



Study on the Application of “White and Black” Concept to Ceramic Luminaire Design

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Abstract. The concept of “White And Black” in Laozi’s thought has had a great influence on Chinese culture and has formed a unique aesthetic form in the field of calligraphy and painting. This study uses the aesthetic form of “White And Black” to convey this concept through ceramic works. The research review explored the connotation and art form of “White And Black”, and formed the theoretical framework of this study based on “communication theory” and “cultural and creative design process”, and used the aforementioned theory as the evaluation criteria and selected works that fit the concept of “White And Black” as stimuli for the questionnaire survey. The research found that using potter’s works as stimuli can convey the connotation of “White and Black” better than general merchandise. Moreover, the performance of the stimuli in “Technical Level” and “Semantic Level” will greatly affect the “Effect Level”. Therefore, this study suggests that the key to convey the concept of “White And Black” through pottery works is to master the expression of “Technical Level” and “Semantic Level”, especially the “Semantic Level” has a greater influence on the “Effect Level” and is an important key to the viewer’s perception of the connotation of the work.

Keywords: Lao Tzu Thought · White And Black · Ceramic Craft · Cognitive Evaluation

1 Introduction

Laozi’s thoughts have had a profound impact on Chinese culture, covering a wide range of fields, and even have an impact on other countries. For example, in the Japanese tea ceremony culture, Okakura Tenshin [1] believes that the greatest contribution of Taoism to Asian life culture is in the field of aesthetics.

The concept of “White And Black” is derived from “Knowing the white and keeping the black is the way of the world.” in Chapter 28 of “Tao Te Ching.” [2] Black and white are very representative colors, with black representing “yin” and white representing “yang”, and forming a set of “yin and yang” theory [3]. Taoist thought had a great influence on the development of art in later times, and in the field of painting and calligraphy it formed a unique aesthetic form and aesthetic value, which also extended to the expression of ceramic painting [4].

The art of painting and calligraphy has long been closely associated with ceramics [5]. However, how to make the public perceive such connotations through the works is undoubtedly a major challenge. This study will help to solve this problem by discussing the mechanism of coding and decoding. In this study, we will evaluate the public’s perceptions of ceramic luminaires that use the concept of “White And Black”. In this study, the public will conduct two cognitive experiments, one on ceramic luminaires created by potters who understand the concept of “White And Black” and the other on mass-produced luminaires on the market that fit this concept. We will assess people’s cognition at the Technical Level, Semantic Level, and Effect Level to identify the elements that affect people’s cognition, and use the results to draw conclusions and recommendations that will help bring the work or product closer to the people, and help with other related designs or research in the future.

2 Literature Review

2.1 “White and Black” in the Art of Calligraphy and Painting

Since ancient times in China, the concept of “White And Black” has formed a form of expression and aesthetic connotation in the art of painting and calligraphy [3]. In calligraphy and painting, the elements of a picture are not only black, but also “white” is equally important, because the black in a picture needs white to set it off, forming an interdependent relationship, just like the concept of “the creation of emptiness and reality” as Lao Tzu said [6]. Therefore, in addition to thinking about the colors, lines, shapes and compositions, the creator also needs to consider the gaps that he wants to leave on the surface of the painting. This artistic expression allows the work to be full of imagination. As Da Zhongguang said, “White and black complement each other, and where there is no painting on the surface, it becomes a beautiful realm [6–8]. This study is mainly based on the art form of ink painting as a reference, and therefore will be directed toward this area of literature.

“White And Black” is a unique aesthetic form in Chinese ink painting, which often uses the expression of “leaving white space” to deal with the situation you want to create in the picture, and uses the relationship between real and virtual scenery to convey the state of mind, especially in landscape painting, which implies the connotation of nature and is closely related to the thought of Laozi [9, 10]. Therefore, Chinese landscape painting is not only a copy of the external environment, but also a manifestation of philosophical thought.

