

Intangible Cultural Heritage of Bio-inspired Design in Manchu Graphic Symbols

XIA Jia^{1, 2*}, YUIZONO Takaya¹

¹Graduate School of Advanced Science and Technology, JAIST, Nomi, Ishikawa, 9231292, Japan

²Dalian Polytechnic University, China

*Corresponding author. Email: xiajia19790923@163.com

ABSTRACT

Intangible cultural heritage carries the civilization of human society and reflects the world's cultural diversity. With the introduction of the Convention for the Safeguarding of Intangible Cultural Heritage in 2003, the transmission and development of intangible cultural heritage have become an increasingly important issue. This study focuses on the theme of bio-inspired design in Manchu's intangible cultural heritage and explains the causes of the creation of traditional graphic symbols in Manchu paper-cutting under the influence of bio-inspiration and their composition methods. Furthermore, this study discusses the influence of bio-inspiration on graphic symbols in Manchu paper-cutting, the influence of graphic symbols in Manchu paper-cutting on people, and the difference in the degree of influence of graphic symbols in Manchu paper-cutting on young people and people of other ages. Based on the analysis of the questionnaire data, this study summarizes the problems of inheritance and development of intangible cultural heritage at present. Combined with the contemporary problems of inheritance and development of intangible cultural heritage, this study discusses a new design of inheritance of Manchu intangible cultural heritage in modern society.

Keywords: *Intangible Cultural Heritage, Bio-inspired, Graphical symbols*

1. INTRODUCTION

In October 2003, UNESCO adopted the Convention for the Safeguarding of the Intangible Cultural Heritage [1][2]. The international community promotes the preservation and transmission of intangible cultural heritage. Intangible cultural heritage is an important manifestation of the achievements of a nation's history and civilization [3].

Intangible cultural heritage is the living carrier of the special way of life, cultural symbols, and aesthetic habits of the nation [4]. Many Intangible Cultural Heritage are bio-inspired in the early stages of their creation. Bio-inspiration can inspire people's creativity. People use the principles of bionics to observe flora and fauna around people. They use the shape or structure and function of plants and animals to create new art works. This approach adapts to the requirements of sustainable development and reflects the harmonious relationship between man and nature.

Intangible cultural heritage strongly engages to local culture worldwide; thus, we focus on Manchu culture as a representative example of local culture in this study. The graphic symbols in Manchu paper-cutting [5] are a more typical example of creative work using biological inspiration. Inspired by biological inspiration, the Manchus abstracted the images of plants and animals and gave symbolic meaning to each graphic symbol. This became a way for the Manchu people to pray for good fortune.

The current studies on graphic symbols in Manchu culture tend to focus on the relationship between graphic symbols in Manchu paper-cutting and shamanism. There is no study on the bio-inspired influence of graphic symbols in Manchu paper-cutting. In this research, we focus on the bio-inspired influence of graphic symbols in Manchu paper-cutting and examine the formation and development of graphic symbols in Manchu paper-cutting under the influence of biological inspiration. Especially, we understand the intangible cultural heritage of Manchu graphic symbols influenced by biological inspiration at present and then demonstrate a

new modern bio-inspired design of the intangible cultural heritage in this new age.

2. LITERATURE REVIEW

2.1. Intangible Cultural Heritage

In November 1997, the 29th General Conference of UNESCO adopted the resolution on "Masterpieces of the Oral and Intangible Cultural Heritage of Humanity." In May 2001, UNESCO proclaimed the first "Masterpieces of the Oral and Intangible Heritage of Humanity." On October 17, 2003, UNESCO adopted the Treaty for the Safeguarding of the Intangible Cultural Heritage. In 2006, Manchu paper-cutting was selected as a list of intangible cultural heritage [6].

2.2. Study Background of Manchu graphic symbols in Manchu embroidery and paper-cutting

Foreign studies of Chinese decorative patterns have focused on their influence on later generations of art. In China, the study of decorative motifs is mainly based on the overall graphics, categorizing them, and listing their symbolic meanings, without systematically summarizing their morphological characteristics. The existing research on Manchu intangible cultural heritage, Manchu paper-cutting graphic symbols, is mainly to study its modeling characteristics and symbolic meaning [7]. However, the studies do not examine the influence of bio-inspiration on the graphic symbols in Manchu paper-cutting. This research fills the gap in the study of traditional Manchu paper-cutting graphic modeling systems to provide basic knowledge for the preservation of Manchu's intangible cultural heritage.

