A Study on the Interpretation of Cultural Symbols and Influence Path of Color Psychology in Intangible Cultural Heritage Communication

Jie Yang*
School of New Media, Beijing Institute of Graphic Communication, Beijing, 102600, China
j.yang@bigc.edu.cn

Shuo Wang
School of Art and Design, Beijing Institute of Graphic Communication, Beijing, 102600, China
shuo.w@bigc.edu.cn

Guobin Xia
School of Engineering, University of Liverpool, Liverpool, L69 3GH, UK
Guobin.Xia@liverpool.ac.uk

Abstract: Intangible cultural heritage, as a unique mark of regional culture, has profound historical and cultural connotations, and exploring its color cultural symbols and influence paths can help expand its communication effects. The article takes Beijing intangible cultural heritage - Beijing embroidery as the research object, constructs a color database by extracting the color characteristic data of Beijing embroidery, conducts a comparative analysis of the color brightness of different types of Beijing embroidery, and explores the cultural connotations of the psychological connotations of its color in combination with emotions. Then the structural equation model was introduced to study the influence path of color psychological cultural symbols on the audience's behavioral imagery of intangible cultural heritage communication. The correlation coefficient values between the bright sense of color of Beijing embroidery and the sense of softness, warmth, coldness, magnificence, and emotion are 0.982, 0.917, 0.835, and 0.829, respectively, which show strong correlation at the 1% level. The direct influence coefficient of color psychological cultural symbols on the audience's behavioral willingness to carry out ICH communication is 0.479, and its 95% confidence interval is [0.023,0.179]. Therefore, exploring the cultural symbols of color psychology in the communication of intangible cultural heritage can help to enhance the audience's behavioral willingness to carry out the communication of intangible cultural heritage, and also further enhance the effect and scope of the communication of intangible cultural heritage, and help the revitalization and inheritance of intangible cultural heritage.
Keywords: Intangible Cultural Heritage; Color Psychology; Structural Equation Model; Color Characteristics

1. INTRODUCTION

Intangible cultural heritage is the core symbol of the history, civilization and traditional culture of a country, nation or region. China's intangible cultural heritage contains the aesthetic meaning of Chinese culture, which originates from the fields and urban life, is full of fireworks and cohesion of the history and culture of a region, and is not only widely loved by the people in the region, but is also more likely to resonate with the Chinese people at home and abroad. Although intangible cultural heritage has a strong vitality, it is undeniable that with the change of history, economic and social development, the trend of personalization of popular cultural needs, and the butterfly change of new media technology, the intangible cultural heritage passed down by word of mouth is gradually lost, and part of the intangible cultural heritage is also facing the crisis of inheritance "generation break" (Chen, 2022; Li, 2022; Wei & Xin, 2024; Xue et al., 2019). The collision of cultural symbols of intangible heritage with modern creative interpretation, in line with the current popular national trend, can develop an unprecedented prosperity and cultural landscape, and contribute to the inheritance and development of intangible cultural heritage (Casonato, 2020; Jing et al., 2021; Su & Ismail, 2024). Most intangible cultural heritage, as an important form of visual expression, reflects the forefathers' reverence for the natural world and their ardent yearning for life. As color is an important part of visual communication, as well as the basis of visual communication, ICH colors can demonstrate the simple philosophy of life that all things in heaven and earth coexist in harmony through the color palette, hues and vivid color contrasts (Fu, 2017; Zhang, 2021; Zhu, 2017; Zlatev et al., 2019). Among them, the color of Chinese intangible cultural heritage is deeply influenced by the five elements and five colors, and is closely related to the folk life, forming the unique color taste of the folk (Jia et al., 2023; Kazlacheva et al., 2023; Yu & Tan, 2022). The language of colors is rich in symbols and metaphors, for example, red represents auspiciousness and warmth, white symbolizes purity and sanctity, black implies solemnity and mystery, and green is associated with life and reproduction (Rastogi et al., 2023; Roberts & Schmidtke, 2019; Xing, 2018). These color combinations are not only reflected in the design of intangible cultural heritage, but also deeply rooted in the folk activities and spiritual life of the people, becoming an important link between the past and the present, tradition and modernity (Dou et al.,

2023; Park, 2017; Weihua, 2017; Zhuang et al., 2022). Intangible cultural heritage not only carries rich historical information and national wisdom, but also has profound cultural connotation and aesthetic value. This paper analyzes the psychological visual effect of color and the psychological effect of color with the digital communication of intangible cultural heritage as an orientation. Taking Beijing intangible cultural heritage Beijing embroidery as the source of research samples, we extracted the color characteristics of its expression and constructed the corresponding color database. With regard to the cultural symbols of color psychology of intangible cultural heritage, its color brightness and psychological emotion are analyzed and demonstrated. In addition, this paper also combines structural equation modeling to construct a research model of the influence of color psychological cultural symbols on the audience's willingness to communicate intangible cultural heritage, so as to study the path of color psychological cultural symbols on the audience's willingness to communicate intangible cultural heritage.

2. DIGITAL COMMUNICATION OF INTANGIBLE CULTURAL HERITAGE AND COLOR PSYCHOLOGY

Intangible cultural heritage is the common wealth of all mankind. The rescue, preservation, transmission and development of intangible cultural heritage is an important and urgent issue facing our nation at a time of great social transformation. However, intangible cultural heritage is living, can not be protected like cultural relics, to develop intangible cultural heritage on the basis of inheritance. Using digital technology as a support to realize the digital dissemination of intangible cultural heritage and exploring the colorful psychological and cultural symbols embedded in intangible heritage will help to further expand its dissemination effect and realize the living inheritance and innovative development of intangible heritage.

