properly	
	A4 The product has detailed design	
	A5 The product surface or surface design is exquisite	
Pleasure	P1 The product evokes people's life memories	Green and Jordan [21, 22]; McCarthy and Wright [24]; Norman [23]; Jagtap [28]
	P2 The product is attractive and enjoyable	
	P3 The product makes people feel satisfied	
Purchase Intention	PI1. Would you buy this product	
	PI2. Will you buy the similar products you like when you see them	
	PI3. Would you buy this product if someone recommends it	
Degree of Preference	PR1. How much you like this product	

delicate workmanship, the product's exquisite structure, the product's sharp shape are summarized as the exquisite factors; the product's excellent production technology, the product's sturdy and durable, the product's good operability are summarized as the ergonomics factor. And according to the purchase heart process, the purchase intention is divided into three levels: purchasing the product, purchasing similar products, and recommending others to purchase. Then, according to the evaluation level and model structure, the evaluation scale of emotional design factors affecting consumers' willingness to purchase and preference is developed. The questionnaire has a total of 19 assessment points with 6 major elements. Each point is mainly derived from the preliminary

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literature, and the elements involved in the article are constructed based on relevant theories. The feasibility of the questionnaire is tested by confirmatory factor analysis (CFA) in the later stage. The questionnaire scale is shown in Table 4.

Selection and measurement of experimental subjects

In Lindstrom and Seybold's [32] study, it is noted that the influence of young children on their parents' purchases has reached alarming levels. Therefore, it is considered that the study of young college students has typical representative significance to understand consumers' preferences and purchase intentions. At the same time, based on the purpose of this study is to understand how emotional factors will affect the willingness and preferences of ordinary consumers to buy Chinese cultural and creative products, and to further explore whether there are cognitive differences between the emotional design standards defined and promoted by professionals and the excellent design recognized by consumers according to their life experience and personal subjective emotional preferences. Therefore, the research subjects are mainly non-art college students, who are also potential consumers of the selected products. Since the research purpose of the article is mainly based on exploring the factors affecting purchase decisions and does not involve the product brand, it deliberately avoids brand awareness when choosing products, so as to be more in line with the consumption level of college students.

The article questionnaires were distributed through the "Questionnaire Star" online questionnaire. After the students agreed, the questionnaires were filled out on the Internet. In the end, 254 questionnaires were received, and 176 valid questionnaires were finally screened. Among them, 58 are males and 118 are females, aged between 18 and 24 years old.

The questionnaire is composed of images, textual descriptions and multiple-choice items, and the basic information of the test taker includes gender, age, nationality and other options. The scale is chosen in the form of a Likert-type 5-point scale, with "totally disagree" representing a score of 1, "partially disagree" representing a score of 2, "average" representing a score of 3, "partially agree" representing a score of 4, and "totally agree" representing a score of 5. There are 19 evaluation questions. After the test results are collected, 176 valid questionnaires are collected after eliminating those that take too little time and those with mostly consistent and unchanged options. According to related theory [33, 34], the longer the scale is, the higher the sample requirement is. The sample size should be more than 5 times of the variables, and the overall sample size is greater than 100, the analysis results have the requirement of reliability, and the sample size of the article has met the requirement.

Then, the study analyzes the structural equation model after statistics. Through questionnaires, data are analyzed by using SPSS and Amos, forming a test scale by

Table 4 Formation scale after three rounds of Delphi method

Measurement elements	Secondary elements
Pleasure	J1. The product conveys cultural connotations
	J2. The product is impressive
	J3. The product has a sense of fashion
Beauty	B1. The product has good proportions
	B2. The product has a sense of design
	B3. The product has a pleasant appearance
Originality	C1. The product is novel and unique
	C2. The product is storytelling
	C3. Creative use of product materials
Exquisite	Ex1. Product workmanship is very fine
	Ex2. Product structure is good
	Ex3. Product shape is sharp
Ergonomics	Er1. Well-made products
	Er2. Durable products
	Er3. Good operability of the product
Purchase intention	PI1. Would you buy this product
	PI2. Will you buy similar products you lik
	PI3. Would you buy this product if someone recommended
Degree of preference	Degree of Preference. How much do you like this product

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summarizing and analyzing the previous study and testing the feasibility of the scale by using confirmatory factor analysis(CFA). And finally, the structural model analysis and research hypothesis validation are used to determine the model path diagram of this study.

