

Research on Color Design of Elderly Apartments

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Abstract: Aiming at the phenomenon of aging of the population and the change in family structure, we study the problems related to the independent living of the self-care elderly in apartments and the color design of the space. The article explains the definition of color psychology and analyzes the influence of color on the psychological and physiological aspects of self-care for elderly people in residential spaces. The article applies the principles of color psychology to the design of elderly apartments and explores the role of color in creating the atmosphere of the interior space. It is proposed to use color aesthetics and design rules to create a pleasant color space atmosphere, that and convenient for the elderly to live in the space color design scheme. This study can provide a theoretical reference for the design of living spaces for the elderly.

Keywords: Color psychology; Aging; Self-care elderly; Space design.

1. Introduction

The number of elderly people in China has been increasing in recent years, coupled with the rapid development of China's economy and the improvement of people's living standards, the issue of supporting the elderly in their twilight years has received increasing attention from people. As the residential space is a place that people will contact every day, the comfort of the space should be an important aspect to weighing the quality of life of the elderly, and the color of the space related to the comfort will invariably have a good or bad influence on the residents. The design of apartments for the elderly must grasp the difference between the characteristics of the elderly and the young, and formulate a spatial color scheme that meets the physiological and psychological needs of the elderly as well as their behavioral needs, to finally create a comfortable, safe, harmonious and beautiful space environment for the elderly, which is different from that of ordinary apartments.

2. The Use of Color Psychology in Space

Color Psychology is a psychology about the relationship between color and the human psyche, and its method is to use various colors to examine people's psychological state, physiological characteristics, and behavioral activities. Color psychology is an important aspect of human psychology, including physiological characteristics, behavioral activities, and personal emotions. The ultimate purpose of the use of color is the transmission of feelings. Color itself naturally does not matter emotion, the so-called color emotion refers to the inductive effect that occurs between people and color. Generally speaking, this emotional effect can be studied from two aspects.

2.1. The psychology of color in space

Color is a unique language, which can make our eyes react visually and produce a sense of color. The mental activities we generate because of color are subjective reflections of the objective world. When human visual organs receive light of different wavelengths, the brain nerves will analyze these signals and generate associations, which will lead people to

generate corresponding mental activities and psychological experiences. Eaton once said, "Color is a kind of power. Whether we are aware of it or not, the effect of color should be experienced and understood not only visually but also psychologically". Growing up in different environments, everyone has their definitions and associations of color, and these colors are processed in the brain, so that our sense of color is transformed into different physiological and psychological responses, thus affecting our emotions and thoughts. People in different color spaces will have different psychological feelings, and this long-term influence will become a force that cannot be ignored, and then affect all aspects of life.

2.2. Influence of spatial color on people

The main body of color psychology research is that people in different color space environments space to produce different psychological and behavioral responses. Different colors will give people different feelings, and different color space environments will make people have different feelings. For different people, different psychological feelings and preferences for the breakdown are indispensable links in our research process. The same color, different races, different cultural backgrounds, different age groups. Different genders, different education levels, and people from different countries will have different psychological feelings towards it. For example, in the wedding ceremony Westerners like white, they think white is pure, usually Western-style weddings pure white is the main color of the wedding site. Westerners believe that white is pure elegant and holy; however, in China, the color is often used in the funeral scene, this is the cultural differentiation between East and West to produce different colors also feel. Even the same color will produce the opposite color also sense.

The color of the physical stimuli directly leads to certain psychological experiences, which can be called direct psychological effects, for example, in the operating room, the doctor in the surgical process sees the blood is red, due to visual adaptation and the visual color complementary principle, the doctor sees red immediately after seeing green can be properly adjusted to the degree of color adaptation, so we can see a lot of willingness to the doctor's surgical clothing is green, which is to meet the human visual color This is to

satisfy the demand for the complementary color principle of human visual color. Human self-color perception can also be cleverly used in our design, through these psychological and physiological needs of human research can let us in the design process choose different colors to meet the color design needs of different functional spaces organically and dynamically. For example, high brightness color is blinding and makes people panic; red color is eye-catching and bright and makes people excited.

