

Impact of Interior Colors on Healthy Empty Nesters

--Taking Qingdao as an example

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Abstract

Indoor living environment has an important impact on the behaviors and psychology of old people. In this paper, attention is fixed on the color of indoor living environment. Through the random survey on old people in Qingdao, guiding recommendations are proposed for the elderly-oriented reform of interior colors to meet the psychological and physical needs of old people.

Keywords

Environmental Psychology, Environmental Behavioral Science, Lighting, Color, Elderly, Living Environment.

1. Introduction

The aging of population is an important trend in today's society. According to the 7th national census, old people aged 60 and over have already accounted for 18.70% of the total population in China. In Qingdao, Shandong province, 55-year-old women and 60-year-old men generally start retirement. Thanks to the improvement of medical level and housing condition, old people ranging between 55 and 75 years old are quite healthy, with complete self-care ability and without restrictions of material conditions. Therefore, empty nesters in this age group living independently or with their spouse account for a great proportion. Due to the decline of various physical functions and increase of psychological needs, old people are usually more demanding on the convenience of various life facilities.

2. Literature Review

The visual information conveyed by colors is the most direct and comprehensive feeling of people towards the environment and objects. Generally, three principles shall be followed in the use of colors in interior design, namely principle of harmony, primary and secondary principle and principle of balance. Principle of harmony refers to an integrated style of interior design, which can prevent the local and overall colors from being too messy and fragmented. The primary and secondary principle emphasizes to determine the primary interior color first and then to consider using colors of the same color system, contrasting or complementary colors. Principle of balance points out that there are deep and light colors, and the matching of two or more colors may receive greatly different visual effects when compared with a single color [1].

Different colors would bring people different psychological feelings, for instance, the use of bright colors and warm colors may give people a forward and open sense, while the use of dead colors and cool colors may give people a back and shrinking sense. In the meantime, bright colors may reflect the light strongly, opposite to dark colors, so colors in interior design play a vital role in adjusting the light [2]. Interior colors also impact the apparent temperature, so it shall be combined with the orientation of the house during the decoration. If the light is ample

and it is hot, cool colors shall be considered; but if the light is insufficient and it is cold indoors, warm colors can be taken into account [2].

The adjustment of light illuminance and light colors in interior design can also have a psychological impact on dwellers. When the light illuminance is high, the light is bright, it makes people more excited and active in thinking. When the light illuminance is reduced, it makes people warmer, safer and more comfortable. If the light illuminance continues to decline, people may be in a dark environment and prone to solemn and silent associations [3]. Warm lights of a high illuminance help create a soft and sweet home environment [4]. Besides, a high light illuminance also gives people an illusion that the room is bigger [5]. Light colors consist of two types, namely warm colors and cool colors. Red, orange and yellow colors have long wavelength, falling into the category of weak light, and it would give people a warm sense when shining on any object. Purple, blue, and green colors have short wavelength, falling into the category of strong light, and it would give people a cool sense when shining on any object. [3]. White light is widely used in indoor space, since it presents excellent color rendering property as a neutral color light, which can be applied everywhere at home [6].

3. Data Description

In this research, the impact of interior colors on the physiology and psychology of healthy empty nesters was investigated, for the convenience of creating the most suitable indoor living environment with colors. Data were collected in the form of questionnaires, and a total of 208 questionnaires was collected. Specifically, more than 70% of the participants were newly retired people below 60 years old, who are mostly empty nesters living independently or with their spouse. More than 95% of the participants had not hired nannies or other caregivers, indicating that they were relatively healthy. For a large part of the participants (38.74%), it had already been 5 to 10 years since the last decoration of the house, and for a considerable part of them (28.8%), it had already been 10 to 20 years. For 26.7% of the participants, their houses were built in around 2000 – 2009, which accounted for the highest proportion among all options, suggesting that it was over 10 years since the building of the house and over 5 years since the last decoration, and many indoor facilities may have already started aging or been worn down. In the past, attention was not paid to the matching of colors. As a result, due to the restrictions of aesthetic factors at that time, the living environment of most old people may be characterized by single colors.