Results and validation
Multifactor scale validation and analysis
Confirmatory factor analysis
In this study, confirmatory factor analysis (CFA) is used to deal with the collinearity between the observed variables and their potential variables [35]. Therefore, 176 valid questionnaires collected in this study are used to test the convergent validity and discrimination validity of the measurement model by confirmatory factor analysis (see Fig. 3).

Standardized estimates from confirmatory factor analysis are as follows: product pleasure factor for award-winning and best-selling products ranged between 0.88 and 0.94, product beauty factor ranged between 0.80 and 0.93, product originality factor ranged between 0.91 and 0.93, product exquisite factor ranged between 0.85 and 0.94, and product ergonomics factor ranged between 0.85 and 0.96. The purchase intention ranged from 0.95 to 0.98, and the valuation after standardization of each factor was higher than 0.7, indicating that the measurement system met the criteria [36].

In the factor loading list, the composite reliability (CR) for each element of both ranges from 0.9141 to 0.9751, and the average variance extracted (AVE) ranges from 0.7809 to 0.9288. Both are above the values of 0.60 and 0.50 suggested by Bagozzi, proving the internal consistency of the model.

The square root of AVE for each element in the discriminant validity category table ranges from 0.884 to 0.964, and all correlation coefficients in the model are less than the square root of Ave. According to the relevant theory of Hair et al. [37], it shows that there is both a certain correlation and a certain differential validity between the latent variables, and the differential validity of the model data is ideal.

The analysis and validation of structural equation modeling
The paper uses structural equation modeling to validate the research hypotheses, in which potential and observed variables are observed as a way to analyze the causal relationship between best-selling and award-winning products. Based on the derivation and analysis, the final model of this study consists of 5 components and 19 measured variables. The independent variables are product emotional design (originality, beauty, pleasure, ergonomics, and exquisite), and the latent variables are preference and purchase intention. The results showed that the chi-square and degrees of freedom ratios were 1.49 and 1.97, respectively, the RMSEA of award-winning products is 0.053, and the RMSEA of best-selling products is 0.074, both less than 0.08, reaching the fitting index standard, and all indicators met the criteria except for the AGFI of the two products and the GFI of the best-selling product, which did not reach 0.9 (within the acceptable range). The above structural model tests are based on the definitions of scholars such as Hair et al. [37, 38]. The overall indicators of the model are almost at or close to acceptable levels, indicating that the overall structural model of the study has a good fit between the theoretical structure and the empirical data.
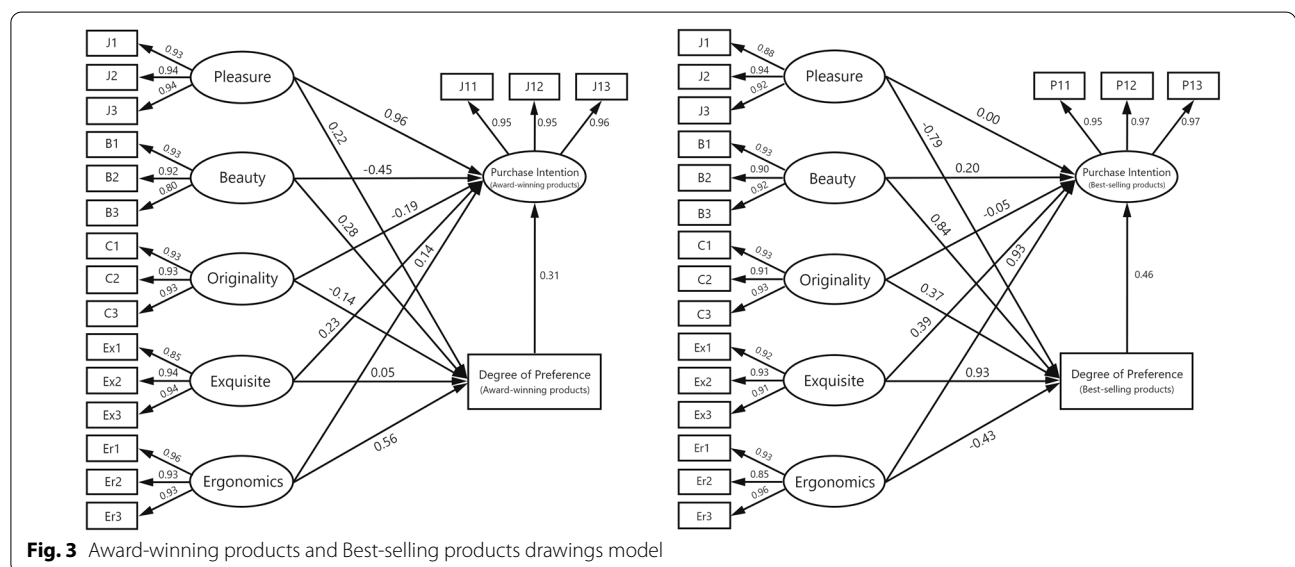

