Research on Spatial Sense in Poster Design Based on Logical Paradox

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ABSTRACT. Modern designs try to realize both breakthrough and innovation. In some design works, space is not expressed on the basis of real scene, instead, it is shown in contradictory forms which break traditions. This paper researches the spatial sense in poster designs on the basis of logical paradox, systematically analyzes representative works which use logical contradiction to express spatial senses and summarizes specific applications of logical paradox in poster designs so as to explore more possibilities for the expression of spatial sense in poster design.

1. Introduction

Logical paradox refers to a theoretical fact or situation: two contradictory statements, which are deduced by two inconsistent statements, can be logically established under the influence of certain universally correct background knowledge [1]. In other words, when logical relationships are established, two objects with relatively different attributes are combined into one and expressed as logical contradiction. Such kind of logic paradox breaks through common logic routines as well as two-dimensional planes, which gives equal stress to both visual value and interactive value. It overturns mindsets of human beings, creates spatial structures quite different from the real world, generates interaction effects, gives people a sense of spatial depth and arouse resonance of people. Logical paradox describes visual forms of space, but that space is not real. It is mainly manifested from three aspects: the coexistence of this thing and that thing, the interwovenness of two-dimensional space and three-dimensional space and the contradiction between reality and illusion.

2. Case analysis

2.1 The coexistence of this thing and that thing

Contour Coexistence Broken Plane—a contour is a discontinuity point breaks a continuous plane. In this process, the contour changes from a single unit into one part of some organic unified whole. Because of the perception process influenced by physiological factors, when images of visual objects fall into the retina field with projected images with contour lines, that visual object will shrink— the areas enveloped in the contour line tend to be tight and solid under some state. It opens the distance with external space, breaks the continuous plane, create connection of spatial position psychologically as well as vertical feelings of three-dimensional spaces[2]。Johnson Defoe's work on the transformation of picture bottom proves this point. We are all familiar with image of the goblet in Rubin's Cup (Figure 1), which is a vague example which can be transformed mutually. Rubin's Cup shows us a contour of interchangeable picture bottoms. The contour of objects in the picture can be regarded as the contour of the goblet or the profile of two human faces. These two alternating phenomena will not appear at any time. If we observe the object of goblet separately, we can see that its contour is quite different from the profile of the two characters that appear alternately, because of which, we can only understand this phenomenon rationally instead of watching it in a real way.The first rule of picture bottom transformation in Rubin's Cup: The closed surface may be regarded as a picture and another surface extending infinitely relative to the closed

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surface can be easily regarded as a bottom. The second rule: Under certain conditions, among pictures following “the reduced law”, those with smaller areas are easily regarded as pictures while those with larger areas are always regarded as bottoms. The second rule: Raised patterns are featured by expansion, attack or advance, so the raised patterns can be easily regarded as "pictures". In contrast, the recessed pattern often appears as a "bottom" and be regarded as one part of the continuous background. The method in Rubin's Cup which uses picture bottom transformation to express static spatial position relationships makes different graphic styles (picture and bottom) in the work which are interrelated appear in difference distances away from the viewers, thus creating a spatial relationship for front and back positions. This method can express a static connection for spatial positions and its picture form with both a picture and a bottom shows different distances away from the viewers.

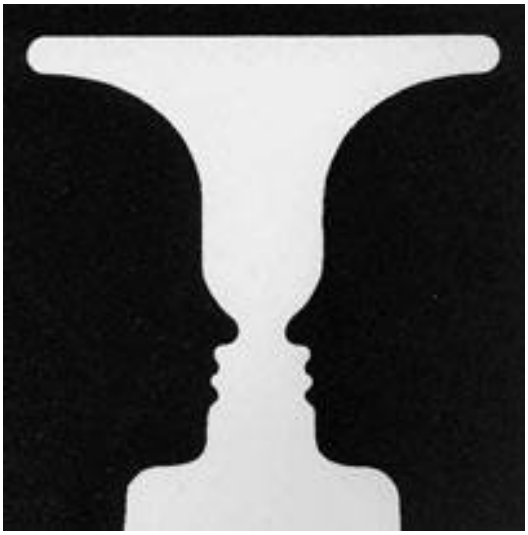

Figure1. Works of Johnson Defoe
Picture source: http://blog.sina.com.cn/s/blog_45ebfb53010009mn.html

2.2 The interwovenness of two-dimensional space and three-dimensional space

In the design work of Guntranberg (Figure2), the plane, serving as the book cover, is integrated with the three-dimensional stream of people. Two completely different objects are integrated on the same picture. Viewers will be convinced by the three-dimensional image in front of them and believe that what is shown is a three-dimensional world. However, the fact is that it is a two-dimensional world. This conveys the great contradiction between the thought that the author wants to express the three-dimensional world and the fact that only a two-dimensional world can be used The whole work not only shows the contradiction between two-dimensional space and three-dimensional space but also realize successful transformation between plane and space.

