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A Study on the Analysis of the Interior Color Environment in Korea: Focus on Senior Citizen Centers in Korea

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Abstract: An increase in the number of elderly persons in the population has resulted in an increase in the number of facilities for the elderly. Of such facilities, senior citizen centers that provide exclusive spaces for the elderly constitute the largest portion of facilities for the elderly. In light of recent social developments, the demand for qualitative improvements regarding facilities for the elderly has been growing. Despite this, studies associated with this issue are currently lacking. Especially in consideration of the direct effects that color environments found in elderly facilities have on the psychology of the elderly, much care must be taken when planning colors. In light of the above, this study undertook further analysis of the color environments of senior citizen centers for the purpose of collating basic research material regarding the color plans of such facilities in the future. In doing, so, the following conclusions were reached in this study. Studies on the color environment of senior citizen centers revealed the distribution of Y and YR series colors to account for over half of the colors which indicated a further need to apply warm color series colors capable of promoting a sense of stability and vigor among the elderly. In the case of senior citizen centers, the use of G series colors that promote the psychological stability of the elderly was rarely found. Senior citizen centers often include furniture of widely varying colors which present difficulties in developing appropriate color plans. In light of the above, appropriate color planning that takes into consideration such factors and aspects must be undertaken.

Key words: The elderly, senior citizen centers, color preference, color environment, guidelines, color plans

INTRODUCTION

The speed at which the population of South Korea is aging is the fastest among OECD countries. The elderly population, concerning individuals over the age of 65 or more, has been gradually on the rise and in the year 2000, South Korea became official known as an aged society with the elderly population accounting for 7.2% of the total (Anonymous, 1996). According to reports published in 2015 by the National Statistical Office, the elderly population accounted for 11% of the total population in 2010 and is projected to account for over 20% of the total population, a figure reserved for super-aged societies by 2026. Such increases in the elderly population have resulted in various social problems and as a means of dealing with such problems South Korea has made efforts to expand welfare facilities for the elderly. As a result of these efforts, according to statistics provided by the Ministry of Health and Welfare, the number of welfare facilities for the elderly increased by approximately 10,000 facilities from 59,098 facilities in 2006-69,238 facilities in 2010. This number rose to 75,708 facilities in 2016 and a gradual increasing trend regarding the number of facilities and facility capacities has been recorded over the last 10 years. Senior citizen centers which are considered to be leisure and welfare facilities for the elderly, constitute the highest proportion of facilities at 64,568 of the total.

The onset of nuclear families following the rapid economic development of South Korea has resulted in the marginalization of the elderly as they become no longer economically viable. Cases of the elderly spending time in solitude and loneliness due to the bereavement of spouses and children leaving home are on the rise (Kwak and Choi, 2016). In particular, the elderly have difficulty leading self-reliant lives and this may result in economic, health andpsychological issues occurring. In

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light of such issues, welfare facilities for the elderly and senior citizen centers that provide sources of leisure and social inclusion through community activities are widely recognized for their importance. The Ministry of Health and Welfare predicts a gradual rise in the demand for elderly facilities due to the increase in the elderly population and in dealing with this issue, the ministry considers the qualitative elements of facility operations to be more important than the size and capacity of a facility. Color plans have a direct effect on the psychological stability of humans and various studies are currently being undertaken to learn how applications of color plans are capable of improving the psychological health of humans (Yu and Lee, 2017). In addition by proposing and analyzing the properties associated with varying spaces, these studies are also resulting in the accumulation of basic research materials regarding the color environments of space. However, the elderly often have different perceptions of colors in contrast to the general population and especially in the case of the elderly suffering from psychological anxiety, color plans may serve as form of treatment. Despite the existence of the demand for studies regarding the analysis of the characteristics associated with various color environments in facilities for the elderly, studies regarding this matter are currently lacking.

In light of this, this study undertook an analysis of the indoor color environment characteristics of senior citizen centers located in apartment complexes for the purposes of establishing basic research material and analyzing the status of the indoor color environments found in senior citizen centers of South Korea.