2.3. Worldwide, the context of research on the relationship between Bio-inspired Design and graphic symbols

One study found that the petroglyphs in the Drachenberg, South Africa, have figures that simulate the forms of animals. Moreover, most of the animals depicted have metaphorical meanings [8]. The eagle is depicted in Eskimo stone sculptures and Native American paintings. The eagle was given the symbolic meaning of transportation to other areas by them. This is the spiritual embodiment of shamanic totem worship [9].

In the modern era, during the Arts and Crafts movement of the late 19th century, William Morris and his followers' designs were often based on natural plant motifs with a decorative aesthetic. These bio-inspired designs had an impact on the later Art Nouveau movement and inspired modern designers. The art

movement emphasized the pursuit of the essence of nature and led to the emergence of many bio-inspired art and design masterpieces. Antoni Gaudi is a representative of the art movement, and his works are mostly inspired by the natural world [10].

3. GRAPHIC SYMBOLS IN MANCHU PAPER-CUTTING

3.1 Reasons for the formation of graphic symbols in Manchu paper-cutting

3.1.1. The generation of Manchu deity worship

The early Manchu people lived by fishing and hunting. In the process of survival, the lack of scientific understanding of the natural environment and disasters and the ability to cope with them prevented the explanation of some natural phenomena. People have long been at a disadvantage in the struggle against nature. Manchu people relate various natural phenomena, animals, and plants to situations encountered in production and life [11]. They give animals and plants special symbolic meanings according to their different habits. They tried to rely on prayer and sacrifice to obtain a stable living environment.

3.1.2. Plant characteristics and graphic symbols

Many plants have unique structural features and survival characteristics. "People from the willow" of Manchu culture declare that the willow tree is extremely vigorous, if the climate is suitable, and if you plant it directly into the ground, it will grow quickly. The willow tree in the Manchu culture has the connotation of children and grandchildren; it is an expression of fertility worship. Other examples are pomegranate, gourd, and lotus; the buds have a lot of seeds and were given meanings of many sons and many blessings by the Manchu people.

The creation of Manchu graphic symbols is based on the abstraction, deformation of plant archetypes. The original shape characteristics of the plant are largely preserved and expressed within a suitable shape.

3.1.3. Animal features and graphic symbols

Many animals are closely related to the fishing and hunting life of the Manchu people. The vigilance characteristics of birds can predict good and bad luck for them, and the beasts can lead the way for the hunters who got lost in the dense forest. Therefore, Manchu people's worship of bird and beast totem were formed [12]. Hunting is the only way for the Manchus to get

food during the long winter months. Manchu people bring eagles to hunt during the winter. Eagles help people hunt animals. Therefore, people worship the eagle as a deity.

3.2. Methods of creating graphic symbols in Manchu paper-cutting

3.2.1. The structure of graphic symbols in Manchu paper-cutting

Most of the graphic symbols in Manchu paper-cutting are symmetrical shapes in the central axis. The face of the animal or person in the painting are on opposite sides, both sides mirror one another. The outline of the entire face pattern appears to be wide and unusual (Fig 1) [13]. Levi-Strauss considered this symmetrical pattern, in which the two sides are arranged together, to be a *split representation* [14]. The *split representation* reflects the binary relationship between the shape and the pattern of art. This relationship is both antagonistic and functional. On the one hand, the pattern needs to be displayed through the object, and the object has restrictions on the pattern. Thus, arises the antagonistic relation between the two. On the other hand, since primitive man always imaginatively created art objects from both shape and pattern, this binary relationship is again a functional one.



Figure 1 Cowboy, Manchu Paper-Cutting, 16. [13]

3.2.2. The meaning of graphic symbols in Manchu paper-cutting

The decoration of graphic symbols in Manchu paper-cuttings is different from Kaduwio Indians'. The graphic symbols in Manchu paper-cuttings use three methods of decoration. The first decoration method is to show the internal image of plants, animals, or people on the outside as a decorative motif. Take pomegranate as an example, people will draw seeds within the shape of the

pomegranate. The seeds are both the internal structure of the pomegranate and a decorative motif. Another example is that when people draw a female animal, they draw the cubs on its abdomen, which is both a decorative motif and an indication of the sex of the animal. This is an anatomical way of filling in decorative patterns. The second method is to fill in the other graphic symbols with a complete graphic symbol with symbolic meaning. (Fig 2) [13]. There is no necessary connection between the two graphic patterns. The purpose of filling with patterns is to make the graphic symbols have a reasonable symbolic meaning. The third way is to simulate plant and animal's outer skin texture to decorate.