2.1 Digital Dissemination of Intangible Cultural Heritage

2.1.1 Embodied Value of Digital Communication

As a new form of communication, digital communication has become a powerful tool for the dissemination of ICH, as it integrates various elements such as text, pictures, audio and video, and has many advantages such as plurality, interactivity and interest, wide dissemination and sustainability. The value of digital communication of intangible cultural

heritage is reflected as follows:

(1) Enriching the display forms of ICH. Digital communication can vividly present the historical stories, culture and skills of ICH through images, text, audio and video. The historical environment of ICH can be reproduced in the form of visual design, so that the audience can understand the development history of ICH. It can also be used with sound design and interactive design to display the process of techniques and product features of intangible cultural heritage, and through games, quizzes and other ways, let the audience understand the history, culture and techniques of intangible cultural heritage while further feeling the unique charm and exquisite skills of the techniques in intangible cultural heritage.

(2) Broaden the scope of dissemination of ICH. Digital communication can broaden the influence and dissemination scope of ICH through the network and other platforms. It can be disseminated through major digital libraries, network platforms and other channels without time and geographical limitations, so that more people can understand and recognize the intangible cultural heritage, and thus promote the inheritance of non-heritage skills in the old intangible cultural heritage and the development of its own brand. It is also possible to expand the scope of dissemination of intangible cultural heritage through social media and other channels to increase the dissemination effect and influence of intangible cultural heritage.

2.1.2 Digital Communication Process System

Digital technology has changed the mode of communication of intangible cultural heritage, digital communication of intangible cultural heritage is not breaking the boundaries of the traditional mode of communication, it is an innovative enhancement of the tradition, and it is in line with the "tradition" of this era. Based on the integration of the digital system, the dissemination of intangible cultural heritage content and dissemination of content and dissemination of the audience to structure the entire process system, specifically as shown in Figure 1 (Wang, 2023). The information from ICH content to dissemination content lies in the ICH resources themselves, and the core content of ICH is organized through digital technology. The mode of communication is the visual representation of the content, which is the process of dissemination to the public. The communication audience, i.e. the public, is the group of people who receive the digitalized information, and the structure of the process presents the relationship of parallelogram, which contains the stable form

of communication of equilateral triangle.

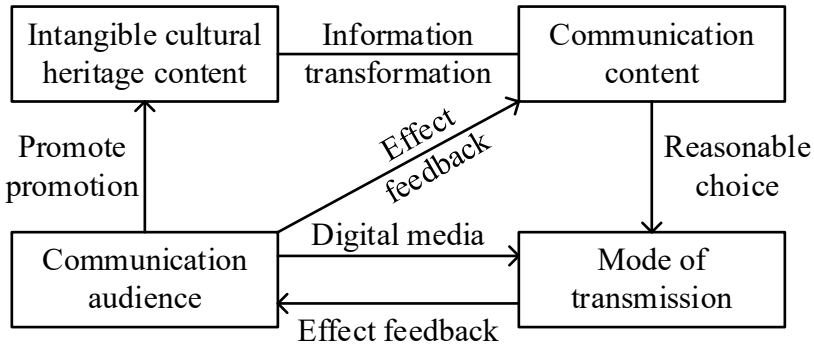

Figure 1: Unlicensed Digital Communication Process System

The "communication content" that is digitally extracted and transformed into intangible cultural heritage content selects a reasonable "communication method", gives it to the "communication audience" through digital media, and gives feedback to the "communication content" after receiving the dissemination of this method, so as to ultimately enhance the audience's attention to intangible cultural heritage and form a virtuous circle as a whole.

2.2 Color Psychology of Intangible Cultural Heritage

2.2.1 Psycho-Visual Sensing of Color

The physical properties of colors are the primary factors affecting visual perception. Colors with large amplitude are easily associated with bright things, while colors with small amplitude are associated with dark things. Similarly, in the process of color perception, although the physiological stimulus of color to the visual organs plays the first factor, but the multiple sensory organs of human beings tend to interact with each other, each other can not be divided. So when the color stimulation of the optic nerve, the person's own multiple sensory centers to form a pathway, causing mental association. People who are sensitive to color will associate it with the sense of lightness, warmth, coldness, and quietness. In the communication process of intangible cultural heritage, through subjective mental association, it can be given multi-level expression, so that the audience can understand the intangible cultural heritage through multiple senses, overcome the limitations of perception and senses of the aesthetic object, and thus have a richer and deeper aesthetic experience of the intangible heritage.

2.2.2 Psychological Effects of Color in NRMs

The image of color in people's minds and people's preference for color

vary greatly depending on the region. Especially the image of color in people's mind, in addition to the differences caused by geographical differences, there are also differences caused by acquired factors such as historical culture and religious background. Color stimulates people's vision and makes them produce different psychological effects, and in the dissemination of intangible cultural heritage, the psychological effect of color cannot be ignored. The psychological effect of color of intangible cultural heritage is shown in Figure 2, including emotional effect, association effect, symbol effect and perception effect (Jiang et al., 2022).

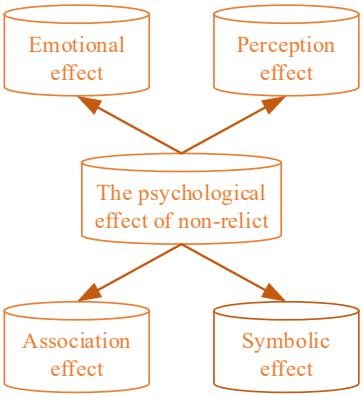

Figure 2: The Psychological Effect of Non-Relict

(1) The emotional effect of color. Color can make people produce different emotional effects, from this point of view on the distinction between colors can be divided into warm colors, cold colors, excited colors, calm colors, bright colors, dark colors and so on.

(2) The association effect of color. Mainly refers to a process from the concrete association to abstract association, that is, the color in the visual perception of people will also trigger the association of the color-related things, and then produce psychological abstraction level of imagination.

(3) The symbolic effect of color. Color symbolism is often recognized by the people, to a particular content of the color for a concept of the symbol.