Methods and scope of research: The research methods of this study, as shown in Fig. 1 involved the following steps. Before undertaking survey activities regarding the color environments found in senior citizen centers, related studies and reference materials regarding the definition of the elderly and the color preferences of the elderly and facilities for the elderly were reviewed to understand the color preferences of the elderly. Based on these activities, color environments that are supportive of various programs and leisure activities for the elderly were studied Thereafter, to analyze the color environment characteristics of senior citizen centers within apartment complexes, 4 senior citizen centers located within apartment complexes having 100 households or more in South Korea, a country that is rapidly aging were selected for further analysis. Upon doing, so, the spatial composition and indoor environment of the selected sites were surveyed and the color preferences of the elderly and the actual color environment of the senior citizen

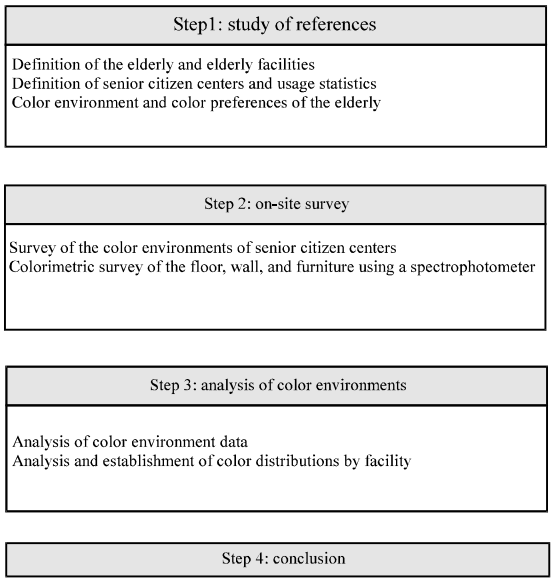


Fig. 1: Research flow

centers were compared. The reason behind selecting senior citizen centers within apartment complexes having 100 households or more was due to the requirement of building senior citizen centers within apartment complexes having 100 or more households as stipulated in the regulations on standard, etc. of housing construction whereby the law further requires the operation of a senior citizen center that is larger than 40 m^2 in size. To undertake further analysis of the color environments of senior citizen centers, the ratio of the area of spatial compositional elements such as the floor, wall andfurniture of the living room, kitchen andprivate rooms of senior citizen centers were measured and the colors of each spatial element were surveyed and categorized into dominant, assisting and highlighting colors.

A spectrophotometer was used to undertake analysis of the characteristics of the color environments. This device has been applied to related research (Jeong and Park, 2017) and was considered to be sufficient to carry out the analysis of this study.

Definition of the elderly and elderly facilities: Despite the concepts and standards regarding the elderly being different among the government and other researchers, the elderly in general can be regarded as 'aging individual's who are 65 years or more of age. Such members of the elderly population experience the effects of aging not only physically but there are also mental and social aspects associated with the process of aging. According to a publication from the International Association of Gerontology and Geriatrics in 1951, 'the

Table 1: Concept of elderly people

Researcher	Definition of the elderly
L.Breen	A person who has entered a declining phase from a physiological and biological standpoin. A person experiencing changes in personality and mental functions from a psychological standpoint. A person who is increasingly losing their status and role from a societal standpoint
Choi	A person experiencing psychological changes and a decline in physiological and physical functions in which the self-maintenance capacities and social functions of the person are becoming weaker

elderly are defined as people who experience complex forms of interaction between the various physiological, physical, psychological, environmental andbehavioral effects that are presented during the aging process'. A number of other definitions regarding the concept of the elderly provided by other scholars were presented in Table 1 (Park and Hwang, 2017).

The types of welfare facilities for the elderly are largely divided into housing facilities for the elderly, health care facilities for the elderly, leisure and welfare facilities for the elderly, assisted home living facilities, professional care centers for the elderly andvocational training centers for the elderly. Senior citizen centers are regarded as leisure and welfare facilities for the elderly. Upon making amendments to the enforcement rules of the welfare of older persons act, provisions regarding assisted home living services were newly established in 2010, provisions regarding hospitals for the elderly and R&R facilities for the elderly were deleted in 2011 and provisions regarding vocational training centers for the elderly were newly established in 2013 (Park *et al*., 2015).