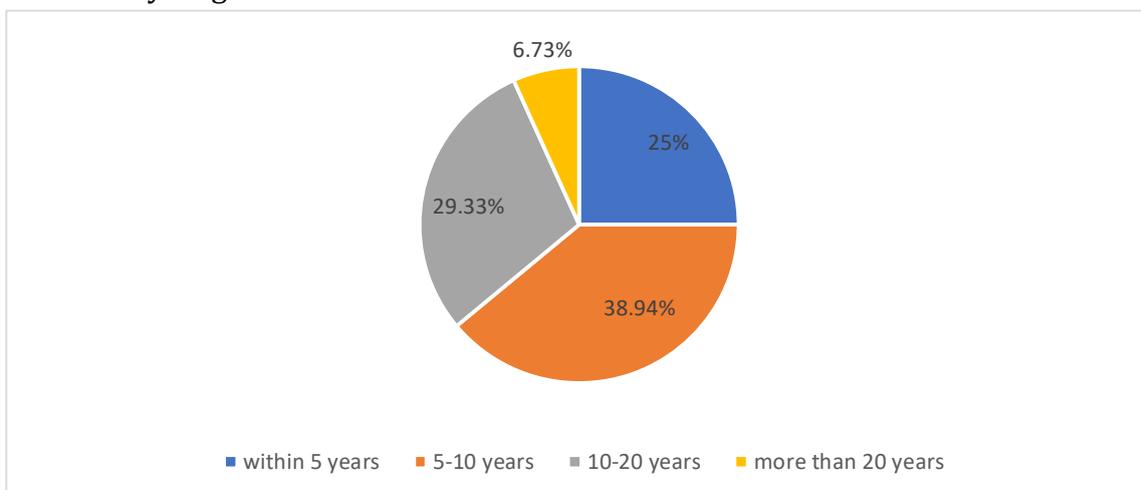


Figure 1: Year since the last renovation of the participant's house

3.1. Natural Lighting

First, natural lighting is a part of interior colors. Different orientations would also directly impact the effect of indoor natural lighting. As high as 75.92% of the participants displayed an obvious preference for south orientation. Old people have aging joints, and they would feel more painful in a gloomy and cold environment. Of course, the survey showed that more than 75% of the participants lived in a south-oriented house, which must be related to China’s building codes on the orientation of the building. Therefore, it is well understood that the elderly universally like sunny houses.

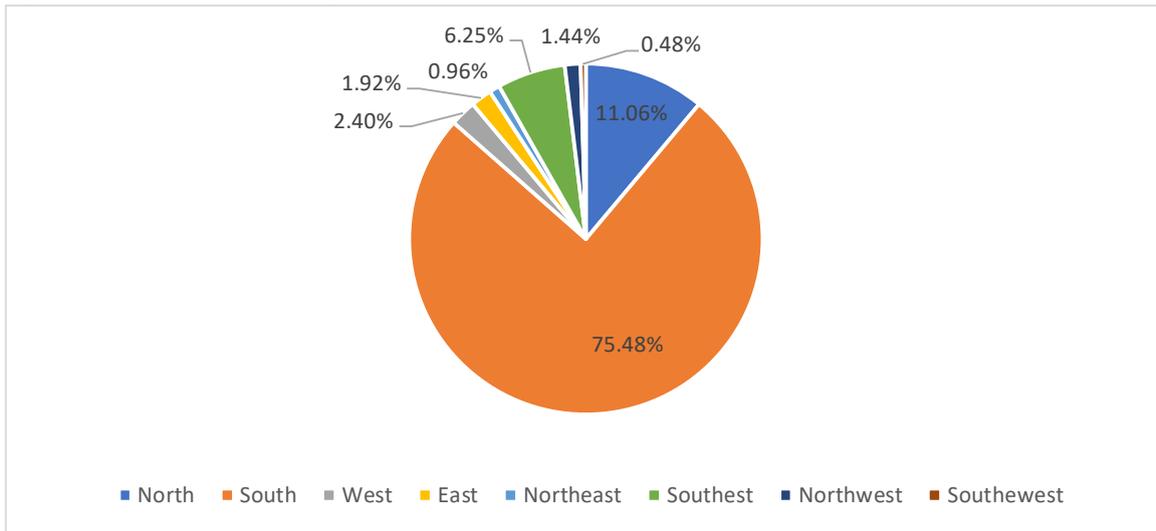


Figure 2: Orientation of the participant's house

3.2. Colors of Indoor Living Environment for the Elderly

Besides natural lighting, the survey also evaluated the colors of participants’ indoor living environment from the overall tone, materials and colors of the floor and wall, and illuminance and colors of light. It was found that warm and light colors were mostly used for the overall tone, floor color and wall color. So the first problem to be solved is ‘why empty nesters prefer warm and light colors in their living environment’?

