Design Preferences for Contemporary Chinese-Style Wooden Furniture: Insights from Conjoint Analysis

Xiaolei Cui,[a] Jindong Xu,[b] and Huajun Dong [a,*]

Chinese wooden furniture occupies a central role in the nation's cultural and historical heritage, serving not only as practical household items for period classification, but also as symbols of social status and artistic achievement. Recently, a new wave of Chinese-style furniture that blends traditional design elements with modern aesthetics has gained considerable market attention and recognition. This paper utilizes Conjoint Analysis to thoroughly investigate and assess consumer preferences and the visual appeal of contemporary Chinese-style furniture, leveraging a combination of user experience surveys and eye-tracking technology. This study suggests a sustained social interest in the materiality of Chinese heritage, emphasizing its relevance in today's culture. The findings show that in subjective evaluations, consumers prioritize material selection. Eye-tracking data reveals that "material," particularly "redwood," demands more intensive cognitive processing during the fixation stage. However, "decoration type" plays a dominant role in visual searches across multiple stages, indicating that consumers employ varied cognitive strategies when interacting with different product attributes. Additionally, consumers' focus on backrests and pattern craftsmanship offers valuable insights into future market trends.

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*Contact information: a: School of Art, Qingdao Agriculture University, No. 700, Great Wall Road, Chengyang District, Qingdao 266109, China; b: School of Science and Information Science, Qingdao Agriculture University, No. 700, Great Wall Road, Chengyang District; *****Corresponding author: 202101095@qau.edu.cn*

INTRODUCTION

As society advances and living standards broaden across a more diversified array of user groups, consumer demand for furniture has shifted from mere functionality to a greater focus on aesthetic value and cultural significance. New Chinese-style furniture, which combines traditional Chinese design elements with modern aesthetic concepts, has gained widespread attention and recognition in the market in recent years (Cao and Hansen 2006; Xiong *et al.* 2017). Despite the production appeal, Chinese-style furniture still faces numerous challenges in promotion, inheriting and innovating traditional craftsmanship, consumer perception and acceptance, and the phenomenon of design homogenization

Additionally, wood as a material with thousands of years of history, holds a crucial role in the preservation of cultural heritage. From buildings to furniture, wooden objects carry the craftsmanship and cultural values of various periods in Chinese history, serving as key mediums for understanding our past (Yin *et al.* 2012; Liu *et al.* 2013). Chinese wooden furniture is not only an item of home decoration and daily use but also a symbol of status and identity. In ancient China, different materials and designs in furniture often

corresponded to different social classes. High-quality wood, such as rosewood and *huanghuali*, was typically reserved for royal family and nobility (Liu *et al.* 2013; Jiang *et al.* 2020). The creation of Chinese wooden furniture embodies the essence of traditional Chinese craftsmanship, notably during the Ming and Qing dynasties, when woodworking techniques reached their peak in innovation and popularity. Techniques, such as mortise and tenon joints, carving, and inlaying, not only made the furniture durable but also imbued it with unique artistic value that is significant to its historical legacy (Xue and Chen 2024; Yan *et al.* 2024). The design of Chinese furniture emphasizes simplicity, symmetry, and harmony, reflecting Confucian practices of faith and aesthetic pursuits in Chinese culture (Xu and Zhang 2011; Chai *et al.* 2020).

As time has progressed, Chinese wooden furniture has continuously evolved, from ancient furniture with low shape to Song Dynasty furniture with simple and high furniture, and then to Ming and Qing furniture of a brilliant period, each period displaying unique styles and characteristics. In recent years, there has been a resurgence in the collection and study of Chinese furniture, driven by a renewed appreciation of traditional culture and heritage (Cao and Hansen 2006; Xiong *et al.* 2017). Many pieces of Chinese wooden furniture have been nationally recognized as culturally significant heritage pieces, receiving more systematic protection and study (Wu and Liu 2019; Wu *et al.* 2021; Xiong *et al.* 2021). Even today, the design principles and craftsmanship of Chinese wooden furniture have a profound influence on modern furniture design. Modern designers have fused traditional elements with contemporary aesthetics to create a new style of Chinese furniture, allowing the aesthetic concepts of Chinese wooden furniture to endure and develop (Niu and Huang 2022; Sun and Du 2022; Ye *et al.* 2022). Therefore, the protection and preservation of materials of cultural significance—in this instance, wood and wood production techniques—is not only about safeguarding historical records, but also about passing on the aesthetics and skills accumulated by previous generations (Wu 2022).

In recent years, as consumer demands have become more diverse and personalized, various analysis methods have been widely applied in the field of furniture design to ensure that products not only meet functional requirements but also provide a superior user experience. Common furniture design analysis methods include the Kano model, Quality Function Deployment (QFD), and Conjoint Analysis. These methods systematically identify and analyze user needs, offering effective tools for furniture design. The Kano model helps designers prioritize fundamental requirements and explore features that enhance user satisfaction by classifying customer needs (Matzler and Hinterhuber 1998). QFD translates consumer needs into actionable design parameters, ensuring that the design process closely aligns with user expectations (Akao 1990; Du *et al.* 2024). In addition, Conjoint Analysis uses a multi-attribute preference model to quantify consumer preferences for different design elements, such as materials, colors, and styles, helping designers make more precise design decisions (Green and Srinivasan 1990). The application of these methods in modern furniture design not only enhances the accuracy of design but also deepens designers' understanding of consumer psychology and behavior (Wan *et al.* 2018).

To better understand modern consumers' preferences for new Chinese-style wooden furniture and to create products that better align with market demands and cultural characteristics, it is essential to gain deeper insights into the materials, colors, and designs that consumers favor (Furst *et al.* 1996; Egbue and Long 2012). Traditional subjective measurement methods, which rely on surveys and questionnaires, are often limited by consumers' self-awareness and abilities of expression, lacking objective behavioral data to

support its suggestions (Feldmann and Hamm 2015; Osburg *et al.* 2016; Li *et al.* 2020). With technological advancements, current methods for researching consumer preferences typically combine quantitative and qualitative approaches to achieve more comprehensive results. Mao (2024) uses big data, such as consumer purchase records, browsing behavior, and social media data, and analyzes consumer preferences and behavioral patterns through data mining and machine learning techniques (Mao 2024). Eye-tracking technology is also widely used. Eye-tracking technology can record the eye movements and visual focus points of consumers when viewing furniture. Through analyzing this data, one can obtain consumers' true visual reactions and preferences (Wan *et al.* 2018).

The principle of eye-tracking technology is based on monitoring eye movements, accurately capturing the time and location of gaze fixation, reflecting the consumer's attention to different parts of the furniture during browsing (Anliker 1976). The selective attention theory suggests that people tend to focus on components of a product related to the current task or characteristics that interest them, revealing potential preferences for certain stimuli without conscious awareness (Ede and Nobre 2023). When viewing visual scenes, the human eye moves rapidly (known as "*saccades*") to maximize the efficiency of information intake. The fixation points and saccade paths during viewing can reveal how people process and understand visual information (Jacob and Karn 2003). Through analyzing these fixation points, one can infer how different types of information are processed and preferred by the audience, which may differ from conscious choices (Carrington *et al.* 2014). During decision-making, people often switch attention between multiple options, and eye-tracking data can help researchers understand how people weigh different options before making a decision. This process reflects the dynamic formation of group preferences (Mao 2024).