(4) The perceptual effect of color. Color has perceptual, common including reflective and absorptive colors, forward and backward colors, expansion and contraction colors. Reflective colors do not absorb heat but only reflect light, so that the actual temperature of the object is relatively low. Absorbing colors absorb both light and heat, making the object warmer than it actually is. Forward color phase for backward color, the former will produce a sense of protrusion, the latter looks like a sense of backwardness or sense of depression, from the degree of color, the former is more for the color of the high degree of color, the latter is more for the

color of the low degree of color.

3. PSYCHO-CULTURAL SYMBOLS OF COLOR IN INTANGIBLE CULTURAL HERITAGE

Beijing's rich historical traditions have accumulated a large number of precious intangible cultural heritages, and the number of representative intangible cultural heritage projects ranks among the highest in the country. For a long time, the protection and development of Beijing's intangible cultural heritage has received attention from all walks of life, and certain achievements have been made, but there are still some shortcomings. Introducing digital technology into the dissemination of ICH as a way to promote the industrialization of ICH. Innovate the online dissemination of ICH, encourage the establishment of ICH themes, columns and special zones, and concentrate and continuously put in quality resources to create an "immersive" ICH online experience. Fully exploring the cultural symbols of the psychological expression of color in the dissemination process of intangible cultural heritage will help further enhance the dissemination effect of intangible cultural heritage.

3.1 Intangible Cultural Heritage Color Extraction

3.1.1 Information on Beijing's Non-Heritage Culture

As an important region for the exchange and integration of national cultures and arts, Beijing is home to a large number of intangible cultural heritages that are rich in form and strong in integration. At present, there are more than 12,000 items of intangible cultural heritage in Beijing, of which 12 items, including Beijing Opera, Taijiquan and Kunqu Opera, have been inscribed on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity, and there are another 144 representative items of national intangible cultural heritage as well as 303 representative items of municipal intangible cultural heritage, which makes Beijing one of the leading cities in the country in terms of the number of representative items of intangible cultural heritage. The number of representative items of all intangible heritage is among the highest in the country. In addition, the protection of NHs in Beijing has created a number of cultural brands and accelerated the digitization of NHs with the help of digitization opportunities, and a number of representative local cultural festivals with large social impacts have also promoted the inheritance and dissemination of NHs. This study chooses Beijing embroidery as the main object of

research, focuses on the forms of non-genetic inheritance of Beijing's intangible cultural heritage as well as dissemination strategies, and explores the cultural symbols of color psychology in the dissemination of intangible cultural heritage, in order to lay the foundation for exploring the specific role of cultural symbols of color psychology in the dissemination of Beijing's intangible cultural heritage.

3.1.2 Non-Heritage Color Data Collection

Accurately measuring the color L*a*b*chromaticity value of Beijing embroidery through spectrophotometer, and then introducing the objective analysis of color difference calculation, combined with the subjective analysis of human eye observation, the original color of Beijing embroidery will be accurately converted into the color of the Menzel color system, and the proprietary color card data for Beijing embroidery will be established. The color data is recorded and stored scientifically and accurately with special color information such as subject matter, age and color type. Figure 3 shows the color collection process of Beijing embroidery. In order to ensure the accuracy of the collected color reproduction, according to the selected color card, 15 standard observers are randomly selected, combined with a variety of natural light conditions and color psychology, to establish a tolerance color gamut for the collected color samples, combining the basic color information data with the tolerance color gamut, and ultimately establishing a proprietary matching color card data system for Beijing embroidery colors.

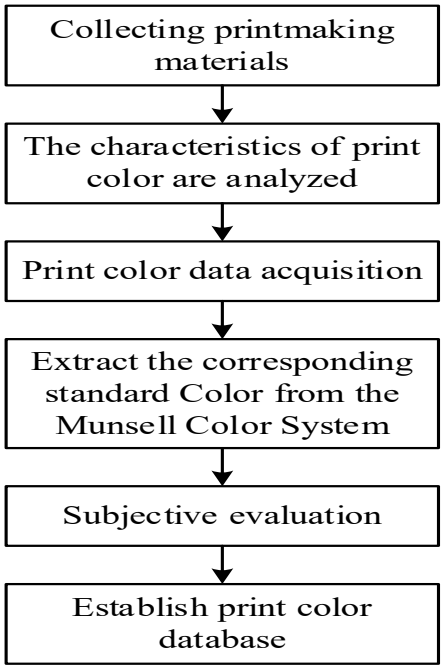

Figure 3: Beijing Embroidery Process

3.1.3 Non-Heritage Color Feature Extraction

Based on the database of Beijing embroidery color cards, the color characteristics of Beijing embroidery, an intangible cultural heritage of Beijing, were obtained. The colors of Beijing embroidery are very rich, in addition to the five positive colors of red, yellow, green, white and black, there are also five lower colors of purple, pink, blue, lake and fragrance, as well as five intermediate colors of deep red, light red, green, turquoise and flowing yellow (light or dark yellow), which are either blended from the positive colors or the chromaticity is not pure enough. In the color collocation also has its unique palace art style, the pursuit of colorful but not frivolous, solemn but not low (Wang et al., 2022). In the analysis of the cultural symbols of the color psychology of the non-heritage if too many colors will appear to be cluttered, the cultural theme symbols are not clear. Therefore, when extracting the colors, the four main hues of red, yellow, blue and green were chosen for the Peking embroidery works, whose main colors are more in line with the aesthetics and habits of modern people. The color matching, on the other hand, restores the superior color matching skills of the art of Beijing embroidery, whose chromaticity changes slightly due to shooting and other reasons, but the overall color tone remains the same. In this paper, we mainly chose four pieces of work, namely, the treasure blue satin embroidered flat gold cloud and crane clip-on waistcoat (JX1), the grass green silk satin embroidered peony regiment longevity clip-on waistcoat (JX2), the apricot yellow satin embroidered eight regiments of clouds and dragons female clip-on dragon robes (JX3), and the yellow gauze embroidered colorful clouds and gold dragons single robes (JX4). In the process of interpreting the color psychological cultural symbols of Beijing embroidery, the main color of these four works can be directly applied to determine the color tone, and some other auxiliary graphics or decorative parts can be applied to the secondary colors, and can be applied to the matching of the main color and the secondary colors, in order to achieve the interpretation of the cultural symbols of the color expression of Beijing embroidery.