Definition of senior citizen centers and usage statistics: Senior citizen centers as defined by the welfare of older persons act are venues for the elderly used to promote friendship, enjoy hobbies, operate group workshops, exchange various information andparticipate in different leisure activities in which the centers serve a role far greater than its role as a resting place for the elderly (Lee and Hwa, 2011). Senior citizen centers in South Korea have been operated since, the Goryeo Dynasty. The centers were also referred to as community halls for the elderly in the early 19th century and began to rapidly establish a presence in society following amendments made to the enforcement rules of the housing construction promotion act in 1978 in which the construction of senior citizen centers in multi-unit housing complexes became mandatory. Upon the enactment of the welfare of older persons act in 1981, the legal basis for the provision of support to senior citizen centers was established and an amendment to the act in 1987 integrated the term 'community halls for the elderly' to be included within 'senior citizen centers'. Senior citizen centers not only provide healthy leisure activities for the elderly of a community but also, serve as day-time care centers for the elderly that offer sources of entertainment, education, health and medical services.

The modern industrial era which gave birth to the onset of nuclear families has produced various challenges that the elderly may have difficulty adapting to. Under such circumstances, the number of elderly who make use of nearby senior citizen centers to deal with feelings of loneliness, reduced social roles, bereavement of spouses andthe challenges of communicating with younger generations is on the rise. According to a status report regarding the elderly published in 2014 which undertook studies with respect to the leisure and community activities of the elderly, 25.9% of the elderly responders indicated that they visited senior citizen centers to form friendships (Chung, 2005). In addition to indicating the important role of senior citizen centers, this figure revealed a more than twofold greater preference for visiting senior citizen centers compared to the preference for visiting welfare centers for the elderly which reported a visitation rate of only 8.9% (Baik and Kim, 2017). Upon examining the leisure activities undertaken by the elderly in senior citizen centers, 'watching TV' was found to be the most popular activity which was followed by taking a walking, reading a book, growing plants and flowers, playing card games, hiking andlistening to music in that order.

Color environments and color preferences for the elderly: The aging process of the elderly entails a period in which people are faced with physical and psychological realities associated with declining levels of their social capacities. These circumstances may sometimes entail a denial of the changes, manifest themselves in psychological anxieties or result in loneliness and isolation until death (Kim and Park, 2014). Due to the physical decline of eyesight and the onset of yellow vision and cataracts, the elderly find it difficult to accurately recognize colors and make distinctions between colors. Color plans that are appropriate for elderly environments provide psychological comfort and support greater activity among the elderly (Chung and Kim, 2016). In addition to this, color plans may also, promote safety and raise self-reliance among the elderly suffering from declining eyesight. In consideration of these characteristics of the elderly when developing color plans, the use of purple and orange colors rather than pastel tones and clearly distinguishable color placements

that utilize the contrast between cold and warm colors may serve as sources of appropriate levels of stimulation and psychological comfort to the elderly (Song and Kim, 2007). In light of this, the color environments of the elderly must be developed in a more sophisticated and systematic manner compared to the color environments of general spaces.