The Song Dynasty was a period of great artistic and cultural development, and the expression of white space was flourishing in the Song Dynasty [11]. Unlike the “panoramic form of landscape painting”, the white space was more emphasized and used in the Southern Song Dynasty. White space has become an expressive technique to show the mood of the painting. The white space not only complements the shapes drawn with ink and brush, but also gives the viewer more room for imagination. This expression of “nothing is better than something here” also presents the spirit of Taoist thought of “The Great Way is invisible.

Ma Yuan was a famous artist of the Southern Song Dynasty and one of the most important artists in the history of Chinese ink and wash art. He excelled in using the art

form of leaving white space to create the mood of his works, and has a very important position in Chinese landscape painting. Ma Yuan's landscape paintings prefer to place visual emphasis in the corners of the composition, with large areas of white space, forming a unique aesthetic style [12]. Ma Yuan's blank space is not blank, but the state of mind and emotion in the creator's mind. Ma Yuan's artistic creation presents an artistic conception of "less is more". The so-called "simplification" does not mean simplification, but the artist uses appropriate white space to set off the most refined brush and ink in the picture, so as to present the focus of the picture and convey the creator's emotions and ideas. Therefore, Ma Yuan's works often use refined shapes and symbols to set off the full emotion of the whole work, bringing the audience a concise and concise feeling [13]. This form of silent expression often gives the viewer a meaningful feeling and leaves more room for the viewer's imagination.

2.2 Ceramic Art Creation and Cognition

When people view a work, they are in fact in dialogue with the creator. The creator uses the work's viewable external form to convey its meaning, and the two are complementary to each other. The public experiences the "content" through the "form"; the "content" enriches the "form" and is more touching to the heart [14]. From another perspective, the work can be seen as the result of "coding" by the creator. Through the external form of the work, the public understands the meaning that the creator wants to express, which in turn leads to the public's emotional resonance with the work. This process can be seen as the process of "decoding" by the public. A channel of communication is formed between creators, the public and works [15].

The three mental models proposed by Norman [16] can be extended into three models: the creator's model, the users' model, and the ceramic artwork [17]. The creator's model is the transformation of abstract concepts into concrete forms to form works, while the users' model is the process of decoding the meaning of the work through the aesthetics of its external form. The creators use symbols or forms familiar to the public, taking into account their cultural backgrounds, to help them understand the message of the work [18, 19]. By perceiving the external form (Technical Level) of the work to understand its semantic meaning (Semantic Level), the public will finally be able to connect and resonate with the internal feeling (Effect Level) [15, 20]. The above principles and models can also be applied to the analysis and evaluation of ceramic artworks.

3 Materials and Methods

3.1 Stimuli

The main purpose of this study is to investigate the public's perception of the "White And Black" concept when applied to ceramics, and the result of the public's perception of the appearance of the work. Therefore, this paper is not concerned with the assessment of public preferences for the works. The focus of this paper is on the translation of abstract thought into the cognitive study of ceramic artworks, and therefore, we have made the concept of knowing white and keeping black the central theme of this study. We will also follow this principle when selecting the objects for this study.

Figure 1 shows the original works selected for this study and the two sets of works generated or selected based on the form and connotation of the original works.

- The author invited experts in the field of craftsmanship and aesthetics to select three landscape paintings from the Song Dynasty (Row 1 in Fig. 1) under the theme of “White And Black”.
- The three pieces of ceramic lamps made by the craftsman according to the stylistic forms and connotations of the reference works are shown in the second row in Fig. 1.
- In this study, three pieces of mass-produced luminaires were selected from the market according to the style and connotation of the original product, which fit the theme and are of the same type, as shown in the third row in Fig. 1.

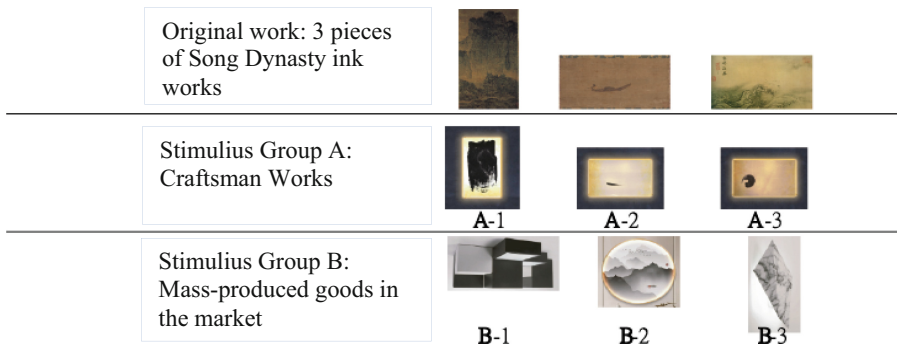


Fig. 1. Two sets of stimulants. (Source: this study).

