

SPATIAL PRIORITIES OF OLDER ADULTS FOR SOCIAL
PARTICIPATION IN A SENIOR CENTER

A Master's Thesis

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ANKARA

January, 2016

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Fine Arts in Interior Architecture and Environmental Design.

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ABSTRACT

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Gökçe Kutsal

MFA in Interior Architecture and Environmental Design

Supervisor: Prof. Dr. Halime Demirkan

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Healthy aging has become a topic of utmost importance as the world's older adult population increases. Social participation has a large impact on mental and physical health of seniors and it increases their sense of well-being as well. Senior centers are one of the important locations for social participation of older adults. This study focuses on the spatial priorities of older adults for social participation in a senior center with an aim to find out their preferences. In a selected senior center, 60 participants are interviewed about the social and physical factors in that setting. The age range was between 60 and 87 with the mean age 72.28. The majority were female, married and high school graduates. As a result of statistical factorial analysis, three groups were determined as social factors: Socialization degree, socialization frequency and demographic information. For physical factors, four groups were found: Furniture and physical comfort, finishing materials, lighting, and decoration. Several differences among age groups, genders, education levels, and occupations were found as well as numerous correlations between demographics, social factors, activities, and physical factors.

Keywords: Elderly, Social Participation, Senior Centers, Interior Design

ÖZET

İLERİ YAŞ GRUBUNUN SOSYAL KATILIM İÇİN YAŞLI MERKEZLERİNDEKİ MEKANSAL ÖNCELİKLERİ

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Dünyadaki ileri yaş grubu nüfusu arttıkça, sağlıklı yaşlanma giderek daha çok önem kazanmaktadır. Sosyal katılım, yaşlıların zihinsel ve fiziksel sağlığı üzerinde büyük bir etkiye sahip olmakla beraber kendilerini iyi hissetmelerine de yardımcı olmaktadır. Yaşlı merkezleri, yaşlıların sosyal katılımı deneyimledikleri önemli mekanlardan biridir. Bu çalışma ileri yaş grubu kullanıcıların yaşlı merkezlerindeki mekansal önceliklerine odaklanmakta ve mekansal tercihlerinin sosyal katılımlarına etkisini araştırmaktadır. Altmış katılımcıyla gerçekleştirilen ve örnek olay incelemesi için seçilen yaşlı merkezinde, mekanın sosyal ve fiziksel özellikleri hakkında bir anket uygulanmıştır. Ankette yaş aralığı 60 ila 87 olup, ortalama yaş 72 dolaylarındadır. Katılımcıların çoğunluğu kadın, evli ve lise mezunudur. Yapılan istatistiksel faktör analizi sonucunda, sosyal faktörlerden üç grup öne çıkarken -sosyalleşme seviyesi, sosyalleşme sıklığı ve demografik bilgiler-fiziksel faktörlerde ise dört grup oluşmuştur: Mobilya ve fiziksel konfor, yüzey malzemeleri, aydınlatma ve dekorasyon. Yaş grupları, cinsiyet, eğitim düzeyleri ve meslekler arasındaki farklılıkların yanı sıra demografik bilgiler, sosyal faktörler, aktiviteler ve fiziksel faktörler arasında da pek çok korelasyon bulunmuştur.

Anahtar Kelimeler: İleri Yaş, Sosyal Katılım, Yaşlı Merkezleri, İç Mekan Tasarımı

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TABLE OF CONTENTS

ABSTRACT	iii
ÖZET	iv
ACKNOWLEDGMENTS.....	v
TABLE OF CONTENTS	vi
LIST OF TABLES.....	iiix
LIST OF FIGURES	ix
CHAPTER 1 – INTRODUCTION	1
1.1. Aim of the Study	2
1.2. Structure of the Thesis	2
CHAPTER 2 – SOCIAL PARTICIPATION IN SENIOR CENTERS.....	4
2.1. Active Aging and Social Participation.....	4
2.2. Locations for Social Participation	5
2.3. Senior Centers	7
2.4. Social and Physical Features of Senior Centers	11
CHAPTER 3 – DESIGN OF THE STUDY	14
3.1. Research Questions.....	14
3.2. Hypotheses	16
3.3. Setting of the Study	16
3.3.1. Site Description	16
3.3.2. The Sample Group	20
3.4. Methodology	21
3.4.1. Stage I - Semi-Structured Interview	22
3.4.2. Stage II	23
3.4.2.1. Structured Interview.....	23
3.4.2.2. Observation	23
3.4.3. Research Instruments.....	24

3.4.3.1. Stage I - Semi-Structured Interview	24
3.4.3.2. Stage II – Structured Interview and Observation Sheet	25
CHAPTER 4 – FINDINGS.....	27
4.1. Stage I – Findings of the Semi Structured Interviews	27
4.2. Stage II.....	29
4.2.1. Findings of the Structured Interviews	29
4.2.1.1. Demographics.....	29
4.2.1.2. Social Factors	29
4.2.1.3. Factorial Analysis of Physical Factors	32
4.2.1.4. Correlations between Demographics, Social Factors, Activities and Physical Factors.....	34
4.2.1.5. Differences among Age Groups, Genders, Education Levels and Occupation Groups	38
4.2.2. Findings of the Observational Data.....	42
CHAPTER 5 – DISCUSSION	45
5.1. On Demographics.....	45
5.2. On Social Factors	47
5.3. On the Factorial Analysis of Physical Factors	48
5.4. On the Correlations between Demographics, Social Factors, Activities and Physical Factors	49
5.5. On the Differences among Age Groups, Genders, Education Levels and Occupation Groups.....	53
5.6. On Observational Data	55
CHAPTER 6 – CONCLUSION.....	57
6.1 Field Notes	60
6.2 Limitations.....	60
6.3 Further Studies	61
REFERENCES	62
APPENDICES	67
APPENDIX A – Permit From Çankaya Belediyesi.....	67
APPENDIX B – Photographs	69
APPENDIX C – Structured Interview (Turkish)	77

APPENDIX D – Structured Interview (English)	83
APPENDIX E – Observation Sheet	89
APPENDIX F – Statistics.....	91



LIST OF TABLES

Table 1. The demographics of participants (n=60).....	30
Table 2. Factorial analysis findings for physical factors	33



LIST OF FIGURES

Figure 1. The senior center	17
Figure 2. Public transportation map	22
Figure 3. Space allocations of ground level and lower level	18
Figure 4. Space allocations of upper level.....	22
Figure 5. The two stages of the study	22
Figure 6. Visit frequency of participants (n=60)	31
Figure 7. Time spent in senior center (n=60)	31
Figure 8. Participation in social activities.....	32
Figure 9. Mean values of 3 weeks (15 workdays) for weekly distribution of number of users.	43
Figure 10. Mean values of 3 weeks (15 workdays) for hourly distribution of number of users.	44

CHAPTER 1

INTRODUCTION

The world is aging. As the most recent population data in Turkey shows, the “65 and above” age range was 7.7% in 2013 while it is estimated to be 27.7% in 2075 (TÜİK, 2014). In 2009, the percentage of aged population was 7.00. This means the population structure has been changed to “aged” since 2009 (Aslan, 2013).

In Canada, the Minister of Industry (as cited in Blackwood, 2000) suggests that the result of an aging population will probably be a significant number of older adults with chronic diseases, which would financially stress the health care system. Therefore, the emphasis should be placed on disease prevention.

Social participation is one of the most important factors in health and well-being of older adults, especially as they age (Fulbright, 2009; Lee et al., 2008; Nord et al., as cited in Invaldsen & Balandin, 2011; Pettersen & Laake, as cited in Invaldsen & Balandin, 2011). Due to the majority of older adults continuing to live in independent households, they need to go out for social participation. Consequently, there is a need for locations where older adults

can have access to varied and diverse activities during their retirement from work or otherwise organized daily activities (Wilson et al., as cited in Ingvaldsen & Balandin, 2011).

Senior centers are one of the facilities that help the independence and well-being of older adults. These centers also offer programs and services in several areas, such as health, education, employment, leisure, nutrition, social work etc. (Foster, 1980; Krout, as cited in Blackwood, 2000).

1.1. Aim of the Study

The importance of senior centers for social participation, and therefore health and well-being of older adults is evident throughout the literature. The provided locations for social participation of older adults should be as preferable and as satisfactory as possible. There are numerous studies focusing on social and psychological aspects of senior centers, however, literature on interior physical features of senior centers is scarce. Therefore, the main aim of this study is to determine the spatial priorities of older adults for social participation in senior centers.

1.2. Structure of the Thesis

There are six chapters in this thesis, the first one being the introduction. Functions and purposes of senior centers are briefly explained, along with the

importance of social participation for seniors. The aim of the study and the structure of this thesis are given in this chapter as well.

In the second chapter, definitions of social participation and active aging are given. Locations of social participation for seniors are mentioned before presenting several definitions for senior centers. Finally, the relevant social and physical factors for these senior centers are examined.

The third chapter focuses on the design of the study. Research questions and hypotheses are presented in this chapter as well as the setting of the study. Afterwards, methodology is explained. The two stages of this study and research instruments are found here.

In the fourth chapter, findings for both stages are presented. Both semi-structured and structured interview results (demographics, social factors, and physical factors) are explained in this chapter along with the data obtained from observation.

The fifth chapter is discussion, where the findings of this study are explained and evaluated. Afterwards, findings are compared to those from the previous studies found in literature.

These are followed by the final chapter of this thesis, conclusion. The overall study is evaluated here and suggestions for further research are found in this chapter as well.

CHAPTER 2

SOCIAL PARTICIPATION IN SENIOR CENTERS

2.1. Active Aging and Social Participation

As the elderly population in the world increases, “active aging” as a term has begun to appear in the literature at an international level (Minagawa & Saito, 2014). Active aging is defined as “the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age” by World Health Organization (2013). The studies on the effects of active aging on health of elderly suggest that social and self-development activities are strongly related to lowering levels of mortality (Avlund et al., 2004; Bowling et al., 2002; Minagawa & Saito, 2014; Novek et al., 2013) while the lack of participation in social activities is significantly related to an increase in mortality and morbidity levels (Novek et al., 2013; Rozanski et al., 1999). Several studies also indicate that socialisation lowers the frequency of fear and illness in seniors, including depression (Fulbright, 2009; Nord et al., as cited in Invaldsen & Balandin, 2011; Pettersen & Laake, as cited in Invaldsen & Balandin, 2011). Social participation has an even bigger impact on health as age increases and the most evident effects are seen in older

women (Lee et al., 2008). Therefore, the role of social participation in active and healthy aging is of crucial significance.

There are several definitions of social participation. It is broadly defined as a person's involvement in activities that provide interaction with others (Levasseur et al., 2010). Another definition relevant to this study might be "the maintenance of many social connections and a high level of participation in social activities" (Hsiang-Yu & Stark, 2010). However, a more comprehensive definition is made by Pohjolainen (1991, p. 111-113, as cited in Levasseur et al., 2010):

Interest in activities (e.g. reading, religious, travelling, going to restaurant, dancing and bingo), membership in various organizations and participation in their work and informal social contacts described as meeting friends at least a few times a week or visiting friends and relatives.