This paper, based on Conjoint Analysis (CA), aims to conduct a comprehensive study and evaluation of consumer preferences and visual quality for new Chinese-style furniture and its relation to historical design references, using a combination of subjective questionnaires and objective eye-tracking data. Conjoint Analysis is mainly used to understand how consumers weigh different attributes of a product or service when making purchasing decisions (Baier *et al.* 2009). Through designing a series of virtual products or services with different combinations of attributes and levels and asking respondents to rate or choose between these combinations, researchers can use statistical models to infer the contribution of each attribute and its levels to consumer decision-making. Through this method, researchers can determine which attributes are most important to consumers and the degree of preference for different combinations of attributes. Therefore, in this work, Conjoint Analysis was employed first to identify the various attributes and attribute levels that consumers value when choosing newly manufactured Chinese-style furniture, create product cards, collect data through surveys, and analyze it using SPSS Statistics 26 software to reveal the key factors influencing consumer purchasing decisions. Secondly, based on eye-tracking technology, representative new Chinese-style furniture products were experimentally tested, and the eye movement data of consumers viewing these products was collected and analyzed to assess their visual perception quality. Through the analysis of data from these two methods, this paper will explore the correlations between subjective questionnaire data and eye-tracking data, further deepening the understanding of the relationship between consumer preferences and visual quality.

This study considered the design preferences for contemporary Chinese-style wooden furniture, revealing consumer preferences regarding attributes such as material selection, design style, wood color, and decoration type. By utilizing Conjoint Analysis,

the study identified the weighting of each attribute in consumer decision-making, and, combined with eye-tracking technology, it analyzed consumers' visual focus points. This multi-dimensional research approach provides valuable market insights for furniture designers and manufacturers, helping them create furniture that aligns with modern aesthetics and market demands while preserving traditional cultural elements. By gaining a deeper understanding of the consumer decision-making process, this study holds theoretical and practical implications for promoting the modern innovation and cultural inheritance of traditional Chinese furniture design.

To better reflect the goals of this study, the cultural context is based on modern minimalist interior design. The focus of the study is new Chinese-style furniture, which represents a fusion of traditional Chinese design elements with modern aesthetics. Modern minimalist interior design emphasizes functionality and simplicity, while conveying a sense of elegance and tranquility through refined design language. New Chinese-style furniture, within this design context, not only inherits the cultural essence of traditional Chinese furniture but also incorporates modern elements that align with contemporary tastes. Therefore, this study aims to explore the cultural compatibility and aesthetic value of new Chinese-style furniture in a modern minimalist design environment, helping to understand how such furniture is perceived and appreciated by consumers in real-life spaces. This context provides a realistic cultural background for the experimental design, allowing for a more comprehensive assessment of consumers' emotional attraction and functional recognition of new Chinese-style furniture in modern living spaces.

EXPERIMENTAL

Overall Experimental Design

This paper utilized Conjoint Analysis (CA) and eye-tracking technology to conduct a comprehensive study and evaluation of consumer preferences and visual quality for new Chinese-style furniture, focusing on their relation to historical design references. Conjoint Analysis is a method used to understand how consumers weigh different attributes of a product when making purchasing decisions (Baier *et al.* 2009). By designing virtual products with varying combinations of attributes and levels, and having respondents rate or choose between them, the study employs statistical models to infer the contribution of each attribute to consumer decision-making. Using this method, the key attributes and preference structures for newly manufactured Chinese-style furniture are identified. The data are collected through surveys and analyzed using SPSS Statistics 26 to reveal the factors that most influence consumer choices. Additionally, eye-tracking technology is employed to experimentally test representative furniture designs, capturing consumer eye movement data to assess their visual perception quality. To further explore the role of cultural emotions, interviews were conducted to gain deeper insights into how consumers emotionally connect with the cultural significance of Chinese-style furniture, enriching the analysis of the factors driving their preferences. By analyzing both subjective questionnaire data and objective eye-tracking data, this study deepens the understanding of the relationship between consumer preferences and visual perception quality.

This study focuses on the Chinese round-backed armchairs, the most representative furniture products in Chinese wooden furniture. The participants were students and faculty from Qingdao Agricultural University. This study selected students and faculty from Qingdao Agricultural University as the primary sample group, based on several

considerations: First, this group was easily accessible, ensuring the smooth conduct of the experiment. Additionally, the high educational background and strong design perception ability of this group make them advantageous in understanding and evaluating modern furniture design trends. Particularly for contemporary Chinese-style furniture, younger and more highly educated consumers are often among those leading modern design trends. As such, this sample group can accurately reflect the preferences of a segment of the market that values innovative design and cultural heritage. However, recognizing that the core consumers of contemporary Chinese-style furniture may also include middle-aged and older individuals, high-income earners, and those with a deeper appreciation of traditional culture. Thus, future studies should expand the sample to include a more diverse range of participants. By incorporating collectors, traditional culture enthusiasts, and higher-income individuals into the survey, a more comprehensive understanding of consumer preferences in the actual market can be achieved.

To explore consumer preferences for Chinese round-backed armchairs, the study was conducted in three stages. First, consumer preferences were compared among typical products, aiming to identify the product attribute structures that influence these preferences. In this stage, both subjective ratings and eye-tracking data were collected. Second, eye-tracking data were compared for different parts of the round-backed armchair to determine which components consumers perceived as especially enticing. Finally, it was analyzed how different decoration types on the same component affect participants' preferences. The schematic diagram of experimental design is shown in Fig. 1.

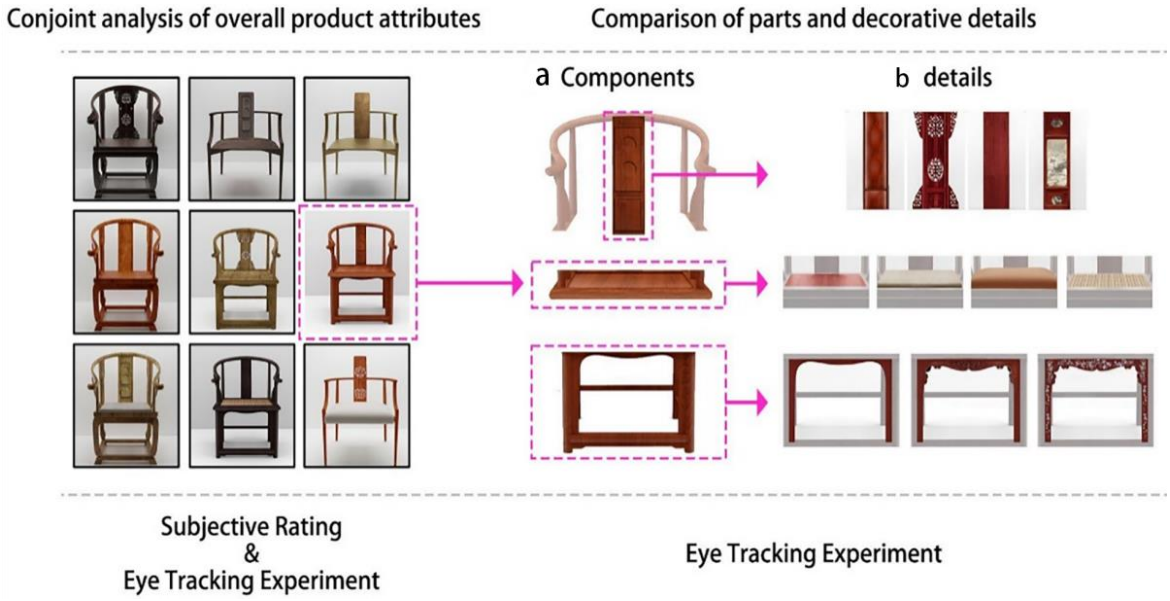

Fig. 1. Schematic diagram of experimental design

Conjoint Analysis Approach

Conjoint analysis is a widely used method in product design research for studying consumer preferences (Moore *et al.* 1999). This method involves having participants rate the overall profiles of multiple products, which allows for the decomposition and calculation of the preference biases of the participant group toward various product features. The essential data for conjoint analysis includes multiple attributes of the study object and the different levels of each attribute. An orthogonal experimental design is then used to

