

# Jinxiu Yao Costume Design Based on Analytic Hierarchy Process and Ethnic Pattern Characteristics

Zehao Liang<sup>1</sup>, Chunli Tang<sup>2\*</sup>

{237787242@qq.com<sup>1</sup>, 986549094@qq.com<sup>2</sup>}

Guangxi Science & Technology Normal University, 966 Tiebei Road, Laibin City, Guangxi Province, China

**Abstract:** Jinxiu Yao Autonomous County has rich and well-preserved Yao cultural resources, which is praised by Fei Xiaotong as the center of Chinese Yao culture research. In its territory, there are five Yao subgroups of Panyao, Chashan Yao, Huachanyao, Shanziyao and Aoyao, which have national traditional pattern resources of high artistic value. In this study, questionnaire survey and interview methods were used to collect evaluation data of Yao costumes for consumers and practitioners of ethnic costumes. AHP was applied to analyze the weight of consumers' demands, and Jinxiu Yao costumes were designed based on the analysis results of practical needs, psychological needs, production processes and innovative characteristics, which combined representative symbol cultural elements with modern aesthetics.

**Key words:** AHP; Analytic hierarchy process; Kim Su; National patterns; Clothing design

## 1 Introduction

Clothing aesthetics is a complex comprehensive judgment process, which is influenced by subjective and objective factors such as people's emotional factors, cultural accomplishment, lifestyle, and color, style, and material of clothing itself<sup>[1]</sup>. From the perspective of empirical research, this paper collects questionnaires and interviews local practitioners, designers and consumers of ethnic clothing. The quantitative and qualitative data evaluation method AHP was used to make decisions<sup>[2]</sup>. After sorting the weight of the demand for ethnic clothing, the design of ethnic clothing was targeted.

Jinxiu County of Guangxi is one of the main inhabited places of Yao nationality and the provinces with the largest number of Yao nationality branches in the world. It is located in the hinterland of Dayao Mountain in the Middle East of Guangxi. From Ming and Qing Dynasties to 1940, the Yao people used the self-made stone plate system to maintain the order of production and life. Due to the relatively few contacts and integration with other ethnic groups, the Jinxiu Yao people retained a rich and complete Yao culture, and the Jinxiu Yao people occupied an important position in the study of Chinese Yao<sup>[3]</sup>.

The Yao costume system in the county has its own characteristics, and according to its ethnic origin, customs, culture and language differences, it is divided into five branches, such as Panyao, Chashan Yao, Huachanyao, Shanziyao and Aoyao<sup>[4]</sup>. Yao patterns are mainly used in hats, skirts, waistbands, trouser legs, back skirts, shawls, gaiters and other parts.

There are natural butterfly patterns, octagon patterns, snake patterns and other plant patterns and animal patterns, and there are also swastika patterns and Pan Wang prints reflecting totem worship. National pattern is not only an aesthetic symbol reflecting national aesthetics, but also a unique carrier of "living fossil" of national history and culture.

Ethnic clothing should be a continuous link for the transmission and retention of ethnic culture. In recent years, with the acceleration of economic globalization, social urbanization and modernization, the rapidly changing fashion clothing culture has caused a huge impact on the manufacturing, sales and communication of ethnic clothing. According to a foreign survey on the use of clothing, the global average number of times of wearing a piece of clothing decreased from nearly 200 times to 120 times in 2016<sup>[5]</sup>. The decrease in the number of times of wearing clothing in a year means the rapid change of fashion. Traditional national craft clothing from the design, production, sales all links can not keep up with such a trend speed.

This study starts from the introduction of the general situation, classification and aesthetic characteristics of Jinxiu Yao traditional patterns, combined with the AHP method to analyze the weight of each factor of Yao costume demand, and extracts the conclusion, so as to further explore its design principles and methods in clothing design. Through the integration of national craft characteristics and modern clothing design, we explore the application path of traditional ethnic patterns in modern design, and help Jinxiu Yao culture live inheritance.

