

Study on the Color Design of Elderly Space based on Design Color Science

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Abstract: The article applies the principle of art color science, through the analysis of the physiological and psychological characteristics of the elderly group and the various feelings of the color environment of the housing interior space, and carries out a series of research on the color matching method of the housing interior space of the elderly. Artistic color theory is a theory about color, and as a research method, it takes "color" as the focus, not just as an ordinary or auxiliary element, but as the "center" to be considered. The researcher can identify the "central" element of color through the artwork, explore the history of color development, color techniques and expressions, color symbols, and cultural symbolism, as well as the symbolic meaning and significance of ethnicity, nation, or country implied by color in the artwork, Art colorism, as a theory and method of interpreting the artwork.

Keywords: Color Design; Design Color Science; Elderly Housing Interior Space.

1. Introduction

China is a large country with an aging population, the study of the living environment of the elderly is still in the exploration stage because the elderly tend to be more inclined to the mode of aging at home, at present, the elderly live at home in the interior space design, a lot of research is on the functional design of the furniture in the housing interior space, wisdom of aging, indoor facilities and other aspects of the research for the housing interior space color design research is very little, the color design, not only gives the most direct visual experience, can regulate psychological emotions, affecting human psychology, plays an important role in the indoor space living experience. Color design, not only can give people the most direct visual experience, but can regulate psychological emotions, affect human psychology, and play an important role in the indoor space living experience. At present, many homes with elderly space color designs are monotonous, and the existence of a one-size-fits-all color design form, is unable to meet the needs of the elderly on the space color aesthetics, therefore, the study of the aging of the color of the housing interior space is imminent, the study of the color design of the space of the elderly at home to be in-depth refinement, and to focus attention on the most fundamental and can not be ignored. This paper focuses on the problems of home care indoor color design, elaborates the color theory from a rational point of view, and discusses how to create a more comfortable and humane indoor living color environment for the elderly groups according to the main characteristics of the elderly's behaviors, psychology, physiology and so on. Art color science is not only understood as a kind of art color technique but also a kind of art color theory and art color research method, just like "image science", so we can also be referred to as "color science". Art color science reveals the performance, style, meaning, and cultural symbolism of artworks using the color symbols and color culture metaphors presented in the identification and presentation of colors in art works. Therefore, we focus on the construction and theoretical interpretation of the principle theory of art color science, which is what makes our art color

science different from the pure color techniques of other related areas.

2. Theory of Artistic Color

Color science refers to a set of color theories established on the system of table color and quantitative color mixing theory in the last twenty centuries, which is one of the important basic disciplines. Its theoretical founders are the German chemist W. Osterwalder and the American painter A. H. Menzel. Color study of color generation, acceptance, and its application to the law of science, because of the shape, and color of the object and art image of the two elements, so the color theory for the art of the first, the basic subject, is based on optics and involves the psychophysics, physiology, psychology, aesthetics, and art theory and other disciplines, the study of color in the 19th century before the beginning of the study of color, which the development of optics as the basis for the development of the Newtonian sunlight Newton's daylight refraction experiment and Kepler's modern experimental optics provide a scientific basis for color science. When many psychologists study the effect of color on human beings, they discuss and summarize the psychological effects of color on human beings through their reflections on different colors. There is psychological reflection, emotional reflection, of course, mainly physiological reflection, in fact, the role of color in people, but also cultural reflection, that is to say, people receiving different education, the reflection of color is different. Color's psychological and cultural reflection on people is an important way for us to understand art colors.

2.1. Color and Art Theory Representation

The concept of color in art does not refer to a certain color but is presented as an artistic concept. It refers to the relationship between colors, the relationship between colors and shapes, the relationship between colors and art styles, the relationship between colors and art categories, as well as the morphology and expression of colors, such as color styles, color emotions, color symbols, color culture, color psychology and so on, in the works of all art forms. When we say that color belongs to the category of art and has the

attributes of art, it is not only a conceptual problem but also a matter of doctrine. Color is a natural property of the hue of an object, we use it to describe the material or the scenery of nature, not to express art or interpret art. The concept of color as a natural property is the hue of some object or material, a simple visual hue identification. Color as an artistic attribute concept, its meaning is broad and profound: on the one hand, we say that the technical aspects of art need color to present the value of art; on the other hand, as an artistic concept, color has a wide range of artistic anthropology and cultural aspects, such as national color and style, regional color and style, ethnic color and style, and even the embodiment of those distant and mysterious cultural symbols of color.