generate non-repetitive combinations of attributes and levels, resulting in the specific products that participate in the experiment. The application of conjoint analysis in this study is as follows. Through literature analysis and expert experience, 4 attributes (material, design style, wood color, and decoration type) were obtained, and each attribute has 3 levels, the attributes and levels are summarized in Table 1. "Rosewood" types are classified by color and wood species as follows: Black-Purple refers to *Pterocarpus santalinus*, Red-Brown corresponds to *Dalbergia cochinchinensis*, and Yellow-Brown refers to *Dalbergia odorifera*. Similarly, "Hardwood" are categorized by color and species: Black-Purple is Ebony, Red-Brown is Walnut, and Yellow-Brown is Teak. Additionally, the category "Mixed with Other Materials" combines wood with materials such as fabric, feather, and weaving for a more diverse design approach.

Table 1. Attributes and Levels Settings for Chinese Round-Backed Armchairs

Attributes /Levels	Material	Design Style	Wood Color	Decoration Type
1	Rosewood	Heavy & Luxurious	Black-Purple	Classical Elements
2	Hardwood	Elegant & Refined	Yellow-Brown	Geometric Elements
3	Mixed with Other Materials	Trendy & Stylish	Red-Brown	No Decoration

An orthogonal experimental design is then used to generate non-repetitive combinations of attributes and levels, resulting in the specific products that participate in the experiment. Through combining the attributes and levels of the round-backed armchair mentioned above, a total of 3^4(3*3*3*3) possible product combinations can be generated. To simplify the product design combinations, this study used the orthogonal design module in SPSS Statistics 26 to perform an orthogonal design, which combined the attributes and levels to generate 9 representative products, as shown in Table 2.

Table 2. Experimental Products of Chinese Round-backed Armchairs

Product Number	Material	Design Style	Wood Color	Decoration Type
1	Rosewood	Heavy and Luxurious	Black-Purple	Classical Elements
2	Rosewood	Elegant and Refined	Red-Brown	Geometric Elements
3	Rosewood	Trendy and Stylish	Yellow-Brown	No Decoration
4	Hardwood	Heavy and Luxurious	Red-Brown	No Decoration
5	Hardwood	Elegant and Refined	Yellow-Brown	Classical Elements
6	Hardwood	Trendy and Stylish	Black-Purple	Geometric Elements
7	Mixed with Other Materials	Heavy and Luxurious	Yellow-Brown	Geometric Elements
8	Mixed with Other Materials	Elegant and Refined	Black-Purple	No Decoration
9	Mixed with Other Materials	Trendy and Stylish	Red-Brown	Classical Elements

After collecting the questionnaire and eye-tracking data, the authors utilized the conjoint analysis method to calculate the utility values for each attribute and its levels, as well as the relative importance of each attribute. Utility values represent the level of preference consumers have for a particular attribute level, with higher values indicating stronger preferences. Meanwhile, using the utility values, the relative importance of each attribute is calculated. This is done by dividing the range of utility values for a particular attribute by the total range of utility values for all attributes. This shows how much

influence each attribute has on consumers' overall choices. The sum of the relative importance values for all attributes is 100%, and the proportion for each attribute represents how strongly consumers weigh that attribute when making their decision. The data processing for the conjoint analysis was carried out in SPSS Statistics 26. In general, the Pearson correlation was used to evaluate the model fit of the conjoint analysis for subjective preference data and eye-tracking data. When the Pearson's R statistic ($R > 0.7$, $Sig < 0.05$) is observed, it indicates a good fit between the data and the statistical model.

Eye Tracking Experiment

Eye tracking device

This study used the ERGONEERS DG3 eye-tracking glasses system for the eye-tracking experiment. The system has a sampling rate of 60 Hz and a tracking accuracy of 0.1 to 0.3°. The eye tracker will track and analyze the participants' visual data, including various types of visual activities related to fixation and saccades. Participants were positioned approximately 60 cm away from the product images. Experimental data were collected, processed, and recorded using D-Lab software.

Eye-tracking metrics

Areas of Interest (AOI) are a crucial concept in eye-tracking experiments, referring to pre-determined regions within the visual scene. The AOIs are used to define the scope of data calculation in eye-tracking studies, and their delineation is closely related to the research objectives and subjects.

Fixation refers to the alignment of the eyes so that the image of the area of interest being focused on falls on the fovea for a certain period (ranging from 100 to 2000 ms). Eye-tracking metrics related to fixation can be used to characterize the participant's level of engagement (Bylinskii *et al.* 2017). Some studies suggest that prolonged fixation indicates a higher level of cognitive alignment by the observer (Shojaeizadeh *et al.* 2016). Additionally, fixation-related metrics are also associated with the difficulty of visual tasks (Fitts 1950). The fixation-related metrics primarily used in this study are as follows:

- Mean Fixation Duration (ms): The length of time that a gaze is fixed on a particular AOI, measured in milliseconds (Salvucci and Goldberg 2000). A longer mean fixation duration typically indicates a more complex visual task that requires more processing time.
- Number of Fixations: Number of fixations on the AOI for the selected time interval.
- Saccade means brief, fast movement of the eyes that changes the point of fixation. These movements are crucial for shifting the line of sight from one area of interest to another, allowing the observer to quickly gather visual information from different parts of a scene. Eye-tracking metrics related to saccades can provide insights into the participant's visual search patterns and cognitive processing during a task. The specific saccade-related metrics used in this study are:
- Mean Saccade Duration (ms): Sum of saccade durations in a selected time interval divided by several saccades in a selected time interval.
- Mean Saccade Angle (deg): The sum of saccade angles within a selected time interval divided by the number of saccades in that interval. Larger saccade angles often indicate that the observed object's features are more distinct.

- Number of Saccades: The total number of saccades within the selected time interval. A higher number of saccades within a given time frame indicates more complex visual search behavior by the participants, suggesting that the features of the observed object are not distinctive enough.

Interviews

To more comprehensively assess the impact of cultural emotions on consumer evaluations, this study incorporated interviews focusing on the cultural significance of Chinese-style furniture into the experimental design. A selection of consumer participants were invited to take part in in-depth interviews regarding the cultural value and emotional connection of Chinese-style furniture. Through open-ended questions, participants were encouraged to express their perceptions of the cultural heritage of Chinese-style furniture and their emotional attitudes, while also exploring how these cultural emotions influenced their purchasing decisions.