Ficture2. Work of Gunter Rambow
Picture source: http://blog.sina.cn/dpool/blog/s/blog_63417ac60100lt47.html

2.3 The contradiction between reality and illusion

Art and science, as two main forms of human civilization, have been quite distinct from each other since ancient times. Science, as a kind of learning seeking true knowledge, focuses on quantitative analysis. Art, with fuzzy virtual forms, focuses on qualitative analysis and the excavation of social nature and human emotions. There are great differences between science and art in terms of their research methods and thinking modes. Although they have many contradictions, scientific methods and principles work together with arts which can clearly express emotions can better explore internal mathematical structure of things and convey design contents and information to audiences. Designers need to deeply think about regularity, continuity and structures, and explore the possibility between space and plane, but they should not express these ideas in words because they can only be shown in a plane. It is impossible for our world to have both rationality and sensibility because it does not adopt completely irrational forms. It only effectively uses rationality to establish a space world full of absurdity. At the same time, designers should have sensibility so that they can create unlimited imagination space for their works. There is one or more "paradoxes" of perceptual space in works of contradictory space, that is, in the rational world. Multiple spaces overlaid in works full of contradictory space. They form visual dislocations and make originally unrealistic spatial structures reasonable. The paradox space exists in our life because we firmly believe that there is only one way to interpret the visual model. When human beings see incomplete works, their imagination will be motivated and think of objects that do not exist in the real world according to their own experience. When the visual phenomenon and visual experience in front of them have contradictions, the present phenomenon of conflict will exist. Herbert Reed once said that “We do not always hold that the theory of perspective developed in the 15th century is a scientific equation. It is only a method to describe the space and is not absolutely effective.”[4]. This also clarifies the ambiguity of objects and images. The perspective works that reproduce spatial depth based on experience have gradually given way to design works with illusion effects.Goyoshi Sugihara, a Japanese optical illusion master, explained this contradictory optical illusion direction as “the way we see the world, which is also our perception, is indirectly generated by brain mechanisms, so perception is illusory to some extent”. In other words, what human sees is consciously formed according to our experience and it is the result under the influence of some preconceived references. This kind of perceptual result is the "compound" result formed after people see objects according to their imagination. It is disconnected from the reality of actual things,

which leads to the contradiction between sensibility and rationality and the optical illusion phenomenon that “what you see is not real”.

Penrose's “Three-Rod” theory shows ways to build an impossible world and it is known as three-dimensional right-angled structures. However, it is not a projection of any real spatial structure in reality. Inspirited by Penrose’s “Three-Rod” theory, Escher created the lithograph of “The Waterfall” (Figure 3). In the picture, he connects such three rods and expresses this impossible absurdity through the waterfall. When observing the picture, what we see first is the waterfall falling down and flowing along the winding path. The water constantly flows downhill and away from us, but absurdly, it finally comes back to the commanding point. It goes full circle and the waterfall has perpetual motions. All structures of the picture are placed inside a seemingly "reasonable" space, but it is in fact a multi-dimensional illusory space created on the basis of perceptual thinking and rational professional knowledge.

Figure3. Works by Escher

Picture source: https://class.duitang.com/blog/?id=13559215

3. Conclusion

The exploration of spatial sense in poster design based on logical paradox is a powerful method to enrich the diversity of poster design[5]. The shaping of spatial sense in poster design not only makes visual expression forms diversified but also enhances viewers’ interaction with visual languages. This form creates unique visual experiences, broadens the dimension and depth of communication, delivers effective information to audiences from a multi-dimensional perspective. Space always exists in our daily life all the time. With the artful application of vertical feelings of space, we can realize breakthrough and innovation of visual forms. In this way, visual elements are no longer dominated by the "carrier space", so more "expression space" can be explored so that poster design can be vibrant with vigor.

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