3.2 Research Design and the Content of the Questionnaire

The general public may not have a deep understanding of Laozi’s philosophy, but they are no strangers to the art of calligraphy and painting. Therefore, when people look at any work of art, they will first understand it by its appearance, then think about its meaning, and finally reach the emotional connection. Therefore, in line with the communication model (see Fig. 2) constructed by the related discussion mentioned in this paper, the three levels of the concept of “White And Black” presented in the middle of the model are the evaluation criteria of this study, which also assesses the perceptions and feelings of the test subjects towards the different works.

The author drafted the questionnaire for this study, and after repeated discussions and corrections by experts in the fields of art, craft, and design, the survey was formally conducted. In order to avoid unnecessary interference with the survey, the works in the questionnaire were named with letters of the alphabet, and detailed descriptions of the contents of the works were avoided, so that the participants could only respond to each work with their most direct perceptions and feelings.

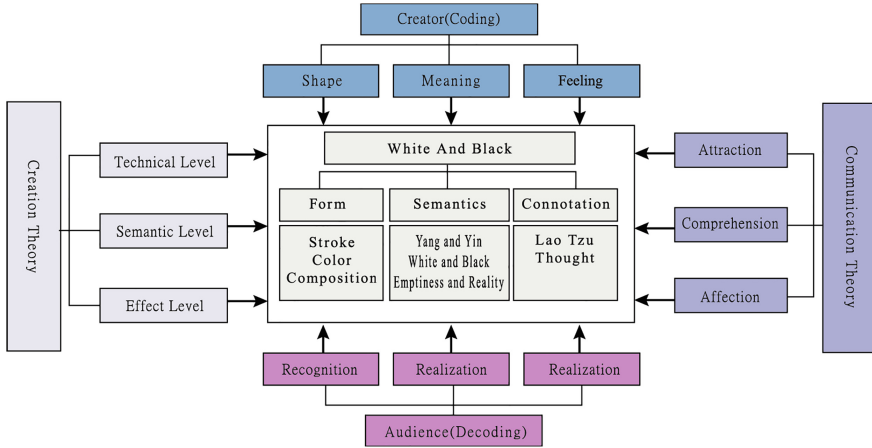


Fig. 2. Communication matrix between the creator, the work and the viewer. (Source: this study).

3.3 Participants

The survey was conducted in January 2023 and lasted for 20 days. 109 valid questionnaires were received at the end (see Table 1).

Table 1. Basic background profile of the participants.

Category		n (%)
1. Gender	Male	26(23%)
	Female	83(76.1%)
2. Age	Under 29	82(75.2%)
	30–39	4(3.7%)
	Over 40	23(21.1%)
3. Educational Attainment	Below high school	3(2.8%)
	Specialties and Universities	92(84.4%)
	Master or above	14(12.8%)
4. Background	Artistic Design Background	95(87.2%)
	Non-Artistic Design Background	14(12.8%)

N = 109

The main focus of this study is to assess the cognitive outcomes of the public through viewing the external form of the work. However, the possible cognitive differences between participants from different backgrounds will be further investigated in future studies and will therefore not be addressed in this paper.

3.4 Research Procedures

This study is divided into several stages. First, we explore and sort out the relevant literature to understand the connotation of the concept of “White And Black” and analyze and summarize the forms of its expression in the field of painting and calligraphy. Secondly, a model of communication between the creator, the viewer and the work was constructed based on the relevant literature. Based on this model, a questionnaire was developed and then a survey was conducted. Finally, the participants’ responses were analyzed and discussed, and the conclusions and recommendations for follow-up research were summarized (see Fig. 3).