Color also has a more complex "indirect psychological effect". At this time the psychological effects caused by color do not only stay in the feeling or perception of the shallow stage but evoke the perception of other more intense, more complex psychological feelings, leading to more profound psychological activities, such as associations, thinking, and even memory, and so on. The role of the color factor will make the individual's behavior more easily swayed by personal emotions. Psychologists believe that 80% of the information people receive comes from visual sources, the most important of which is color. Color can be used as an art of healing. Appropriate colors can alleviate the condition, regulate the patient's mood, and reduce the patient's pain. Due to the differences in the wavelength and intensity of colors, different spatial environments can be created, and the experience and psychology of individuals can vary.

3. Physical, Mental, And Behavioral Characteristics of Self-care in Older Persons

As the ability of the elderly to take care of themselves declines with age, they are broadly categorized into the self-care elderly, the assisted elderly, and the cared-for elderly, depending on their ability to take care of themselves and whether they need the care of others. Apart from living with their adult children, many elderly people live with only a couple or live alone as "empty nesters". In local society, the traditional family of several generations has gradually disintegrated, and there is an inevitable trend towards smaller families, with children going out to work, and couples living independently with each other after retirement becoming more and more common. Couples living independently after retirement are increasingly common. In addition, the aging of the population is widespread in society. According to the results of the Seventh Population Census, in 2020, the total number of elderly people aged 60 and above in the Mainland will reach 264 million, accounting for 18.7% of the total population. Compared with the data from 2000, the proportion of elderly people has increased by 8.4 percentage points, showing that the elderly have become a group that cannot be ignored in society. Among them, most of the elderly who can live alone are self-care elderly, so this paper focuses on the analysis of the elderly who can live independently to explore the physical and mental characteristics and behavioral features of the self-care elderly empty nesters, to understand their needs for living space, and to provide a suitable color scheme for the self-care elderly apartments.

3.1. Psychological Characteristics of Self-Care Older Adults

As people grow older, their physiological functions deteriorate and their values change, their psychology will also undergo certain changes. When many elderly people leave their jobs or when their children leave home, they feel that

their value has become lower and they are at a loss as to how to cope with the emptiness that suddenly arrives. At the same time, without the company of their colleagues and with their children busy with their work, older people generally feel lonely and lose their motivation for life. In addition, their physical condition deteriorates day by day, and their perceptual ability declines and their memory fades. These changes in social and family roles, increased financial burdens, decreased companionship with friends and relatives, and declining health all lead to a loss of confidence and loneliness among the elderly. Moreover, as people age, their personalities also change. Many people who were ambitious and unique when they were young become depressed in their old age, or who pursued excitement when they were young wish to return to a life of ease and leisure when they grow old.

Elderly people's psychological needs can be reflected in the demand for dependence after retirement and social ties are reduced, the family has become their most common place to stay, and they still want to have a place to communicate with the outside world, so there should be a living room suitable for receiving guests, in the space to meet the needs of their self-esteem, aging design should be affable and unobtrusive, do not let them produce their incompetent feeling of loss, but in several colorful reminders to make them feel that they are cared for. Instead of giving them a sense of loss that they are incompetent, they should be reminded in some colors to make them feel that they are cared for. The space as a whole can choose warmer colors to give people a soothing and leisurely feeling and create a living environment with a sense of security, comfort, and a sense of belonging.

3.2. Physical characteristics of self-care older adults

Physical health is measured by the Katz scales for Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). ADL consists of six indicators: "bathing, dressing, indoor mobility, toileting, eating, and urinary and bowel control"; IADL consists of eight indicators: "visiting, shopping, cooking, washing clothes, walking 1 km, lifting 5 kg, stretching three times, and using transportation". The IADL consists of eight indicators: "walking, shopping, cooking, washing clothes, walking 1 kilometer, lifting 5 kilograms, stretching three times, and using transportation", with a differentiated coefficient of self-care based on the level of achievement.