## **2 Jinxiu Yao pattern research background**

At present, the research on Jinxiu Yao patterns mainly focuses on the classification, cultural connotation and artistic aesthetic characteristics of the patterns. The book "Jinxiu Yao Costume Pictorial Guide" gives a comprehensive and systematic introduction to the shape, structure, pattern and humanistic content of the five branches of Yao nationality in Jinxiu <sup>[6]</sup>, which provides a systematic overall reference for this study to understand the distribution and internal meaning of Jinxiu Yao patterns in clothing. In the academic research on Jinxiu Yao costume modeling system, there has been an overall analysis of the influence of Jinxiu Yao's living customs, cultural beliefs, history and geographical environment on their aesthetic formation, and a systematic and comprehensive study on their clothing structure and patterns, which provides a directional reference for the application position of patterns in clothing structure and the cultural causes of patterns in this study <sup>[7]</sup>.

In the academic research on the analysis of Jinxiu Yao patterns, there are views that Jinxiu Yao patterns have the characteristics of being embodied in objects, a specific combination of square shapes, and originated from nature, etc., and the design principles of Jinxiu Yao patterns' cultural creation are determined from the level of instinct design, behavior design and reflection design, providing a train of thought reference for this study <sup>[8]</sup>. In the graphic study of Jinxiu Yao patterns in modern clothing, some scholars put forward the general methods of extracting patterns, classifying and building databases through the evolution and development of shape grammar, and designed a complete set of modern clothing featuring Yao patterns, providing a complete process of extracting and deducing ethnic elements <sup>[9]</sup>.

In the research on the aesthetic language of ethnic patterns, some scholars have summarized Jinxiu Yao patterns as exaggeration and deformation, contrast and unity, repetition and

regularity in fashion design (meaning methods), and sorted out international brand designs that use ethnic elements abroad, and found the common points of aesthetic language between them [10].

From the perspective of iconography, some scholars have made an in-depth analysis of the formation form, theme background, and cultural connotation symbolized by Yao patterns, and put forward the viewpoint of exploring the life customs, worship concepts, and cultural values of national emotions contained in ethnic pattern<sup>[11]</sup>.

Foreign scholars<sup>[12]</sup> extend from the social identity theory that national fashion plays an intermediary role between self-identity and internationalization. National costume culture helps us to understand national cultural traditions and retain national knowledge. Therefore, in the process of preserving intangible cultural heritage and inheriting national cultural vitality, National dress is an important and unique part of national identity here.

In general, although the total number of studies on Jinxiu Yao patterns is relatively small, there have been systematic literature collection and work statements on its pattern classification, aesthetic modeling, cultural representation and other aspects. There have also been certain preliminary studies on the transformation of Jinxiu Yao patterns' literary and creative works, from which reference can be obtained for design ideas, design principles, and design effect display. But as far as the research output is concerned, it is mainly the combing of the connotation of pattern and the induction of the design principle, mainly the qualitative research.

### **3 Consumer demand weight evaluation of ethnic clothing based on AHP**

#### **3.1 The concept of AHP**

Hierarchy Process (AHP) is a multi-criterion decision-making method first proposed by Professor Thomas L. Saaty of the University of Pittsburgh in the early 1970s, which represents complex decision-making problems as an ordered hierarchical result. Based on people's subjective judgment and a series of calculations, it has the characteristics of clear thinking, simple method, wide application range and strong system<sup>[13]</sup>.

#### **3.2 Establish Yao costume evaluation index system**

Based on the semi-structured interview survey of tourists, sales staff of cultural and creative center and staff of cultural center in Jinxiu County, based on the principle of market demand, combined with the existing research situation, this paper analyzes the practical demand, psychological demand, production process and innovation characteristics of consumers, determines 4 aspects of demand and 11 specific indicators, and establishes the evaluation index system of Yao costumes ( Figure 1).

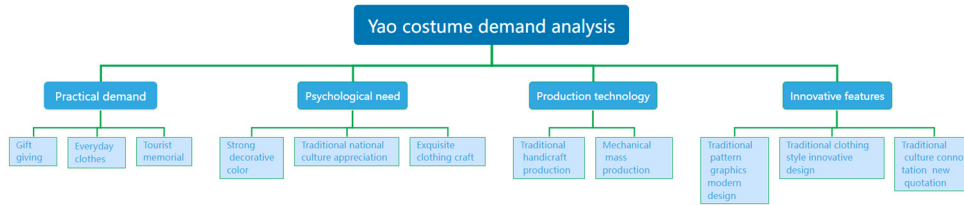


Figure 1 Yao costume evaluation index system

### 3.3 Establish the scale of judgment matrix

For the evaluation index system of Yao costume, the 1-9 scale is used to score the importance of indicators, and the importance of all indicators is assigned according to the principle of pound-for-pair comparison, so as to calculate the relative weight of each factor.