The designs painted on the faces of the indigenous people are geometric or composed of patterns formed by the arrangement of lines. In indigenous thought, the pattern is the face, or the pattern is creating the face. The pattern gives spiritual meaning to the face. The pattern acquires its symbolic meaning by decorating the face; this is very similar to the Manchu graphic symbols.

Susan Lange is one of the leading symbolic aesthetic figures in the history of contemporary Western aesthetics in the United States [15]. She believes that art is the symbolic expression of life forms. The artistic symbol is "the ultimate image-an irrational and inexpressible image-an imagery that appeals to direct perception, imagery full of emotion, life, and personality, a living thing that appeals to feeling". People need to convey this imaginative emotion and cognitive feeling using a figurative materialized vehicle. Manchu graphic symbols also belong to this imagery and emotional carrier of artistic symbols. The Manchus were influenced by bio-inspired to depict their external forms and fill them with decorative patterns. The decorative pattern and the external form of the creature form a whole together. Manchus hope to gain symbolic meaning in this way.



Figure 2 generations of children and grandchildren, Manchu Paper-Cutting, 146. [13]

4. QUESTIONNAIRE SURVEY

This research conducted questionnaire research on the influence of bio-inspiration on the forms and meanings expressed in the graphic symbols of Manchu paper-cutting. The questionnaire is divided into three parts: The first part consists of the basic information, the second part contains questions about people's understanding of the meaning of Manchu paper-cutting graphic symbols, and the third part is the research on the aspects that people are concerned about. This questionnaire aimed to demonstrate the influence of bio-inspiration on Manchu graphic symbols.

4.1. Participants

A total of 141 participants took part in this research survey, 37 men and 104 women. All of them were from the same university, Dalian Polytechnic University of China. The ages of the participants ranged from 18 to 54 years. They participated in this study on a voluntary basis. Among them, 127 were Han Chinese, 11 were Manchu, and 3 were Mongolian. Furthermore, 44.0% of the participants were 18–24 years old, 11.4% were 25 to 34 years old, 35.5% were 35 to 44 years old, and 9.2% were 45 to 54 years old.

4.2. Questionnaire Design

The graphic symbols in Manchu paper-cutting apply bio-inspired design. People create graphic symbols according to the different characteristics of living creatures and give the graphic symbols corresponding meanings. We chose graphic symbols that appear frequently in Manchu paper-cutting, such as willow tree, pomegranate, fish, gourd, magpie, lotus, eagle, and mandarin duck, as the test questions of the questionnaire. In primitive societies, people attached great importance to the reproduction of life. When people see pomegranates, lotus flowers, and gourds with many seeds, fish with many eggs, and willows with tenacity, people associate them with the reproduction of human life. Therefore, these graphic symbols are given the meaning of many sons and many blessings.

In the second part of the questionnaire, we set the names of several common graphic symbols and asked the participants to choose the correct meanings. These questions mainly examine whether people can judge the meaning of Manchu graphics from the morphological characteristics of animals and plants. It is used to demonstrate the influence of bio-inspiration on Manchu graphic symbols.

5. RESULT AND DISCUSSION

In the previous section, we collected the data. In this section, we analyze the collected data from four aspects.

5.1. The influence of bio-inspiration on graphic symbols in Manchu paper-cutting

In Fig. 3, people's knowledge of the meanings of graphic symbols is more correct for pomegranates, magpies, lotus, eagles, and mandarin ducks. The ones that people recognize less correctly are gourds, willows, and fish. People compare the morphological features of plants and animals with the meanings of graphic symbols. Hence, they find the meanings in the options that match the morphological features of plants and animals. This shows that bio-inspiration influences the graphic symbols. It also proves that the meaning of the graphic symbols originates from the morphological characteristics of living things. These symbolic symbols have been passed down as intangible cultural heritage and still possess their symbolic meaning today. People will understand the meaning of the graphic symbols based on the characteristics of the creature.