Fig. 3 Award-winning products and Best-selling products drawings model

Three-factor scale validation and analysis
Three-factor model construction

In best-selling products, consumers are usually attracted by the appearance of products, resulting in consumer behavior. Nyurenberger [39] pointed out that consumers would feel happy because of the beauty of products; Coelho et al. [40] had also shown that the visual perception brought by products can compensate for the performance of inefficiency. Therefore, consumers usually start from the characteristics and forms of products. After attracting consumers, they will further understand the operability and durability of products, so as to produce pleasure and purchase products. Although each path of the initial model is significant, the fitting index of the model of best-selling products is poor, and the model is not the best. Mueller [41] gave the steps of modification and optimization, so the initial model should be modified. Because there is a residual correlation between ergonomics and pleasure, beauty and pleasure, so e1 and e5 paths, e4 and e5 paths are added. The construction of a three-factor analysis model based on this is shown in Fig. 4. According to the definitions of experts and scholars such as Hair, Black, Babin, Anderson, Tatham and Blunch, the fitting index of this model reaches the standard value.

Confirmatory factor analysis

Confirmatory factor analysis standardized estimates (SFL): the product emotional design factors of the award-winning and best-selling products range from 0.90 to 0.98, and the valuations after standardization were higher than 0.7, indicating that the measurement system met the criteria.

In the factor loadings list, the composite reliability (CR) of each factor of both is 0.9583 and 0.9562, respectively, and the average variance extracted (AVE) is 0.7542 and 0.7428, respectively, which proves that the model is internally consistent.