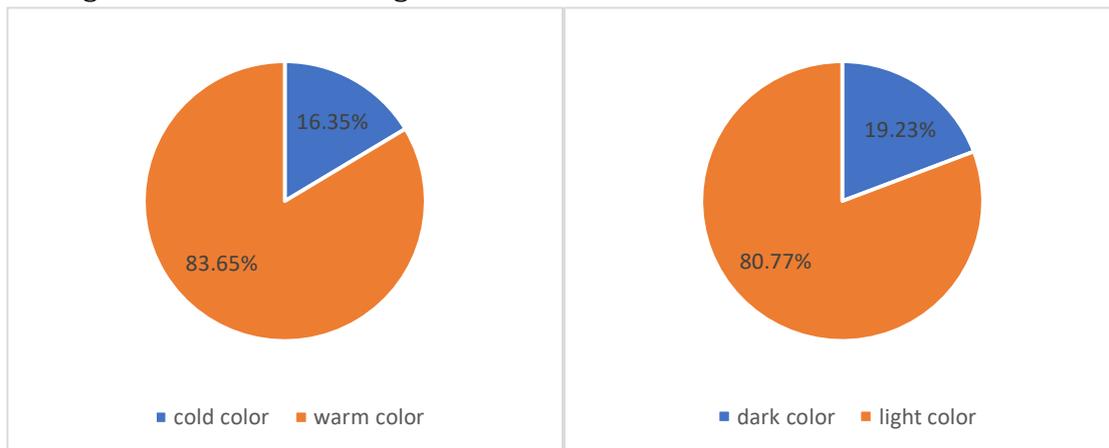


Figure 3: Overall color tone of home decoration

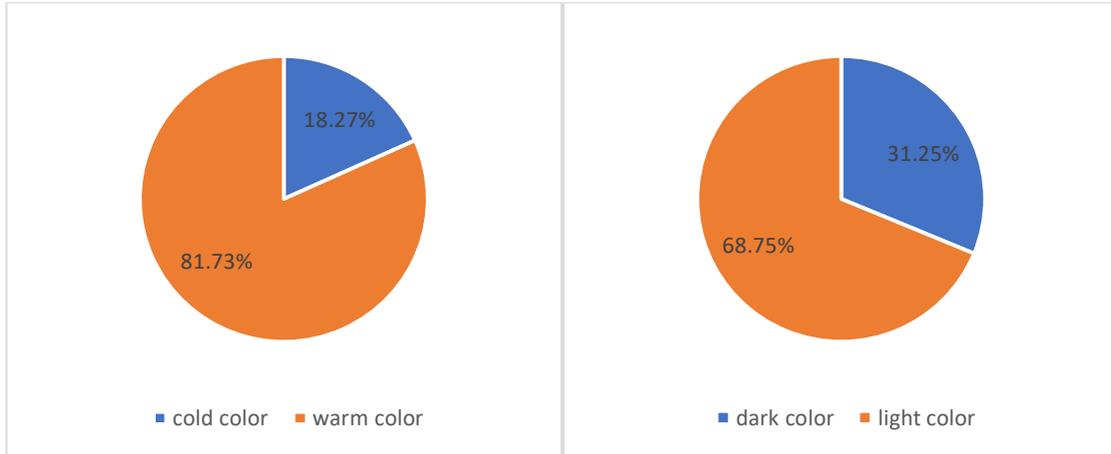


Figure 4: Color of floors in participants' homes

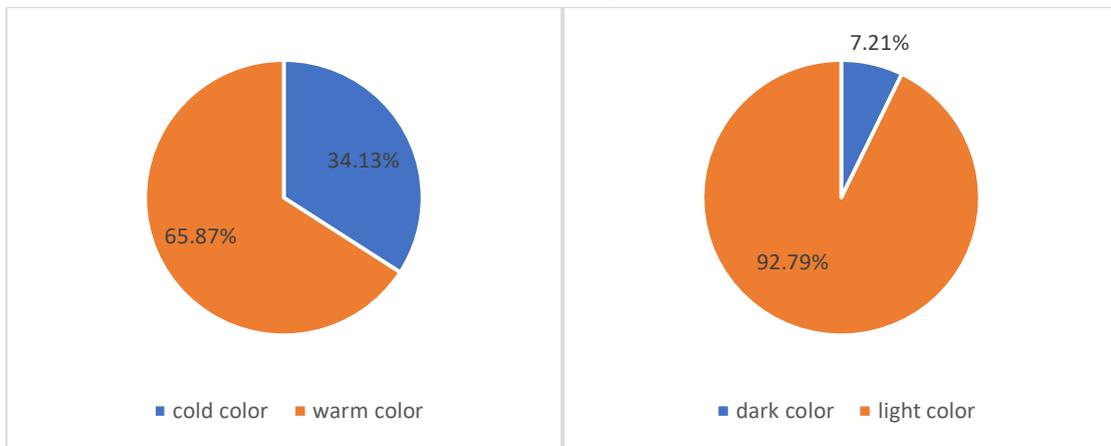


Figure 5: Color of walls in participants' homes

Above all, empty nesters tend to feel lonely since they do not live with their children, especially those who are just retired at the age of 55 and 60, cause they are experiencing the transition from the a busy working state to a retirement state. The abundant free time in their lives make them develop a psychological gap, and they may doubt whether they have lost value to their children and even to the whole society. Warm colors like red, orange and yellow usually make people excited and inspire their potential psychological feelings [7], and enable empty nesters to enjoy their later life much more enthusiastically and optimistically. Meanwhile, warm colors help create a soft, sweet and cheerful living environment, and make empty nesters feel warmer and more comfortable. The intensity of color is related to its purity and lightness. Purity refers to the brightness of color, while lightness refers to the darkness of color. Light color is usually of low purity ranging between 1 and 3 and high darkness ranging between 8 and 10. Old people are generally conservative, and their decoration at home is still in the style of the last century, so there would not be particularly bright high-purity colors. Research shows that living in a high-purity environment, people may get emotional stress, visual fatigue and anxiety easily, and it is difficult for them to be quiet and relaxed. On the contrary, low-purity colors usually make people more comfortable [7]. Grey, brown, black and other low lightness colors make people grave, lonely and depressed, and it makes empty nesters who are prone to negative emotions even worse. Dark colors also absorb lights [2], and influence the natural lighting in the room. As a result, the use of warm and light colors in the home of empty nesters is good for their physiology and psychology.

If the floor color is discussed separately, 68.75% of the participants used light colors, and the rest 31.25% used dark colors. Actually, dark colors are recommended, since the ceiling is usually in light colors, and the layout of the color mode using light colors above and dark colors

below may enhance the feeling of depth [2]. Meanwhile, it would avoid the “top-heavy” sense. Although light-colored floor looks brighter and cleaner, it stains easily, making it more difficult for empty nesters to do the cleaning.

3.3. Indoor Lighting Facilities

The installation of indoor lighting equipment and all kinds of lamps is also a significant factor impacting the interior colors. So the second problem to be solved is how to design lighting facilities to make the living environment more suitable for empty nesters. According to the survey results, more than half (57.21%) of the participants used white light for lighting, 38.45% used yellow light, and the rest 4.33% used cold light.

