



Research on the Influence of Interactivity on the Aesthetic Cognition of Art

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Abstract. The art participation of the public has been declining year by year, and art has become more and more difficult to understand. However, the complex pressure of modern life has made people's spiritual needs getting urgent. How to let art re-enter into the daily life of the public is a problem that art workers need to face. Interactive art seems to be a good medium to attract the public to participate in art activities, but the impact of interactivity on the audience's aesthetic cognition remains to be explored. This study takes the art work "Iron Bird" as the object, uses Norman's emotional design theory, and uses questionnaires to understand the audience's perception situation of "iron bird" from the three levels of "instinct", "behavior" and "reflection", also to explore the impact of interaction on the aesthetic perception of art. The research shows that: 1. The influence of interaction on cognition is mainly reflected in the instinct level and behavior level. 2. Compared with pleasure, the influence of interaction on cognition is less and weaker. 3. Interactivity has no significant effect on the preference. 4. Interaction can significantly improve viewer's sense of pleasure. 5. Interaction can enhance the viewer's rational cognition and make them judge in a more objective way. The sense of pleasure can influence the viewer's perceptual cognition and subjective recognition.

Keywords: Interactivity · Cognition

1 Introduction

The change of lifestyle and the change of population composition have caused the decline of artistic participation of the public year by year, especially in visual art [1]. At the same time, the art works created by artists are becoming more and more difficult to understand, and the distance between art and life has become increasingly farther away. The complex life pressure faced by modern people makes them gradually regain the sensory experience and spiritual needs. How to make art re-enter into daily life is a problem that art workers need to face. Howard Gardner emphasizes in his research on seven intelligence in the brain: interactivity can stimulate the understanding of different learning individuals and greatly enhances their memory [2]. It can be seen that interaction can positively influence audience perception, interactive art work seems to be a good medium to guide the public into the art activities, but how the influence of

interaction on the audience's aesthetic cognition remains to be explored. This study takes the art apparatus "Iron Bird" as the research object, based on the emotional design theory proposed by Norman, through questionnaires, in order to understand the influence of interactivity on aesthetic cognition, in order to provide theory reference for related art creators.

2 Literature Review

2.1 Cognition of Art

Art creation is a process of continuous exchange. When evaluating works, we must understand the communication between artists and audiences, not only in the social context but also in the interactive experience between artists and audiences [3, 4]. Audience is the key to understanding art, because the meaning that art creates depends on how it is used by its consumers, rather than by creators [5]. When appreciating works of art, the audiences feels the medium, form and content of art in a mingled state of perceptual emotion and rational cognition, and perceives the image and characteristics of the works of art, which in turn produces inner feelings and resonance [6].

2.2 The Different Levels of the Brain

Roger Fly in Discussion on Aesthetic Sense said that most of human life consists of instinctive reactions to perceptible things and the accompanying emotions. Humans can evoke and relive this experience again in consciousness. In this way, we get different levels of value standards and different types of feelings [7]. Norman, Andrew Ortony and William Revelle, suggest that these human attributes result from three different levels of the brain: the visceral level, the behavioral level and the reflective level. The three levels can be mapped to product characteristics like this:

- Visceral design .> Appearance
- Behavioral design > The pleasure and effectiveness of use
- Reflective design. > Self-image, personal satisfaction, memories

At the visceral level, physical features—look, feel, and sound—dominate. There are four components of good behavioral design: function, understandability, usability, and physical feel. Reflective design is all about message, about culture, and about the meaning of a product or its use [8].

2.3 Installation Art Work "Iron Bird"

The Iron Bird (Fig. 1) is a piece of installation art work in steel as the main material and kraft paper on the wings. The creation was inspired by the toy "flying bird mobile" (Fig. 2). In order to adapt to the processing technology of metal bars and to make the wings can be folded and unfolded, the author designed a new modeling form. It is characterized by a linear shape, a simple mechanical structure, some movable parts and a sense of life.



Fig. 1. Iron bird



Fig. 2. Flying bird mobile

3 Research Method

This study adopted a questionnaire survey method, selected the guests and audiences participated in the OPOP Forum 2018 as subjects, through the questionnaire to find out the audience’s cognition of the art work “Iron Bird”. The OPOP Forum is an academic event integrated exhibition of Works and publication of Papers, organized by the Graduate School of Creative Industry Design of the National Taiwan University of Arts. It is an one-week academic activity. A total of 120 valid questionnaires were collected during the event. There were 45 males and 75 females; 4 people under 19 years old, 101 people aged 20–39 and 15 people aged 40–59. Professional background: 14 people in sculptures, 3 in mechanics, 10 in artists, 30 in design and 63 in others. Academic background: 86 students, 29 institute researchers and 4 others. Interaction with “Iron Bird”: 68 people (56.7%) did not operate it while 52 (43.3%) operated. Based on the questionnaire information, the study is divided into three stages: the first stage tests the reliability and validity of the assessment questionnaire; the second stage detects the influence of interaction on the cognition of the work and the third stage corrects the results obtained in the second stage. The study process is shown in Fig. 3.