3.2 Attribute Characteristics of the Color Psychology of Non-Heritage

3.2.1 Comparison of the Brightness of the Color of the Non-Heritage

Based on the four different types of Beijing embroidery selected in the previous section, combined with the color collection method of intangible cultural heritage given in the previous section, the brightness data of the four different types of Beijing embroidery are compared, and the brightness trend change of Beijing embroidery is obtained as shown in Fig.

4. As can be seen from the figure, the luminance difference of each color block color scheme in the treasure blue satin embroidered flat gold cloud and crane jacket (JX1) is five stages, which belongs to the contrast in luminance. As the low brightness color in the treasure blue satin embroidery flat gold cloud crane jacket area of the absolute advantage (area of about 75%). As a result, the treasure blue satin embroidered flat gold cloud crane jacket to brightness contrast dominated the composition of the color tone for the low medium tone. Grass green satin embroidered peony group life jacket (JX2) each color block color scheme of the brightness difference of five stages, belonging to the brightness of the middle contrast. Beijing embroidery architecture and pavement color block accounted for higher, 4, 8 as well as 12 color block for Beijing embroidery plant elements brightness, accounted for less. As the medium brightness color fast in the area of the absolute advantage. As a result, grass green satin embroidered peony group life jacket with brightness contrast dominated the composition of the tone for the middle of the middle tone. Apricot yellow satin embroidered eight groups of clouds dragon lady clip dragon robe (JX3) of the elements of the color block for 5, 7, 8, 9, 11, the same elements to form a stronger brightness difference, plant elements color block for 1, 10, there are two levels of brightness difference. The brightness difference of the elemental color blocks in the figure is six stages, which is a strong contrast of brightness. As the medium brightness color is absolutely dominant in the area. As a result, apricot yellow satin embroidered eight groups of clouds dragon lady clip dragon robe with brightness contrast dominated by the composition of the tone for the medium-length tone, forming a clearer brightness level hierarchy, the landscape spatial sense is strong. Yellow satin embroidered color clouds golden dragon single robe (JX4) of plant elements for color block 1, 3, 6, 8, brightness difference value is small, pavement elements color block 2, 5, 7, brightness value difference of about three levels. The luminance difference of the color blocks of the elements in the figure is four stages, which belongs to the contrast in luminance. Because of the low brightness color in the area of the absolute dominance, therefore, yellow yarn embroidered color clouds and golden dragons single robe color brightness contrast dominated the composition of the tone is low medium tone, the sense of space is weak. In summary, the four types of Beijing embroidery show obvious differences in brightness, different brightness embodies the color psychology also has a big difference, the visual experience for the audience has differences, and its embedded cultural symbols also have a certain degree of variability.

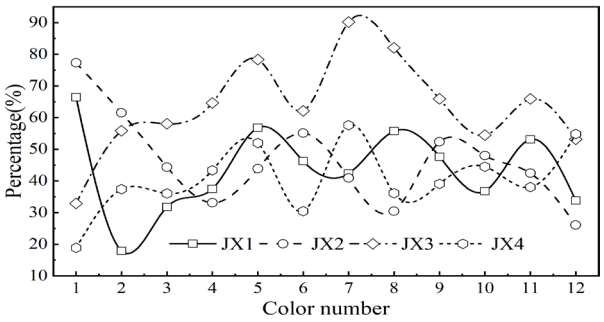

Figure 4: The Brightness of the Embroidery Changes

3.2.2 Psychological Emotions of Color in Nonheritage

Color is a language and a kind of information, which occupies the primary position of visual stimulation as the most direct visual impact factor. Since the method of relying on human subjective awareness and language description is too one-sided for the evaluation of color, the semantic differential method is used to provide a scientific basis and quantitative means for the analysis and evaluation of color perception and emotion. Personnel who can recognize colors normally were selected to evaluate the common color perception and emotion of Beijing embroidery according to the evaluation levels -3, -2, -1, 0, 1, 2, 3. The perception and emotion levels of colors are shown in Table 1.

Table 1: Color Perception and Emotional Hierarchy

Level	Bright	Hard soft	Cold warm	Ornate	Emotions
-3	Darkness	Hardness	Cold	Simplicity	Calm down
-2	More dark	Harder	Colder	Simpler	Calmer
-1	Darker	Pinking	Slightly cold	Austerity	Calmness
0	Neutrality	Neutrality	Neutrality	Neutrality	Neutrality
1	Brighten	Slightly	Slightly warmer	Slightly ornate	Slightly excited
2	Brighter	Softer	Warmer	Ornater	More excited
3	Shine	Soft	Warm	Ornate	Excitation

Using the internet survey as a medium, 200 valid questionnaires were collected using the questionnaire method, and the evaluation ratings were recorded and averaged to obtain the results of the evaluation ratings of the commonly used color families in Beijing embroidery as shown in Table 2. Pearson correlation coefficient was used to study the correlation between color sensation characteristics, indicating the strength of the correlation. Correlation coefficient is a quantity to study the degree of linear correlation between variables.The absolute value of Pearson correlation coefficient is generally above 0.75, which is considered that there is a strong correlation between A and B. Between 0.35 and 0.75, it can be considered that there is