Structural model analysis and validation

From the results, it can be seen that the cardinality to freedom ratios of the award-winning and best-selling products are 2.531 and 2.110, respectively. Except for the two products whose PGFI does not reach 0.5 and the award-winning products whose AGFI does not reach 0.9 (0.89) (within the acceptable range), all other indicators meet the standard. Shi [42] believed that the RMSEA below 0.1 indicates a good fit, and the RMSEA below 0.05 indicates a very good fit; Tu et al. [43] mentioned that the fitting index should be considered comprehensively in their research on consumers' preference for cultural and creative products of the Palace Museum from
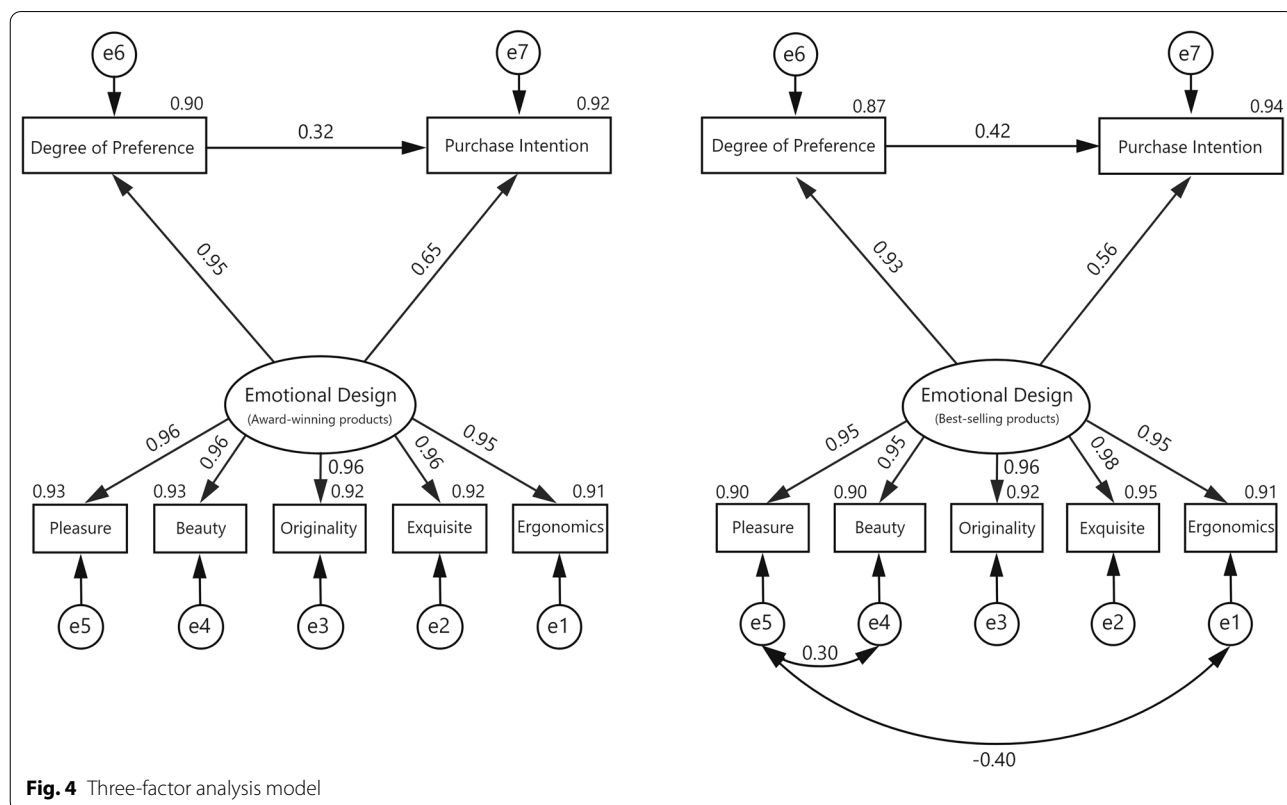

Fig. 4 Three-factor analysis model

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the perspective of cultural sustainability. The NNFI and CFI values of all scales in the two models are above 0.9, and some even reach above 0.95. The RMSEA and RMR values of the award-winning products are $0.094 < 0.1$ and $0.038 < 0.08$. RMSEA of popular products is $0.08 \leq 0.08$, RMR is $0.029 < 0.08$. According to the definition of Yockey [44], Thakkar [45] and other experts, all indicators of this model reached an acceptable level. Therefore, considering all goodness of fit indicators comprehensively, this model showed good construct validity. This result proves that the overall indicators of the model are almost at or close to the acceptable level, indicating that the overall structural model of the study has a good fit between the theoretical structure and the empirical data.

Mediation effect

In the mediation effect analysis of award-winning products, the CI of indirect effect affective factor-purchase intention does not contain 0, the indirect effect holds, and Indirect effect/(Z) ≥ 1.96, the indirect effect holds, so the mediation effect is significant, and the CI of direct effect preference-purchase intention does not contain 0, the direct effect is significant and is partially mediated.

In the analysis of the mediation effect of best-selling products, the CI of indirect effect affective factor-purchase intention does not contain 0, the indirect effect holds, and Indirect effect/(Z) ≥ 1.96, the indirect effect holds, so the mediation effect is significant, and the CI of direct effect preference-purchase intention does not contain 0, the direct effect is significant and is partially mediated.

Analysis of verification result

Based on the results of the analysis, from the two structural models in this paper, it can be found that the path coefficients of the variables of originality, beauty, ergonomics, pleasure and exquisite on product emotional design in real life and each factor loadings exceed 0.85 or more, which shows that these factors constitute product emotional design. Whereas the emotional design of

the product (0.65 and 0.56) has a higher impact on purchase intention than preference (0.32 and 0.42), shown in Table 5. Therefore hypothesis 1: Emotional design significantly affects consumers' purchase intention and preference in the sales of Chinese cultural and creative products of this paper holds.