Fig. 3. The study process

4 Questionnaire Design

The assessment questionnaire is divided into three parts: basic information work evaluation and general rating. The basic information includes: gender, age, professional background, education level and interaction. The evaluation of the work takes the form of a 5-point scale. According to the emotional research conducted by Norman and his colleagues, the evaluation project is divided into: Visceral level, Behavioral level and Reflection level [4]. To be specific, the Visceral level takes color, material, form, texture and sound as the evaluation item; The Behavioral level is evaluated by technic, operability, structure and narration; The Reflection level is based on emotion, resonance, style, nostalgia, culture and pleasure. And the level of preference was added as a general rating (Fig. 4).

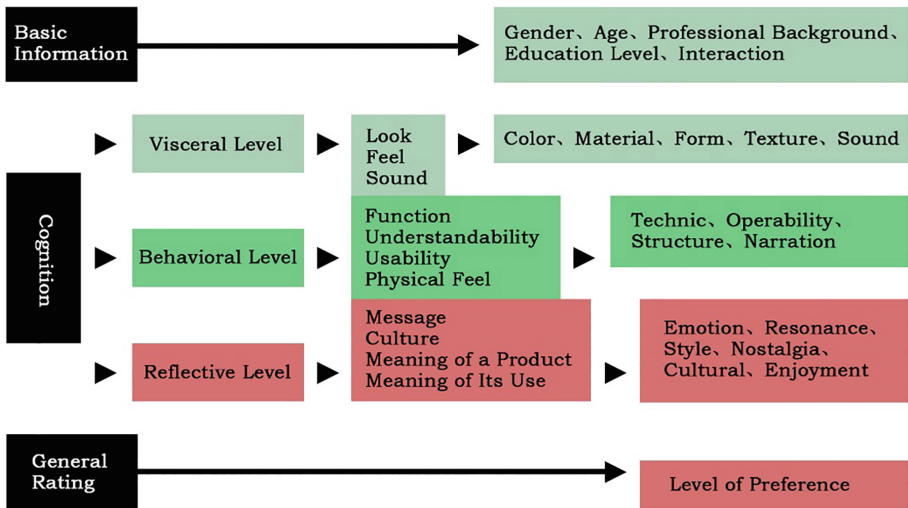


Fig. 4. Questionnaire design

5 Analysis and Discussion of Results

5.1 Analysis of Validity and Reliability

The reliability analysis of the questionnaire is to explore the internal consistency of each facet of the present scale and the reduction of the Cronbach- α coefficient of the dichotomous degree after deleting the single-question, and is set as the reference standard of the selected topic and the reliability of the questionnaire. The questionnaire analysis found that the Cronbach- α coefficient was .945. The total correlations of the single article correction is between .498–.848, the “ α coefficient after deletion” is between .937–.944, therefore the internal consistency between the selected questions is quite high, and the question selection is reasonable. Though the validity analysis we

found that the KMO coefficient is .942, which means a higher value. The Sig value is .000, which is significant. The characteristic value is 8.352, which can explain 59.657% of the variation of the preset use. The factor loading of every test article is between .553–.873, and commonality is between .457–.762, overall this questionnaire has good construction validity.

5.2 General Evaluation of the Works

Taking the interaction between the subject and the work as the self-variation, the 15 factors and the general evaluation of the work as dependent variables, the independent sample t-test is used to analyze the influence of interaction on the cognition of the work. The results are summarized in Table 1. Among them, the audience has significant differences in material, form, technic, culture, narration, emotion, resonance, style, nostalgia, pleasure and preference. The audience interacted with the work rated notable higher points than non interaction audience. It can be seen that the interaction can significantly affect the audience’s aesthetic cognition in many aspects (Table 1).