Specifically, interviews covered the following aspects:

1. **Cultural Emotional Connection**: Participants were asked about their views on the cultural connotations of Chinese-style furniture and its significance in modern life. These questions aimed to understand how consumers perceive the cultural history and traditional values embodied in Chinese-style furniture and their emotional connection to this culture.
2. **Cultural Identity and Purchase Decisions**: It was explored whether participants' cultural identity had a significant impact on their decision-making when selecting Chinese-style furniture. Through the interviews, participants expressed the importance of cultural values in their furniture choices and whether cultural emotions motivated them to purchase this style of furniture.
3. **Emotions and Aesthetic Preferences**: The interviews also examined participants' aesthetic evaluations of the appearance, design, and functionality of Chinese-style furniture. The aim was to explore the relationship between cultural emotions and aesthetic preferences, and whether these emotions influenced the way consumers evaluated the furniture.

Methods

Conjoint analysis of overall product attributes

Based on the generated 9 representative product features in Table 2, the 9 virtual product profiles are presented visually according to the attributes and levels of each product by 3D modeling. The front elevation views of each product are shown in Fig. 2.

A preference survey and eye-tracking data collection were conducted for the nine products mentioned above. During the eye-tracking experiment, each product image was displayed for 8 s. After collecting and organizing the subjective rating data and eye-tracking data, the conjoint analysis method was applied to process the two sets of data separately. This analysis ultimately revealed the attribute-level structures of round-backed armchair products that influence consumer preferences under both subjective evaluation and eye-tracking conditions.

Fig. 2. Product images

Comparative Analysis of Product Components and Decorative Details

Comparison of product components

In this stage, the authors selected the product that received the highest subjective rating from the previous experiment. A detailed analysis was conducted of the decorative types of each component of this product. The AOIs were defined as shown in Fig. 3. AOI-1 represents the armrest, AOI-2 represents the backrest, AOI-3 represents the seat cushion, and AOI-4 represents the chair legs.

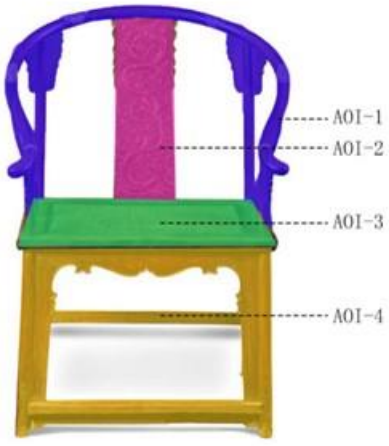

Fig. 3. Schematic diagram of AOI division for product components

The purpose of this phase of the experiment was to explore the differences in eye-tracking data across these components and to investigate which part of the round-backed armchair captures the most consumer attention.

Comparative Analysis of Decorative Types for Individual Components

Based on expert opinions, the authors experimented with a variation of design on three key decorative components of the round-backed armchair: the backrest, seat surface, and chair legs (in Table 3 and in Fig. 4). Specifically, the authors analyzed eye-tracking data for different decorative types on the backrest (leather, carving, plain wood, and inlay), seat surface (plain wood, fabric, leather, and weaving), and chair legs (plain wood, carving, and inlay). The aim was to explore which design elements at the component level of the round-backed armchair generate the most visual interest among participants.

Table 3. Decorative Types for Components of Round-backed Armchairs

Type	Backrest	Seat Surface	Chair Leg
1	Leather	Plain	Plain
2	Carving	Fabric	Carving
3	Plain	Leather	Inlay
4	Inlay	Weaving	/

a) leather **b)** carve **c)** plain board **d)** inlaid

Fig. 4. Four decorative types for backrest of round-backed armchairs

a) plain board **b)** fabric **c)** leather **d)** weaving

Fig. 5. Four decorative types for seat surfaces of round-backed armchairs

a) plain board **b)** carve **c)** inlaid

Fig. 6. Three decorative types for chair legs of round-backed armchairs

Participants' Demographics

The basic demographic characteristics of the sample population participating in this study are given in Table 4 (N = 105, after excluding 16 problematic samples from the original 121).

The gender distribution in the sample was fairly balanced, with 48.6% male and 51.4% female participants. The majority of participants (80%) were aged between 18 and 35 years, which indicates a younger population in this survey.

In terms of household income, 68.6% of participants report an annual income between 100,000 and 200,000 RMB. A considerable portion of the sample consists of students or doctoral candidates (70.5%), reflecting the academic background of most respondents. Educational attainment was also high, with 53.3% holding a bachelor's degree and 41.0% possessing a master's or doctoral degree.

Table 4. Basic Information of Participants

Sample Size (N = 105)	Title 2	Title 3	
Participants' Characteristics	Category	Count	Percentage
Gender	Male	51	48.57%
	Female	54	51.43%
Age	18 to 35years	84	80.00%
	36 to 50years	18	17.14%
	51 years and above	3	2.86%
Household Income (Yuan)	100,000 to 200,000 (RMB)	72	68.57%
	200,001 to 400,000 (RMB)	25	23.81%
	400,0001 to 700,000 (RMB)	5	4.76%
	Above 700,000 (RMB)	3	2.86%
Occupation	Students in university	74	70.48%
	Corporate/Company employee	2	1.90%
	Government/Public sector employee	21	20.00%
	Freelancer	3	2.86%
	Self-employed	4	3.81%
	Other	1	0.95%
Education Level	Master's/PhD	43	40.95%
	Bachelor's degree	56	53.33%
	Associate degree or below	6	5.71%
Familiarity with Chinese Wooden Furniture	Very familiar	8	7.62%
	Fairly familiar	40	38.10%
	Slightly familiar	52	49.52%
	Not familiar at all	5	4.76%

RESULTS

Analysis Results for Subjective Preferences

The conjoint analysis of the subjective preference ratings data for the nine round-backed chair products resulted in the relative importance values of each attribute, as shown in Table 5.

Table 5. Utility Values for Product Attribute Levels Based on Subjective Preferences

Attributes	Levels	Values	Relative Importance
Material	Rosewood	0.242	35.6%
	Hardwood	-0.148	
	Mixed with Other Materials	-0.094	
Design Style	Heavy and Luxurious	-0.148	27.5%
	Elegant and Refined	0.153	
	Trendy and Stylish	-0.005	
Wood Color	Black-Purple	0.071	21.8%
	Yellow-Brown	0.084	
	Red-Brown	-0.154	
Decoration Type	Classical Elements	0.093	15.1%
	Geometric Elements	-0.021	
	No Decoration	-0.072	
* The value of Pearson's R is 0.898. The value of significance is 0.001.			

The research results indicate that among the attributes, "Material" had the highest utility value, with "Rosewood" having the highest utility value (0.242). This was followed by the "Design Style" attribute, where "Elegant and Refined" had a utility value of 0.153. Within the "Material" attribute, "Rosewood" stood out with the highest utility value (0.242), while "Hardwood" (-0.148) and "Mixed Materials" (-0.094) had lower utility values. For the "Design Style" attribute, "Elegant and Refined" showed a higher utility value (0.153), whereas "Heavy and Luxurious" had a somewhat lower utility value (-0.148).