a weak correlation, and below 0.35, it is considered that there is no correlation. The data in Table 2 were imported into SPSS for Pearson correlation analysis, and the results of correlation analysis of color features were obtained as shown in Table 3. In the table *,** represent $P<0.05$ and $P<0.01$ respectively. From the table, it can be seen that all the four items between the bright sense and the soft and hard sense, the cold and warm sense, the gorgeous sense, and the emotion show significance, and their correlation coefficient values are 0.982, 0.917, 0.835, 0.829, respectively, which are all greater than 0.82, which means that there is a strong positive correlation between the bright sense and the four sensory features. That is, the brighter the color is, the lighter it is, the softer it feels, the warmer the hue is, and it shows a certain sense of splendor, and the mood tends to be excited and bright. Other sensory characteristics can be obtained in the same way. Through the correlation analysis, it is easy to see that the red color has a more prominent sense of brightness, warmth, gorgeousness, and the mood is more excited. The green color has a slightly more pronounced sense of brightness and shows a slightly more sedate emotional character. The blue color possesses more prominent bright, soft and hard, and warm/cold characteristics, and shows a slightly more sedate mood. The yellow color system shows prominence in the sense of brightness, warmth and coldness, and its softness, hardness and magnificence features are also more obvious, showing the emotional character traits of excitement and cheerfulness. Based on the sensory characteristics of the color of Beijing embroidery, we can clarify its psychological and emotional changes, so as to better interpret the cultural spirit embedded in Beijing embroidery, and provide support for the exploration of the cultural symbols of color in intangible cultural heritage.

Table 2: The Evaluation Grade of the Common Color System of Beijing Embroidery

Level	Bright	Hard Soft	Cold Warm	Ornate	Emotions
Red	1.85	2.01	2.09	1.69	2.29
Yellow	2.06	0.85	2.13	1.18	1.72
Blue	-1.74	0.74	-1.74	-0.15	-1.38
Green	1.17	1.63	0.22	0.57	-1.24

Table 3: Correlation Analysis of Color Characteristics

-	Bright	Hard Soft	Cold Warm	Ornate	Emotions
Bright	1.000	-	-	-	-
Hard soft	0.982**	1.000	-	-	-
Cold warm	0.917*	0.843	1.000	-	-
Ornate	0.835*	0.724	0.937**	1.000	-
Emotions	0.829*	0.735	0.942**	0.918*	1.000

4. THE INFLUENCE OF COLOR PSYCHO-CULTURAL SYMBOLS ON THE DISSEMINATION OF NON-HERITAGE

With the communication advantages of digital technology, the communication of intangible cultural heritage is characterized by the typical features of high efficiency and immediacy, authority and precision, interactivity and multidimensionality, as well as three-dimensionality and immersion, and it also provides more possibilities for the long-term development of intangible cultural heritage. After clarifying the cultural symbolic expression of the color psychology of ICH, this chapter further uses structural equation modeling to study the specific path of its influence on the dissemination of ICH, aiming at enhancing the dissemination effect of ICH and realizing the living inheritance and development of ICH.

4.1 Hypothesis Formulation and Questionnaire Design

4.1.1 Formulation of Research Hypotheses

As a color expression derived from intangible cultural heritage, color psychological cultural symbols help the color expression of intangible cultural heritage to attract the attention of the audience, fully mobilize the audience's emotional and associative effects, thus influencing the audience to implement measures to enhance the communication effect of intangible cultural heritage. Based on the psychological and cultural symbols of color, the quality of the audience's perception of the intangible cultural heritage can be improved, thus enhancing the audience's understanding of the intangible cultural heritage and increasing the communication effect of the intangible cultural heritage. Color psychological cultural symbols will make the audience show more positive behavioral attitudes in the face of intangible cultural heritage, and guide the audience to carry out the dissemination of intangible cultural heritage with behavioral attitudes. Color psychological and cultural symbols also have a certain degree of influence on the audience's perceived behavioral control, the stronger the communication effect of intangible cultural heritage will make the audience's perceived behavioral control further strengthened.

Based on this, this paper proposes the following hypotheses:

H1: Color psychological and cultural symbols positively affect the perceived quality of audiences for NRM communication.

H2: Color psychological and cultural symbols positively affect the audience's behavioral attitude towards NRS communication.

H3: Color psychological and cultural symbols positively affect the

audience's perceived behavioral control of NRM communication.

H4: Color psychological and cultural symbols positively influence audiences' behavioral intention to carry out non-heritage communication.

H5: Perceived quality positively influences audience's behavioral intention to engage in non-heritage communication.

H6: Behavioral attitude positively influences audience's behavioral intention to communicate NRL.

H7: Perceived behavioral control positively influences audience's behavioral intention to communicate NRLs.

In summary, the hypothetical model proposed in this paper is shown in Figure 5.

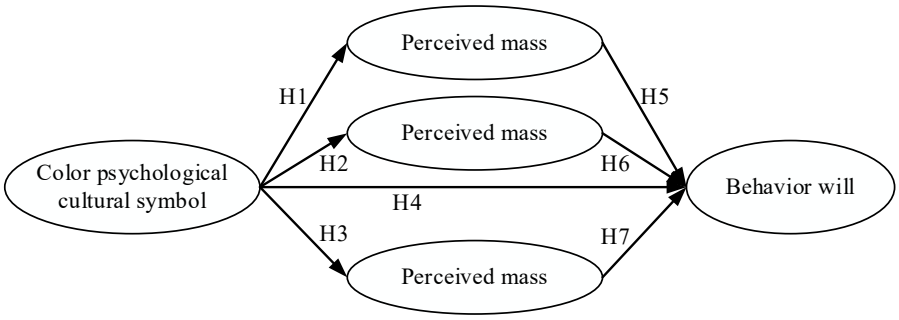

Figure 5: Research Hypothesis Model

4.1.2 Questionnaire Design

In order to ensure that the questionnaire is comprehensive, scientific and operable, this study adopts a pre-survey method to adjust the questionnaire, and the questions are mainly derived from the indicators used in existing studies. The questionnaire consists of two parts, the first part is the demographic characteristics and social attributes of the respondents, including gender, age, ethnicity and other basic information, and the second part is the main body of the questionnaire, i.e., the behavioral willingness to measure the transmission of intangible cultural heritages of the residents of Beijing, which is mainly designed from the five dimensions of the color psychological and cultural symbols, behavioral attitudes, perceived quality, perceived behavioral control and behavioral willingness. Including five latent variables and its 16 measurement indicators, its specific content is shown in Table 4. All questions were scored on a 5-point Likert scale from "strongly disagree" to "strongly agree" from 1 to 5, respectively, and the KMO value of the survey scale in this study was 0.934>0.75, which is suitable for factor analysis, and the Bartlett's test of sphericity showed that the scale is not suitable for factor analysis, and the scale is not suitable for factor analysis. The results of Bartlett's test of sphericity showed that the approximate chi-square value

was 9657.379 and the probability of significance was 0.002 (P<0.05), which indicated that the validity structure of the scale was good.