Table 1. Interaction differences

Factors	Interactive situation	N	M	SD	T	Sig
Material	Without interaction	68	3.47	.819	-4.132***	Without < With
	With interaction	52	4.04	.685		
Form	Without interaction	68	3.66	.840	-4.607***	Without < With
	With interaction	52	4.25	.556		
Technic	Without interaction	68	3.63	.790	-3.062*	Without < With
	With interaction	52	4.06	.725		
Culture	Without interaction	68	2.62	1.093	-5.296***	Without < With
	With interaction	52	3.50	.728		
Narration	Without interaction	68	2.44	1.214	-5.943***	Without < With
	With interaction	52	3.54	.803		
Emotion	Without interaction	68	2.59	1.200	-6.088***	Without < With
	With interaction	52	3.69	.781		
Resonance	Without interaction	68	2.31	1.225	-6.380***	Without < With
	With interaction	52	3.48	.779		
Style	Without interaction	68	2.93	1.319	-4.654***	Without < With
	With interaction	52	3.87	.886		
Nostalgia	Without interaction	68	3.10	1.295	-4.309***	Without < With
	With interaction	52	3.96	.885		
Pleasure	Without interaction	68	2.69	1.123	-7.177***	Without < With
	With interaction	52	3.90	.721		
Preference	Without interaction	68	3.49	.782	-4,303***	Without < With
	With interaction	52	4.02	.577		

*p < .05 ***p < .001

5.3 T-Test Result Correction

However, according to Table 1, the interaction caused a significant difference in pleasure. Compared with the non interaction audience, the average of interacted audience’s enjoyment value increased by 1.21 (45%). Psychologist Alice Isen pointed out that happiness can expand ideas and promote creative thinking [9]. It shows that the sense of pleasure affects the perception of the audience. Therefore, the factors with significant differences in Table 1 may not be directly caused by interaction, but because the interaction aroused the audience’s pleasure and thus affected the audience’s perception of the work. In order to accurately detect the impact of interaction on cognition, it is necessary to get rid of the disturbance of the result of pleasure (Fig. 5).

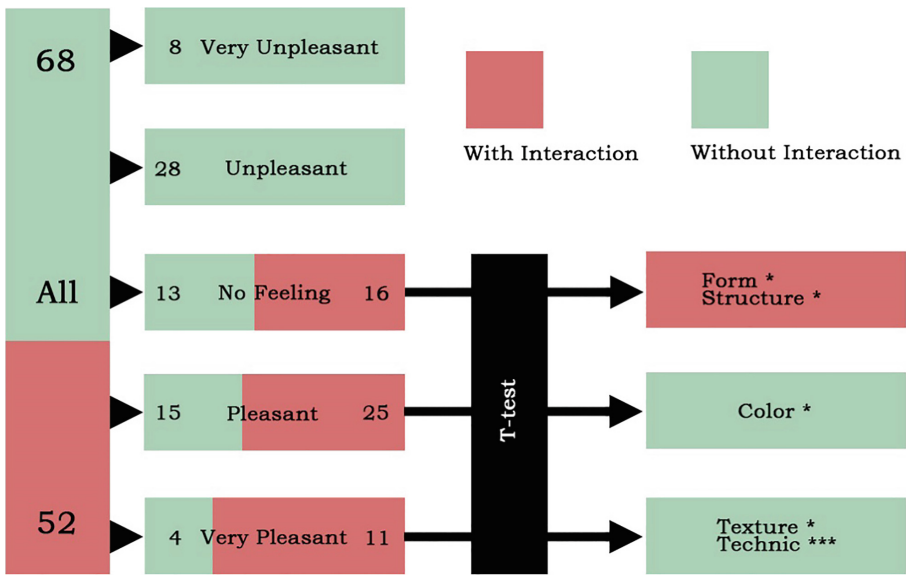


Fig. 5. Result correction

- Grouping questionnaires of the same level of enjoyment the following results are obtained:
 - A total of 29 questionnaires selected “have no feeling”, of which there were 13 with interactions and 16 non interactions.
 - A total of 40 questionnaires selected “feeling pleasant”, of which there were 15 with interactions with and 25 non interactions.
 - A total of 15 questionnaires selected “feeling very pleasant”, of which there were 11 with interactions and 4 non interactions.
 - The audience who chose “feeling unpleasant” and “feeling very unpleasant” did not interact with the work so the results of which could not be compared with the other questionnaires. Therefore, they were not included in the consideration.

2. Taking the interaction between the subject and the work as the self-variation, the 15 factors and the general evaluation of the work as dependent variables, the independent sample t-test is used to analyze the influence of interaction on the cognition of the work. The results were arranged in order as follows: (Table 2: Audience without obvious pleasure, Table 3: Audience feeling pleasant, Table 4: Audience feeling very pleasant).