The content of existing studies regarding the preferences of colors by the elderly revealed the following. A study by Chun (2004) in which the indoor color preferences of 124 users of senior citizen centers aged 65 and older were studied indicated a preference for red series colors in indoor environments among 39 users (35.1%), a preference for yellow series colors among 27 users (21.8%) anda preference for green series colors among 25 users (20.1%). These results indicated that the elderly in South Korea preferred warm colors over cold colors (Chun, 2004). A study by Cho and Jang (2006) in which the preference of single color patterns or multiple adjacent color patterns among elderly individuals aged between 65 and 78 were studied, revealed a preference among the elderly for warm colors used as dominant colors compared to the use of cold colors. The study also further revealed a preference for R series colors over Y series colors with regards to preferences of warm colors (Cho and Jang, 2006). A study by Cho and Lee (2018) in which 5 tones (P, B, V, L, DI) for each of the basic 10 colors (R, YR, Y, GY, G, BG, B, PB, P, RP) of the Munsell color order system were presented to elderly individuals to study the order of preferred colors and tones, revealed a preference for colors in the order of RP 27.56%, B 15.7% and RG 13.7 and a preference for pale tones in all of the colors. The study further revealed a preference for vibrant and bright tones as well as clear and vivid tones for each of the colors (Cho and Lee, 2018). This indicated that the elderly had a preference for brighter color tones over low saturation colors and disclosed a preference by the elderly for hues having clear tones, a preference related to the characteristics associated with aging. In light of this, it was regarded that the elderly largely held a preference for warm colors over cold colors and that the elderly also, held a high preference for highly saturated bright and vibrant colors over low saturation colors.

MATERIALS AND METHODS

Analysis methods and analysis results

Selection of subjects of analysis: According to the National Housing Survey of the National Statistical Office, the ratio of apartments of total housing units was found to be 60.1% in 2016 which signified that apartments accounted for more than half of the types of housing units. This ratio was found to be a 12% increase compared to the same ratio in 2000 and this increasing trend is predicted to continue into the future. According to the regulations on standard, etc. of housing construction, senior citizen centers must be built in apartment complexes having 100 housing units or more. In light of this, 4 senior citizen centers located within apartment complexes having 100 or more housing units located in South Korea, a country with the highest increase rates of the elderly population among OECD countries were selected and thereafter visited for on-site surveying and analysis of color environments. As indicated in Table 2, four sites were selected for further color analysis of senior citizen centers in this study.

Table 2: Outline of analysis target

Apartment	Hwain apartment	Hanil apartment	Eobang siyoung apartment	Wooshin greenpia apartment
Preference	A	B	C	D
Exterior				
Interior				
				
Address	Saman-ro, Gimhae	Saman-ro, Gimhae	Beon-gil, Gimhae	Beon-gil, Gimhae
No. of housing units	Total 930 units	Total 834 units	Total 318 units	Total 321 units
Spatial composition	Entrance, kitchen, living room, room, utility closet	Entrance, hallway, bathroom kitchen, room	Entrance, room 1, room 2 bathroom	Entrance, room 1, room 2 kitchen, bathroom

Table 3: Tools and pictures of field survey

Spectrophotometer	Photo of survey activites
	
Product name: CM-2600d Measurement time: Approx. 1.5 sec Measurement value: SCI (Including specular light)/SCE (without specular light)	

Method of analysis: As shown in Table 3, a spectrophotometer (cm-2600D) was used to undertake the color analysis. Survey activities were undertaken according to the spatial compositions of the senior citizen centers and were limited to surveys of the living room and

Table 4: Color environment of facilities A

Space	Spatial Composition	Dominant			Assisting			Highlighting		
		H	V	C	H	V	C	H	V	C
Living room	Floor	7.3YR	5.60	8.00						
	Wall	4.4Y	9.30	0.30	4.0GY	7.30	0.30	6.9YR	5.20	8.60
	Furniture 1	8.9PB	1.00	0.10	1.5YR	1.90	9.60			
	Furniture 2	1.8YR	4.40	10.70	7.1Y	8.20	2.90	2.7PB	9.40	0.40
	Furniture 3	4.2YR	3.00	8.80	8.1YR	5.10	5.10	4.5YR	2.4	7.7
Room 1	Floor	7.3YR	5.60	8.00						
	Wall	4.4Y	9.30	0.30	4.0GY	7.30	0.30	6.9YR	5.20	8.60
	Furniture 1	7.3Y	9.30	0.30	3.8YR	0.10	0.90	0.2PB	6.60	0.40
	Furniture 2	8.9Y	9.00	0.90	2.5YR	3.10	10.50	1.4B	0.50	0.20
Kitchen	Floor	7.0BG	7.30	0.50						
	Wall	4.4Y	9.30	0.30	3.8GY	7.90	0.40			
	Furniture	9.0YR	4.90	4.60	0.8GY	8.30	0.40	8.8YR	5.0	7.6