Fig. 7. Heatmap generated from eye-tracking data

In terms of relative importance, the "Material" attribute had the most significant impact on choice decisions, accounting for 35.649% of the total importance, followed by the "Design Style" attribute with 27.5%, the "Wood Color" attribute with 21.8%, and the "Decoration Type" attribute with 15.1%.

Analysis Results from Eye-tracking Experiment

Figure 7 illustrates the original choice set along with the heatmap generated by the software D-Lab, which visualizes participants'' areas of interest (red regions) as an example.

Fixation Data Results

Table 6 reports the utility values for each level of the attributes and the relative importance of each attribute with respect to Mean Fixation Duration. Fixation duration is generally associated with the significance of areas of interest to consumer attention. The Pearson's R correlation coefficient from the conjoint analysis (R = 0.963, Sig. = 0.000) indicated a good fit between the data and the statistical model.

Notably, the attribute with the greatest impact on Mean Fixation Duration was "Material," with a relative importance of 39.2%, followed by Wood Color (27.6%), Decoration Type (20.0%), and Design Style (13.3%). According to the utility values, the product attributes considered most interesting by participants were Rosewood (Mean Utility = 106.5), Black-Purple (Mean Utility = 91.0), Geometric Elements (Mean Utility = 70.0), and Elegant and Refined (Mean Utility = 51.5).

Table 6. Utility Values for Product Attribute Levels Based on Mean Fixation Duration

Attributes	Levels	Values	Relative Importance
Material	Rosewood	106.517	39.2%
	Hardwood	24.063	
	Mixed with Other Materials	-130.580	
Design Style	Heavy and Luxurious	-22.614	13.3%
	Elegant and Refined	51.513	
	Trendy and Stylish	-28.899	
Wood Color	Black-Purple	91.020	27.6%
	Yellow-Brown	-76.198	
	Red-Brown	-14.821	
Decoration Type	Classical Elements	-19.048	20.0%
	Geometric Elements	69.968	
	No Decoration	-50.920	
* The value of Pearson's R is 0.963; The value of significance is 0.000			

Table 7 reports the utility values for each level of the attributes and the relative importance of each attribute concerning the number of fixations. The number of fixations is related to information processing and the importance of information to the consumers. More fixations may indicate that participants are processing complex information or need more time to understand certain details, while fewer fixations might suggest quicker or simpler processing. The Pearson's R correlation coefficient from the conjoint analysis (R = 0.925, Sig. = 0.000) indicates a good fit between the data and the statistical model.

In particular, the attribute with the greatest impact on the number of fixations was "Decoration Type," with a relative importance of 39.6%, followed by Design Style (22.3%), Wood Color (18.9%), and Material (19.2%). According to the utility values, the product attributes with the highest number of fixations were No Decoration (Mean Utility = 0.478),

Yellow-Brown (Mean Utility = 0.303), Heavy and Luxurious (Mean Utility = 0.200), and Wood with Other Materials (Mean Utility = 0.258).

Table 7. Utility Values for Product Attribute Levels Based on Number of Fixations

Attributes	Levels	Values	Relative Importance
Material	Rosewood	-0.030	19.2%
	Hardwood	-0.228	
	Mixed with Other Materials	0.258	
Design Style	Heavy and Luxurious	0.200	22.3%
	Elegant and Refined	0.165	
	Trendy and Stylish	-0.365	
Wood Color	Black-Purple	-0.176	18.9%
	Yellow-Brown	0.303	
	Red-Brown	-0.127	
Decoration Type	Classical Elements	-0.524	39.6%
	Geometric Elements	0.046	
	No Decoration	0.478	
* The value of Pearson's R is 0.925. The value of significance is 0.000.			

Saccade Data Results

Table 8 reports the utility values for each level of the attributes and the relative importance of each attribute with respect to mean saccade duration. The average duration and frequency of saccades can reveal participants' visual search strategies and the distinctiveness of features. For example, a higher number of saccades and shorter saccade durations may indicate that participants are rapidly scanning the information, while fewer saccades and longer durations may suggest detailed observation of specific areas.
The Pearson's R correlation coefficient from the conjoint analysis (R = 0.961, Sig. = 0.000) indicated a good fit between the data and the statistical model.

Specifically, the attribute with the greatest impact on mean saccade duration was "Decoration Type," with a relative importance of 39.8, followed by Wood Color (24.4%), Material (21.9%), and Design Style (13.9%). According to the utility values, the product attributes considered most distinctive by participants are Geometric Elements (Mean Utility = 16.1), Black-Purple (Mean Utility = 9.8), Hardwood (Mean Utility = 9.3), and Trendy and Stylish (Mean Utility = 6.2).

Table 8. Utility Values for Product Attribute Levels Based on Mean Saccade Duration

Attributes	Levels	Values	Relative Importance
Material	Rosewood	-3.370	21.9%
	Hardwood	9.298	
	Mixed with Other Materials	-5.928	
Design Style	Heavy and Luxurious	-3.442	13.9%
	Elegant and Refined	-2.790	
	Trendy and Stylish	6.232	
Wood Color	Black-Purple	9.835	24.4%
	Yellow-Brown	-2.650	
	Red-Brown	-7.185	
Decoration Type	Classical Elements	-11.637	39.8%
	Geometric Elements	16.077	
	No Decoration	-4.440	
* The value of Pearson's R is 0.961. The value of significance is 0.000.			

Table 9 reports the utility values for each level of the attributes and the relative importance of each attribute with respect to the Number of Saccades. The Pearson's R correlation coefficient from the conjoint analysis (R = 0.896, Sig. = 0.001) indicated a good fit between the data and the statistical model.

Specifically, the attribute with the greatest impact on the number of saccades was "Decoration Type," with a relative importance of 33.9%, followed by Design Style (25.1%), Wood Color (21.3%), and Material (19.7%). According to the utility values, the product attributes associated with the fewest saccades were Hardwood (Mean Utility = -0.290), Black-Purple (Mean Utility = -0.200), Trendy and Stylish (Mean Utility = -0.434), and Classical Elements (Mean Utility = -0.511).

Table 9. Utility Values for Product Attribute Levels Based on Number of Saccades

Attributes	Levels	Values	Relative Importance
Material	Rosewood	0.045	19.7%
	Hardwood	-0.29	
	Mixed with Other Materials	0.244	
Design Style	Heavy and Luxurious	0.246	25.1%
	Elegant and Refined	0.188	
	Trendy and Stylish	-0.434	
Wood Color	Black-Purple	-0.2	21.3%
	Yellow-Brown	0.377	
	Red-Brown	-0.177	
Decoration Type	Classical Elements	-0.511	33.9%
	Geometric Elements	0.105	
	No Decoration	0.406	
* The value of Pearson's R is 0.896. The value of significance is 0.001.			

Product Components and Decoration Style Eye-tracking Data Comparison

Analysis results of eye-tracking metrics for product components

In this study, the subjective rating results of the products were compared, and the product with the highest average score was selected as the baseline for the eye-tracking experiment on product components. As shown in Table 10, the highest-scoring product was Product 2, which features redwood material, an elegant and refined design style, red-brown color, and geometric element decorations.