2.2. Locations for Social Participation

The social networks of the aging population are decreasing as the likelihood of children living away increases, thus older adults have reduced social contact with their close relatives (Hsiang-Yu & Stark, 2010; Novek et al., 2013). As their social contact declines, the majority of older adults are alone for most of the time (Horgas, Wilms & Baltes, 1998) and as their social participation diminishes, both their physical and mental health receive a negative impact (Bassuk, Glass & Berkman, 1999; Rozanski et al., 1999). Retirement, death, or illness among family or friends, relocation, health conditions and socio-economic status are some factors that affect social

participation in older age (Ashida & Heaner, as cited in Novek et al., 2013). Lee et al. (2008) found that self-rated good health had a strong association with social participation level for all ages and the influence of social participation increased with age. In order to provide opportunities for social participation, several senior housing options such as assisted living facilities and nursing homes are now offering social activities for residents (Hsiang-Yu & Stark, 2010). However, the total number of individuals in these facilities was 19.317 in Turkey in 2012 (TÜİK, 2014). This is quite low when compared to the overall population of older adults, which was 5.892.000 in 2013 (TÜİK, 2014).

Another factor is that older adults who do not wish to move to an assisted living facility or nursing home are now finding more support through the “aging in place” concept (Mynatt, Essa & Rogers, 2000). The term, “aging in place”, is defined as “the ability to live in one’s own home and community safely, independently, and comfortably, regardless of age, income, or ability level” by Centers for Disease Control and Prevention (CDC, 2013). This concept focuses on delaying the move into assisted living facilities or nursing homes for as long as possible (Aday, 2003; Mynatt, Essa & Rogers, 2000). Since the majority of older adults continue living in independent households, they need to go out of their houses for social participation. As a result, there is a need for locations where older adults can have access to varied and diverse activities during their retirement from work or otherwise organised daily activities (Wilson et al., as cited in Ingvaldsen & Balandin, 2011). For

this reason, two of the major municipalities in Ankara are working on creating a more age-friendly city with more opportunities for social participation (Ankara Büyükşehir Belediyesi, 2012a; Çankaya Belediyesi, 2012a). There are currently four local senior centers that are governed by these municipalities in Ankara (Ankara Büyükşehir Belediyesi, 2012b; Çankaya Belediyesi, 2012b).

2.3. Senior Centers

Several definitions for senior centers have been proposed throughout the last decades. However, none of these definitions has been universally accepted. One of the most widely accepted definition was by Monro (1972, p. 26, as cited in Foster, 1980):

A senior center is a facility for older adults, well-staffed, housed, and financed which enjoys broad community support; which is readily accessible to the older people in the community and which is open often enough to fulfil its objectives; which offers a wide ranging program of activities and services designed with a knowledge and understanding of the interests, needs and desires of the older people of its community; and, which provides for the real involvement and participation of its members in the planning, conducting, and evaluation of its program and in the determination of its policies and goals.

More recently, senior centers have been defined as community centers for seniors who are not institutionalized and do not require constant assistance and they offer a variety of activities for users regularly and frequently, such as health, leisure, nutrition, social work etc. (Aday, 2003; Hewson, 1998; Krout, as cited in Blackwood, 2000; Novek et al., 2013). Senior centers are different from day care and residential facilities for seniors, but they may serve several

similar purposes (Hewson, 1998). These centers are capable of delivering physical and mental health promotion and prevention programs for seniors as well as protecting against loneliness and social isolation (Aday, 2003; Novek et al., 2013). Other benefits include helping seniors lead active and healthy lifestyles, giving them something to look forward to, helping with depression, providing opportunities for learning and volunteering (Aday, 2003; Novek et al., 2013). Therefore, the presence of these centers is vital for communities. In fact, since the establishment of the first senior center in 1943, their popularity has increased astoundingly (Foster, 1980).

Some of the activities older adults participate in at a senior center at least once a month are playing games (45%), exercise (41.7%), education (20%), outings (13.3%), arts and crafts (8.3%), health services (6.7%), informational (5.1%), intergenerational activities (5%) and counselling (1.7%) (Novek et al., 2013). However, some of these activities may not be offered in every senior center. Likewise, some activities that have not been mentioned might be offered in some senior centers.

In senior centers, memberships are usually available to individuals aged 55 and older. Pettersen & Laake (2000, as cited in Ingvaldsen & Balandin, 2011) suggest that 40-50% of senior population aged 67 years and over visit senior centers. In the study by Hewson (1998), the senior center had 860 members and the ages of users ranged from under 55 to over 90 with an average of 75, of which 64% were females.

The study by Aday (2003) report that senior center participants are typically in their mid-seventies and the majority are single, Caucasian, relatively well educated females. Seventy five percent of participants visit the center 1-3 times a week and stay there for 3.3 hours per day. Many participants prefer going to the center for specific events such as educational or health programs, they do not stay there for the entire day. The participants have mentioned increasing knowledge and learning new skills.

Novek et al. (2013) suggest that in the literature, the majority of older adults who attend senior centers are found to be female, more likely to be single or widowed and relatively healthy individuals between the ages of 75-84, as frailty and physical limitations become more prevalent in older ages. In that study, participants' ages were between 50 and 99, the average age was 74 and 67% of participants were females. Almost half of the participants were widowed and the range of education levels was from less than high school to postgraduate education. Fifty three percent of the participants attended the senior center three or more times a week and 35% attended once or twice a week.

Bøen et al. (2010) mention that in literature, it is suggested that women use senior centers more frequently than men and attendance to senior centers increases with age, while education level and income are not found to be relevant. In their study, especially between ages 70 and 79, single women were found to attend the senior center more often than other groups. Single

men in the same age group used the center less than married ones. It is suggested that women might have more time and energy when they are single and do not need to care for others.

Another study by Bøen (2012) focused on the characteristics of senior center users in two different settings. It was found that 60% of total users in two centers were female and increased age was associated with increased use. In that study, 58% of total users were married and 42% were single. It was also found that single women used the center more than married women did while married men used the center more than single men did. The education levels of users were as follows: 50% primary school graduates, 15% secondary school graduates, and 35% college graduates.

A study by Fulbright (2009) used a questionnaire to find out demographic and lifestyle data of senior center users. Four categories were used to group ages of participants: 55-64, 65-74, 75-84, 85 and over. Eighty percent of participants attended for social support and social interaction with friends while ninety-four percent mentioned having made close friends at the centers. Eighty-six percent had made friends they could rely on and ninety-four percent said that since attending the senior center their lives had improved. This study also found that the majority of seniors attending for social support did not report symptoms of depression.

Turner (2004) has performed a study on the participants of senior centers and their gains from participation in these locations. In 27 senior centers,

856 participants were surveyed, 64% of which were females. While 48% were widowed, 34% were married, 9% divorced, and 8% single. Eighty one percent of participants had been attending the center for at least a year. For the frequency of visit, 71% responded three or more times per week while 25% responded once or twice per week. Meal programs in centers were found to be significant, with 87% of participants reporting they preferred meal programs for both meals and socialization opportunities. A considerable percentage, 56% of participants also mentioned the people they interact with in senior centers are usually the only people they spend time with during the day and as a result, 90% viewed the personal contacts at the senior center as important to them. As for the activities in a senior center, 52% participated in physical fitness, 56% in health assessments, 61% in trips, 36% in dance/aerobics, 47% in chair exercises, 66% in cards/table games and 54% in community volunteer work in that study.

2.4. Social and Physical Features of Senior Centers

Hsiang-Yu and Stark (2010) argue that there are both social and physical features for these senior centers that affect users' social participation.

Physical features include proximity of sitting areas to functional spaces and multipurpose spaces while social features include homogeneity of residents and expectation of encounters. For the interiors of these public areas for seniors; adequate lighting, seating arrangement, color schemes, homelike decoration, and overall accessibility are found to be influential on the social participation of older adults (Hsiang-Yu & Stark, 2010; Zavotka & Teaford,

1997). In a similar study, Abu Samah et al. (2012) chose 9 survey items to be rated by participants in a hospital outpatient unit: space planning, accessibility, ergonomics, way finding, safety, color, lighting, comfort, materials and finishes. These are consistent with the interior physical features mentioned by Hsiang-Yu & Stark (2010) as well.

As some of the most important physical features are adequate lighting and color in an aesthetically pleasing interior environment, a study by Hedge (2011) focused on the effects of these features on the seniors. Weale (as cited in Hedge, 2011) argued that after the age of 40, age related changes start in vision and increase after the age of 60. Because the way seniors perceive color has an effect on their morale, appetite and sense of well-being (IESNA, as cited in Hedge, 2011), Hedge focused on examining how the older adults perceive colors of different saturations under specific lighting conditions. Their findings suggest that as people age, colors are perceived less vivid and thus, highly saturated colors appear paler. The ability to discriminate blues and violets is lower in seniors, which results in a lessened preference for blues. Meanwhile, the preference of seniors for reds and greens increased. The most favorable colors were found to be at the highest saturation.

A similar study in 2011, by Sinoo et al., has focused on lighting conditions in a nursing home for seniors. It is mentioned that the visual field declines and blue, green and yellow color discrimination decreases due to yellowing of the lens. Adaptation from light to dark can be impaired, the aging eye requires

more light than younger people do and the recovery time from glare is longer in seniors as well.

As seen in the literature, senior centers are an important component in the social participation of older adults and few studies have focused on their requirements. This study was designed with the methods and findings from previous research in mind. The research questions, hypotheses, setting and methodology of this study are presented in the following chapter.



CHAPTER 3

DESIGN OF THE STUDY

This chapter contains the building blocks for this study: Research questions, hypotheses, setting of the study and methodology. Also the site, sample group and research instruments are presented in this chapter. The two stages of this study are explained in detail as well.

There is some terminology in this study that needs to be defined from the beginning. Within the context of this thesis, “environmental factors” is used as a broad term that encloses lighting (natural and artificial), color schemes (bright or neutral), physical factors (acoustical and thermal comfort), furniture properties (materials, ergonomics and arrangements) and spatial properties (ceiling height, home-like decoration, materials of floor, walls and ceiling).

3.1. Research Questions

The research questions for Stage I are as follows:

1. What are the social activities that older adults participate in at a senior center?
2. What spatial factors and furniture properties are important in social participation for senior center users?

The research questions for Stage II are as follows:

1. Is there a relationship between demographic characteristics of users (age, sex, marital status, education level and occupation) and their social participation level (visit frequency, time spent, number of friends in the senior center, meeting frequency with friends in the senior center, presence of a social group in the senior center and the number of friends in their social group in the senior center) in a senior center?
2. Is there a relationship between demographic characteristics of users and their priorities in terms of environmental factors (lighting, color schemes, physical factors, furniture, and spatial properties) in a senior center?
3. Is there a relationship between social activities that users participate in and their priorities in terms of environmental factors in a senior center?
4. Is there a relationship between social participation level of users and their priorities in terms of environmental factors in a senior center?