In the three-factor model in Fig. 4, it is demonstrated that the emotional design factor has an effect on both award-winning and best-selling products in Chinese cultural and creative products, and there is a correlation among the emotional design of the product, the degree of preference, and purchase intention. The mediating effect analysis proves that the degree of preference has a mediating effect on both best-selling and award-winning products, and the emotional design of the product influences people's preference and further influences people's purchase. Therefore hypothesis 2: Preference mediates between purchase intention and emotional design of creative products, and emotional design of products can influence consumers' preference and increase purchase intention of this paper holds.

However, in the multi-factor model, award-winning products and best-selling products, have different effects on the general consumers, and in this structural model, neither the creative factors of the product can directly affect the purchase intention and the degree of preference. Beauty factors likewise do not directly affect purchase intention and preference; nor do product exquisite factors affect purchase intention and preference levels. However, the ergonomics factor of award-winning products affects people's preference into, and the pleasure factor affects people's purchase, but this does not exist in the best-selling model, indicating that there is a difference between best-selling and award-winning products. Therefore hypothesis 3: There are significant differences between award-winning and best-selling products of this paper holds.

Through the comprehensive analysis of consumers' three-factor and multi-factor models and their elements of award-winning products and best-selling products,

Table 5 Structural model analysis

Variable parameter			Standardized path coefficient	C.R	P	Test Result
Structural model analysis of award-winning products						
Degree of Preference	←	Emotional design	0.95	28.795	***	Established
Purchase intention	←	Degree of preference	0.32	4.230	***	Established
Purchase intention	←	Emotional design	0.65	8.285	***	Established
Structural model analysis of best-selling products						
Degree of preference	←	Emotional design	0.93	26.451	***	Established
Purchase intention	←	Degree of preference	0.42	7.066	***	Established
Purchase intention	←	Emotional design	0.56	9.240	***	Established

there are obvious differences in their cognitive paths in the three-factor model. In the originality aspect of the multi-factor model, the difference between the two is that the award-winning products can bring consumers a stronger sense of story substitution; In the pleasure aspect, J2 (The product is impressive) and J3 (The product has a sense of fashion) have higher influences on the award-winning products, and J2 and J3 have higher influences on the best-selling products. The difference between J2 and J3 is that the result caused by fashion emphasizes substitution, while impressed emphasizes the extension of situation. Combined with originality and pleasure, it can be found that consumers pay more attention to the situational value and emotional extension of products. Compared with the best-selling products, the award-winning products can make consumers have a sense of fashion, and bring people situational value through the substitution and innovation of old ideas, so as to impress consumers' purchase intention. In the ergonomics aspect, Er1 (Well-made products) has a higher influence on the award-winning products, and Er3 (Good operability of the product) has a higher influence on the best-selling products. The two represent different consumption purposes. Excellent technology emphasizes the manufacturing process of products, while operability represents the function of products; In the exquisite aspect, the award-winning products have more Ex3 (Product shape is sharp) factors than the best-selling products. Combined with the beauty aspect, it can be found that the excellent cultural and creative products defined by professionals have more prominent process characteristics for consumers, rather than the needs of non-professional consumers, and prefer excellent design interaction in the ergonomics aspect. It can be seen from this that there is a gap between the emotional design standard defined and promoted by professionals and the excellent design recognized by consumers according to their living experience and personal subjective emotional preferences. Although the overall preference and purchase intention of emotional design tend to be consistent, there are differences in cognitive paths. Therefore hypothesis 4: Consumers pay different attention to the emotional cognition of award-winning products and best-selling products of this paper holds.

Conclusions and suggestions

The Chinese manufacturing industry has always had superb and sophisticated production technology and rich manufacturing experience. However, in this era of constant change, consumer ideas and needs must be taken into account in order to make this industry unique, brandable and sustainable. All of these need to be explored through the study of relevant models, and their application in teaching and related industries. This study starts with literature exploration, takes the questionnaire of product emotional design as the research object, analyzes the data and verifies the feasibility of the structural equation model. Based on emotional design and starting from the multidimensional nature of emotion, the model explores the key factors affecting the emotional design of cultural and creative products, constructs a representative index system, and scientifically verifies and analyzes the emotional design evaluation criteria for the design and development of cultural and creative products, explore the impact of emotional factors on the willingness and preferences of ordinary consumers to buy Chinese cultural and creative products, and deeply understand whether there are cognitive differences between the emotional design standards defined and promoted by professionals and the Chinese excellent cultural and creative products identified by consumers according to their living experience and personal subjective emotional preferences.The conclusions are summarized as follows:

(1) Consumers' preference and purchase intention of Chinese cultural and creative products are affected by emotional design standards.