Table 10. Average Subjective Preference Scores of Products

Product No.	1	2	3	4	5	6	7	8	9
Mean Score	5.38	5.58	5.13	4.8	5.0	5.02	4.71	5.18	5.20

Table 11. Eye-tracking Results for Product 2

Components	Mean Fixation Duration (ms)	Number of Fixations	Mean Saccade Duration	Mean Saccade Angle (°)	Number of Saccades
Armrest	318.485	3.345	22.894	4.797	2.155
Backrest	1002.829	5.949	62.945	4.611	3.349
Seat Cushion	577.216	4.682	35.480	4.487	2.636
Chair Legs	570.080	5.465	29.896	4.615	4.021

The product was divided into AOIs as shown in Fig. 3, and the eye-tracking data were collected for the armrest, backrest, seat cushion, and chair legs. The results are shown in Table 11.

In the fixation eye-tracking data, the backrest received the highest mean fixation duration and fixation count, indicating that it captured the most attention from the participants. The seat cushion and chair legs followed, with the armrest receiving the least attention. This suggests that the backrest was the primary focus of the participants. In the saccade data, the backrest also had a significantly longer mean saccade duration compared to other parts. However, the armrest and chair legs had the largest mean saccade angle and saccade count, likely due to their slender shapes, which made the visual processing more complex.

Analysis results of eye-tracking metrics for different decorative types of each component

First, the homogeneity of variance test was conducted on the eye-tracking metrics in this experiment to ensure that the subsequent analysis metrics show significant differences between groups. The study applied analysis of variance (ANOVA) to process the data. Before conducting the ANOVA, the following assumptions were ensured: the samples under each treatment condition are random, the samples are independent of each other, the data under each treatment condition come from a normally distributed population, and the variances across different treatment conditions are equal. If these assumptions are not met, non-parametric analysis methods should be considered to obtain more reliable results. This study used the Levene test to examine the homogeneity of variances across different groups. The Levene test is used to assess whether the sample variances under each treatment condition are equal, to ensure that the homogeneity of variances assumption for ANOVA is met. The metrics with a significance level greater than 0.05, which were selected for further analysis, include mean fixation duration, number of fixation, and number of saccades, as shown in Table 12.

Table 12. Homogeneity of Variance Analysis for Eye-tracking Data of Different Decorative Types of Each Component

Eye-tracking Index	Levene	df1	df2	Sig.
Mean fixation duration	1.840	10	1217	0.050
Number of fixation	1.673	10	1217	0.082
Mean saccade duration	6.802	10	1217	0.000
Mean saccade angle	10.646	10	1217	0.000
Number of saccades	1.126	10	1217	0.338
Time to first glance	146.918	10	1217	0.000

The one-way ANOVA analysis was performed on the three valid data sets, and the results are shown in Table 13. The data indicate that the significance levels for all three factors were less than 0.05, suggesting that there were significant differences in means between the groups. This implies that participants exhibit significant differences in the eye-tracking metrics of Mean Fixation Duration, Number of Fixations, and Number of Saccades when observing different decorative types of chair components. Therefore, the subsequent analysis of the eye-tracking data will be conducted based on these key indicators.

Table 13. ANOVA Analysis of Eye-tracking Data for Different Decorative Types of Each Component

Eye-tracking Index		df	F	Sig.
Mean fixation duration	between-group	10	18.166	0.000
	within-group	1254		
	total	1264		
Number of fixation	between-group	10	70.927	0.000
	within-group	1234		
	total	1244		
Number of saccades	between-group	10	77.793	0.000
	within-group	1239		
	total	1249		

Analysis of Eye-Tracking Data for Different Decorative Types of Backrests

According to Table 14, the carved type of chair back received the highest number of fixations and saccades. These metrics, number of fixations, and number of saccades, indicate that the carved type, which had more distinctive features, garnered greater preference from participants. The inlay-type chair back, on the other hand, received the longest fixation duration, suggesting that participants paid more detailed attention to this type, reflecting a higher interest in it. In contrast, the leather chair back even performed lower than the plain type in some eye-tracking metrics, indicating the lowest level of interest from participants for this typical type.

Figure 8 shows that the carved-type chair back was a more connected and continuous high-heat region, with hotspots concentrated around the carved patterns. The other two types of chair backs display more dispersed heat regions, suggesting that participants' visual focus was more scattered when observing these types.

Table 14. Overall Eye-tracking Data for Different Decorative Types of Backrests

Decoration Styles	Mean Fixation Duration (ms)	Number of Fixations	Number of Saccades
Leather	527.816	3.005	2.572
Carving	526.753	9.123	10.664
Plain	386.134	4.933	4.097
Inlay	680.335	3.396	2.800

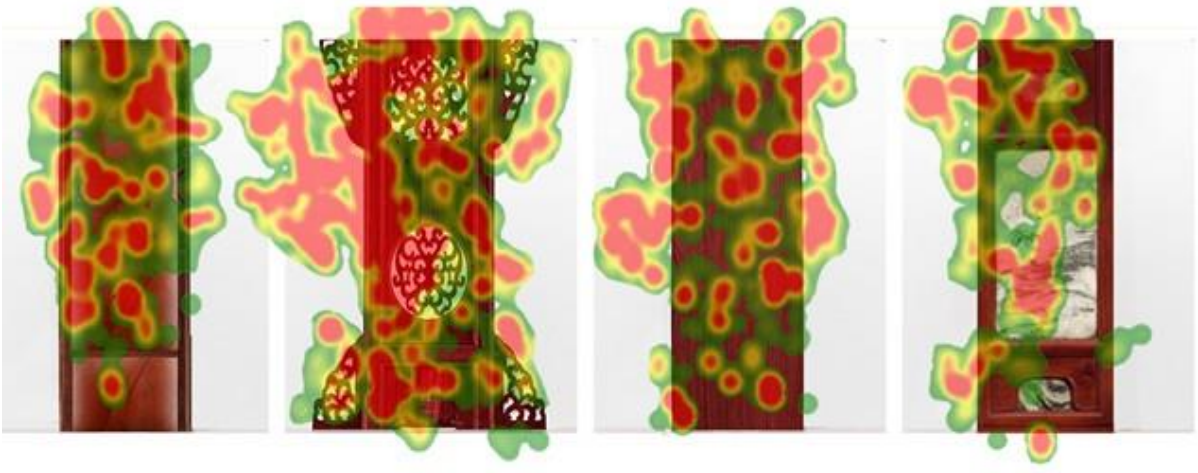

Fig. 8. Heatmaps of eye-tracking data for four decorative types of backrests

Analysis of Eye-Tracking Data for Different Decorative Types of Chair Legs

In the eye-tracking experiment results for the leg area, similar data patterns to those observed for the backrest were evident. The values for the number of fixations, and number of saccades parameters for the carved chair legs were higher than those for the other two types of chair legs. This indicates that carved chair legs, which have more distinctive features, attracted attention. In contrast, the mean fixation duration parameter was longer for the inlaid chair legs, suggesting that although participants looked at this type of chair legs less frequently, they spent more time on each fixation. This implies that the inlaid chair legs also attracted more interest from the participants.

As seen in Fig. 9, the heatmap for the carved chair legs is more continuous, with larger high-heat areas. In contrast, the heatmap for the inlaid chair legs shows multiple dispersed hot spots, which may be related to the presentation of the decorative patterns. The plain chair legs received the least attention with less heat areas.