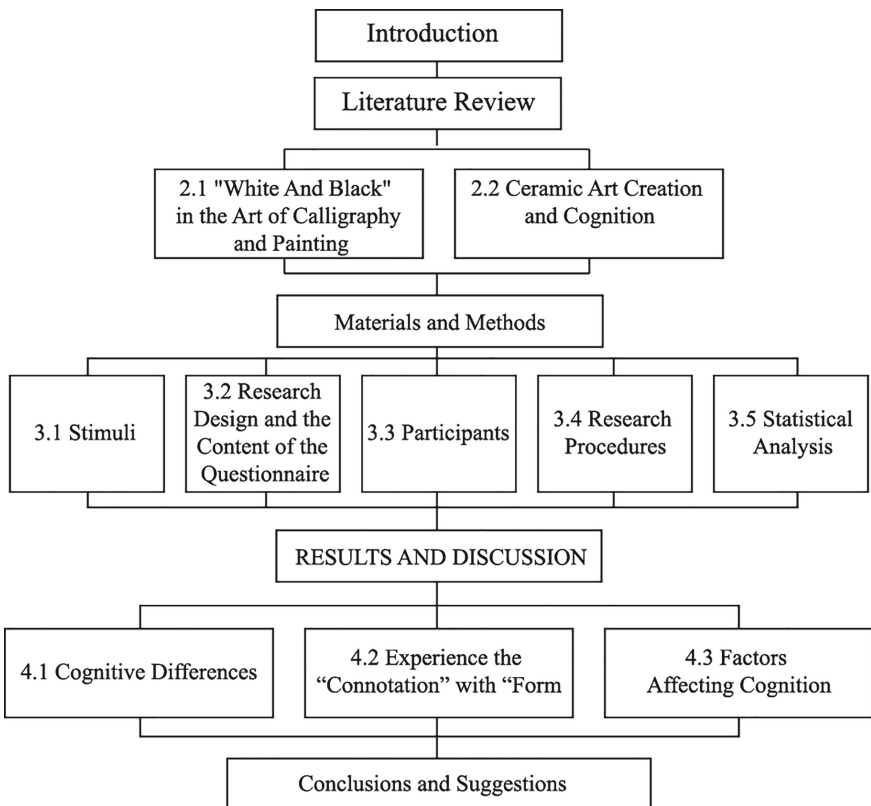


Fig. 3. Research procedures.

Participants in the survey were asked to read the instructions carefully before responding to the questions. People were asked to rate six works in relation to the brush strokes, color expression, white space effect, and the content of the work. The study used Likert’s 5-point scale, which assigns a score from a minimum of 1 to a maximum of 5 based on the individual’s perception of the work.

3.5 Statistical Analysis

The questionnaires in this study were initially examined and met the requirements for a valid questionnaire, and were used to conduct relevant statistics and analyses. First, we used descriptive analysis to statistically analyze the background information of the participants, second, we used independent sample t-testing to analyze the cognitive differences between group A and group B, and finally, we used regression analysis to analyze whether the Form and Meaning of all stimuli had a significant effect on Feelings and which attribute had the most significant effect on Feeling.

4 Results and Discussion

In this study, the stimuli were divided into two groups, A and B, with a total of 6 works. The people who participated in the questionnaire survey directly reflected the evaluation after viewing without knowing the connotation of the works. Therefore, this chapter will conduct data analysis and discussion on three parts. The first is the difference in the public’s perception of ceramic artists’ works and mass-produced products. The analysis includes the differences in Form, Meaning, and Feeling of the two groups of stimuli. The second is to analyze whether the audience’s Form and Meaning for each stimulus have a significant impact on Feeling. Finally, it is to analyze which attribute has the most significant impact on Feeling.

4.1 Cognitive Differences

From the data of the three control groups, we can see that although the data show different levels of significant reflection, people’s perception of stimulus group A is generally more significant than that of stimulus group B (see Table 2).

Table 2. Comparison of the cognitive differences between the works of Group A and Group B.