The design of cultural and creative products focuses more on the non-functional elements of the objects themselves than on the general merchandise, presenting them in a modern way and using the aesthetics and refinement of the objects to reflect the creativity and cultural meaning inherent in the products to meet the spiritual needs of the users. Therefore, in the design process of cultural and creative products, the most important thing for designers is to meet the emotional expectations of consumers. An excellent design of cultural and creative products should not only have practical value, but also have more non-functional attributes, which echo the living style or spirit of the times, and can arouse the association of consumers. When designers consider more emotional elements, they can prioritize exquisite first, then originality, and finally beauty, pleasure and ergonomics elements, so that products have additional meaning beyond practical value, thus influencing consumers' purchase intention.

(2) Consumers' preference and purchase intention of Chinese cultural and creative products are affected by the interaction of emotional factors.

Affected by the multiculturalism of contemporary society, people have different definitions of product demand. Consumers will define the most suitable cultural and creative products through their own cultural background [46]. However, too obscure design is difficult to resonate with different cultural groups in a short time. When consumers have different cultural backgrounds, they produce emotional preferences based on the function of the product itself. However, in the actual product sales back, people's purchase is more complex. People decide to buy through the interaction of multiple factors and the overall emotional experience.

With the development of the times and the great satisfaction of material, people pay more and more attention to the value beyond material, which makes the design goal of cultural and creative products no longer just profit as much as possible, but more promote themes, ideas or ideas. In fact, what cultural and creative design should do is to endow products with distinctive characteristics through external factors, to make hesitant consumers more firm. However, because single factors can not directly affect consumers' preferences and purchase intentions, designers should pay attention to the interaction of various elements of emotional design in cultural and creative products in order to attract consumers from different cultural backgrounds. In the production of cultural and creative products, in addition to paying attention to the pleasant factors (cultural background, etc.) of consumers and producing cultural and creative products with necessary functions, enterprises can also focus on exquisite factors to assist the originality and beauty of products. In the interaction between various factors, the emotional design of products will eventually affect prople's preferences, so as to obtain cultural and creative products favored by modern consumers.

(3) Consumers have different preference paths for excellent cultural and creative products defined by professionals and products identified according to life experience.

For consumers, excellent cultural and creative products defined by professionals can better reflect cultural values and excellent workmanship, while consumers are more accustomed to taking exquisite factors as the core elements of interpreting products in actual consumption. Therefore, when designing cultural

and creative products, designers should not only take "product + culture" as the design element, but also consider the impact of multiple factors on consumers' preferences and purchase intentions. The core of product preference and purchase intention is more in line with consumers' emotional characteristics, highlights psychological needs and integrates them into the design, so as to arouse consumers' emotional identity, make the products acceptable to different cultural groups around the world while maintaining their nationality, and finally achieve the purpose of cultural communication through consumption behavior.

With the diversification of China's industrial field and the maturity of production technology, the demand for product design is escalating. The paper uses localized and Chinese characteristic connotations, and through emotional design standards and design models, it can help China's cultural and creative industry to shape an industrial brand image with a unique style. At the same time, integrating the focus of today's cultural and creative product design into future teaching can be helpful to cultivate design talents that are more in line with the current market needs. Through this research, we can see that various design concepts and methods have challenged traditional industrial practices. Only by providing high-quality cultural product designs for related industries can the industry visibility and competitiveness of enterprises be improved. Currently, this research only surveys college students studying in China. Because the subject matter of the product is the same as the Chinese cultural background, most of the testees have a similar understanding of the cultural connotation conveyed by the product. The following research will be able to expand the investigation of different ethnic groups and product varieties, and make more in-depth discussions on the emotional design of product brand image, the internationalization of local styles, and market acceptance.