3.2. Hypotheses

The hypotheses are as follows:

1. There is a relationship between demographic characteristics of users (age, sex, marital status, education level and occupation) and their social participation level (visit frequency, time spent, number of friends in the senior center, meeting frequency with friends in the senior center, presence of a social group in the senior center and the number of friends in their social group in the senior center) in a senior center.
2. There is a relationship between demographic characteristics of users and their priorities in terms of environmental factors (lighting, color schemes, physical factors, furniture, and space quality) in a senior center.
3. There is a relationship between social activities that users participate in and their priorities in terms of environmental factors in a senior center.
4. There is a relationship between social participation level of users and their priorities in terms of environmental factors in a senior center.

3.3. Setting of the Study

3.3.1. Site Description

In Ankara, the capital of Turkey, the major social participation locations for older adults are senior centers that are governed by municipalities.

Therefore, to find the priorities of users in a senior center, one of these municipality-governed local senior centers in the city center is chosen as the setting of this study. The permit from the governing municipality can be found in Appendix A.

The chosen center is 100+ Yaş Kulübü in Çankaya, Ankara due to its central location in the city and ease of public transportation (Figures 1 and 2). It is a split-level center that is located at the ground level of a five story building, split-level meaning that the floor levels are staggered, as in the main entry level of the building is partway between the upper and lower floors. Space allocations of ground, lower and upper levels are shown in Figures 3 and 4.



Figure 1. The senior center (Çankaya Belediyesi, 2012)



Figure 2. Public transportation map

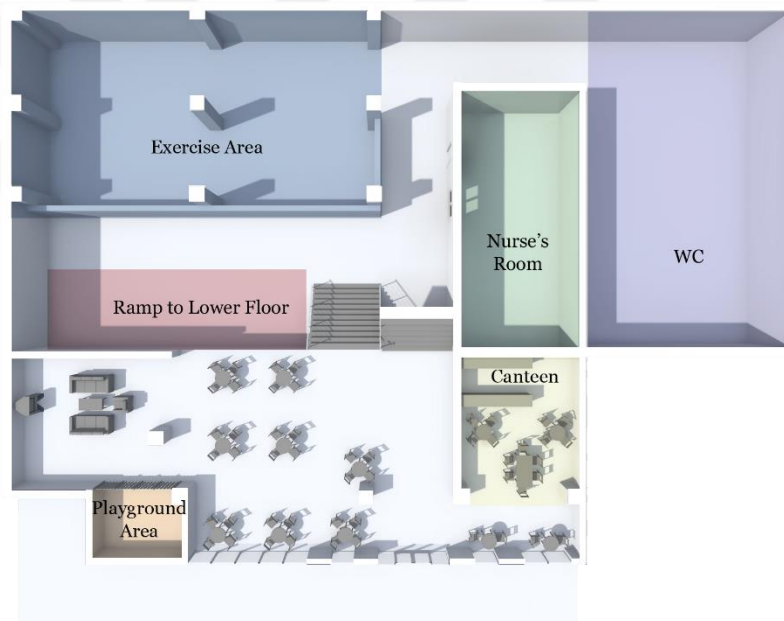


Figure 3. Space allocations of ground level and lower level

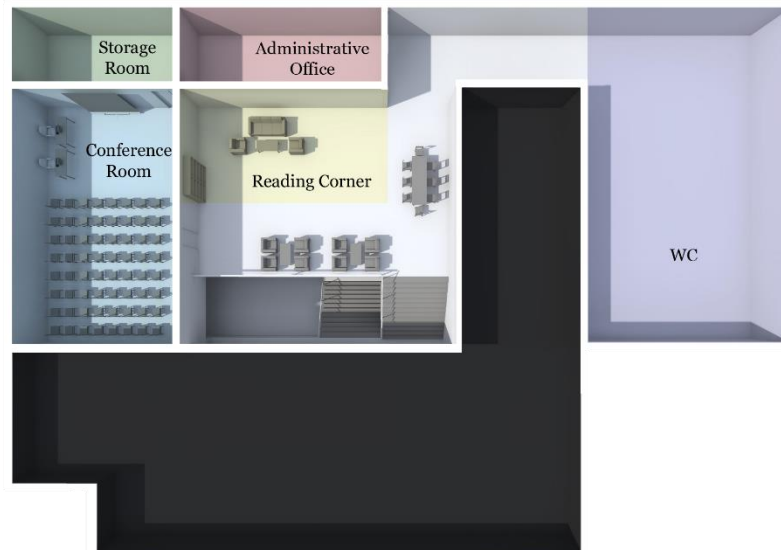


Figure 4. Space allocations of upper level

The entrance is on the ground level (Figure B.1 in Appendix B). The lobby area, which consists of several different seating arrangements, a playground for toddlers and the canteen are on this level as well. The canteen serves toasted sandwiches, pre-packaged goods, soft drinks, tea and coffee to senior center users. The photographs of these areas are in Appendix B (Figures B.2 - B.8).

There is a set of stairs and a ramp from the ground level to the lower level. The ramp is seen in Figure B.9 in Appendix B. On this level, there is an exercise area, the nurse's room and restrooms. The exercise area consists of a large space where users can place their exercise mats in and a few exercise equipment (Figure B.10 in Appendix B).

On the other hand, the upper level is accessible only via a flight of stairs. This level contains some seating units, a reading corner with a bookshelf, a conference room for 60 people with a storage room at the back, and administrative office and restrooms. Of these, socialization areas for seniors are shown in Figures B.11 – B.14 in Appendix B.

The working hours of the senior center are from 9:00 AM to 5.00 PM and available services range from educational to socio-cultural activities.

Approximately 50 users visit the center daily and on special occasions; the number can go up to 250. Some of the events held in this center include concerts, seminars, and movie screenings. As this senior center is a major location of social participation for older adults, their spatial comfort is of upmost importance.

3.3.2. The Sample Group

For Stage I, the interview is conducted in 100+ Yaş Kulübü in Çankaya, Ankara and participants are chosen from visitors of the center. The interview is conducted with 12 participants, as this is a preliminary study. There is no age limit for this stage of the study in order to find the full age range of the visitors. Convenience sampling method is utilized, which means interviewing only the users present at the location (Lunsford & Lunsford, 1995). This method is chosen over others because it is faster, access is easier, and the subjects are already available in the senior center. The subjects are readily users of that location and are opinionated as well.

However, for Stage II, an age limit is set. By definition, a senior center caters to users who are 60 years old and older (Lund & Engelsrud, 2008). While some previous studies and literature suggest that citizens who are aged 65 years or older should be considered as seniors (Hsiang-Yu & Stark, 2010; TÜİK, 2014), the users of 100+ Yaş Kulübü have a broader age range, some as young as 51 years old. Therefore, only users who are 60 years old and older are interviewed at this stage. Again, convenience-sampling method is chosen for this stage as well.

3.4. Methodology

The study consists of two stages, both of which can be seen in Figure 5. Using the research by Hsiang-Yu and Stark (2010) as a guide, where the research procedure begins with an open-ended interview, the first stage of this study is designed as an interview to find out the relevant factors for older adults in a such setting. Since structured interviews mostly focus on quantitative data, semi-structured interview format is found to be preferable for this stage of the study as it yields qualitative data (DiCicco-Bloom & Crabtree, 2006). This format is chosen as these interviews can combine qualitative research and observational data as well (Adams et al. as cited in DiCicco-Bloom & Crabtree, 2006). These interviews also are able to contain a wide range of subjects (DiCicco-Bloom & Crabtree, 2006). Therefore, a semi-structured interview format is chosen for Stage I of the study.

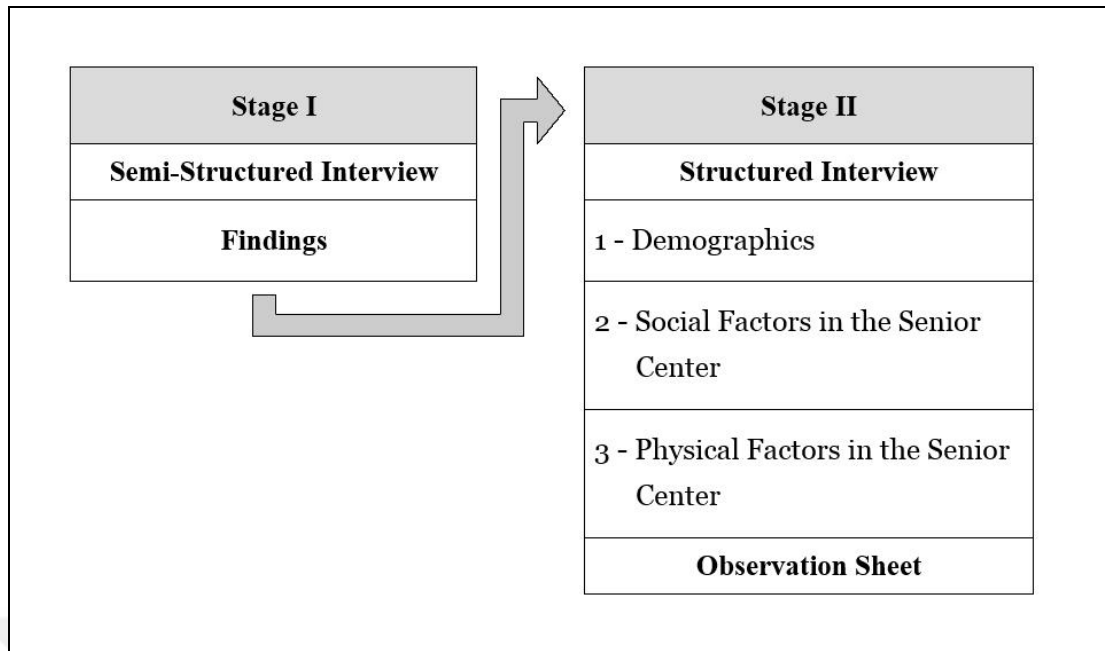


Figure 5. The two stages of the study

3.4.1. Stage I - Semi-Structured Interview

At the first step of Stage I, a form is prepared that is based on the previous literature. This form is used by the researcher for taking notes while interviewing the users about their priorities in the senior center. Some information about their demographics is collected, as well as the social activities that the users participate in. These activities and the physical factors affecting their choice of activity areas that are mentioned by the users are noted down on the form. Interviews are conducted in a casual manner to form a rapport with users, so they can be considered as “guided conversations”. Aside from demographics, time spent in the center and frequency of visit are identified without asking direct questions in order not to cause any biased answers. The interview mostly includes asking open-ended questions such as “is this your favorite table, why”, “why did you

choose this area”, “do you prefer sitting in this armchair or the chair here, why” and “in which part of the center are you more comfortable, why”. The physical factors mentioned by the users as answers to these questions are noted down on the semi-structured survey form. Acquired data is analyzed to find out which physical factors from the literature are relevant for this setting. The findings of this stage are used in forming the more-detailed questionnaire at Stage II.