2.2. Art color Principles and Theory

Without light, there is no color. Although we say that the principles of artistic color have some relation to the theory of light and color, the principles and theory of artistic color are different from the theory of light and color in physics. Art color is a proposition of art science, and color is a concept of art science, an artistic property. Here we want to reveal the principle problem of color, the emotional problem of color, and the presentation problem of color from the perspective of the discipline of astrology. Understanding the principle of color is the starting point and foundation of our cognition of color, the basic knowledge of color is from the principle of color, students studying art should have an understanding of the basic knowledge of color and familiarity, the lack of appropriate basic knowledge of color, the study of art can not do, nor can go far, but also affects the normal level of artistic creation. Color is not only a visual response, but also an expression of emotion, because art is the need to express emotion, color and emotion are more closely linked. Human emotion is the same form of catharsis, manifested as sour, sweet, bitter, spicy, and other feelings, in most cases, people's physiological response to color and emotional representation is also relatively similar. It is this common characteristic that seeks a basis for the color expression of emotion, and color may become a specific symbol of a certain culture and cultural significance of emotional expression. Of course, different countries and nationalities, and people in different cultural backgrounds have different ways of perceiving color emotions. Even for people of the same nation, different individuals have different emotional responses to colors, depending on their perceptions of warmth and coldness. The artist's reaction and attitude towards color, and the perception of cultural symbols of color will inevitably affect the artist's creation, influencing and constituting the way of color presentation.

2.2.1. Primary and Intermediate Colors

The theoretical knowledge of primary and intermediate colors is based on material pigments or art colors. Our theoretical knowledge of primary and intermediate colors is also based on this. It is basic knowledge that there are primary colors and then there are intermediate colors. Primary colors are the smallest units of color and cannot be separated into other colors. An intermediate color is a color that is a mixture of two primary colors and contains the properties of both primary colors.

2.2.2. Complementary and Compound Colors

The so-called complementary colors are 180 degrees on the color ring, geometrically known as complementary angles, so called "complementary colors". Complementary colors are visually conflicting and contrasting hues. We usually say that

complementary colors are a pair of discordant colors. There are three pairs of complementary colors: red and green, orange and blue, and purple and yellow. It is actually the object relationship between the three primary colors and the three intermediate colors. The complementary color relationship tells us a principle of color, which is not only a principle of artistic color, but also a principle of light and color. This principle is that complementary color relationships are conflicting, contrasting, exciting and discordant color relationships.

2.2.3. Purity and Brightness of Colors

The two color concepts of purity and lightness co-exist in the light-color principle and the pigment principle. Here we explore the issue of purity and lightness of colors from an artistic point of view. The Artistic color Principle tells us that the three primary colors have the highest purity, followed by the three intermediate colors, and then the complex colors. The three primary colors are pure because the primary colors are the smallest unit elements and are not re-decomposable. The intermediate colors are made up of two primary colors added together, and their brightness is therefore reduced. Complex colors are formed by the addition of intermediate colors, so the purity of complex colors is the lowest. Compound colors are the colors that are mixed with the intermediate colors. Complex colors are characterized by low purity and low lightness. The more intermediate colors are mixed, the more complex the hue, and sometimes the warm and cold and subtle hue tendency of the complex color can be seen, but it is difficult for us to say the name of the complex color, and the reason for this is that the complex color has infinite richness and complexity. Therefore, there are many colors that we can only feel its hue, but we can't say what color it is. In the art of oil painting, the most complex colors are used.

2.2.4. Warm and Cold Colors

Warm and cool colors are the psychological perceptions of the hues of colors, which are derived from people's life experiences. The colors blue and red are two of the three primary colors. Then the yellow of the three primary colors belongs to the neutral color which is neither cold nor warm. Among the three primary colors, the intermediate colors mixed with red, such as orange, tend to be warm, and the intermediate colors mixed with blue, such as green, tend to be cool. Then red and blue mixed with the inter-color purple is a neutral color. In the actual use of colors, the feeling of warm and cold colors is also changing, due to the contrast of adjacent colors and hair due to the contrast of adjacent colors and the occurrence of different feelings of warm and cold colors, or to reconcile the colors if the tendency of the red component is more than the red component of the warmer than the lesser, if an artist grasps the relationship between warm and cold colors, and used in the creation of art.

2.2.5. Inherent Colors, Ambient Colors and Light Source Colors

The concept of inherent color originated in the Middle Ages in the West, when Westerners had not yet explored the relationship between color and light sources, nor had they seen the interplay of colors between objects, but only the colors of the objects themselves, and at that time there was no concept of light-color, so it was not clear that the production of colors of objects was related to the relationship between light waves. Of course, from the light-color principle, the color is determined by the wavelength of the light wave.