As they age, older people experience different degrees of deterioration in various aspects of their bodies, especially their limbs and senses, and this deterioration further contributes to a decline in their physical functioning, making them susceptible to various diseases. Although elderly people can perform most of their daily activities independently, their physical senses deteriorate to a greater or lesser extent as they age, with the most notable deterioration occurring in their vision. As their eyesight declines with age, older people's ability to perceive light also deteriorates, and they have less sensitivity to color, are more likely to confuse colors, and are more sensitive to glare. Therefore, they can't see clearly in low light, their ability to distinguish objects is weakened, and their ability to judge spatial relationships is reduced. The color tone of the space should be chosen to serve the self-care activities of the elderly and make it easy for them to distinguish between different areas and objects; the spatial layout should also reduce the visual obstacles and avoid dangers as much as possible. The design of light sources

should also take into account the physiological characteristics of the elderly. The deterioration of various body functions may cause the elderly to have a restless sleep, wake up more often, and lose their mobility, which should be taken into account in the space design.

3.3. Behavioral characteristics of self-care older adults

Due to changes in physical condition and social status, older people tend to have specific behaviors that are different from those of younger people. Moreover, unlike young people who have a variety of leisure options, older people tend to have a fixed leisure pattern, with fixed leisure partners, fixed leisure venues, and leisure time. Older people's circle of friends is mainly composed of neighbors and old friends, and they choose indoor recreational facilities, green gardens, pavilions, open spaces, and other spaces in the community as their places of activity. Most young people live as wildcats who stay up late and don't take naps, while the behavior of the elderly is to go to bed early and get up early and take naps. Aging changes the biological clock, so even if they want to sleep late, they will be sleepy by zero o'clock; even if they want to wake up late, they will wake up before dawn. Therefore, the elderly get up early, go out in the morning, come back for a nap, go out in the evening, and spend the rest of the time on home activities, such as housework, socializing with guests, reading, eating, and other daily activities. The lighting arrangement should take into account the content and time of their activities. For example, if the light is not good in the early morning or in the middle of the night, there should be a soft light in the aisle that does not hurt the eyes but is sufficient for illumination. For reading, we have to take into account the decline of their senses, and the lighting in the reading area should be slightly brighter than that suitable for young people. Compared with young people, the elderly live a frugal and leisurely life, happy to spend time cooking, so the time spent in the kitchen will be longer, but their memory is failing, easy to forget to turn off the fire, forget which cabinet to put things in, designers should pay attention to the use of color space design color for the elderly to provide operational convenience, to play a reminder role.

4. Color Design Strategies for Elderly Apartment Spaces

Different colors will convey different psychological feelings to people, and people of different ages may have different feelings when they look at the same color, so we need to pay attention to the positioning of the target group and make it people-oriented when we do the color matching and articulation in the space. The elderly as a special social group, are affected by the aging process, their vision and emotions will change, so the color selection needs to fully take into account the elderly's perception of color. After retirement, the elderly will live a more leisurely life, and the scope of socialization is greatly reduced, according to the survey shows that the elderly spend more than half of the day indoors. Therefore, strengthening the color design of the living space for the elderly plays an important role in improving the quality of their lives. According to the definition in the "Building Design Code for the Elderly" GB50340-2016, apartments for the elderly refers to the service content for elderly couples or singles, which is gradually recognized by society, so we are going to study the color design of these

spaces according to the functional classification.