3.4.2. Stage II

3.4.2.1. Structured Interview

At the second stage, a structured interview is designed based on the findings of the previous interviews. While the previous stage is about finding out which physical features are relevant for users in this particular senior center, this stage is focused on the priorities of users. The interview of this stage is applied to users who are 60 years old and older. Results of this interview are statistically analyzed to find which physical features come out as the most preferred ones by the users. The Turkish and English versions of structured interviews can be found in Appendices C and D, respectively.

3.4.2.2. Observation

Apart from the structured interview, the other component of Stage II is observation. An observation sheet is prepared for noting the user density in

the senior center every hour and whether there are any special events. For three weeks, 15 workdays, the number of users is written on this form from March 5 to March 25, 2015. On the case of special events, such as group fitness activities, concerts, movie screenings or seminars, the number of users participating in that event is noted as well. Data from this observation sheet is analyzed to find the minimum, maximum, and average numbers of users per hour and per day. The observation sheet can be found in Appendix E.

3.4.3. Research Instruments

3.4.3.1. Stage I - Semi-Structured Interview

For the first stage, a semi-structured interview sheet that is composed of several sections is prepared: Demographics (age, sex, education level, occupation, marital status), frequency of visit and time spent per visit, social activities involved in, environmental factors of the space (adequate lighting, color scheme, thermal and acoustical comfort), furniture (materials, ergonomics, function, arrangement and movability) and space quality (ceiling height, home-like decoration and finish materials). These survey items are similar to those used in the previous studies (Hsiang-Yu & Stark, 2010; Abu Samah et al., 2012; Zavotka & Teaford, 1997).

3.4.3.2. Stage II – Structured Interview and Observation Sheet

Structured Interview Sheet

The first part of the structured interview contains demographic information of participants (age, sex, education level, occupation, marital status). In the second part, questions focus on the social factors in that particular location. These include frequency of visit and time spent per visit, friends in that location and the frequency of interaction with these friends, whether there is a group of friends in the senior center, the number of friends in that group and finally, social activities involved in to determine the social participation of users in that location. The final part of this interview is about the environmental factors in a senior center (see Appendices C and D). The interview items are created with the previous stage's findings in mind. Users of the center are asked to rate the importance of physical features such as lighting, color schemes, physical factors, and furniture and space quality on a Likert scale of 1 to 5, from "very important" to "not important at all". The furniture section again has five survey items; materials, ergonomics, functionality, arrangement and movability. Finally, the space quality section includes ceiling height, home-like decoration, materials and finishes, overall ergonomics and accessibility (Abu Samah et al., 2012).

Observation Sheet

The observation sheet contains several fields for date, number of users hourly at 9:00, 10:00, 11:00, 12:00, 13:00, 14:00, 15:00, 16:00 and 17:00 as well as special events such as movie screening, seminar, concert or group fitness

activity and the number of participants at these events (see Appendix E). It is filled by the researcher daily for 15 days to gather data about user density at various times of day and week.

This chapter is focused on the design process of this study and the research instruments. The findings are given in the following chapter, including statistical analysis of demographic characteristics, social factors, activities and physical factors. Several correlations and differences among age groups, genders, education levels, and occupation groups are presented here as well.

CHAPTER 4

FINDINGS

In this chapter, the findings obtained both from the interviews and the observation sheet are presented. The performed statistical analyses are explained. Results from statistical analysis; correlations between demographics, social factors, activities, physical factors are shown as well as differences between age groups, genders, education levels and occupation groups.

4.1. Stage I – Findings of the Semi Structured Interviews

Demographics of Stage I revealed that 3 males and 9 females participated in the interview. The mean age is 69.8 with a minimum of 51 and maximum of 86. Education levels are between secondary school and Master or Ph.D. degrees. Eight of the participants are retired while 4 were housewives. Marital statuses of participants are as follows: 6 married, 3 widowed, 2 divorced and 1 single. Frequencies of visit were between twice a week to every weekday and durations of visit were between 15-30 minutes to more than 4 hours.

All 12 of the participants of this interview mentioned eating and drinking beverages as activities they participate in and 11 of them said they use the facility to meet and chat with their friends. Seven participants regularly attend seminars, 5 participants attend movie screenings and concerts, 4 prefer going to the facility for reading books or newspapers and 2 use the facility for playing chess or backgammon. Only 2 participants mentioned regularly going to the group fitness activities.

For environmental factors, all 12 participants mentioned lighting and thermal comfort to be important factors for their decision-making process in the facility. Eleven participants mentioned acoustical comfort as a factor due to age-related hearing loss. Only 6 participants mentioned the color scheme in the facility as an important factor for their choices.

Nine participants mentioned that movability is important for their choice of furniture in the facility while 8 of them mentioned ergonomics. Functionality was mentioned by 7 participants, furniture arrangement was mentioned by 3 and materials were mentioned by 2.

For space quality, finishing materials of floors were mentioned as important factors by 7 while decoration was mentioned by 5 participants. Ceiling height was mentioned by 1 participant, however, the finishing materials of ceiling and walls were not mentioned by any participants.

4.2. Stage II

4.2.1. Findings of the Structured Interviews

4.2.1.1. Demographics

Demographics of Stage II showed that there were 24 males and 36 females for a total of 60 participants. The mean age is 72.28 with a minimum of 60 and maximum of 87. Gender-specific age means were 70.86 for females and 74.41 for males. Marital statuses of participants were 29 married, 19 widow and 12 single. The majority of participants were high school and university graduates, 27 and 24 participants respectively. One participant was a primary school graduate, 3 were middle school graduates and 5 had Ph.D. or Master degrees. Forty of the participants were retired, 2 were working and 18 were housewives (Table 1).

4.2.1.2. Social Factors

The majority of participants (n = 28) visit the center at least 3 - 4 times a week while three participants stated visiting once a month. For the time spent in the center, the majority of participants (n = 23) stated spending between 2 - 3 hours there and four participants stated spending less than 1 hour (Figures 6 and 7).

Table 1. The demographics of participants (n=60)

Sample Characteristics	No.
Gender	
Male	24
Female	36
Age	
Min	60
Max	87
Mean	72.28
Marital Status	
Single	12
Widow	19
Married	29
Education Level	
Primary School	1
Middle School	2
High School	27
University	24
Master or Ph.D.	5
Occupation	
Retired	40
Working	2
Housewife	18

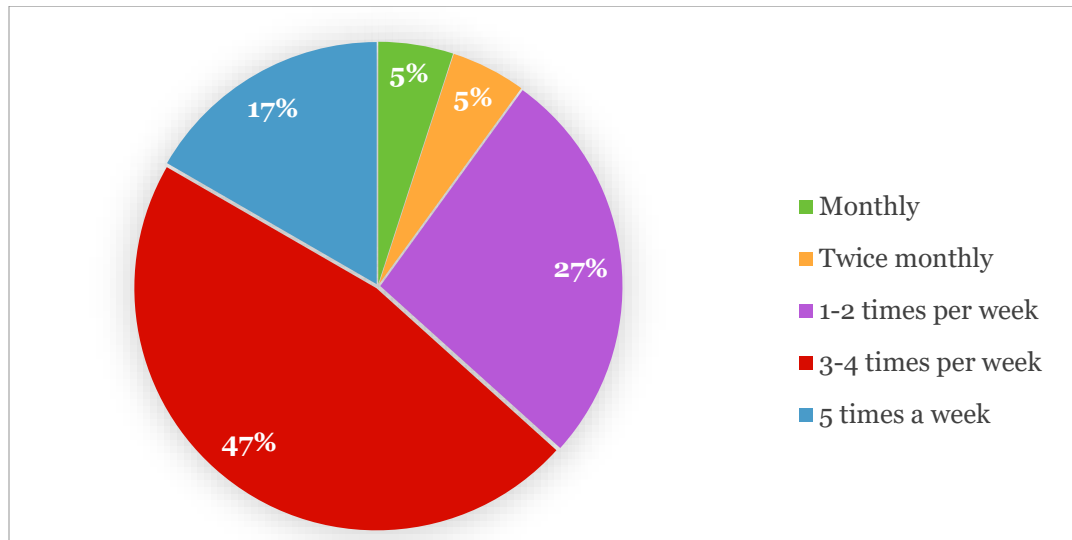


Figure 6. Visit frequency of participants (n=60)

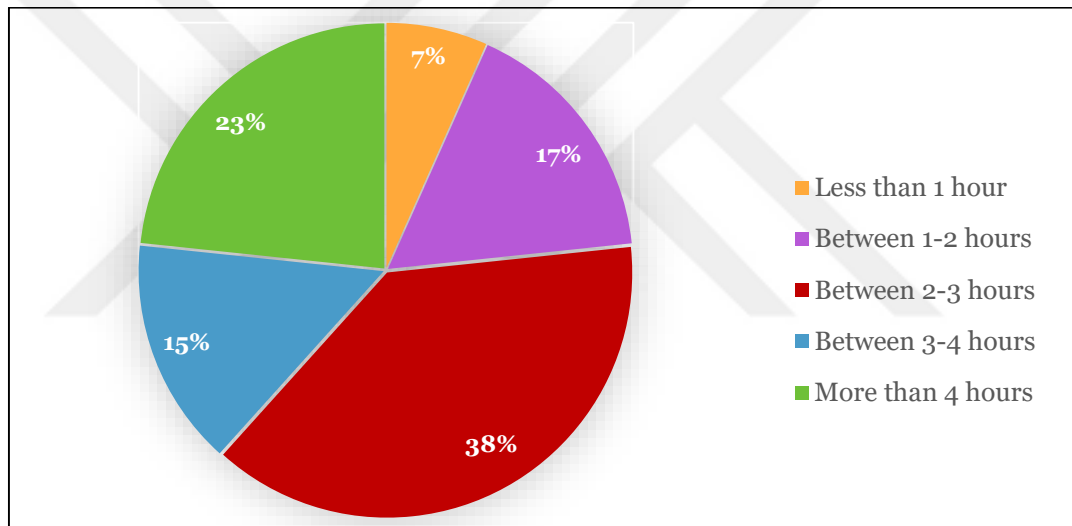


Figure 7. Time spent in senior center (n=60)

For the social activities participated in, all 60 participants mentioned using the services for food and drinks. Fifty-two participants mentioned using the senior center for meeting friends, while 24 used the facility for reading newspapers or books. Twenty participants attend movie screenings, seminars and concerts, 16 play games such as backgammon or chess, and 9 participants regularly attend group fitness activities (Figure 8).