### 3.4 Weight evaluation of consumers' demand for ethnic clothing based on AHP

In this study, 5 Yao costume practitioners and 5 Yao costume designers in Jinxiu Yao Autonomous County were selected to make pairwise comparison on the importance of four aspects of demand, and the results were expressed by scoring scale. For 11 specific demand indicators at the sub-level, data were collected from 10 consumers with Yao costume purchasing habits, 10 ordinary consumers and 10 tourism sales personnel by means of questionnaires and interviews. The comparison between the basic needs of Yao people's costumes is shown in Table 1.

Table 1 AHP data of Yao nationality's basic demand for clothing

	Practical demand	Psychological need	Production technology	Innovative features
Practical demand	1.000	0.167	0.333	0.200
Psychological need	6.000	1.000	1.000	0.500
Production technology	3.000	1.000	1.000	0.250
Innovative features	5.000	2.000	4.000	1.000

To ensure that the evaluation weight results are established, a one-time test is carried out. After calculation, the maximum feature root is 4.159, and the CI value is calculated, The CI value is calculated using equation (1),

$$CI = \frac{\lambda_{\max} - m}{m - 1} \quad (1)$$

CI=0.053. By looking up the table, the RI value of the fourth-order matrix is 0.89, CR=CI/RI=0.059<0.1, the judgment matrix passes the consistency test, and the weight calculated by AHP is credible.

Aiming at the four items of practical needs, psychological needs, production process and innovation characteristics, a four-order judgment matrix was constructed for AHP hierarchical

research (calculation method: ANC), and the feature vector obtained by analysis was (0.262,1.054,0.726,1.958), and the weight value was shown in Table 2.

**Table 2** Results of AHP hierarchy analysis

Item	Eigenvector	Weighted	Maximum eigenvalue	CI value
Practical demand	0.262	6.547%		
Psychological need	1.054	26.358%		
Production technology	0.726	18.152%	4.159	0.053
Innovative features	1.958	48.943%		

Combined with the above data results, it is shown that in the current demand for Jinxiu Yao costumes, innovation features account for the largest proportion, followed by whether to meet the psychological needs, how to make the technology, and the last consideration is the practical needs of national costumes.

In the same way, weight analysis is carried out on the second layer of indicators of Yao costume demand, and the results are shown in Table 3.

**Table 3** Ranking weights of second-level subitems in Yao costume demand

Basic needs	Subrequirement	Weight
Practical demand	Tourist memorial	0.6221
	Wear everyday clothes	0.2413
	Gift giving	0.1366
Psychological need	Traditional national culture appreciation	0.4413
	Strong decorative color	0.3106
	Exquisite clothing craft	0.2481
Production technology	Mechanical mass production	0.5421
	Traditional handicraft production	0.4579
Innovative features	Traditional pattern graphics modern design	0.4324
	Traditional clothing style innovative design	0.3217
	Traditional culture connotation new quotation	0.2459

#### 4. Jinxiu Yao pattern dress design principles

Combined with AHP hierarchy analysis of the weight of Yao costume needs: innovation characteristics > psychological needs > production technology > practical needs, this design mainly focuses on innovation, culture and technology.

#### **4.1 Innovation**

Advocate pattern design innovation, clothing style innovation, color matching innovation and other means, on the basis of preserving Jinxiu Yao pattern cultural symbols and basic color matching bold innovation. By simplifying, reconstructing, enriching and re-creating the original national patterns, the vitality of the patterns is increased.

#### **4.2 Cultural**

The Yao ethnic group in Guangxi is rich in cultural resources. As the first place of food, clothing, housing and transportation, the costumes run through the information of Yao ethnic branch, totem belief, social status, national aesthetic preference and regional color. They are not only the living fossils of national history, but also the concise materialized symbols and expressions of Yao culture. The preservation and development of Jinxiu Yao costumes in the rapid changes of market economy today mainly rely on the individuality provided by ethnic characteristics culture. Therefore, in the innovative design, it is necessary to emphasize the styling characteristics of ethnic patterns, color matching of ethnic patterns, and ethnic pattern implication as the additional part of cultural value of tourism commodities to meet the cultural needs of consumers.