Table 15. Overall Eye-tracking Data for Different Decorative Types of Chair Legs

Decoration Styles	Mean Fixation Duration (ms)	Number of Fixations	Number of Saccades
Plain	398.520	4.782	4.195
Carving	518.104	10.254	8.492
Inlay	586.715	5.709	4.778

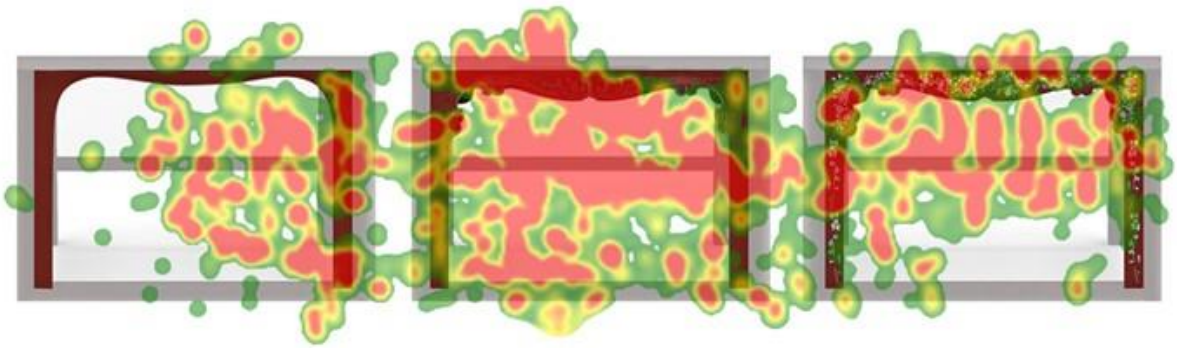

Fig. 9. Heatmaps of eye-tracking data for four decorative types of chair legs

Analysis of Eye-tracking Data for Different Decorative Types of Seat Cushions

Through analyzing the eye-tracking data for the seat cushions of four different decoration types, it was observed that the fabric type received the longest average fixation time. This result indicates that fabric seat cushions are of greater interest and preference to participants. Conversely, the rattan seat cushion had a lower average fixation time but received more fixations and saccades. This suggests that the visual characteristics of rattan cushions are more pronounced, capturing participants' curiosity. The leather seat cushion showed mediocre results, similar to those for the backrests and chair legs, indicating lower interest from participants.

It is evident that the wooden seat cushion has the smallest heatmap area in Fig. 10, while the fabric and leather seat cushions have the largest heatmap ranges. However, this does not align with the data trends, which may be due to the small AOI set for the seat cushions.

Table 16. Overall Eye-tracking Data for Different Decorative Types of Seat Cushions

Decoration Styles	Mean Fixation Duration (ms)	Number of Fixations	Number of Saccades
Wood	1.701	0.731	435.624
Fabric	3.033	0.763	351.912
Leather	2.891	0.707	340.219
Weaving	1.996	0.982	661.139

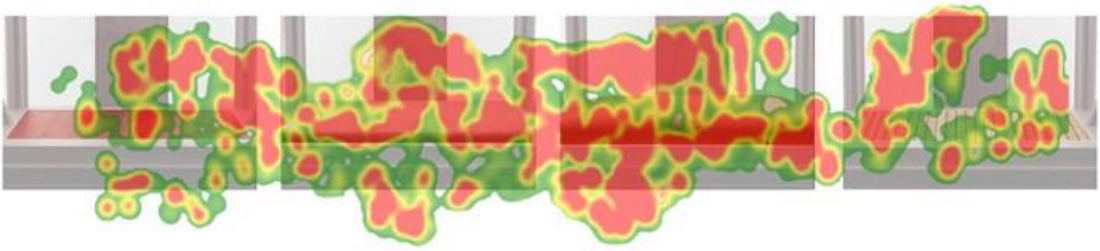

Fig. 10. Heatmaps of eye-tracking data for four decorative types of seat cushions

Analysis of Interview Results

Through consumer surveys and interviews, it was found that cultural emotions play a crucial role in consumer evaluations and purchasing decisions regarding Chinese-style furniture, reflected in the following aspects:

1. The Prevalence and Intensity of Cultural Emotions: Most respondents indicated that they had a deep emotional connection to the cultural connotations of Chinese-style furniture, especially in terms of its traditional cultural and historical value. This emotion not only stems from the unique visual and aesthetic qualities of the furniture but also from the heritage and spirit of Chinese culture it symbolizes. Some respondents mentioned that Chinese-style furniture evoked memories of family, national identity, and a strong sense of cultural belonging. Therefore, cultural emotions became an important psychological factor in their choice of furniture.

2. Cultural Identity's Influence on Purchasing Decisions: In the survey, most consumers clearly stated that cultural identity had a decisive influence on their purchasing decisions. Compared to modern furniture that focuses only on design and functionality, Chinese-style furniture, rich in cultural meaning, often stimulated a higher desire to purchase. Respondents believed that choosing Chinese-style furniture was not just about buying an item but also expressing recognition of traditional culture and respect for history. Some respondents even mentioned that they were willing to pay a higher price for Chinese-style furniture, seeing it as a form of support and acknowledgment of cultural heritage. For example, one respondent noted: "When I buy Chinese-style furniture, I am not just purchasing furniture, I am buying into a culture. These pieces make me feel connected to the past, especially when I see them in my home; they give me a sense of inner belonging."

3. Deeper Connections Between Cultural Emotions and Product Perception: Cultural emotions not only impact purchasing intentions but also profoundly influence how consumers perceive and evaluate Chinese-style furniture. Many respondents stated that the cultural value enhanced their overall assessment of the furniture's quality and aesthetics. Specifically, consumers believed that Chinese-style furniture not only had functional value but that the cultural symbolism behind it added a unique spiritual dimension to the product. For instance, traditional patterns or carvings on the furniture

were seen not just as decorations but as tangible representations of certain cultural spirits. Respondents generally felt that these cultural emotions increased the "spiritual value" of Chinese-style furniture, making them more inclined to use these pieces in their homes to convey and preserve traditional culture. This spiritual value, combined with aesthetic preferences, elevated the overall evaluation of Chinese-style furniture beyond its physical attributes and functional needs. As one respondent described: "Even if Chinese-style furniture functions the same as other modern furniture, I would still prefer the Chinese style because it offers me not just beauty but also the power of cultural heritage."

4. Cultural Emotions as a Driver of Emotional Premium: The results also showed that consumers with stronger cultural emotions toward Chinese-style furniture were often willing to pay higher prices, a phenomenon that can be understood as an "emotional premium." Consumers generally believed that cultural emotions were not just personal feelings but also a form of social recognition. They were willing to pay more for products that reflect these emotions, as they viewed such furniture as more than just ordinary goods but as cultural symbols. The motivation behind this premium was not solely based on product quality or craftsmanship but also on the consumers' desire to express their support and respect for traditional culture through their purchasing behavior.
5. Long-term Impact of Cultural Emotions on Consumer Satisfaction: Beyond short-term purchasing decisions, the survey revealed that cultural emotions had a significant impact on long-term consumer satisfaction. Many respondents mentioned that after acquiring Chinese-style furniture, their satisfaction came not only from the practical use of the furniture but also from the emotional pleasure they derived from seeing and using culturally meaningful items on a daily basis. This emotional fulfillment continued in their everyday lives, further reinforcing their high evaluation and loyalty to Chinese-style furniture.