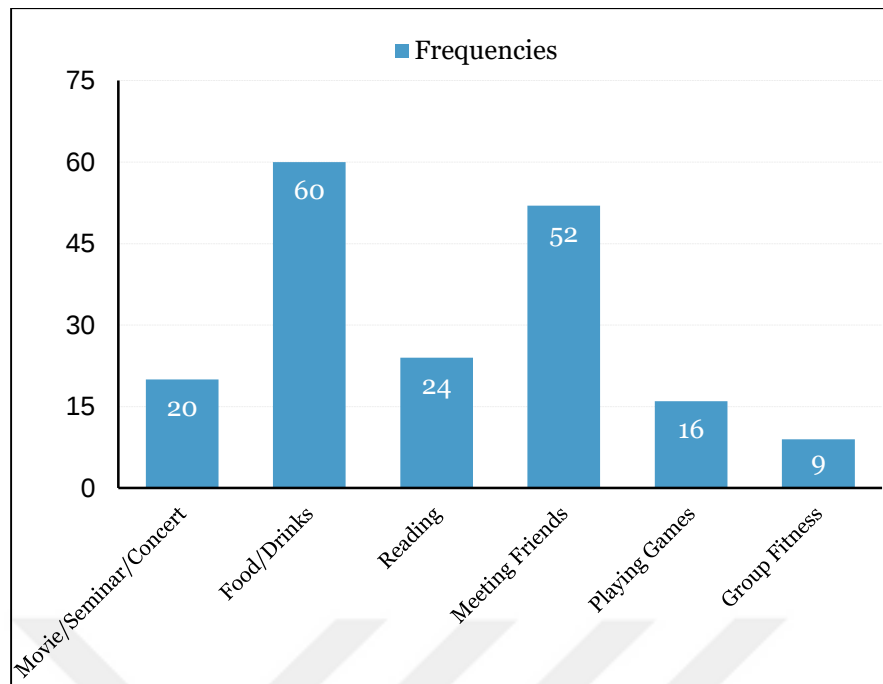


Figure 8. Participation in social activities

4.2.1.3. Factorial Analysis of Physical Factors

Ratings of participants on 14 physical factors were analyzed using Statistical Package for Social Sciences version 20 (SPSS 20). Varimax method was used for an exploratory factor analysis (Howitt & Cramer, 2011). A rotated component matrix was developed that extracted factors and their factor loadings. Factor loadings greater than 0.50 were considered to be correlated and ones below 0.50 were excluded. Another exclusion criterion was for factors containing less than three items as this pointed to a poor correlation structure. For physical factors, three factors were extracted with eigenvalues greater than 1.00. Orthogonal rotation of factors yielded the factor structures used for statistical analysis.

For the ranking of physical factors in the senior center, the principal component analysis revealed 4 factor groups as depicted in Table 2. These groups were named furniture and physical comfort factors (20.99%), finishing materials (17.83%), lighting (14.58%) and decoration (13.48%). The first group included furniture ergonomics, furniture materials, thermal comfort, furniture arrangements, and acoustical comfort. The second group consisted of finishing materials of floor, ceiling, and walls. The third group had daylighting, artificial lighting, and ceiling height while the fourth group included bright color schemes, neutral color schemes, and home-like decoration. Overall, these four groups of factors explained a total variance of 66.89%. The more detailed results of this factorial analysis can be found in Table F.1 in Appendix F.

Table 2. Factorial analysis findings for physical factors

FACTOR	SCALE	ITEMS	Rotated Component Matrix				Total Variance Explained
			1	2	3	4	Cumulative %
1	Furniture & Physical Comfort	Furniture Ergonomics	0.835				
		Furniture Materials	0.767				
		Thermal Comfort	0.642				
		Furniture Arrangements	0.635				
		Acoustical Comfort	0.578				20.993
2	Finishing Materials	Materials Floor		0.858			
		Materials Ceiling		0.793			
		Materials Walls		0.779			38.828
3	Lighting	Daylight			0.738		
		Artificial Lighting			0.722		
		Ceiling Height			0.557		53.406
4	Decoration	Bright Colours				0.809	
		Neutral Colours				- 0.787	
		Home-like Decoration				0.508	66.886

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 5 iterations.

4.2.1.4. Correlations between Demographics, Social Factors, Activities and Physical Factors

To determine the relationships between 5 social factors, 6 social activities and 14 physical factors, Spearman's rank-order correlation and chi-square test of independence were run using Statistical Package for Social Sciences version 20 (SPSS 20). Only correlation strength values greater than 0.40 were considered to be moderately to strongly correlated and ones below 0.40 were excluded. All correlation findings from statistical analysis can be found in Table F.2 in Appendix F.

Within demographics, significant relationships were found between gender and occupation ($\chi^2(2, N=60) = 16.35, \phi_c = 0.522, p = 0.001$) due to all housewives being female, and between occupation and education level ($r_{rb} = 0.710, p < 0.001$) suggesting that education level increases with retired or working participants. Age and presence of a social group were found to have a significant relationship ($r_{rb} = -0.439, p = 0.001$) which suggests that older participants are more likely to have a social group. Gender and movie/seminar/concert attendance were found to be correlated ($\chi^2(1, N = 60) = 11.25, \phi_2 = -0.433, p = 0.001$) due to the majority of attendants being female. Gender was also found to be correlated with playing games ($\chi^2(1, N = 60) = 15.47, \phi_2 = -0.508, p < 0.001$) as males are more likely to play games at the senior center. With physical factors; age and the importance ranking of bright color schemes ($r_b = -0.402, p = 0.001$) as older participants rank bright color schemes higher; gender and the importance

ranking of bright color schemes ($r_{rb} = 0.682, p < 0.001$) as females rank bright color schemes higher; gender and the importance ranking of neutral color schemes ($r_{rb} = -0.567, p < 0.001$) as males rank neutral color schemes higher, occupation and the importance ranking of bright color schemes ($r_{rb} = 0.514, p < 0.001$) as housewives rank bright color schemes higher; and occupation and the importance ranking of neutral color schemes ($r_{rb} = -0.498, p = 0.001$) as retired/working participants rank neutral color schemes higher, were found to have a correlation.

For social factors; number of friends in the senior center and visit frequency ($r_s = 0.453, p < 0.001$) suggesting that the number of friends increases with visit frequency, and number of friends in the senior center and the frequency of meeting those friends ($r_s = 0.623, p < 0.001$) as the frequency of meeting friends in the senior center increases simultaneously with the number of friends, were found to be correlated. The frequency of meeting friends in the senior center was also found to have a strong positive relationship with the visit frequency ($r_s = 0.809, p < 0.001$) suggesting that those who visit the center more often also tend to meet their friends more often. Number of friends in the social group in the senior center was found to have several correlations; with time spent in the senior center ($r_s = 0.551, p < 0.001$) as those with higher number of friends in their social group spend more time in the senior center; with total number of friends in the senior center ($r_s = 0.638, p < 0.001$) as those with higher number of friends in their social group have a higher total number of friends in the senior center; with the

frequency of meeting friends in the senior center ($r_s = 0.402$, $p = 0.001$) as those with higher number of friends in their social group meet their friends in the senior center more often; and with the presence of a social group in the senior center ($r_b = -0.720$, $p < 0.001$) those replying positively to the presence of a social group also have a higher number of friends in their social group. Both the presence of a social group in the senior center and the number of friends in that social group were also found to have moderate relationships with reading ($\chi^2(1, N = 60) = 10.46$, $\phi_2 = -0.419$, $p = 0.001$) as those without a social group in the senior center tend to read books or newspapers in the center and ($r_b = 0.414$, $p = 0.001$) as those with higher number of friends in their social group tend to not read books or newspapers in the senior center, and with meeting friends in the senior center ($\chi^2(1, N = 60) = 16.34$, $\phi_2 = 0.522$, $p < 0.001$) as those with a social group in the senior center tend to meet friends in the center and ($r_b = -0.428$, $p = 0.001$) as those with a higher number of friends in their social group tend to meet friends in the senior center respectively. Finally, between social and physical factors, visit frequency and the importance ranking of acoustical comfort were found to be correlated ($r_s = 0.402$, $p = 0.001$) suggesting that more frequent visitors of the senior center are more likely to rate acoustical comfort highly.

Only one moderate relationship was found within social activities, which is between reading newspapers/books in the senior center and meeting friends ($\chi^2(1, N = 60) = 13.85$, $\phi_2 = -0.480$, $p < 0.001$) which implies that those who read newspapers or books tend to not meet friends in the senior center. A

moderate correlation is also found between movie/seminar/concert attendance and the importance ranking of bright color schemes ($r_{rb} = -0.400$, $p = 0.001$) suggesting that those who attend these events tend to rank the importance of bright color schemes highly.

Within physical factors, 20 moderate to strong correlations are found between the importance rankings of survey items. In this section, a positive correlation coefficient suggests that those who rank one item highly tend to rank the other highly as well. Consequently, a negative correlation coefficient implies that those who rank one item highly tend to rank the other one lowly. Artificial lighting was found to be correlated with both daylighting ($r_s = 0.417$, $p = 0.001$) and materials of walls ($r_s = 0.425$, $p = 0.001$). Bright colors were found to have moderate relationships with neutral colors ($r_s = -0.504$, $p < 0.001$) and home-like decoration ($r_s = 0.401$, $p = 0.001$). Another correlation of home-like decoration was found with acoustical comfort ($r_s = 0.427$, $p = 0.001$), and acoustical comfort also had a moderate relationship with ceiling materials ($r_s = 0.502$, $p < 0.001$) and with furniture materials ($r_s = 0.556$, $p < 0.001$). Thermal comfort was found to have a relationship with furniture materials ($r_s = 0.426$, $p = 0.001$) as well. The importance rankings of furniture materials were found to have an extensive list of correlations, including relationships with furniture arrangements ($r_s = 0.439$, $p < 0.001$), with furniture ergonomics ($r_s = 0.661$, $p < 0.001$), with home-like decoration ($r_s = 0.498$, $p < 0.001$), with wall finishing materials ($r_s = 0.549$, $p < 0.001$), and with ceiling finishing

materials ($r_s = 0.535$, $p < 0.001$). Moderate correlations were also found between furniture ergonomics and thermal comfort ($r_s = 0.495$, $p < 0.001$), acoustical comfort ($r_s = 0.405$, $p = 0.001$), and furniture arrangements ($r_s = 0.408$, $p = 0.001$). Home-like decoration was found to have a moderate relationship with ceiling height ($r_s = 0.408$, $p < 0.001$). Finally, the relationships found between finishing materials were as follows; wall finishing materials and floor finishing materials ($r_s = 0.591$, $p < 0.001$), ceiling finishing materials and floor finishing materials ($r_s = 0.608$, $p < 0.001$), ceiling finishing materials and wall finishing materials ($r_s = 0.767$, $p < 0.001$).