Table 2. InterAction differences (Audience without obvious pleasure)

Factors	Interactive situation	N	M	SD	T	Sig
Form	Without interaction	13	3.69	.751	-1.570*	Without < With
	With interaction	16	4.06	.443		
Structure	Without interaction	13	3.77	.439	-1.517*	Without < With
	With interaction	16	4.00	.365		

*p < .05

Table 3. Interaction differences (Audience feeling pleasant)

Factors	Interactive situation	N	M	SD	T	Sig
Color	Without interaction	15	4.00	.353	.935*	Without > With
	With interaction	25	3.80	.816		

*p < .05

Table 4. Interaction differences (Audience feeling very pleasant)

Factors	Interactive situation	N	M	SD	T	Sig
Texture	Without interaction	4	4.00	.000	1.000*	Without > With
	With interaction	11	3.73	.905		
Technic	Without interaction	4	5.00	.000	2.887***	Without > With
	With interaction	11	4.55	.522		

*p < .05 ***p < .001

The results show:

- Audience without obvious pleasure has significant differences in the recognition of the two evaluation factors of form and structure. The audience with interaction has significantly higher recognition than those who did not interact.
- The audience that felt pleasant has significant differences in the recognition of color. The audience without interaction has a significantly higher recognition than the interacted audience.
- The audience who felt very pleasant has significant differences in the recognition of the two aspects of “texture” and “technic”. The audience without interaction has significantly more recognition than the audience with interaction.

3. The comparison of above results with Table 1 gives the following differences:

- The total number of factors showing significant differences in Table 1 is 10 (excluding pleasure), and the total number of factors showing significant differences in Tables 2, 3 and 4 is 5. It can be seen that when the difference caused by pleasure is excluded, the scope of influence of interaction on cognition is narrowed.
- Interactivity has no significant effect on the “preference”.
- Table 2 (Group of audience without obvious pleasure) has an intensity of “form” factor (-1.570^* , non interaction < with interaction) significantly lower than Table 1 (-4.607^{***} , non interaction < with interaction); The “structure” factor (-1.517^* , with interaction > non interaction) that shows significant differences in Table 2 did not appear in Table 1. It can be seen that compared with pleasure, the influence of interaction on cognition is weaker. When both pleasure and interaction exist, the influence of interaction is difficult to be shown.
- Table 3 (Group of audience feeling pleasant) has a significant difference in the “color” factor ($.935^*$, non interaction > with interaction), which is not shown in Table 1, it means no significant difference.
- Table 4 (Group of audience feeling very pleasant) showed a significant difference in the “texture” factor (1.000^* , non interaction > with interaction), which did not appear in Table 1. The “technic” factor (2.887^{***} , non interaction > with interaction) shows a significantly higher intensity than that in Table 1 (-3.062^* , non interaction < with interaction), and the ratio relationship is reversed. Tables 3 and 4 present the situation in which the viewers are pleasant, compared with Table 1, there are two differences.

The first type is the difference in the “technic” factor. As shown in Table 2, the impact of pleasure on cognition is much greater than that of interactivity, so the “technic” factor (2.887^{***} , non interaction > with interaction) that was originally expressed as a strongly significant difference in Table 4, is changed to (-3.062^* , non interaction < with interaction) in Table 1 when the pleasure effect was added, meanwhile, the ratio relationship is reversed and a significant difference is presented.



Fig. 6. Iron bird details (Color figure online)

The second type: interaction under the premise of pleasure reduces the audience's sense of identity to the work. This phenomenon did not appear in Table 1 or Table 2. Factors that reduced identity are: color, texture and technic. From the appearance of the "Iron Bird" in Fig. 6, we can see the uneven color of the steel surface due to high temperature, the traces left by the welding not carefully polished and the convex or concave on surface due to the inferior welding technique. These details are consistent with the identity reducing factors in Tables 3 and 4. The "Iron Bird" is not outstanding in terms of color, texture and technic. The high recognition in Table 1 is derived from the pleasant emotions that caused the viewer's perceptual cognition, which made them subjectively tolerate the deficiencies of the art work, thus increasing the recognition of it (the viewers without obvious pleasure in Table 2 did not make similar judgments can prove this from the side), while the interaction enhances the viewers' rational cognition and makes them see a more objective reality through emotions.

6 Conclusion and Suggestion

Given the influence of interactivity on cognition, interaction has become a hot trend in art. More and more interactive art works are exhibited in art galleries and are sought after by artists and spectators. However, interactivity is not as powerful as what we think or what we see. Simple interaction is even hard to touch the viewer's heart. The expression that the artistic creators hope to engage the public in participating in artistic activities through interaction is difficult to achieve. The detailed conclusions are as follows:

1. The influence of interactivity on cognition is reflected in the level of instinct and behavior.
2. Compared with pleasure, interactivity has less impact on cognition and weaker intensity.
3. Interactivity has no significant effect on the preference.
4. Interaction can significantly improve the viewer's sense of pleasure.
5. Interaction can enhance the viewer's rational cognition and make him see things in a more objective way; The sense of pleasure can affect the viewer's perceptual cognition and provoke a subjective recognition.

Due to the limitations of the work, in this study, it is nearly impossible to detect the influence of interaction on emotional factors other than pleasure.

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