However, in actual life, when people view colors, there is no concept of light waves, and the same is true for Western artists before the Middle Ages. Ambient color refers to the color of the environment when illuminated by various types of light sources. Source color refers to the natural color of an object on the lighted surface and the color of the light source that is different from the natural color of the object. Light source color varies according to the color of the light source. The color of an object is a mixture of the color of the light source, the color of the environment and the intrinsic color. Therefore, when studying the color of an object's surface, the environment color and the light source color must be taken into account.

According to the ancient Greek philosopher Aristotle, light is color, and it is only with the presence of light that there can be color, for without it there would be no sight. Light is the only source of color for all objects, and color perception is formed when light stimulates the human retina, without which there would be no color. Light is an electromagnetic wave originating from the sun, other celestial bodies, flames, and artificial light sources. It has a wide range of wavelengths, and when the wavelengths are too long (infrared region) or too short (ultraviolet region), the human eye is unable to distinguish them. Only the narrow light region with a wavelength range between 380 and 760 nanometres is visible to the human eye. Several balanced distributions of colors in this visible region have been explored with the longest wavelength being red, followed by orange, yellow, green, blue and violet in that order, an effect we can see in rainbows after rain or when light rays pass through prisms separating them into spectra. The type of light source and the way an object absorbs and reflects light can determine the color of the object we see. When light strikes an opaque object accompanied by touch, the surface of the object will absorb russet talk about most of the visible light, and part of the visible light will be reflected, the color of the reflected light that is the object's original color. For example, a piece of lemon yellow and yellow fabric will absorb almost all the colors in the light except yellow. A white object reflects almost all the colors in the light, while a black object absorbs almost all the colors. The inherent color of any group of objects is only visible in white light, and in fact the light itself is not completely colorless.

2.3. Emotionality of Colors

We are referring here to the emotionality of colors as they are presented in works of art, not to the symbolic elements of the natural properties of colors. Of course, the symbolic elements of colors are the basis of our discussion on the emotionality of colors. Different colors cause people to have different physiological reactions, which in turn generate different psychological perceptions. This physiological reaction and psychological cognition accumulate over a long period of time and then form a structure that is compatible with certain emotions, so there is a relatively stable and coincidental correspondence between colors and emotions.

2.3.1. Color and Psychological Correspondence

colors can have certain effects on both the physical and psychological aspects of a person, for example, green gives a feeling of youth and vitality. For example, green gives people a feeling of youth and vitality, while black gives people a feeling of sanity and, at the same time, a feeling of depression and panic. These colors often have a physical and psychological impact on people's lives. Our discussion here

of colors and psychological correspondences is of course connected with the relatively stable psychological signification of colors, as we say, the color psycho-symbol. Natural colors are endowed with a certain ideal function, corresponding to people's psychological feelings, stemming from their experiences. That is to say, colors as psychic symbols are associated with people's experiences. Artists often bring colors from our experience into their art as symbols of a spiritual abode, so that the colors in their art are in line with our experience, thus transforming natural colors into artistic colors, which become the support of people's spirit and mind. An important concept in the West is "imitation" or "reproduction", while in China, it is "to look at things and take images" or "to transfer and mould them". "To achieve these different artistic concepts in Chinese and Western painting, one factor that cannot be ignored is the reliance on color. People engaged in the art of painting and art design, engaged in a variety of artistic creation activities, if there is no color as the basic carrier of artistic expression, artistic activities can be effectively implemented is unimaginable. From the point of view of the artistic expression process from "image" to "imitation", color becomes the "main character" of the artistic creation process from the beginning to the end.

Table 1. Symbolism of different colors

Coloration	Positives	Negative aspects
Green	Peace, growth	Quality, greasy
Blue	Quiet, distant	Cold, mediocre
Purple	Elegant, noble	Mysteriou, proud
White	Pure, sacred	Nothingness, death
Grey	Plain, simple	Hesitant, dull
Black	Serious, gritty	Death, terror
Red	Passionate, revolutionary	Dangerous, extreme
Orange	Sumptuous, tenderness	Jealous, impetuous
Yellow	Light, happiness	Vulgar, shallow

2.3.2. Color Warmth and Mood

Different colors in art can express people's different emotions, which is the same as people's psychological perception of colors. From a psychological point of view, the emotional response caused by color warmth and coolness is a psychological phenomenon. color warmth and coolness can give people a certain emotional response because the real colors correspond to certain experiences in people's lives, which makes people feel a certain emotion when they see the warmth and coolness of certain colors. The relationship between warm and cool colors and human emotions is the relationship between warm and cool colors in art and human emotions. Simple color warmth or coolness is a natural attribute that excludes many complex cultural factors, but the warmth or coolness of colors needs to take into account the nature of the artistic attributes of the colors in the artwork, as well as the artist's ideas and concepts of using the colors, and so on, to comprehensively grasp the relationship between warmth or coolness of the colors and the audience, and thus to interpret the resulting emotional outcome.