4.2.1.5. Differences among Age Groups, Genders, Education Levels and Occupation Groups

Among Age Groups

Nowadays the senior age category is divided further into 3 groups: Young-Old (ages between 65 and 74), Old-Old (ages between 75 and 84) and Oldest-Old (ages 85 and above) (Crews & Zavotka, 2006; Suzman & Riley, 1985).

However, for the purposes of this study, combining the latter two categories into one was deemed appropriate. Therefore, the participants were re-grouped into two using Statistical Package for Social Sciences version 20 (SPSS 20), younger old (74 and younger, 36 participants) and older old (75 and older, 24 participants) for comparison between these two groups. With these two groups, an independent samples t-test was conducted to compare differences between age groups. The results of this statistical analysis can be

found in Table F.3 in Appendix F. In terms of gender, there was a significant difference between younger old ($M = 1.72$, $SD = 0.454$) and older old ($M = 1.42$, $SD = 0.504$), $t(58) = 2.444$, $p = 0.018$. Another significant difference was found between younger old ($M = 1.25$, $SD = 0.439$) and older old ($M = 1.00$, $SD = 0$) in terms of the presence of a social group, $t(58) = 2.781$, $p = 0.007$. For activities, the only difference was found in terms of playing games, ($M = 1.86$, $SD = 0.351$ for younger old; $M = 1.54$, $SD = 0.509$ for older old) $t(58) = 2.882$, $p = 0.006$. Finally for priority ranking of physical factors, only one significant difference was found in terms of bright colors ($M = 3.94$, $SD = 1.120$ for younger old; $M = 3.21$, $SD = 1.532$ for older old) $t(58) = 2.151$, $p = 0.036$.

Among Genders

Using Statistical Package for Social Sciences version 20 (SPSS 20), an independent samples t-test was run to compare differences among male and female participants (24 male, 36 female participants). The results of this statistical analysis can be found in Table F.4 in Appendix F. The most significant difference for this group was found in terms of age ($M = 74.42$, $SD = 7.518$ for males; $M = 70.86$, $SD = 6.123$ for females) $t(58) = 2.011$, $p = 0.049$. In terms of education level, the difference among males ($M = 4.75$, $SD = 0.608$) and females ($M = 4.31$, $SD = 0.856$) was found to be significant as well, $t(58) = 2.198$, $p = 0.032$. Similarly, a difference among genders was found in terms of occupation ($M = 1.08$, $SD = 0.282$ for males; $M = 1.89$, $SD = 1.009$ for females) $t(58) = -3.807$, $p < 0.001$. Two activities showed up

as having differences among genders, one is movie screenings / seminars / concerts ($M = 1.92$, $SD = 0.282$ for males; $M = 1.50$, $SD = 0.507$ for females; $t(58) = 3.658$, $p = 0.001$) and the other one is playing games ($M = 1.46$, $SD = 0.509$ for males; $M = 1.92$, $SD = 0.280$ for females; $t(58) = -4.489$, $p < 0.001$). For physical factors, significant differences were found between genders' prioritized color schemes; both with bright color schemes ($M = 2.54$, $SD = 1.285$ for males; $M = 4.39$, $SD = 0.728$ for females; $t(58) = -7.101$, $p < 0.001$) and with neutral color schemes ($M = 4.33$, $SD = 0.761$ for males; $M = 2.97$, $SD = 1.108$ for females; $t(58) = 5.242$, $p < 0.001$).

Among Education Level Groups

The participants were re-grouped into two using Statistical Package for Social Sciences version 20 (SPSS 20), high school and below (graduates from primary school, secondary school and high school, 31 participants) and university and above (graduates from university, Masters or Ph.D. degrees, 29 participants) for comparison among different education level groups. The results of this statistical analysis can be found in Table F.5 in Appendix F.

Major differences were found among two education groups in terms of gender ($M = 1.74$, $SD = 0.445$ for high school and below; $M = 1.45$, $SD = 0.506$ for university and above; $t(58) = 2.391$, $p = 0.020$) and occupation ($M = 2.03$, $SD = 1.016$ for high school and below; $M = 1.07$, $SD = 0.258$ for university and above; $t(58) = 4.956$, $p < 0.001$). For activities, the only significant difference among education level groups were in movie

screening / seminars / concerts ($M = 1.55$, $SD = 0.506$ for high school and below; $M = 1.79$, $SD = 0.412$ for university and above; $t(58) = -2.046$, $p = 0.045$). The difference among priority rankings of bright colors ($M = 4.03$, $SD = 1.224$ for high school and below; $M = 3.24$, $SD = 1.254$ for university and above; $t(58) = 2.376$, $p = 0.021$) and neutral colors ($M = 3.19$, $SD = 1.301$ for high school and below; $M = 3.86$, $SD = 0.953$ for university and above; $t(58) = -2.256$, $p = 0.028$) were found to be statistically significant as well.

Among Occupation Groups

For comparison between occupation groups, the participants were re-grouped into two using Statistical Package for Social Sciences version 20 (SPSS 20), retired and working (44 participants) and housewives (16 participants). The results of this statistical analysis can be found in Table F.6 in Appendix F. As expected, a significant difference was found between these two groups in terms of gender ($M = 1.45$, $SD = 0.504$ for retired and working; $M = 2.00$, $SD = 0.0$ for housewives; $t(58) = -4.308$, $p < 0.001$). Another major difference among retired and working ($M = 4.77$, $SD = 0.642$) and housewives ($M = 3.69$, $SD = 0.602$) was found in their education levels, $t(58) = 5.882$, $p < 0.001$. Two items came up as having differences between occupation groups in the activities column. These were movie screening / seminar / concerts ($M = 1.80$, $SD = 0.408$ for retired and working; $M = 1.31$, $SD = 0.479$ for housewives; $t(58) = 3.870$, $p < 0.001$) and reading books or newspapers in the senior center ($M = 1.50$, $SD = 0.506$ for retired and

working; $M = 1.88$, $SD = 0.342$ for housewives; $t(58) = -2.740$, $p = 0.008$). Finally, for the physical factors, a significant difference among occupation groups was found in priority rankings of bright color schemes ($M = 3.25$, $SD = 1.332$ for retired and working; $M = 4.75$, $SD = 0.447$ for housewives; $t(58) = -4.396$, $p < 0.001$) and neutral color schemes ($M = 3.77$, $SD = 1.138$ for retired and working; $M = 2.81$, $SD = 1.047$ for housewives; $t(58) = 2.949$, $p = 0.005$).

4.2.2. Findings of the Observational Data

Using the observation sheet (in Appendix E), data was gathered for 3 weeks, which equals 15 workdays in the senior center. Special events were held 5 times during this period, 3 of those were movie screenings on Tuesdays, 1 was a public health seminar on Monday and 1 was a concert on Thursday. Exercise group meetings on Mondays, Wednesdays, and Fridays had a minimum of 12 participants and a maximum of 15. Movie screenings had 15, 18 and 10 participants during these 3 weeks. The public health seminar had 21 participants while the concert had a total of 245 participants.

Weekly density was analyzed using data gathered by the observation sheet. Tuesdays ($M=205$) and Thursdays ($M=194$) were found to be the most densely populated days. Wednesdays and Fridays had mean user numbers of 172 and 156 respectively while Mondays ($M=151$) were the least populated days (Figure 5).

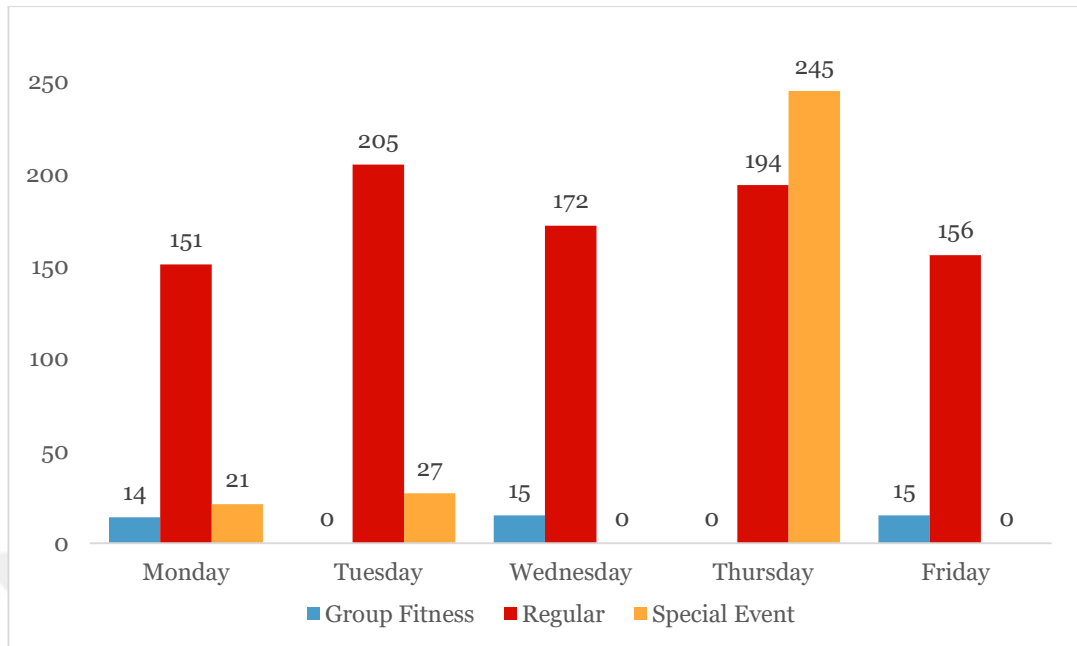


Figure 9. Mean values of 3 weeks (15 workdays) for weekly distribution of number of users

Along with weekly density, hourly density statistics were analyzed as well.

Means of hourly user numbers revealed that there were no users at the opening hour, 9:00. Mean user numbers increased hourly, from 1.4 at 10:00 to 3.7, 9.9, 18.7, 25.6, 34.4, 35.6 and 36 at 11:00, 12:00, 13:00, 14:00, 15:00, 16:00 and 17:00 respectively. Therefore, the most densely populated hours were after 14:00, until the closing time of 17:00 (Figure 6).