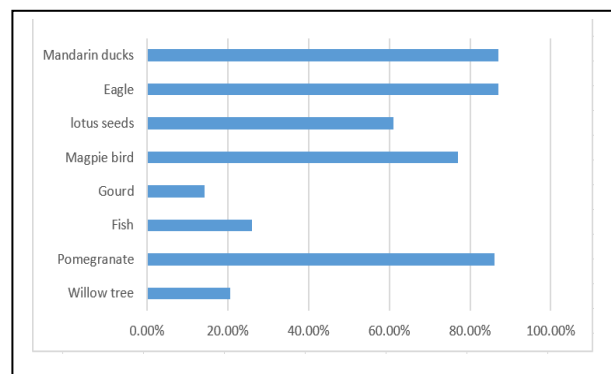


Figure 3 Questionnaire results of people's perception of graphic symbols in Manchu paper-cutting

5.2. The impact of intangible cultural heritage on people

We conducted a cross-sectional comparative analysis of the research results (Fig. 4). Participants from different ethnic groups had different perceptions of the fish pictorial symbols. The meaning of "fish" that represents many children is the graphic symbols of Manchu. Therefore, most Manchus answered many children, while a small number of Han Chinese answered many children too, and no Mongolians chose a different answer. It shows that the meaning of fish depicts the presence of many children in the perception of the Manchu people and indicates that traditional Manchu culture evidently influences Manchu people.

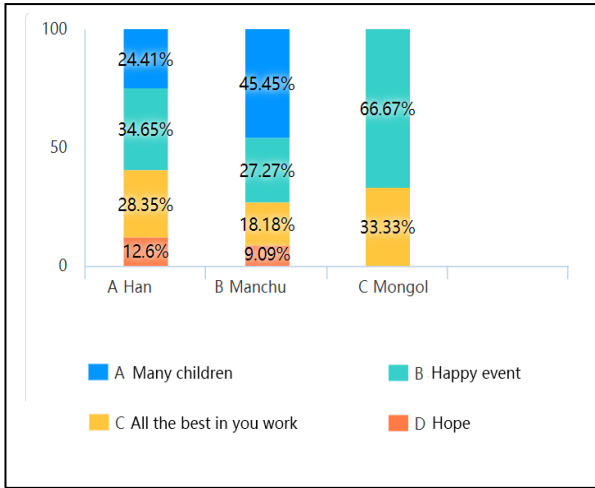


Figure 4 Questionnaire results for the fish option

5.3. The impact of intangible cultural heritage on young people and other age groups

Based on the results of the questionnaire, we also compared participants' understanding of the "fish" graphic symbol by different ages (in Fig. 5). Among the participants aged 25–54 years, more than 30% of them chose the meaning of multiple children, whereas for participants aged 18–24 years, only 17.74% chose this answer.

This result shows that young people know less about traditional culture than other age groups. Therefore, it is necessary to pass on and develop intangible cultural heritage and make more young people understand it.

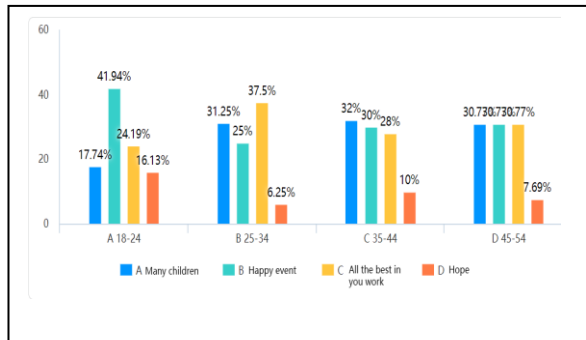


Figure 5 Questionnaire results for the fish option for people of different ages

5.4. In modern society, there is a demand for the meaning of graphic symbols in Manchu paper-cutting

In the third part of the questionnaire, we set a question to understand the issues that are of most concern to people in contemporary society. According to the results (Fig. 6), we found that people focus most on personal health, followed by quality of life and

education. On the contrary, people are least concerned about promotion.

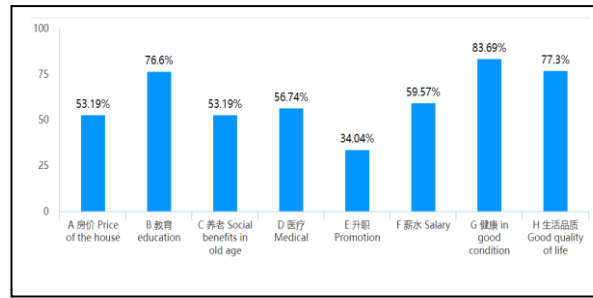


Figure 6 Questionnaire results of people's concerns

5.5. New design of graphic symbols in Manchu paper-cutting in modern society

With the progress of science and technology and the development of society, people's lives are gradually becoming affluent. People's minds are changing as their lives change. The original graphic symbols cannot meet the needs of people in contemporary society. Nowadays, people are more concerned about their health and their personal quality of life. We have created new graphic symbols in Manchu paper-cutting with personal health as the topic concern of people (Fig. 7). The body parts of the characters were named with symbolic graphic symbols "cats and butterflies" with the same Chinese pronunciation "耄耋," and it signifies long and healthy life. This new bio-inspired design aims to advance the transmission and development of Manchu intangible cultural heritage in contemporary times to make Manchu intangible cultural heritage contemporary.