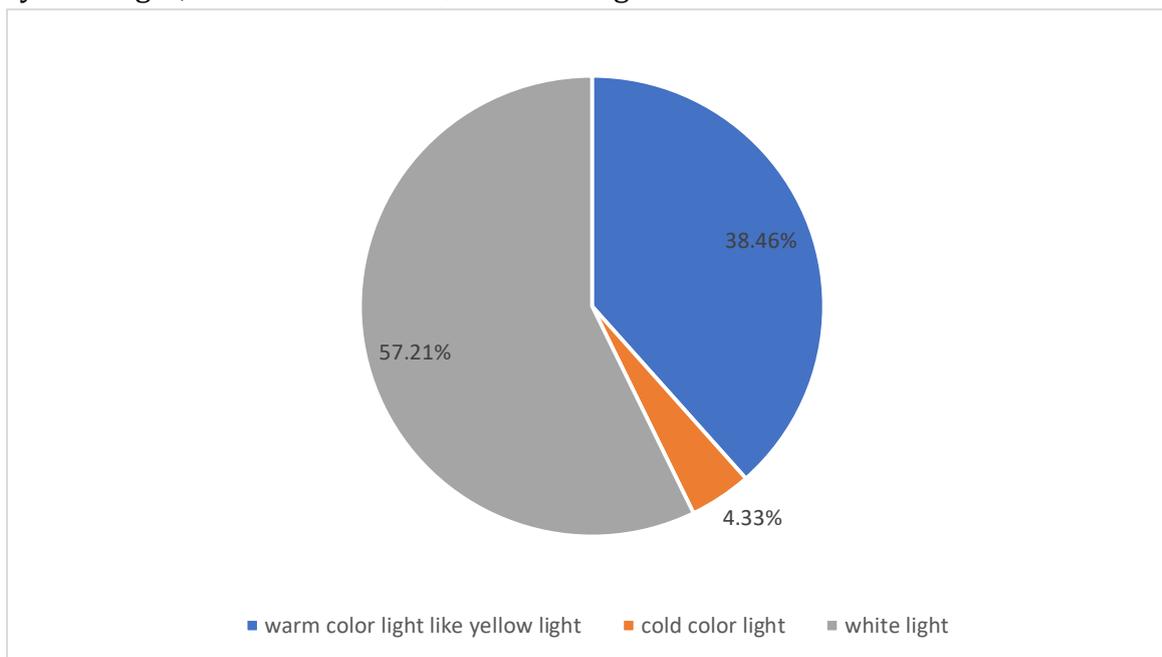


Figure 6: Color of lighting devices in participants' homes

As people grow older, they get weaker, and both their joints and blood vessels become age. Thanks to all these factors, old people tend to feel the cold. Warm lights shining on all objects in the room will generate a sense of warmth and improve the apparent temperature of old people. Especially in Qingdao, a northern city in China, it is relatively cold in winter, so it is necessary to improve the warmth of living environment for old people. From the perspective of color temperature, warm light is apparently more suitable for empty nesters than white light and cold light.

White light is still the most widely used colored light, since it has a high color rendering index, and its illuminance is usually higher than warm light. For the group that need a lot of work and study, white light can make them more awake to ensure the efficiency. But for old people, particularly empty nesters, they need to rest in a warmer and sweeter environment. Consequently, from the view of illuminance, warm light is also more suitable for empty nesters at home than white light.

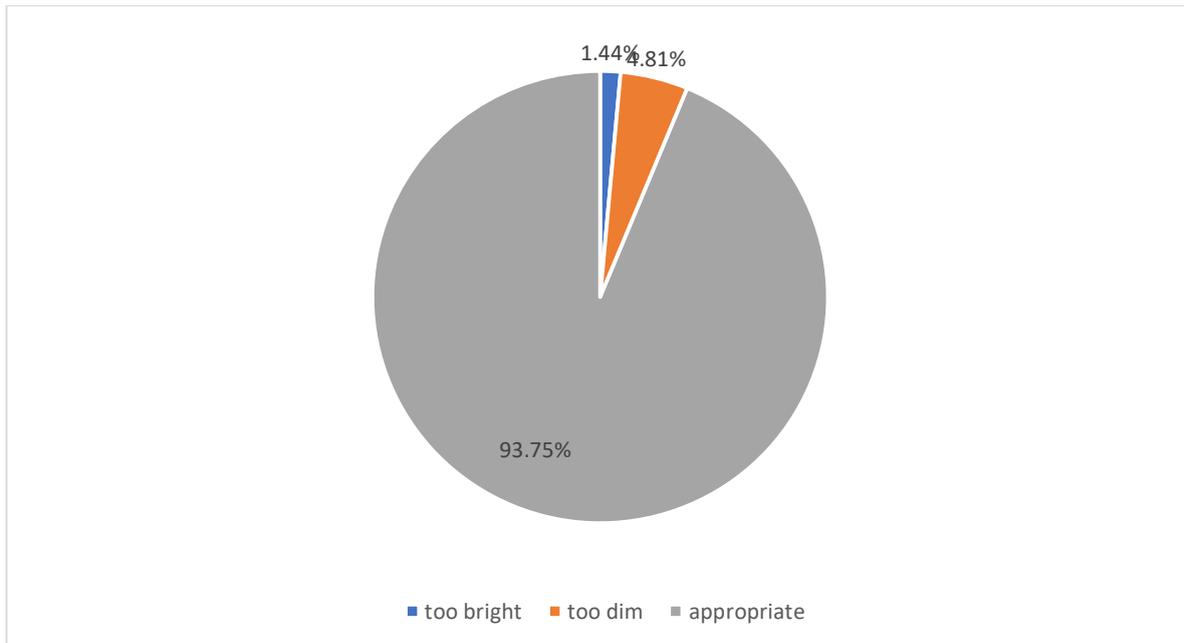


Figure 7: Participants' opinions on the illuminance of lighting facilities in their homes