2.3.3. Color is a Symbol of Emotion

Artists use color to express emotion, which is the vibration and sublimation of emotions in the mind. color or the correspondence between color and the psyche is the accumulation of human experience that constitutes a relatively stable psychological perception. One is from the experience of color perception in life, and the other is from

the cultural experience of color perception in the art we create. Once a certain color in life or a color in art becomes an element fixed to express a certain emotion, this color or colors become the emotional symbols of people's collective consciousness. Of course not all colors are emotional symbols perceived by the collective consciousness. Some colors show different emotional symbols in different works of art.

3. Research on Color Design for Elderly Space

Aging room space color consists of three aspects: background color, main body color, accent color, the three in the space occupies an area of different proportions, 6:3:1, although the background color area is the largest, accent color area is the smallest, but each plays a different role in the space, the three complement each other, you can't have one without the other.

3.1. Aging of the Room Color in the Background Color

Background color in the composition of the color of the housing interior space accounted for the largest proportion of the housing interior space will be the overall space in the form of six-sided enclosure, six-sided by the top, walls, ground combination, which is the background color of the housing interior space color. Background colors interact with each other and integrate with each other, as the tone of the color of the housing interior space, is an important part of the overall color of the housing interior space, in the housing interior space environment has the status of the scene. The background color may seem to act as a backdrop, but its significance and influence is far greater than that of a backdrop. Background color is the basic elements of the spatial color environment, in the case of the background color saturation, brightness is relatively high, the background color is the main color, the overall color feeling depends on the background color; if the background color saturation, brightness value is relatively low, the background color will be relegated to the second line, become the main body of the color of the accompaniment, the spatial color feeling by the main body of the color and accent color decision. Through the analysis of the color of the housing interior space, the top color of the elderly is more inclined to the brightness of the color, which makes the space feel brighter and more open. Wall colors, as the transitional colors between the ceiling and the floor, need to be coordinated with the various surfaces and the main colors, and the elderly preferred less saturated colors in the experiments. The choice of floor colors was based on the choice of the roof and walls, and the elderly preferred colors with the same brightness as or lower than that of the walls, while some preferred colors with similar brightness and saturation and in the middle of the range.

3.2. The Main Color in the Color of the Ageing-Friendly Housing Interior Space

The main color in the color of housing interior space mainly refers to the furniture with large area such as sofa, bed, wardrobe, cabinet, etc., and the fabrics with large area such as curtains, carpet, bed sheet, quilt cover, sofa cover, etc. The main color is the centre of our vision, and it is an important part of the color atmosphere of the whole space. The main color is the centre of our vision, it is the color of the housing interior space and its important part, it is the main body of the

color atmosphere of the whole space, which expresses the different themes and styles of the space. The background and accent colors are matched on the basis of the main color, so the correct use of the main color is an important part of the interior color design. The matching of main color can be analyzed from two major aspects. From the point of view of hue, the main body color can be chosen to match with the complementary or contrasting colors of the background to form a sharp contrast and make the space feel more free and active; the main body color can also be matched with the adjacent colors of the background hue or the same colors to make the space feel more coordinated and stable. From the point of view of saturation and brightness, different saturation, brightness of the background color and the main body color contrast to determine the housing interior space color atmosphere.

3.3. Aging of the Housing Interior Space Color in the Accent Color

Accent color is generally the strongest color in the composition of housing interior space color, saturation and brightness are higher than the background color and the main color, this paper studies the elderly housing interior space color accent color elderly more inclined to the overall coordination of the color, the accent color for the neighboring or contrasting colors and high saturation and brightness of the color, so that the overall color of the housing interior space, coordination of the overall color of the large area, the small area of the contrast change, to create a rich and colorful color of the housing interior space. In the use of accent colors, can not be overly seeking changes, resulting in space clutter, nor can it be too monotonous, resulting in space disorder and tedious. Aging-friendly housing interior space color design regular use of accent colors should be based on the background color and the main body color, to create a rich, vibrant elderly housing interior space color.

4. Conclusion

The innovation of the design expression form of the elderly home space color design. For a long time, the design of elderly home space has been dominated by interior furnishings, lighting design and furniture design. A new form of spatial art has been explored through the study of color science and has contributed to the innovation of home space design for the elderly in the city. Introducing color psychology into elderly space design. Explore the strategy and method of space design art design by studying the psychological characteristics of the elderly. Design a housing interior space suitable for the elderly to live, improve the quality of the elderly, enhance the personality of spatial art, and play a guiding role in the color design and research of home-based elderly space. Explore the aesthetic value of space, avoid homogenisation of design, and meet the needs of different elderly people for space.

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