4.1. Color design of living room space

The living room is the medium of communication between the elderly and the outside world and is the more public part of the living space, which should be both personalized warm, and interesting. According to the different needs of the elderly, two types of living room layouts are designed. Firstly, the traditional living room layout is adopted, with the sofa and TV background wall arranged on the wall, and cabinets placed next to the sofa to increase the storage space. The overall space color is warm and bright, the main color is warm wood gray with green-gray curtains, and the accent color is green plants and flowers. The main color is bright, 36° yellow, saturation 44%, brightness 92%, and other colors in the space. Secondly, the living room breaks the conventional background wall design, the use of projection, and the abolition of the TV background wall, when the projection is closed, the space becomes larger, and the scope of friendship becomes wider. The living room color gives people a sense of active and friendly, wall saturation and brightness are higher than the top and the ground to make the space more three-dimensional sense, the main color uses warm wood color and warm gray, through the saturation and brightness changes to highlight the difference, the use of warm green greenery is to make the space full of personality. The accent color warm green saturation of 48% and, a brightness of 75%, in this low saturation background color weak brightness contrast space is prominent enough to avoid the use of higher saturation brightness of the accent color, so as not to produce discomfort in the elderly.

4.2. Color design of kitchen space

The kitchen is used frequently in the space of the elderly living room, and the household chores are mainly concentrated in the kitchen. The kitchen cabinets are designed in an L-shape so that the operating table of the elderly in the kitchen becomes bigger the sense of space is enhanced, and the elderly can cook together to reduce the sense of loneliness and stabilize the psychological state. The kitchen space needs to have a good healthy environment, the space color should be high and short tone, that is, high brightness, weak contrast, background color saturation of up to 12%, the main body color saturation of up to 36%, background color brightness of up to 94%, the main body color brightness of up to 93%. This bright space color is easy to take care of, mainly warm yellow, the plate is set as warm green, and the space color is related to each other, coordination and unity.

The main color of the kitchen can be warmer, try to have a window in the kitchen space, and at the same time, choose a light warm color imitation of the feeling of sunshine, plus fresh color embellishments, so that the space is bright, but also to make the elderly in the process of cooking in a happy mood. In the kitchen the main body and the background color need to have a transition, there is a contrast, the color of the cabinets under the depth of the upper light, and the kitchen countertops are suitable for neutral colors or wall colors to coordinate, to expand the sense of space. To facilitate work, the concept of streamlined cabinets has been proposed. Whether U-shaped, L-shaped, or straight, washing, preparing, cooking, and serving should be designed as a streamlined operation flow to reduce the number of back-and-forth movements of the elderly. In addition, the elderly will also have a significant memory decline, the kitchen has a lot of

items, and the elderly tend to rely on psychological stereotypes for storage and organization, we can also use color to differentiate between different functional areas and storage areas, and can use different color stickers to indicate different seasonings, to help the elderly to form stereotypes. Meanwhile, in the design of safety facilities, the high frequency of water use in the kitchen, the material should pay attention to anti-slip; can be installed in the hanging cabinet lifting device, or the cabinet door is designed as a glass door, so that it is convenient for the elderly to observe where the items they need are located, to reduce the workload, and to reduce the fatigue of the operation of the kitchen; if possible, the kitchen should be equipped with a smoke sensor and an automatic alarm device for the fire alarm.

4.3. Color design of bedroom space

The bedroom is the private part of the space, usually separated from the common space, and can have a more independent color palette. As a place of rest, the bedroom should be able to calm the mood and adjust the body temperature of the materials and colors. If the color saturation is too high, it will make the central nervous system excited, and not conducive to sleep, bright over low is easy to make people feel dull depressed, and anxious. According to the survey, the elderly prefer solid wood furniture, color warm gray system, log color, teal, and walnut colors as their attraction, this warm color system can bring them a warm and safe feeling. To avoid the tedium brought by the color or even fear, the theme color and background color of a dark and light match more elegant and comfortable. Such as the choice of apricot beige or light gray and another light background, can be matched with dark furniture, but avoid black and grey, blue and green, and deep purple systems, because the elderly eyeglass body turbidity, blue, green, purple, and other colors in the eyes of the elderly bright through the low, is not suitable for use in the bedroom.

A bedside table as bedside furniture, especially for the need to take medicine and drink water to wipe the sweat of the elderly, is indispensable. In bedroom furniture such as nightstands, the elderly still love wood and other natural materials such as furniture, furniture color can be used with the bed body in similar colors, more harmonious and unified. To avoid falling objects, consider connecting the bed to the nightstand. For easy access, the drawers of the nightstand can be equipped with dividers and auxiliary lighting to provide localized special lighting services.