As for the illuminance of light, the survey shows that over 90% of the participants think that the illuminance of lamps in all areas including the toilet is appropriate. Generally speaking, the light in their homes is relatively dark, which is largely due to the old people's habit of saving electricity. Being in a dim light would make dwellers depressed, and it is inadvisable for empty nesters. But high illuminance may stimulate their aging optical nerve. According to the survey results, most old people believe that their lamps are of appropriate illuminance, and it is quite positive. It is worth noting that it may differ from the facts. Old people live a frugal way of life, and they are afraid that bright light is more power-consuming. Therefore, they may adapt to a relatively dim environment, and perceive it as proper light illuminance, or they live in a high-illuminance environment for a long time, and perceive the high-illuminance light as a proper one. According to the *Standard for Light Design of Building*, 100lx is the appropriate light illuminance in the living room for common activities. A participant was selected randomly to calculate the average illuminance of his home, and specifically, two different kinds of LED lights were used in his home, including two 30W lights and two 15W lights. The luminous flux of such LED light is 90Lm/W, and the average light illuminance = total luminous flux / total area. So the total luminous flux in the home of the participant was $90 \times 30 \times 2 + 90 \times 15 \times 2 = 8100\text{Lm}$, and the total indoor area was 50m^2 , the average illuminance was 162lx. That is to say, although the participant believes that the light illuminance is proper, but actually, if all lights are turned on at night, the average light illuminance indoors is too high, which is not good for physical and mental relaxation and rest. In the meantime, light illuminance shall also be adjusted according to different functional areas at home, for instance, high-illuminance light can be used above the dining table, since it can better highlight the color of dishes and increase old people's appetite. Low-illuminance light is suitable for bedroom, since it enables old people to be more quiet and relaxed.

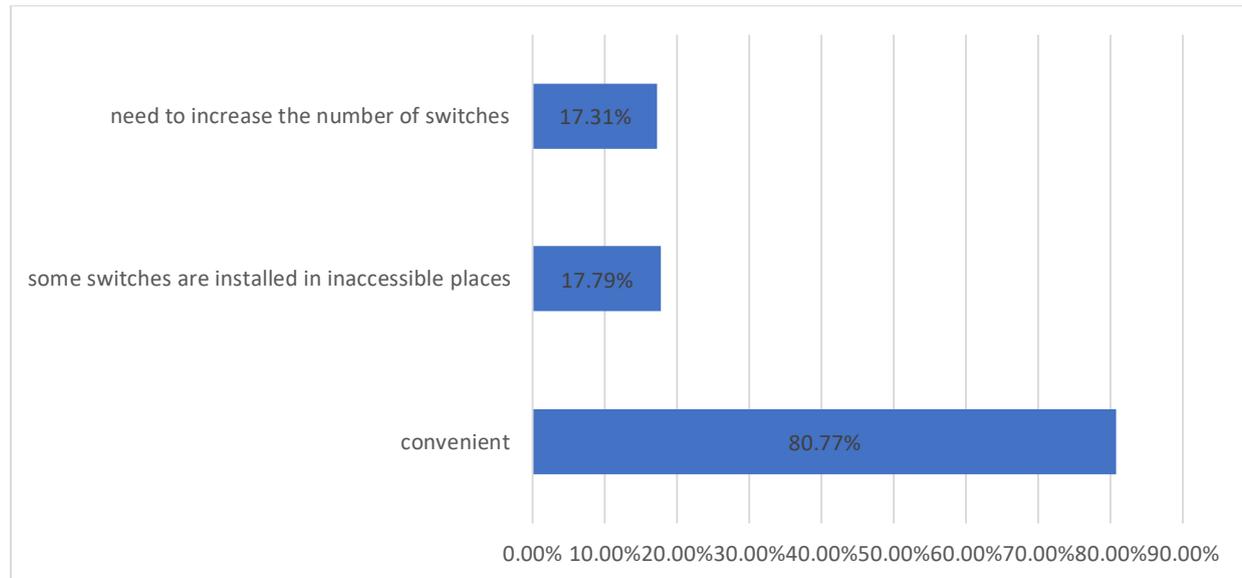


Figure 8: Participants' opinions on the lighting switches in their homes

Without their children's daily care, it is more necessary to guarantee the convenience of living environment and eliminate hidden danger for empty nesters. We need to focus on the installation of the light switches. Old people are less flexible and slower, so the switches shall be within reach, and the number of switches can be added properly. But the layout of furniture shall not block the switches. Among all participants, 35.1% insisted that some of the switches shall be relocated or more shall be installed. Besides, old people may go to bathroom at night, so there must be a switch or a table lamp at the bedside, and it shall be reachable. According to the survey results, it is easy to find that the position or quantity of switches at the home of old people is inappropriate. It is recommended to change the position of switches or increase the number of switches as quick as possible to eliminate safety hazards and solve the inconvenience in life for them.