Appendix

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Table 6 Factor Loading of Award-winning products

Path			Estimate	AVE	CR
J3	←	Pleasure	0.939	0.873	0.9537
J2	←	Pleasure	0.936		
J1	←	Pleasure	0.928		
B3	←	Beauty	0.797	0.7809	0.9141
B2	←	Beauty	0.921		
B1	←	Beauty	0.927		
C3	←	Originality	0.93	0.8649	0.9505
C2	←	Originality	0.933		
C1	←	Originality	0.927		
Ex3	←	Exquisite	0.935	0.8304	0.9361
Ex2	←	Exquisite	0.943		
Ex1	←	Exquisite	0.853		
Er3	←	Ergonomics	0.927	0.8769	0.9553
Er2	←	Ergonomics	0.925		
Er1	←	Ergonomics	0.957		
PI1	←	Degree of purchase(Award-winning products)	0.954	0.9095	0.9679
PI2	←	Degree of purchase(Award-winning products)	0.951		
PI3	←	Degree of purchase(Award-winning products)	0.956		

Table 7 Factor loading of best-selling products

Path			Estimate	AVE	CR
J3	←	Pleasure	0.924	0.8349	0.9381
J2	←	Pleasure	0.939		
J1	←	Pleasure	0.877		
B3	←	Beauty	0.915	0.8393	0.94
B2	←	Beauty	0.899		
B1	←	Beauty	0.934		
C3	←	Originality	0.927	0.8508	0.9448
C2	←	Originality	0.908		
C1	←	Originality	0.932		
Ex3	←	Exquisite	0.909	0.8459	0.9427
Ex2	←	Exquisite	0.934		
Ex1	←	Exquisite	0.916		
Er3	←	Ergonomics	0.956	0.833	0.9372
Er2	←	Ergonomics	0.853		
Er1	←	Ergonomics	0.926		
PI1	←	Degree of purchase(Best-selling products)	0.948	0.9288	0.9751
PI2	←	Degree of purchase(Best-selling products)	0.968		
PI3	←	Degree of purchase(Best-selling products)	0.975		

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Table 8 Discriminant validity of award-winning products

	Pleasure	Beauty	Originality	Exquisite	Ergonomics	purchasing
Pleasure	0.873					
Beauty	0.499***	0.7809				
Originality	0.558***	0.502***	0.8649			
Exquisite	0.551***	0.497***	0.554***	0.8304		
Ergonomics	0.548***	0.492***	0.552***	0.553***	0.8769	
Purchasing	0.421***	0.898	0.446***	0.452***	0.265***	0.9095
AVE square root	0.934	0.884	0.930	0.911	0.936	0.954

Table 9 Discriminant validity of best-selling products

	Pleasure	Beauty	Originality	Exquisite	Ergonomics	purchasing
Pleasure	0.8349					
Beauty	0.519***	0.8393				
Originality	0.559***	0.5***	0.8508			
Exquisite	0.55***	0.5***	0.547***	0.8459		
Ergonomics	0.541***	0.494***	0.543***	0.542***	0.833	
Purchasing	0.618***	0.701***	0.367***	0.313***	0.403***	0.9288
AVE square root	0.914	0.916	0.922	0.920	0.913	0.964

Table 10 Overall fitting coefficients of award-winning products

X^2/df	RMR	GFI	AGFI	PGFI	NFI	RFI	IFI	TLI	CFI	PNFI	PCFI	RMSEA
1.49	0.07	0.9	0.855	0.625	0.966	0.956	0.956	0.985	0.985	0.746	0.763	0.053

Table 11 Overall fitting coefficients of best-selling products

X^2/df	RMR	GFI	AGFI	PGFI	NFI	RFI	IFI	TLI	CFI	PNFI	PCFI	RMSEA
1.97	0.088	0.872	0.818	0.611	0.955	0.942	0.977	0.971	0.977	0.743	0.760	0.074

Table 12 Factor loading of award-winning products

Path			Estimate	AVE	CR
Degree of preference	←	Emotional design	0.949	0.7542	0.9583
Ergonomics	←	Emotional design	0.955		
Exquisite	←	Emotional design	0.959		
Originality	←	Emotional design	0.961		
Beauty	←	Emotional design	0.963		
Pleasure	←	Emotional design	0.963		
Purchase intention	←	Emotional design	0.647		
Purchase intention	←	Degree of preference	0.323		