Table 4: Questionnaire Content

Index	Explanation	Symbol
Color Psychological Cultural Symbol	Emotional Symbol	CC1
	Associative Symbol	CC2
	Symbolize Symbol	CC3
	Perceptual Symbol	CC4
Perceived Mass	Understanding of Non-Relict	PM1
	Easy Access to Non-Legacy Knowledge	PM2
	Nongenetic Bearing	PM3
Behavior Attitude	Recognition of Non-Licents	BA1
	Love Not a Legacy	BA2
	Active Propagation	BA3
	Body Line	BA4
Perceptual Behavior Control	Have Enough Time	PB1
	Call On Friends to Spread	PB2
Behavior Will	Willing to Spread Unlicored	BW1
	Like to Spread Unlicored	BW2
	Unimpressed and Psychological Understanding	BW3

This study takes the local residents of Beijing as the research object, and obtains the first-hand data needed for the study through structured questionnaires. During the survey, 400 questionnaires were distributed to each scenic spot in Beijing by means of household (store) survey, and 368 valid questionnaires were obtained after eliminating the questionnaires with more repetitive choices or incomplete data, and the total recovery effectiveness rate was 92%. Using SPSS and AMOS software to analyze the research data, the research data basically conforms to normal distribution, sampling representation is good.

4.2 Hypothesis Testing and Mediation Effect Testing

4.2.1 Questionnaire Reliability Tests

In this study, the reliability and validity of the scales were tested using questionnaire measurements of the explanatory variables, explanatory variables, and latent variables such as the mediator variables. Table 5 shows the loadings, Cronbach' α and combined reliability (CR) of each measurement factor. The results of the study show that the loadings of each factor on the latent variables are higher than 0.6, and the Cronbach' α coefficients and CR values of the variable measurement items are above 0.8, which indicates that the data have good reliability and internal consistency, and can be used to analyze the path of the influence of the color psychological and cultural symbols on the willingness to communicate the behavior of the intangible cultural heritage.

Table 5: Items and Reliability Test Results of the Scale

Index	Symbol	Factor load	Cronbach' α	CR
Color Psychological Cultural Symbol	CC1	0.725	0.842	0.817
	CC2	0.688		
	CC3	0.763		
	CC4	0.675		
Perceived Mass	PM1	0.676	0.857	0.843
	PM2	0.789		
	PM3	0.762		
Behavior Attitude	BA1	0.791	0.919	0.869
	BA2	0.735		
	BA3	0.714		
	BA4	0.786		
Perceptual Behavior Control	PB1	0.785	0.923	0.824
	PB2	0.673		
Behavior Will	BW1	0.762	0.895	0.836
	BW2	0.786		
	BW3	0.658		

In addition, Table 6 shows the mean, standard deviation, correlation coefficient matrix, and average variance extracted (AVE) for each latent variable, respectively, with the diagonal line indicating the square root of AVE. Aggregate validity is used to measure the degree of aggregation of different indicators among the same factor, and it is generally considered that factor loadings and AVE are both greater than 0.6, which indicates that the scale performs well in terms of aggregation validity. The AVE values of the five measurement constructs in this paper all exceeded the 0.6 threshold, indicating good convergent validity. Distinguishing validity refers to the degree to which a construct distinguishes itself from all other concepts, and is usually measured by whether the square root of the AVE of a construct is greater than the correlation coefficient between that construct and other constructs. As can be seen from the table, The correlation coefficients between the latent variables are lower than the square root of AVE, which can be considered as a good discriminant validity of the research scale.

Table 6: Correlation Coefficient Matrix and AVE

Variable	Means	SD	AVE	Correlation Coefficient Matrix				
				CC	PM	BA	PB	BW
CC	3.241	0.715	0.632	0.795	-	-	-	-
PM	4.058	0.663	0.617	0.625	0.786	-	-	-
BA	4.123	0.702	0.629	0.549	0.515	0.793	-	-
PB	3.547	0.836	0.656	0.493	0.557	0.528	0.810	-
BW	3.769	0.689	0.608	0.455	0.536	0.584	0.616	0.780

4.2.2 Hypothetical Path Testing

In order to analyze the role of color psychological and cultural symbols in the genetic transmission of intangible culture in influencing the willingness to communicate behavior, this paper uses the software AMOS to verify the fitness of latent variables and the proposed model, and its running results are shown in Figure 6. And each path coefficient is tested, and its test results are shown in Table 7. The results show that the value of the chi-square degrees of freedom ratio (CMIN/DF) is 3.127, the value of the root mean square of the approximation error (RMSEA) is 0.036, and the value-added fit index (IFI), the non-canonical fit index (TLI), the comparative fit index (CFI), and the goodness-of-fit index (GFI) are 0.936, 0.927, 0.915, and 0.938, respectively, which indicates that the model fitness is high. From the results of the hypothesis path test, hypotheses H1~H7 were found to be valid. That is, color psychological and cultural symbols positively affect the audience's perceived quality, behavioral attitude, perceived behavioral control and behavioral intention to carry out ICH communication, and their path coefficients are 0.232, 0.324, 0.256, 0.479, respectively, and all of them show significant differences at the 1% level, which indicates that color psychological and cultural symbols will have a direct impact on the audience's behavioral intention to carry out ICH communication. The perceived quality, behavioral attitude and perceived behavioral control of audience for ICH communication all positively affect the behavioral intention of ICH communication respectively. This result is consistent with the basic framework of the theory of planned behavior in existing studies, as well as with some of the studies related to the effectiveness of ICH communication. In fact, some researchers have pointed out that the three antecedent variables of the Theory of Planned Behavior have different effects on behavioral intention in different research scenarios. The effects of audience's perceived quality, behavioral attitudes and perceived behavioral control on behavioral intention to communicate NRM need to be specifically analyzed in specific cases.