Table 5: Color environment of facilities B

Space	Spatial Composition	Dominant			Assisting			Highlighting		
		H	V	C	H	V	C	H	V	C
Room	Floor	1.3Y	7.40	6.50	1.3Y	4.40	10.40			
	Wall	3.3Y	9.00	1.30	2.6Y	8.60	1.10	1.4Y	7.50	7.30
	Furniture 1	5.7YR	3.20	9.50				2.9Y	5.10	5.80
	Furniture 2	5.1YR	2.10	6.80	3.9YR	2.40	8.30	3.9Y	1.80	3.60
	Furniture 3	8.9YR	5.30	6.80	7.0Y	9.80	1.00	7.0GY	8.50	0.10
Kitchen	Floor	8.4YR	5.50	8.60						
	Wall	2.6Y	8.70	1.60	2.8Y	5.70	2.20	9.3YR	3.60	7.30
	Furniture 1	6.9YR	2.70	7.60	7.4YR	3.60	9.90	2.3Y	4.40	6.40
	Furniture 2	7.0YR	4.70	6.50	2.1G	7.90	0.10	2.2Y	0.50	1.30
Entrance	Floor	8.6YR	6.00	8.20						
	Wall	4.3Y	8.80	0.70	2.6Y	8.60	1.10	2.2Y	6.50	0.90
	Furniture	2.2Y	7.10	1.80	4.2Y	7.40	1.80			

private rooms. During the survey process, dominant,assisting and highlighting colors according to the ratio of the areas of the floor, wall and furniture within the space were measured. The measured munsell data was then inputted into a CMC (munsell conversion) program to convert the data into H, V andC values and based on the specular light SCE data, a color distribution chart representing each space/domain was developed.

Table 6: Color environment of facilities C

Space	Spatial Composition	Dominant			Assisting			Highlighting		
		H	V	C	H	V	C	H	V	C
Room 1	Floor	9.3YR	5.70	4.70						
	Wall	2.1Y	8.80	1.10	6.1B	9.30	0.20	0.6Y	6.40	2.90
	Furniture 1	7.4Y	8.90	0.50				0.7BG	6.90	0.20
	Furniture 2	7.5Y	7.90	0.70	6.5Y	8.10	1.00	7.6BG	4.20	6.00
	Furniture 3	2.4YR	3.80	8.40	1.9YR	1.70	8.20	1.8YR	2.60	7.50
Room 2	Floor	9.3YR	5.70	4.70						
	Wall	2.1Y	8.80	1.10	6.1B	9.30	0.20	0.6Y	6.40	2.90
	Furniture 1	5.7YR	2.30	7.20	7.0YR	2.90	7.30	3.7YR	1.90	7.20
	Furniture 2	9.0YR	4.00	10.2	3.6Y	3.70	1.40			
	Furniture 3	7.6R	0.80	1.00	8.5Y	8.50	0.80	0.4Y	6.70	0.90