	A1	B1	A2	B2	A3	B3
Stroke	2.90	2.56	3.05	2.62	3.43	3.32
Color	3.21	2.49	3.43	3.02	3.18	2.98
Composition	3.34	2.67	3.26	3.41	3.42	3.34
Semantics	2.71	2.97	3.86	3.09	3.66	2.65
Connotation	2.81	2.86	3.9	3.09	3.23	3.16

4.2 Experience the “Connotation” with “Form

Analyzing the data obtained after the participants viewed Group A and Group B, the F value of each stimulus showed a high value, while the value obtained for significance was below 0.05. This shows that form and semantics have a significant effect on feeling (see Table 3).

Table 3. The influence of form and semantics on feelings.

	F	Significance
A1	42.447	0.000 ^b
A2	21.117	0.000 ^b
A3	31.911	0.000 ^b
B1	36.071	0.000 ^b
B2	102.855	0.000 ^b
B3	29.746	0.000 ^b

4.3 Factors Affecting Cognition

We can find from the data that although other attributes also have different degrees of influence, the attribute of Semantics has a significant impact on the comparison of Connotation. From the Significance data of each stimulus in Table 4, only the data of Semantics, in each stimulus the response of the object is presented below the value of 0.05. This consistency shows that this attribute has a certain influence on the Connotation of the work.

Table 4. Factors affecting the communication of the content of the work.

	Stroke	Color	Composition	Semantics
A1	0.114	0.159	0.167	0.518
Significance	0.192	0.034	0.027	0.000
A2	0.080	0.087	-0.007	0.550
Significance	0.247	0.180	0.920	0.000
A3	0.150	0.086	0.089	0.533
Significance	0.079	0.374	0.312	0.000
B1	-0.053	-0.086	0.421	0.538
Significance	0.536	0.384	0.000	0.000
B2	0.038	0.072	0.139	0.761
Significance	0.587	0.276	0.690	0.000
B3	0.164	0.067	0.189	0.516
Significance	0.143	0.507	0.081	0.000

5 Conclusions and Suggestions

5.1 Conclusion

Most human beings rely on their senses to understand the world, and most of the external information is obtained through the eyes. No matter it is a scenery of nature, an art work, a commodity, etc., as long as there is a viewable appearance, through the color, line, texture, structure and other attributes of the appearance, it may be transformed into a meaningful message to the viewer. Therefore, the meaning and connotation of a work needs to be conveyed by the form. The creator's understanding of the subject matter and its transformation into a formal symbol that expresses the relevant message is the most basic condition for conveying the message of the work, and it is also the code formed by the author through his personal experience and emotion. Through the clues provided by the form, the public is able to deduce the meaning of the work in their minds and understand the connotation and idea of the work.

This study found that the work presents its semantic meaning and connotation through its external form. However, once all the external formal attributes of the work are discussed independently, although the effect of the attributes can still be obtained, the meaning of the work cannot be fully conveyed, just as in a painting, you are asked to understand the meaning of the painting only by the feeling of lines or colors. This is an imposition. In addition, from the results of the study, we can find that although the single external form attribute will affect the conveyance of the semantic meaning and connotation, but usually not too strong, and the public through the viewing of the overall effect of the work, generally can understand the work to express the semantic meaning, and then trigger the feeling of the connotation of the work. Therefore, whether you are engaged in graphic design, three-dimensional creation or product design, as long as you can master the external form, it will enhance the audience's understanding of the semantic meaning of the work and strengthen the public's feeling of experiencing the connotation of the work.

5.2 Suggestions

After the preliminary drafting of the questionnaire for this study was completed, it was found that many participants could not understand the vocabulary of Lao Tzu's philosophy in the questionnaire questions, and this problem was especially obvious among the young people. Such a situation will cause the participants to not be able to truly understand the meaning of the questionnaire, and of course it will not be able to reflect the participants' real thoughts and feelings after viewing the stimuli. After discussing and suggesting with experts in related fields, I amended the sentence of the topic to a more understandable word, but the author believes that there is still a gap between the true feeling and understanding of the spirit and connotation of Laozi's philosophy, so I will continue to carry out relevant research in the future, better fixes for such problems will be proposed.

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