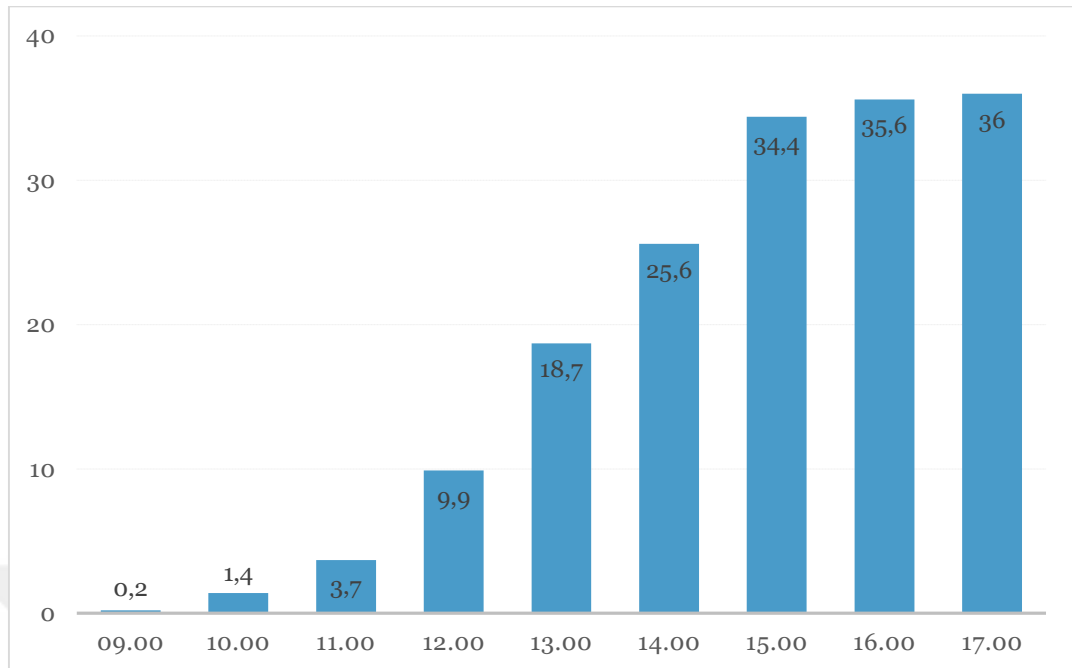


Figure 10. Mean values of 3 weeks (15 workdays) for hourly distribution of number of users

In this chapter, data collected via interviews and observation sheet is presented, and results from statistical analysis are given. In the following chapter, these findings and statistical analysis results are discussed in detail. Comparisons with findings of previous studies are found in this chapter as well.

CHAPTER 5

DISCUSSION

In this chapter, the findings from statistical analysis, which are presented in the previous chapter, are discussed in detail. Potential implications of these findings are explained and compared with those found in literature. Limitations and weaknesses of this study are found in this chapter as well.

5.1. On Demographics

Of 60 total participants, 60% ($n = 36$) were female. As the sampling method used was convenience sampling, the gender percentage implies that females attend the senior center more than males. This is also consistent with findings from literature, in which the female percentage ranges from 60% to 67% (Aday, 2003; Bøen, 2012; Bøen et al., 2010; Hewson, 1998; Novek et al., 2013; Turner, 2004).

Even though users as young as 51 years old were present at the senior center, only those over 60 were interviewed at the second stage of this study. The maximum is 87 while the mean is 72.28. The mean age of users is similar to

those from literature, where an age range of 55 to 99 can be seen with means of and around 75 years old (Aday, 2003; Hewson, 1998; Novek et al., 2013).

Participants' marital statuses were 29 married, 19 widow and 12 single. When the categories of widow and single are merged into one for comparison purposes, it is seen that more than half of participants are single. This percentage is consistent with the majority of those from the literature as senior center attending older adults are said to be more likely to be single or widowed (Aday, 2003; Bøen et al., 2010; Novek et al., 2013; Turner, 2004) while one study has found otherwise, where 58% of participants are married (Bøen, 2012).

The majority of participants were high school ($n = 27$) and university ($n = 24$) graduates in terms of education levels. This suggests that the majority of senior center participants are relatively well educated. The education levels of this sample group are similar to those found in the study by Aday (2003) as 80% had an education level at or above high school, however, Bøen (2012) has found that half of the participants were primary school graduates in their sample group. It is worth mentioning that in another study, Bøen et al. (2010) have found that education level is not relevant to senior center attendance.

5.2. On Social Factors

The majority of participants, 64% (n = 54) in this study have mentioned visiting the center at least 3 - 4 times per week while 16 participants (27%) visited 1 - 2 times per week. These percentages are similar to those found in the literature in which users are mentioned to visit the senior center at least 1-2 times a week with over 50% visiting 3 or more times a week (Aday, 2003; Novek et al., 2013; Turner, 2004).

For the time spent in the senior center, 38% (n = 23) have stated staying at the center for between 2 - 3 hours, while 17% (n = 10) spent between 1 - 2 hours, 15% (n = 9) spent between 3 - 4 hours and 23% (n = 14) stayed there for more than 4 hours. Reviewing the literature, these numbers are found to be consistent with the study by Aday (2003) where participants have stated spending around 3.3 hours.

The social activities users participate in at the senior center are as follows:

Movie screenings, seminars, concerts, food/drinks, reading books/newspapers, meeting friends, playing games and group fitness.

Food/drinks and meeting friends were activities that were preferred the most, with all 60 participants using the food/drinks services. Compared to the literature (Novek et al., 2013; Turner, 2004), the number of services offered at the senior center and therefore activities users participate in are lower. The reason for this might be that the senior center used for this study is relatively new and functions as a pilot for the governing municipality.

5.3. On the Factorial Analysis of Physical Factors

A factorial analysis was performed using Statistical Package for Social Sciences (SPSS) to group the variables. For the ranking of factors, the principal component analysis revealed 4 factor groups for physical factors.

The first factor group included furniture ergonomics, furniture materials, furniture arrangements, thermal comfort, and acoustical comfort. Hence, this factor is named 'furniture and physical comfort'. This factor might suggest a positive relationship between all of its components' importance ratings, as in thermal and acoustical comfort being rated more importantly by participants who rated furniture comfort items as important as well.

The second factor for physical factors consisted of finishing materials for floor, ceiling, and walls. Thus, this factor is named 'finishing materials'. The positive factor loadings for this factor indicate that all three finishing materials have a similar importance ranking for participants.

The third factor for physical factors revealed daylight, artificial lighting and ceiling height. As these items are all related to lighting quality in the senior center, this factor is named 'lighting'. This factor suggests that participants who rank ceiling height as important also rank artificial lighting and daylight as important.

The final factor for physical factors, the fourth, included bright color schemes, neutral color schemes, and home-like decoration. As it contained elements related to decoration in a senior center, this factor is named 'decoration'. It should be noted that the factor loading for neutral color schemes is negative in this factor. These results might indicate that participants who ranked home-like decoration as important also ranked bright colors as important but their ranking for neutral color schemes was not as important.

5.4. On the Correlations between Demographics, Social Factors, Activities and Physical Factors

As a result of using Statistical Package for Social Sciences 20 (SPSS 20) to run Spearman's rank-order correlation and chi-square test of independence, several significant relationships were found between demographics, social factors, activities, and physical factors. At this point, only moderate to strong correlations were considered significant.

Within demographics, gender and occupation were found to be correlated. A major factor in this correlation is the category for not having worked at all (housewives), as all participants in this category are females. Occupation and education level were found to be correlated as well, again this is mostly because the occupation category for housewives had education level at or below high school while retired and working participants were mostly high school graduates, university graduates or had a Master/Ph.D. degree.

Between demographics and social factors, the presence of a social group was found to have a correlation with age, meaning that older participants mostly answered positively while younger participants were more inclined to choose the answer no. Gender had two significant correlations with activities, negative with movie/seminar/concert attendance and positive with playing games. These findings mean that movie/seminar/movie attending participants are more likely to be female while those who play board games are more likely to be male. Between demographics and physical factors, the importance ranking of bright color schemes had three correlations while the importance ranking of neutral color schemes had two. According to these relationships; younger, female and housewife participants ranked bright colors as more important while male and retired/working participants ranked neutral colors as more important. These findings are in fact contrasting with those from literature, where it is stated that color discrimination declines with age and thus older participants were expected to have a preference for bright colors schemes (Hedge, 2011). However, this might be due to the fact that the average age for males, who rank neutral colors as more important, is higher than females, who rank brighter colors as more important.

For social factors, correlations between the number of friends in the senior center and visit frequency were found as well as with the frequency of meeting those friends. These findings suggest that as the number of friend in the senior center increases, visit frequency, and the frequency of meeting

those friends increases. This is consistent with Fulbright's (2009) findings, as the social interaction with friends is a main component of senior center attendance. The frequency of meeting friends in the senior center was also found to have a correlation with visit frequency, suggesting that visit frequency increases as the participants' frequency of meeting friends in the center increases. Several correlations were found to indicate that as the number of friends in social group increases, time spent in the senior center, total number of friends in the senior center, frequency of meeting friends increase and the likelihood of having a social group increases as well. The presence of a social group and the number of friends in that social group were found to have a relationship with reading and meeting friends in the senior center activities. These findings suggest that participants with a social group and those with a larger number of friends in that social group are not inclined to read books/newspapers at the center and are more likely to meet their friends. Finally, greater visit frequency was found to have a positive relationship with the importance rating of acoustical comfort, which implies that more frequent visitors of the senior center are more concerned with the acoustical properties of the center.

Similarly, the only correlation within social activities was between reading books/newspapers and meeting friends, meaning those who participate in one activity are more inclined to not participate in the other. Another correlation suggests that movie/seminar/concert attending participants tend to rank the importance of bright color schemes lower.

Within physical factors, several correlations were found. Firstly, those who ranked the importance of artificial lighting highly were more inclined to rank the importance of daylight and finishing materials of walls highly as well. Those who ranked bright colors more importantly tended to rank the importance of neutral colors lower, while ranking home-like decoration higher. Another correlation with home-like decoration was found with acoustical comfort, suggesting that those who rank one highly tended to rank the other highly as well. The importance ranking of acoustical comfort also had a correlation with importance rankings of ceiling materials and furniture materials. Those who ranked furniture materials as important had a tendency to rank thermal comfort, furniture arrangements, furniture ergonomics, and home-like decoration, wall finishing materials and ceiling finishing materials highly as well. The findings also suggest that participants who rank the importance of furniture ergonomics highly are more inclined to rank the importance of thermal comfort, acoustical comfort, and furniture arrangements. The correlation found between home-like decoration and ceiling height implies that as the participants' ratings for the importance of home-like decoration increases, their ratings for the importance of ceiling height increases as well. As the importance rankings of wall finishing materials increased, so did the importance rankings of floor finishing materials and ceiling materials. Lastly, the importance rankings of ceiling materials tended to increase as those of floor finishing materials increased as well.

5.5. On the Differences among Age Groups, Genders, Education Levels and Occupation Groups

Among Age Groups

Regrouping the ages of participants into two category revealed several differences between the younger old (74 and younger, 36 participants) and the older old (75 and older, 24 participants). The difference between genders suggests that there are more female participants in the younger old category while the older old category has a higher number of males. For the presence of a social group, it was found that older old are more likely to have a social group but the younger old are less likely to have one. The only difference between age groups in the activities they participate in was found with playing games, the younger old are much more likely to play board/card games than older old. Lastly, the priority ranking of bright colors was found to be much higher with younger old.