Table 7: Model path coefficient result

Hypothesize	Path	Coefficient	P	Result
H1	CC → PM	0.232	0.002**	Accept
H2	CC → BA	0.324	0.006**	Accept
H3	CC → PB	0.256	0.001**	Accept
H4	CC → BW	0.479	0.000**	Accept
H5	PM → BW	0.157	0.003**	Accept
H6	BA → BW	0.342	0.008**	Accept
H7	PB → BW	0.308	0.005**	Accept

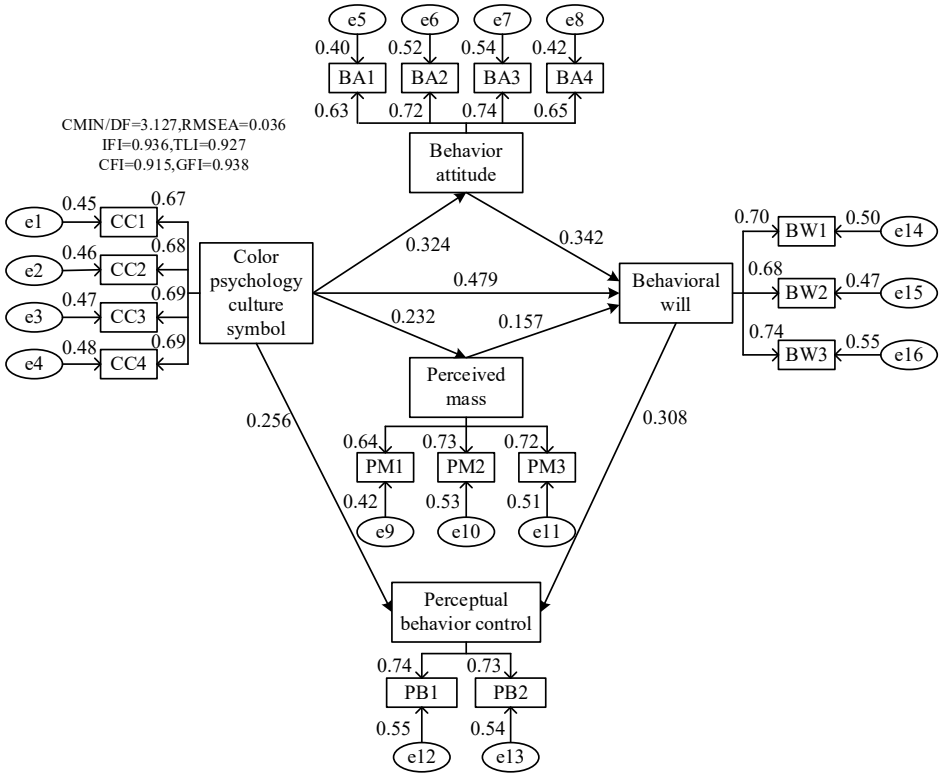

Figure 6: The Fitting Result of the Model

4.2.3 Mediated Effects Test

In this study, three indirect pathways, namely "color psychocultural symbols→ perceptual quality→ behavioral intention", "color psychocultural symbols→ behavioral attitudes →behavioral intentions" and "color psychocultural symbols→ perceptual behavior control →behavioral intentions", as well as the direct path "color psychocultural symbols → behavioral intentions". The parallel mediation model was established by AMOS again, and the Bootstrap method was used to test, and 1000 repeated samples were set, and the fixed confidence interval (PC) and bias correction confidence interval (BC) were both 95%. Table 8 shows the results of the mediating effect test. According to the results of the mediation effect test, the 95% confidence interval of the Bootstrap test of the paths "color psychocultural symbols→ perceptual quality →behavioral intention", "color psychocultural symbols→ behavioral attitudes →behavioral intentions" and "color psychocultural symbols → perceptual behavior control →behavioral intentions" does not contain 0, which proves that the parallel mediating effect is significant. The confidence interval of "color psychocultural symbols → behavioral intention" of the direct path is [0.023, 0.179], and does not include 0, which is consistent with the results of the hypothetical path test, which proves that color

psychocultural symbols have a direct impact on the audience's behavioral intention to disseminate intangible cultural heritage. In summary, color psychological cultural symbols can effectively improve the audience's perception quality of intangible cultural heritage, optimize the audience's behavioral attitude, combine their perception and behavior control, and then affect the audience's behavioral image of intangible cultural heritage transmission, which is helpful to further improve the communication effect of intangible cultural heritage.

Table 8: The Mediation Effect Tests the Results

Path	95% CI		P	Result
	Lower	Upper		
CC → PM → BW	0.259	1.517	0.002**	Accept
CC → BA → BW	0.207	0.728	0.005**	Accept
CC → PB → BW	0.115	0.334	0.000**	Accept
CC → BW	0.023	0.179	0.000**	Accept

5. CONCLUSION

Starting from the digital communication of intangible cultural heritage, the article establishes a color database with Beijing intangible cultural heritage Beijing embroidery as the research object, and analyzes the characteristics of its color psychological attributes. Then the influence path of color psychological cultural symbols on the communication of ICH was studied by combining with structural equation modeling. Under the comparison of the color brightness of four different types of Beijing embroidery, the 5, 7, 8, 9 and 11 element color blocks of apricot-yellow satin embroidered eight clusters of cloudy dragonesses sandwiching dragon robes (JX3), the same element forms a strong difference in brightness, in which there is a two-level difference in brightness in the color block of the plant element. The correlation coefficient values between the color brightness of Beijing embroidery and the softness, warmth, coldness, magnificence, and emotion are 0.982, 0.917, 0.835, and 0.829, respectively, which show strong correlation at the 1% level. This indicates that the color emotion reflects the color psychological effect, and the intangible cultural heritage can fully mobilize the audience's psychological emotion, and then help them better understand the cultural core of the intangible cultural heritage. In addition, there are direct and indirect effects of color psychological and cultural symbols on the audience's behavioral willingness to engage in NRM communication, with a direct effect coefficient of 0.479 and a 95% confidence interval of [0.023,0.179] that does not include zero.