DISCUSSION

This study explored consumer preferences for traditional Chinese round-backed armchairs from both a holistic and detailed perspective. A conjoint analysis was employed, combining four product attributes of round-backed armchairs—material, style, wood color, and decoration type—to assess the subjective evaluations and eye-tracking data of consumers from different age groups and backgrounds regarding New Chinese round-backed armchairs. Additionally, eye-tracking was used to study the eye movement preferences of consumers when viewing individual parts of round-backed armchairs presented in image form. The findings indicate that while material was the most important product attribute in subjective evaluations, decoration type had a significant impact on eye-tracking data.

In this study, the results of subjective evaluations were largely consistent with the utility value ranking for fixation duration in the eye-tracking data. "Material" was the most influential product attribute in participants' subjective choices, particularly "redwood." This aligns with traditional material typologies of Chinese heritage furniture production. Redwood furniture is considered synonymous with high-end, classic, and heritage value styles, often used in the creation of classical furniture and regarded as a status symbol (Ren

and He 2019; Zhu 2020). Owning redwood furniture is often seen as a reflection of wealth and taste, making consumers more subjectively inclined towards this material. Visually, redwood usually features dark wood grain and unique textures (Shou *et al.* 2014), which causes the product to appear very elegant and premium, possibly attracting longer fixation times during eye-tracking tests.

However, in other eye-tracking metrics, subjective preferences and eye-tracking data yielded almost opposite results. While material had a greater impact on fixation duration and subjective evaluation, decoration type had the most significant influence on the number of fixations, saccade duration, and saccade count. This discrepancy may reflect consumers' focus at different cognitive stages: material might trigger longer fixations due to its texture and quality, while decoration type may elicit more frequent fixations due to its visual distinctiveness. Mao (2024) compared the design styles, aesthetic performance, and visual attention of materials and decorations in Chinese chairs, suggesting that material and decoration have both independent and interactive effects (Mao 2024). The prominence of "no decoration" and "geometric patterns" in the data might reflect a new aesthetic trend influenced by modern, minimalist art forms, while still retaining a preference for traditional styles. This is consistent with current research findings. Yang (2024) suggested that the design of armrests in New Chinese chairs should strike a balance between tradition and modernity (Yang *et al.* 2024). Mao (2024) also found that the New Chinese style is more popular than the traditional Chinese style (Fan and Lv 2024).

In terms of saccade duration and saccade count, "Decoration Type" remained one of the most focused attributes in visual search. Notably, "Black Purple," "Hardwood," and "Trendy and Stylish" were consistently rated as distinctive attributes in the tests, while the differences between "Geometric Elements" and "Classical Elements" might also indicate that different design elements possess strong appeal and distinct characteristics. This differs somewhat from the fixation-related data, which may suggest that "no decoration" products, being simpler and easier to understand, require less processing of details but receive more attention to their form, leading to higher rates of fixation. In contrast, decorated products, with their distinct features, might attract repeated views to fully process details. These findings align with those of Zhang (2020), who used eye-tracking combined with sentiment analysis and perceptual evaluation methods to assess Tang Dynasty chairs, finding that decoration and form were the most influential factors (Zhang and Xu 2020).

In the eye-tracking experiment on chair components, the results for the backrest showed significant advantages in most eye-tracking metrics. This outcome is partly due to the backrest occupying a central position and a larger area in the frontal image of the round-backed chair, leading to greater attention from participants during the eye-tracking experiment. Additionally, the AOI for the backrest was more concentrated, resulting in more complete and sensitive data statistics. This also introduced a potential bias, as the experiment only used frontal images of the chair, whereas from other angles, the backrest might not be the largest eye-tracking capture area. Future studies could address this by allowing participants to view real products in a real-life setting or by using product images from multiple angles for comparative research.

In the interview, the results demonstrate the importance of considering cultural emotions when studying consumer behavior. By understanding the cultural connection consumers have with Chinese-style furniture, the research reveals the more complex emotional motivations in consumer decision-making and offers further possibilities for exploring the interaction between culture and consumer behavior in future studies.

The socio-demographic profile of this sample may not be representative of the general population, given the high proportion of young, academically inclined participants. However, the aesthetic trend of traditional Chinese furniture is currently undergoing noticeable changes, with "New Chinese" products gaining an increasing market share. To better adapt to this aesthetic shift towards younger consumers, it is crucial to understand the aesthetic preferences of this user group regarding Chinese furniture. Existing research also indicates that young consumers tend to focus more on the appearance and style of products rather than quality (Filieri and Lin 2017). This study primarily targets the style and design of Chinese round-backed armchairs, selecting a young demographic to potentially capture more sensitive data, as they are more concerned with these aspects.

CONCLUSIONS

This study explored consumer preferences for contemporary Chinese-style wooden furniture through the use of Conjoint Analysis and eye-tracking technology, which helped gather both subjective evaluations and objective visual attention data. The research sought to identify the key attributes influencing consumer preferences, particularly focusing on how different materials, design styles, wood colors, and decoration types impact consumer choices and visual attention patterns. By analyzing the preferences for Chinese round-backed armchairs, the study integrated both consumer surveys and eye-tracking experiments, providing a comprehensive view of consumer behavior.

Conjoint Analysis was utilized to break down consumer preferences based on four key attributes—material, design style, wood color, and decoration type—demonstrating the relative importance of each in decision-making. Meanwhile, eye-tracking technology was employed to record metrics such as fixation durations, saccades, and the number of fixations, revealing which furniture components captured the most visual attention. Consumer surveys and interviews were used to study the influence of cultural emotions on consumer evaluations and purchasing decisions. Based on the research objectives and methods, the key conclusions are as follows:

1. Material as a Key Factor: The study revealed that material, especially "redwood," was the most important factor in preferences of the panel members. Participants associated redwood with high quality, cultural significance, and aesthetic appeal, leading to higher fixation durations and subjective preference scores.
2. Influence of Decoration Type: Although material was prioritized in subjective evaluations, decoration type played a more significant role in visual search behavior, as indicated by the eye-tracking data. Consumers showed a strong preference for carved and inlaid decoration styles, especially in backrests and chair legs.
3. Cognitive Strategies in Furniture Evaluation: The combination of subjective and eye-tracking data suggests that different cognitive strategies are employed when evaluating material *versus* decoration. While material requires more cognitive processing time (longer fixation), decoration tends to attract more frequent shifts in attention (higher saccade counts).
4. Market Trends and Modern Aesthetic Preferences: The findings highlight a shift toward modern preferences in Chinese-style furniture, with younger consumers

favoring designs that balance traditional elements with contemporary aesthetics, reflecting current trends in minimalist and geometric designs.

5. Cultural Emotions Influence on Consumer Evaluations and Purchasing Decisions: The result shows that cultural emotions influence consumers' immediate purchasing decisions, product evaluations, purchasing willingness, emotional premium, and long-term satisfaction. This demonstrates that cultural emotions can be taken as a core variable when studying consumer behavior.
6. Design Implications for Future Products: The study suggests that future designs of Chinese-style furniture should focus on incorporating premium materials such as redwood while exploring diverse decoration techniques and increasing the study of cultural emotion to appeal to both traditional and modern consumer preferences. This approach could help maintain cultural heritage while adapting to modern market demands.

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