Figure 7 Blessings for good health

6. CONCLUSION

Intangible cultural heritage can only be developed and perpetuated through continuous transmission. It is necessary to study bio-inspired design in intangible cultural heritage. Summarizing the development of graphic symbols after bio-inspired influences and

implementing laws to recreate intangible cultural heritage helps make it more dynamic in contemporary society. It is conducive to the transmission and development of intangible cultural heritage in contemporary times.

As an important part of local intangible cultural heritage, the transmission and development of Manchu intangible cultural heritage plays an important role in the construction of local cultural system. A study of intangible cultural heritage on bio-inspired influence will provide a strategy to promote intangible cultural heritage in other regions.

REFERENCES

- [1] R. Kurin, "Safeguarding intangible cultural heritage in the 2003 UNESCO convention: A critical appraisal," *Museum Int.*, vol. 56, no. 1–2, pp. 66–77, 2004.
- [2] M. J. Del Barrio, M. Devesa, and L. C. Herrero, "Evaluating intangible cultural heritage: The case of cultural festivals," *City, Cult. Soc.*, vol. 3, no. 4, pp. 235–244, 2012.
- [3] J. Dai, K. Wang, and Y. Sun, "Analysis on the Inheritance and Development of Manchu Intangible Cultural Heritage in Changbai Mountain by the Creation of Animation Short Films in the New Media Era," vol. 507, no. Icelaic, pp. 376–379, 2020.
- [4] X. Song, Y. Yang, R. Yang, and M. Shafi, "Keeping watch on intangible cultural heritage: Live transmission and sustainable development of Chinese lacquer art," *Sustain.*, vol. 11, no. 14, 2019.
- [5] Y. X. Hao, Application of Manchu folk art of paper-cutting in graphic design, *Popular Literature And Art*, pp. 39-40, 2021.
- [6] Y. Cui, "On the Design of Cultural Creative Products Under the Influence of Manchu Native Culture Take Fengning Manchu Autonomous County, Chengde City, Hebei Province as an Example," *Proc. 2nd Int. Conf. Lang. Art Cult. Exch. (ICLACE 2021)*, vol. 559, no. Iclace, pp. 514–517, 2021.
- [7] T. S. Yang, B. Liu, The beauty of Manchu paper-cutting in Jinzhou, *Popular Literature. Research in Science Education*, pp 188-189, 2011.
- [8] R. Layton, "Shamanism, Totemism and Rock Art: Les Chamanes de la Préhistoire in the Context of Rock Art Research," *Cambridge Archaeol. J.*, vol. 10, no. 1, pp. 169–186, 2000.
- [9] P. Dufrene, "Utilizing the arts for healing from a Native American perspective: Implications for Creative Arts Therapies, *Canadian Journal of Native Studies*, vol. 10, no. 1, 121–131, 1990.
- [10] B. Orman, "Art Nouveau & Gaudí: The Way of Nature," *JCCC Honor. J.*, vol. 4, no. 1, p. 2, 2013.
- [11] Y. anhong Li, A. Comparison of Manchu Shaman Culture and Indian Shaman Culture, *Cambridge Archaeological Journal*, vol.10, Issue 01, pp 169 – 186, April 2000.
- [12] S. Wang and F. Jia, "A Study of Northeast Natural Consciousness From the Perspective of Manchu Totem Culture," vol. 468, no. Icessh, pp. 203–207, 2020.
- [13] X. S. Luo, W. Z. Peng, and N. Luo, *Manchu Paper Cutting*, Liaoning Fine Arts Publishing House, 2015.
- [14] J. B. Deregowski, "a Note on the Possible Determinant of 'Split Representation' As an Artistic Style," *Int. J. Psychol.*, vol. 5, no. 1, pp. 21–26, 1970.
- [15] S. K. Langer, The Cultural Importance of the Arts, *The Journal of Aesthetic Education*, vol.1, no.1, pp. 5-12, 1966.