Table 7: Color environment of facilities C

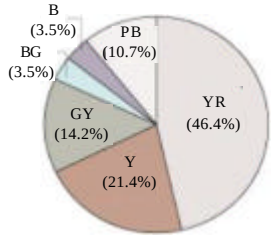
Space	Spatial Composition	Dominant			Assisting			Highlighting		
		H	V	C	H	V	C	H	V	C
Room 1	Floor	8.1YR	4.30	5.50	6.3YR	3.40	5.90	9.2YR	4.10	4.70
	Wall	9.8YR	8.60	0.40	5.6GY	9.10	0.40	2.9GY	8.90	0.30
	Furniture 1	2.5YR	1.20	1.70	2.0YR	1.20	1.60	3.8YR	0.70	5.00
	Furniture 2	9.9RP	0.10	0.00				6.9Y	3.70	1.90
	Furniture 3	1.4Y	7.40	6.80	0.3GY	0.40	0.50	2.7Y	4.50	3.90
Kitchen	Floor	8.1YR	4.30	5.50	6.3YR	3.40	5.90	9.2YR	4.10	4.70
	Wall	9.8YR	8.60	0.40	2.8Y	9.00	0.50	3.2GY	9.10	0.50
	Furniture 1	9.6Y	8.40	0.80	3.9Y	6.90	1.50	5.6B	8.30	0.20
Room 2	Floor	8.1YR	4.30	5.50	6.3YR	3.40	5.90	9.2YR	4.10	4.70
	Wall	9.8YR	8.60	0.40	5.6GY	9.10	0.40	2.9GY	8.90	0.30
	Furniture 1	0.7Y	4.40	6.50	7.4YR	3.80	8.80			
	Furniture 2	1.6YR	1.10	6.80	3.1YR	0.40	3.80			
	Furniture 3	9.0BG	2.80	2.00	1.5GY	0.80	1.50	9.4Y	4.70	1.00

Color environment analysis results: The results of analyzing the color distributions of the facilities of selected senior citizen centers as presented in Table 4-8 indicated that YR and Y warm color series colors constituted the largest portion of the colors. Further details regarding the color environment analysis of the facilities were as the following.

Table 8: Color distribution of senior center

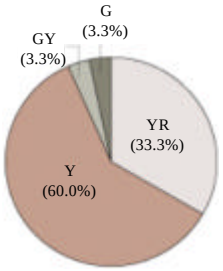
Color distributions by facility

A



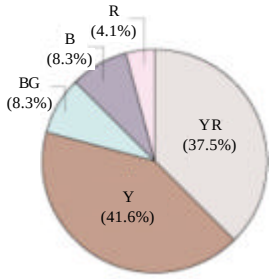
Avg. brightness 5.7 Avg. saturation 3.8

B



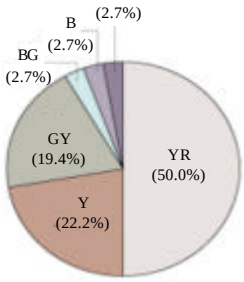
Avg. brightness 5.7 Avg. saturation 4.6

C



Avg. brightness 5.6 Avg. saturation 3.6

D



Avg. brightness 6.1 Avg. saturation 3.0

In the case of facility A in order of highest to lowest, the color environment was found to include YR 46.4, Y 21.4 and GY 14.2% series colors. The floors and walls of the facility embodied mostly warm series colors while P, B and BG series colors were present in the furniture. Overall, the facility was regarded as presenting various colors. In addition, average saturation was measured to be 5.7 and average brightness was measured to be 3.8 in which an overall comfortable and relaxing environment was present in terms of saturation and brightness levels falling within mid-brightness and low saturation levels. In the case of facility B, Y series colors were found to constitute more than 60% of the color environment with YR 33.3, GY 3.5 and G 3.5% series colors being present in order of highest to lowest thereafter. On the other hand in light of those colors being the only colors present, facility B was found to entail a relatively more passive use of colors compared to facility A. Despite such arrangements being possibly sufficient to consider the facility to have exemplified the warm color preferences of elderly individuals, the application of colors to promote greater activity and social participation among the elderly was considered needed in this case. The colors also were considered to have fallen within mid-brightness and mid-saturation levels. In the case of facility C in order of highest to lowest, the color environment was found to include Y 41.6, YR 37.5, BG/B 8.3 and R 4.1% series colors. Such results signified that facility C presented a high ratio of Y series colors which was similar to facilities A and B. Average brightness was measured at 5.6 which fell within the mid-brightness levels and average saturation was measured at 3.6 which indicated the use of colors having relatively low saturation levels. In the case of facility D, YR series colors were found to constitute more than half of the colors present in the color environment with Y 22.2, GY 19.4, BG/B 2.7 and RP 2.7 series colors being present in order of highest to lowest thereafter. Average brightness was measured at 6.1 which indicated that brightness levels were at mid to high levels andaverage saturation was measured at 3.0 which signified that saturation levels fell within low saturation levels. In the case of facilities C and D while Y and YR series colors were mostly present, there also were some applications of cold color series colors which resulted in a color environment in which warm and cold colors were appropriately mixed. Such arrangements were considered to result in greater psychological stability for the elderly. However, due to their overall low saturation levels, the application of brighter and more vibrant colors to these facilities was deemed appropriate.