The closet is also one of the furniture needed in the bedroom space. The material of the closet in the elderly space should be friendly and suitable for touching, avoiding sharp edges and corners, and the color should be simple and elegant, coordinating with the color of the bedroom space. Considering that the self-care elderly have certain mobility, but it is still difficult for them to lift or bend down to fetch things, the closet can be designed with multi-level space division to make full use of the best fetching space in the middle, and the upper and lower parts can be equipped with lifting devices and electric hanging rods, to reduce the difficulty of the elderly in fetching and placing articles and to avoid any danger. As the visual perception of the elderly decreases, the cabinet can be equipped with a sensor light to provide illumination when it is turned on.

Lighting is also an important factor affecting the color of the space, in the light arrangement should consider the physical characteristics of the elderly, night and drink more

frequently than young people, so reading before bed, getting up and other convenient, bedside lighting can be set up, the light color to avoid the cold tones, you can use warm and soft warm tones, in the periphery of the lamp with opaque or translucent lampshade, increase the number of light refraction, avoid glare. Avoid glare. Or change the position of the lamp, installed on the bottom edge of the bed, the use an automatic sensing device, when the elderly feet and the ground, the light turned on, from top to bottom can not see the position of the light source, but also to reduce eye irritation. At the same time, it is best to use non-slip, non-reflective surface materials for the floor, matte paint or wallpaper for the walls, and two layers of curtains for the windows to minimize glare from the outside world.

In addition, designers can also communicate with the elderly, choose the color palette according to the character traits of the residents, understand the needs of the elderly living in the bedroom, and carry out personalized designs for the elderly. For the elderly who pursue fashion, their bedrooms will be more modern and use trendy colors, while those who are physically weak may prefer simple and quiet colors that can eliminate their nervousness and relieve their fatigue.

4.4. Color Design of Bathroom Space

The bathroom is a necessary space in the house, and it is also a space that is frequently used by the elderly. If there are two areas for toileting and bathing, there should be some differentiation in color. Elderly people go to the toilet more often at night, coupled with the deterioration of eyesight, the ability to perceive light and objects decreases, so the background color of the toilet should be as simple as possible and lighter than the main body of the color. Toilets should be made of white material so that the elderly can find the abnormalities of urine and feces in time, and also help to create a clean and bright atmosphere in the space. The floor should not have too many color variations to prevent the elderly from misjudging the height of the floor and falling. Shelves, lockers, and other facilities should be differentiated from the background color, with moderate contrast when the color can not be too strong, more goose yellow, mahogany color.

At the same time, the bathroom also has some safety designs, such as bathroom water frequency, easy to slip, not use reflective materials, paving non-slip floor. In the appropriate area to add barrier-free handrails, a hand basin around the bar can be used as both towel racks, but also as a handrail to help the elderly action, in line with the design of the interior space of the elderly. Some handrails and door handles can be reminded in recognizable colors to make it easier for the elderly to find supportive objects and avoid bumping. If necessary, install emergency call devices in the toilet or bathing area. At the same time, each partition as far as possible not use a difference in height of the stone threshold door, Choosing the sliding door on the hanging rail can prevent the elderly from tripping, but to deal with the drainage problem.

5. Conclusion

As China ages, the physical and mental health of the elderly is gradually receiving attention in various fields. Maintaining health seems to be simple, but with the development of society and the maturity of cognition in all aspects, health no

longer refers to healthy body organs, good physiological functions, good physical activity, etc. The health of the living environment for the elderly is also of vital importance. Thus, this paper in the scientific design methodology under the guidance of aging color research, for the elderly to create a high degree of comfort in the elderly environment, to create a good and comfortable spatial atmosphere, color is an important element of the space that can be well used, but also to show the effect of the powerful means, I hope that this paper for the elderly apartments in the space of the color design research to provide a certain reference significance and value.

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