Therefore, in the process of dissemination of intangible cultural heritage, fully exploring the cultural kernel of its color psychology can help to enhance the effect of dissemination of intangible cultural heritage and expand the scope of dissemination of intangible cultural heritage.

References

Casonato, C. (2020). Using Graphics to Communicate Intangible Cultural Heritage: Kids and Teens at Work! In *Proceedings of the 2nd International and Interdisciplinary Conference on Image and Imagination: IMG 2019* (pp. 182-194). Springer.

Chen, F. (2022). Analysis of the characteristics of art intangible cultural heritage in cross-cultural communication. *Art and Design Review*, *10*(3), 389-396.

Dou, J., Liu, M., & Chen, T. (2023). Embodiment of color metaphor: an image-based visual analysis of the Chinese color terms hēi 'black'and bái 'white'. *Language and Cognition*, *15*(3), 574-600.

Fu, Y. (2017). Aesthetic Research of Colors in Chinese Folk Art. 2017 International Conference on Humanities Science, Management and Education Technology (HSMET 2017),

Jia, J., Xu, P., Cui, R., Cao, J., & Sun, X. (2023). Coloration parsing and transfer design of han folk costumes. *ACM Journal on Computing and Cultural Heritage*, *16*(4), 1-17.

Jiang, B., Li, D., & Shui, S. (2022). A STUDY OF THE RELATIONSHIP BETWEEN THE PSYCHOLOGICAL SENSORY EFFECTS OF COLOR AND CLOTHING DESIGN. *Psychiatria Danubina*, *34*(suppl 5), 293-293.

Jing, X., Tan, F., & Zhang, M. (2021). Digital application of intangible cultural heritage from the perspective of cultural ecology. *Journal of Smart Tourism*, *1*(1), 41-52.

Kazlacheva, Z., Ilieva, J., Dineva, P., Stoykova, V., & Zlatev, Z. (2023). Digital Color Images as a Tool for the Sustainable Use of Embroidery Elements from Folk Costumes. *Heritage*, *6*(8), 5750-5778.

Li, Y. (2022). Characteristics of Intangible Cultural Heritage Communication in the New Media Environment. *Cultura: International Journal of Philosophy of Culture and Axiology*, *19*(1).

Park, S. O. (2017). A Study on the Development of Textile Design Contents Reflecting The Cultural Characteristics of Multi-cultural Society-Focused on Folk Paintings in China, Vietnam and Japan. Korea Science and Art Forum,

Rastogi, T., Munjal, K., & Thakuriya, K. (2023). " Environmental Heritage in Hues: Traditional Natural Colors in Madhya Pradesh Folk Art" Theme: Design and Environmental Protection. *Journal for ReAttach Therapy and Developmental Diversities*, *6*(1), 1430-1441.

Roberts, P., & Schmidtke, K. A. (2019). Folk core beliefs about color. *Review of Philosophy and Psychology*, *10*, 849-869.

Su, L., & Ismail, N. H. (2024). Application of Intangible Cultural Heritage Elements in The Interactive Space. *International Journal of Education and Humanities*, *13*(2), 88-91.

Wang, J. (2023). Barriers to sustainable development in digital communication of intangible cultural heritage: emotion drain under the technology dominance.

SHS Web of Conferences,

Wang, S., Liu, J., Jiang, J., Jiang, Y., & Lan, J. (2022). Attribute analysis and modeling of color harmony based on multi-color feature extraction in real-life scenes. *Frontiers in psychology*, *13*, 945951.

Wei, W., & Xin, X. (2024). Transformation and Development of Intangible Cultural Heritage through Technology. *Journal of Library & Information Science in Agriculture*, *36*(1).

Weihua, Y. (2017). A Discussion of Color Metaphors From the Perspective of Cognition and Culture. *Studies in Literature and Language*, *15*(1), 19-23.

Xing, H. (2018). Beauty of the White Mountain and Black Water Exploration on the Graphic Design of Folk Culture in Heilongjiang Province. International Conference on Contemporary Education, Social Sciences and Ecological Studies (CESSES 2018),

Xue, K., Li, Y., & Meng, X. (2019). An evaluation model to assess the communication effects of intangible cultural heritage. *Journal of cultural heritage*, *40*, 124-132.

Yu, R., & Tan, B. (2022). Construction of color network model of folk painting based on machine learning. International Conference on Machine Learning for Cyber Security,

Zhang, T. (2021). Color Network System of Folk Painting Based on Fractal Algorithm Theory. International conference on Big Data Analytics for Cyber-Physical-Systems,

Zhu, Y. (2017). Research on the application of Chinese folk art patterns in animation design. *International technical management*, *2*(3).

Zhuang, Q., Wan, M., & Zheng, G. (2022). Presentation and Elaboration of the Folk Intangible Cultural Heritage from the Perspective of the Landscape. *Buildings*, *12*(9), 1388.

Zlatev, Z., Indrie, L., Ilieva, J., & Ivanova, T. (2019). Analysis on colors of folk costume and their application in contemporary textile design. *Annals of the university of Oradea Fascicle of textiles, leatherwork*, *20*(1), 125-130.