4. Results

4.1. Renovation options about colors of indoor environment for the elderly

In the end of the questionnaire, a series of elderly-oriented transformation options of interior colors was listed, among which the change of wall colors and the change of some switches were the two mostly-demanding options, and the rest options were also required. In recent years, more attention has been paid to the interior design, and color matching is getting more and more artistic appreciation. Besides, many new decoration materials have been put into use. The wall is an important component of a building, and the change of wall color would have a great impact on the overall color matching of the living environment. Moreover, there are many ways to change the wall color, for instance, re-painting, wall paper, marble, etc. Old people can make selection according to their economic condition and preference. The adjustment of some switches is closely related to safety. For empty nesters who do not live with their children, safety is the top priority, and the installation of switches costs little time and money, as an elderly-oriented transformation that can be completed in a short term. Participants generally indicate that they will not change the material of floor or increase the window area. The two are actually the most difficult to be conducted on the basis of the original living environment. Whether changing the size of windows or re-paving the floor is a costly project, so old people would not choose the two options without seriously affecting their lives.

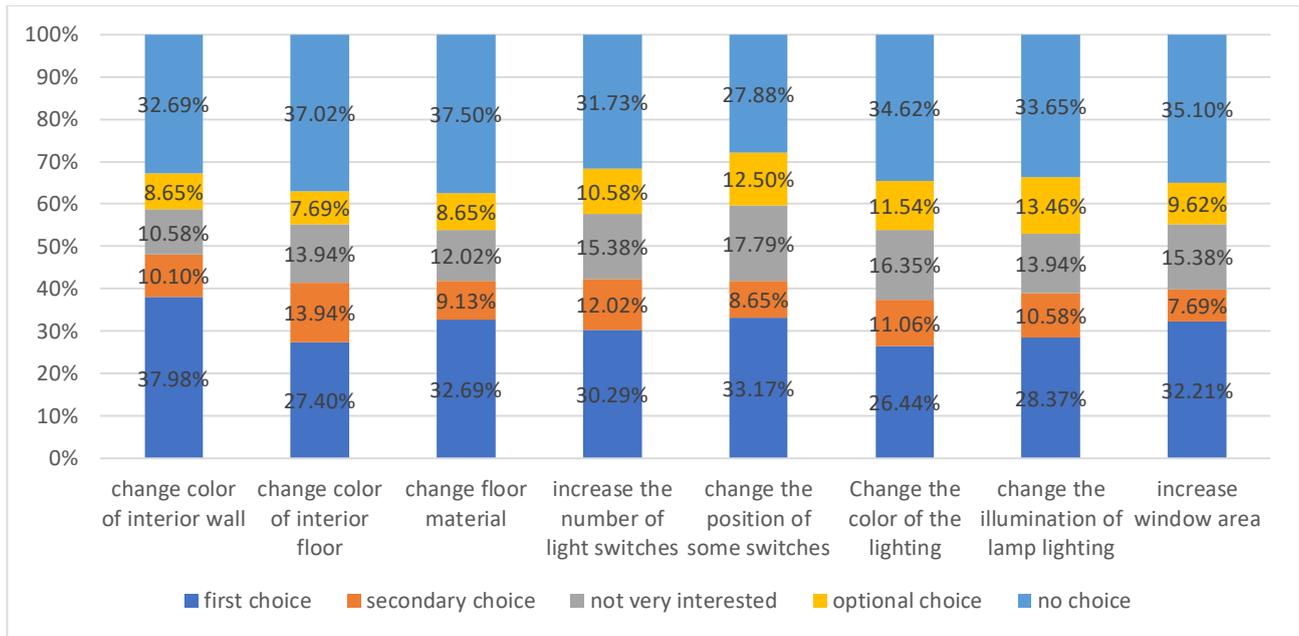


Figure 9: Participants' opinions on the renovation projects about indoor environmental color