#### **4.3 Manufacturability**

Traditional Yao embroidery is embroidered on the warp and weft line of the cloth on the front or back, including seven or eight different stitches such as pan needle, trocar needle, fine needle, robbing needle, and flat needle. Skilled workers can embroider patterns directly without drawing or drawing, and the embroidery patterns completed by hand are exquisite. Yao embroidery is even listed in the third batch of national intangible cultural heritage list approved by The State Council of the People's Republic of China.

However, combined with the results of this research interview, questionnaire and AHP hierarchy analysis, the weight difference between the Yao costumes of the surveyed consumers is not obvious between the pure hand-made and mechanical mass production. From the perspective of innovative technology and reducing the purchase cost of consumers to improve the performance, this innovative design mainly discusses the clothing design styles suitable for computer embroidery.

### **5 Based on Jinxiu Yao pattern dress design case practice**

In the practice design, the style of a reference to Jinxiu Chashan Yao women's blouse and bold innovation, the use of wide sleeve shirt design, full color at the cuff with a small amount of sun pattern. Double sleeve design takes full account of the range of hand activity, simple and generous. The main points of decoration and beautification of this set of clothes are concentrated on the chest pattern, and the exquisite decal technology is used to display the original national pattern of the sun pattern. The sun pattern in the center of the chest of the clothes is also a beautiful message to the wearer in addition to the decorative role, here the auspicious pattern "sun pattern" is a reflection of the wearer's character and aesthetic habits, meaning that the wearer will shine in all directions, bringing light and hope, reflecting the

aesthetic taste of traditional national culture, to meet the psychological needs of consumers' clothing needs in the national culture aesthetic.

Style A woman wear a short skirt, skirt with prismatic geometric simple generous and not with the gorgeous sun of the top. The bold use of white on the outer belt and collar provides a splash of color to emphasize the curve of the waist in the overall indigo tone of the dress. The outer belt is tied with a pure decorative red band on the front and blue, red, yellow and green ribbon on the back to enhance the overall level. The feet are hollowed-out black shoes with red thousand-layer soles, which improve the overall posture and emphasize the sense of modern design.(Figures 2)

The style B adopts the design of standing collar Qipao MIDI skirt with broken sleeves.(Figures 2), the edge of the sleeves adopts two square continuous shape pattern, and the chest is protected with diamond plate. The main color of the whole body of the two styles is red and black with simple and generous, and the decorative use area is less, which focuses people's attention on the central decoration with gorgeous colors and complicated processes. The second style strengthens the upper body as the focal point of the visual center, and the lower body adopts a modern style without decoration, lengthening the proportion of the lower body.

The color matching of the two sets of clothes is mainly black (indigo), white, green, red and yellow in the traditional color matching of Jinxiu Yao nationality. On the basis of the overall simple and elegant style, the key point is that the color changes have layers and rich decorative sense, and the key is to meet the psychological demand for color decoration.

## **6 Conclusions**

National dress is the vivid carrier of national culture, and national pattern is the symbol of the unique connotation of national culture. The application of ethnic pattern innovation to modern clothing design can not only promote excellent ethnic traditional culture, strengthen Chinese cultural identity, and create an atmosphere of friendly coexistence among ethnic groups. It is also to excavate outstanding traditional cultural resources, discover cultural symbols, and help national cultural stories spread; It can also cooperate to build the image of Guangxi Yao ethnic group and help Guangxi Yao cultural resources live inheritance;

Based on the analytic hierarchy Process (AHP), the data collected by interviews and questionnaires can be deeply quantified, and the dimensions of clothing demand satisfaction and the demands in sub-directions can be weighted in order to help designers form an effective judgment on the market demand of Yao clothing and play a good data supporting role in the improvement of existing products.



**Figure 2** Jinxiu Yao costume design line drawing and color draft (left is style A, right is style B)  
Designed by Liang Zehao

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