Table 13 Factor Loading of Best-selling products

Path			Estimate	AVE	CR
Degree of preferenc	←	Emotional design	0.934	0.7428	0.9562
Ergonomics	←	Emotional design	0.954		
Exquisite	←	Emotional design	0.977		
Originality	←	Emotional design	0.957		
Beauty	←	Emotional design	0.947		
Pleasure	←	Emotional design	0.948		
Purchase intention	←	Emotional design	0.564		
Purchase intention	←	Degree of preference	0.419		

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Table 14 Overall fitting coefficient table of award-winning products

X²/df	RMR	GFI	AGFI	PGFI	NFI	RFI	IFI	TLI	CFI	PNFI	PCFI	RMSEA
2.531	0.038	0.949	0.890	0.441	0.986	0.977	0.992	0.986	0.991	0.610	0.614	0.094

Table 15 Overall fitting coefficient table of best-selling products

X²/df	RMR	GFI	AGFI	PGFI	NFI	RFI	IFI	TLI	CFI	PNFI	PCFI	RMSEA
2.110	0.029	0.967	0.917	0.380	0.990	0.981	0.995	0.990	0.995	0.519	0.521	0.080

Table 16 Analysis of the mediation effect of award-winning products

	Point estimate	Product of coefficients		Bootstrap 5000 time 95% CI			
				Bias corrected		Percentile	
		SE	Z	Lower	Upper	Lower	Upper
Emotional factors-purchase intention	0.245	0.108	2.269	0.103	0.528	0.106	0.53
Degree of preference-purchase intention	0.694	0.116	5.983	0.488	0.947	0.483	0.938
Emotional factors-degree of preference	1.023	0.031	33	0.963	1.087	0.963	1.086

Table 17 Analysis of the mediation effect of best-selling products

	Point estimate	Product of coefficients		Bootstrap 5000 time 95% CI			
				Bias corrected		Percentile	
		SE	Z	Lower	Upper	Lower	Upper
Emotional factors-purchase intention	0.436	0.073	5.973	0.298	0.585	0.29	0.575
Degree of preference-purchase intention	0.619	0.077	8.039	0.468	0.772	0.476	0.777
Emotional factors-degree of preference	1.054	0.031	34	0.998	1.118	0.998	1.118

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Table 18 Structural model analysis

Variable parameter			Standardized path coefficient	C.R	P	Test result
Structural model analysis of award-winning products						
Degree of preference	←	Pleasure	0.22	0.619	0.536	Invalid
Degree of preference	←	Beauty	0.28	0.495	0.62	Invalid
Degree of preference	←	Originality	−0.14	−0.448	0.654	Invalid
Degree of preference	←	Exquisite	0.05	0.143	0.887	Invalid
Degree of preference	←	Ergonomics	0.56	2.581	0.01	Invalid
Degree of purchase	←	Degree of preference	0.31	2.863	0.004	Established
Degree of purchase	←	Ergonomics	0.14	0.545	0.586	Invalid
Degree of purchase	←	Exquisite	0.23	0.534	0.593	Invalid
Degree of purchase	←	Originality	−0.19	−0.442	0.659	Invalid
Degree of purchase	←	Beauty	−0.45	−0.65	0.516	Invalid
Degree of purchase	←	Pleasure	0.96	2.408	0.016	Invalid
Structural model analysis of best-selling products						
Degree of preference	←	Pleasure	−0.786	−2.674	0.008	Invalid
Degree of preference	←	Beauty	0.842			Invalid
Degree of preference	←	Originality	0.367	0.908	0.364	Invalid
Degree of preference	←	Exquisite	0.928	1.490	0.136	Invalid
Degree of preference	←	Ergonomics	−0.429	−0.917	0.359	Invalid
Degree of purchase	←	Degree of Preference	0.458	5.799	***	Established
Degree of purchase	←	Ergonomics	0.005	0.019	0.985	Invalid
Degree of purchase	←	Exquisite	0.387	1.280	0.201	Invalid
Degree of purchase	←	Originality	−0.054	−0.225	0.822	Invalid
Degree of purchase	←	Beauty	0.200	0.568	0.570	Invalid
Degree of purchase	←	Pleasure	−0.001	0.004	0.997	Invalid

Declarations

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