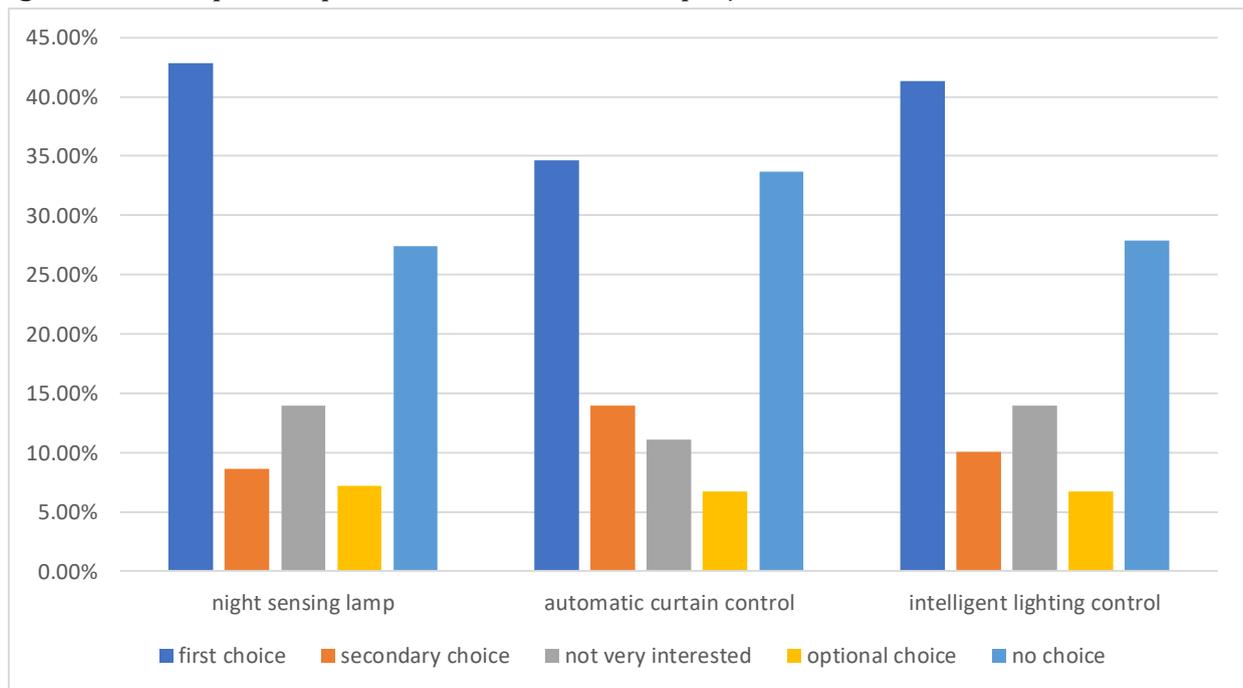


Figure 10: Participants' opinions on intelligent furniture

4.2. Intelligent Equipment

With the constant progress of technology, the addition of intelligent equipment to interior decoration is an important development trend of future interior decoration. Aiming at the perspective of interior color, three kinds of intelligent equipment can help improve the indoor lighting, namely night induction lamp, automatic curtain control and intelligent light control. Night induction lamp is a really convenient device for empty nesters, since there is no need for them to touch the switch in darkness, and all they need is to get up, and the lamps in the corridor and toilet would turn on. The automatic curtain control saves the trouble of manual curtain lifting. Intelligent light control means that the light will turn on when it is needed in a space and turn off after use. The design perfectly meets old people's frugal way of life, which can not only guarantee their safety and avoid the waste of electricity. Now the intelligent light control can also implement intelligent life truly by adjusting the color and illuminance of the light according

to the room temperature and lighting conditions. Participants showed a high degree of acceptance of the three kinds of intelligent equipment.

5. Conclusion

With the continuous improvement of living standards, old people are more and more willing to conduct elderly-oriented transformation at home. In the survey, almost half (42.31%) of the old people are willing to do the elderly-oriented transformation, wishing to live a more comfortable and safer life. The adjustment of interior colors and improvement of indoor lighting is a relatively feasible method. In this research, the impact of interior colors on the old people, especially empty nesters, was surveyed by taking Qingdao as an example. As a new first-tier city in recent years, Qingdao has made considerable progress in social pension. But their living environment shall be further improved according to the psychological and physical needs of old people, to help create a happier and more comfortable old age life for them. The survey results aiming at Qingdao is universally applicable in China, especially northern coastal cities. Of course, there were only 208 questionnaires, so the conclusion was still restricted. In the future research, different interior decoration materials can be included for discussion, to figure out the impact of material on the presentation of interior colors and the specific implementation of intelligent furniture at the homes of old people.

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