Based on the above analysis results, the color environments of the 4 senior citizen centers were found to have embodied color plans that considered the preference of warm colors among the elderly. However, it was also, found that the facilities were relatively passive in applying cold series colors such as GY, B and BG series colors. In addition to this, it was interesting to note that there were no facilities presenting the use of G series colors which are colors regarded as providing greater psychological stability to the elderly. Although, average brightness ranged mostly in the bright and vibrant mid to high level range, average saturation was found to range mostly within the mid to low level range. These findings reveal the need for the application of more clearly visible and bright colors.

RESULTS AND DISCUSSION

Discussion of the color analysis results: The overall color environments of senior citizen centers were found to embody distributions of warm color series such as Y and YR color series. Although, such arrangements may have exemplified the warm color preference of the elderly, further applications of appropriate levels of cold series colors were considered necessary to promote greater activity and subsequent developments of greater stability among the elderly. Although, more colors were present in facility A and D, these variations of color were considered

to have resulted from the random arrangements of furniture within the center. In light of this, it was found that there exists a need to more carefully consider furniture arrangements that entail appropriate color and contrast arrangements when planning colors for senior citizen centers. In addition, although, the overall bright and vibrant tones present within the indoor environments resulted in greater lighting efficiencies, the use of more visible and clear colors is recommended.

CONCLUSION

By analyzing the color environments of senior citizen facilities in light of increasing concerns regarding the social issues associated with aging, this study established basic research material that may be applied to the planning of colors for senior citizen centers in the future. In doing, so, the following conclusions were reached in this study.

First, upon reviewing the color preferences of the elderly in which theories regarding color environments that consider the characteristics of the elderly were studied, the elderly were regarded to have a preference for warm color series colors over cold color series colors and also were regarded to have a high preference for colors having clear tones. In addition to this, the elderly were also found to prefer high saturation colors having bright and vibrant tones over low saturation colors.

Second, upon analyzing the status of the color environments present in senior citizen centers in the South Korea, it was found that most of the centers actively applied warm color series colors. However, the analysis of the color environment of senior citizen centers revealed a distribution of Y and YR series colors to account for over half of the colors which indicated a further need to apply warm color series colors capable of promoting stability and activity among the elderly.

Third in the case of senior citizen centers, the use of G series colors that promote the psychological stability of the elderly was rarely found. This was thought to have been the case due to a lack of thoughtful color planning regarding the characteristics of the elderly during the process of planning colors in senior citizen centers. When undertaking the planning of color environments in senior citizen centers in the future, color plans that consider aspects regarding the activity, stability, self-reliance and awareness levels among the elderly were considered to be needed.

Fourth, despite the need for appropriate arrangement of colors to promote greater psychological stability among the elderly when planning colors in senior citizen centers, the application of appropriate color plans was found to be difficult due to random arrangements of furniture presenting various colors. Such aspects were considered to be impediments to the qualitative improvement of the facilities. In the future, color planning activities must be undertaken in a manner that considers the characteristics of the elderly such as their reactions to excessive color contrasts or reflections of light.

In addition to its proposal of an appropriate color coding guideline for the elderly that reflects the color preferences of the elderly, this study is also, significant in that it provides basic research materials regarding the color environments of senior citizen centers. In light of this, the study provides insights regarding the planning of colors for senior citizen centers in the future in a manner that may promote greater leisure activities among the elderly and result in the greater utilization of color features. Despite this, this study is limited in that the study examined only a few specific cases of senior citizen centers. In the future, further studies that entail the analysis of additional parameters such as the founding year and size of the facilities should be undertaken.

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