Among Genders

An independent samples t-test was run to find out the differences between males ($n = 24$) and females ($n = 36$) and the most significant difference was found to be in the age groups. The analysis suggests that male participants are significantly older than females. Education levels were found to be different, suggesting that males have a higher education level than females. Occupations were found to be significantly different among genders as well; due to those who have never worked (housewives) being only female. All male participants were either working or retired while half of females were

housewives and the other half retired. For activities, it was found that movie screenings / seminars / concerts were mostly attended by females while those who play games are mostly males. The difference between genders is seen in their prioritized color schemes as well, with the males ranking neutral color schemes as more important while females rank bright color schemes more important.

Among Education Level Groups

The regrouping of participants into two, high school and below ($n = 31$) and university and above ($n = 29$), revealed two significant demographical differences between groups. The findings suggest that females tend to have an education level of or below high school while males tend to have a university, master's or Ph.D. degrees. Occupations differ among education level groups as well, suggesting that high school and below group has either retired or housewives whilst university and above group has mostly those who are retired or working. For activities, the only difference is seen in movie screenings / seminars / concerts, with high school and below group being more likely to attend these events. In terms of importance rankings of physical factors, bright colors were found to be ranked as more important by participants in high school and below group while neutral colors were ranked as more important by those in university and above group.

Among Occupation Groups

Using Statistical Package for Social Sciences version 20 (SPSS 20), the participants were regrouped into two, retired and working (n = 44) and Housewives (n = 16). All of the participants in housewives category were females, as expected. A significant difference was found between the education levels of these groups, with the majority of housewives being high school graduates while the retired and working group was mostly university graduates. In terms of activities, it was found that the attendance rate to movie screenings / seminars / concerts were much lower with the retired and working group while they tend to reading books / newspapers more than housewives. The priority rankings of bright color schemes and neutral color schemes were found to differ between these two groups as well. While retired and working had a tendency to rank neutral color schemes higher, housewives ranked bright color schemes higher.

5.6. On Observational Data

Findings from the observation sheet revealed that the majority of users preferred visiting the center on Tuesdays and Thursdays while the days before and after weekends had the lowest user density. Special events, such as movie screenings or concerts on Tuesdays and Thursdays might have a role in this distribution.

The majority also visited the center in the afternoon, after 13:00. The hours after opening were usually quite uncrowded, even during lunchtime. A reason

for this might be the limited options for food and beverages. This particular senior center only serves toasted sandwiches, pre-packaged goods, soft drinks; tea and coffee. Several of the participants have mentioned wishing the senior center offered more meal options so they could have full meals there or invite their friends over for lunch. Instead, they can only have snacks and beverages. Several have expressed a wish for the senior center to have a later closing time in the evening, such as 19:00 or 20:00, as well. This might account for the high number of users at the closing time.

The findings from statistical analysis, which are presented in the previous chapter, have been discussed in this chapter. In the following chapter, Conclusion, the study is summarized and the implications of findings are mentioned. Limitations and weaknesses of this study are found in the following chapter as well.

CHAPTER 6

CONCLUSION

As the aging population of the world increases, the emphasis on their health and well-being increases as well. Social participation is one of the most important factors affecting the health and well-being of older adults. Senior centers are one of the facilities that support their social participation by offering programs and services. Therefore, senior centers have an important role for the aging population.

The importance of senior centers is evident for social participation and the provided locations should be as preferable and as satisfactory as possible for older adults. The social and psychological aspects of senior centers is well investigated, however, literature on interior physical features of those centers is scarce. Accordingly, the main aim of this study is to determine the spatial priorities of older adults for social participation in senior centers.

One of the two municipality governed senior centers in the city center has been chosen for this study, due to its location and ease of access. For the first stage, a semi-structured interview is applied to 12 participants using

convenience-sampling method. The findings are used to design the second stage of this study, which consists of a structured interview and observation. This interview is applied to 60 participants, who are 60 years old and older, using a convenience sampling method again. Demographic information of participants, social factors, activities and physical factors in the senior center are found out through this interview while the observation sheet is used to record the daily and hourly number of users and special event participants.

It was found that the majority of participants are female, around age 72, married, relatively well educated and retired. They visit the senior center at least 3 - 4 times a week and stay there between 2 -3 hours. The most popular activities at the senior center are services of food/drinks and meeting friends. With these findings, this study has found out the demographic information and senior center visit frequency of this particular sample group in the capital of Turkey.

This study has also found out the social factors affecting the users of this senior center, such as the presence of a social group, the number of friends at the senior center and the frequency of meeting those friends. However, the main aim of this study was to find out the spatial priorities of older adults in the senior center. This aim has been realized with the findings of physical factors. Furniture and physical comfort was found out to be the most significant factor group, with finishing materials coming in the second place. Lighting and decoration were found to be of lesser importance, though these

factors by no means should be thought of as unimportant. This study has also focused on the correlations between demographics of participants, social factors, activities, and physical factors in a senior center, as well as differences between age groups, genders, education levels, and occupation groups. In that sense, the factors affecting participants in a senior center have been examined thoroughly.

The findings of this study might aid both architects, interior designers and researchers with the design of satisfactory interiors of senior centers. This study has revealed that there are numerous differences among user groups, therefore the architects and interior designers might take these into consideration when designing for their specific target user groups. The prioritized spatial properties are also examined in this study, therefore architects and interior designers can focus on the priorities of older adults in a senior center as well.

6.1 Field Notes

Due to the nature of the study, the researcher spent a considerable time observing the users in the senior center and their behavioral patterns. One of the most significant observation is that the most preferred tables in the senior center were near the windows due to the amount of daylight they receive. However, because the windows are near the entrance and the door is opened frequently, some of the users were uncomfortable with the lowering

temperatures. Consequently the majority of users prioritized thermal comfort over sufficient lighting in that setting.

It is also observed that almost all users preferred having a drink at the senior center whether they were playing games, reading or meeting friends. Even those who spent around 15 minutes in the senior center or those who did not participate in any other activity are observed to have a drink. This might suggest that the simple act of being in the senior center and having a drink is sufficient social participation in that location for some users.

Another observation the researcher made is that the users of a senior center are very pleased to have a younger person there and are eager to have a conversation. The majority are also pleased that there is a playground in the senior center, even though they did not personally make use of it by bringing toddlers with them. Therefore it is seen that even though the senior center caters to those who are 60 years old and older, intergenerational activities and younger visitors are also welcome there.

6.2 Limitations

There are some limitations of this study due to the limited sample size and the study being confined to one site only. There are currently only four senior centers in Ankara, the capital of Turkey. For this study, one of these senior centers was selected. The limited setting might be a limitation for this study, as the sample present at that senior center might not represent the entire population.

Another limitation of this study might be the number of participants for a statistically representative sample size. Even though the total number of users is high when compared to the number of participants, those willing to participate in a survey were quite low in number. Consequently, the sample might not represent the entire population of senior center attending older adults.

6.3 Further Studies

For this study, one of the only four senior centers in Ankara, Turkey was selected. The limited setting might be a limitation for this study, as the sample present at that senior center might not represent the entire population. For future studies, expanding the number of senior centers might be a plausible idea.

The number of participants for this study was lower than expected in the chosen senior center. Therefore, the sample might not represent the entire population of older adults in a senior center. Further studies may aim to conduct a survey with a higher number of participants as this is necessary to find out extensive information regarding demographics of senior center users, activities they participate in and factors affecting their social participation at that location.

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APPENDIX A

PERMIT FROM ÇANKAYA BELEDİYESİ



T.C.
ÇANKAYA BELEDİYE BAŞKANLIĞI
Sosyal Yardım İşleri Müdürlüğü
ANKARA

Sayı : M.06.3.ÇAN.0.22.01.00/3780/66658
Konu : Anket çalışması

12.11/2014

BİLKENT ÜNİVERSİTESİ
Güzel Sanatlar Tasarım ve Mimarlık Fakültesi

Bilkent Üniversitesi Güzel sanatlar Tasarım ve Mimarlık Fakültesi İç Mimarlık ve Çevre Tasarımı Bölümü Yüksek Lisans öğrencilerinden Gökçe KUTSAL' ın Yüksek Lisans Tezi kapsamında " Yaşlılar için Sosyal Kulüplerde Mekansal İnceleme" araştırması için Müdürlüğümüz 100+ Yaş Kulübünde Aralık ve Ocak ayı içerisinde anket uygulaması yapmasında herhangi bir sakınca yoktur.

Gereğini bilgilerinize arz ederim.

Dr. Yusuf KAYA
Sosyal Yardım İşleri Müdürü

12.11/2014 Düzenleyen E.YİĞİT
12.11/2014 Büro Sorm. N.ÇELEBİ

APPENDIX B

PHOTOGRAPHS





Figure B.1. The entrance



Figure B.2. The main level



Figure B.3. The main level 2



Figure B.4. The main level 3



Figure B.5. The TV area



Figure B.6. The playground



Figure B.7. The canteen area 1

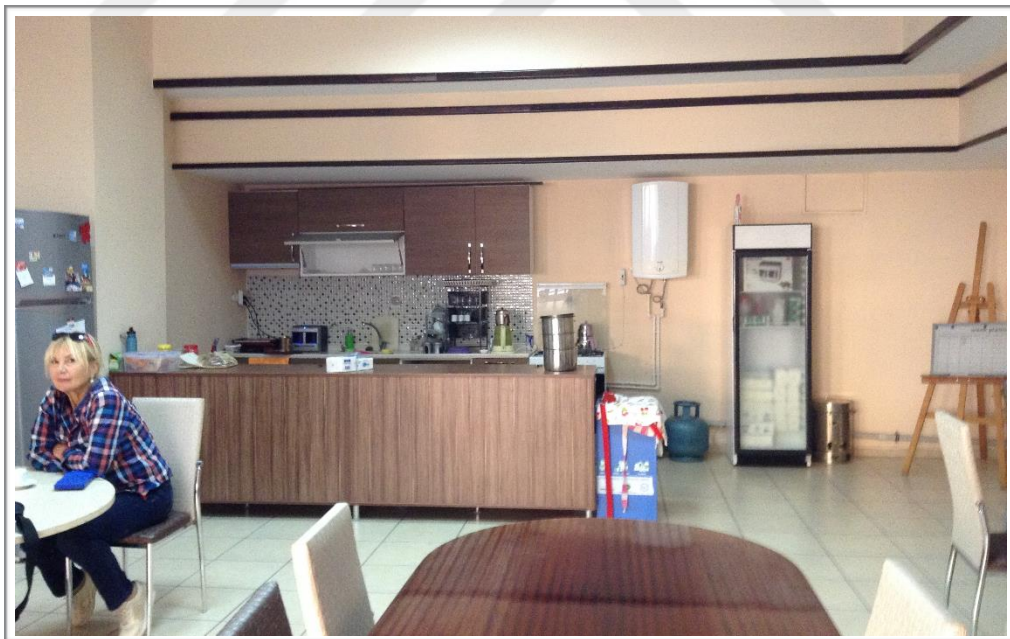


Figure B.8. The canteen area 2

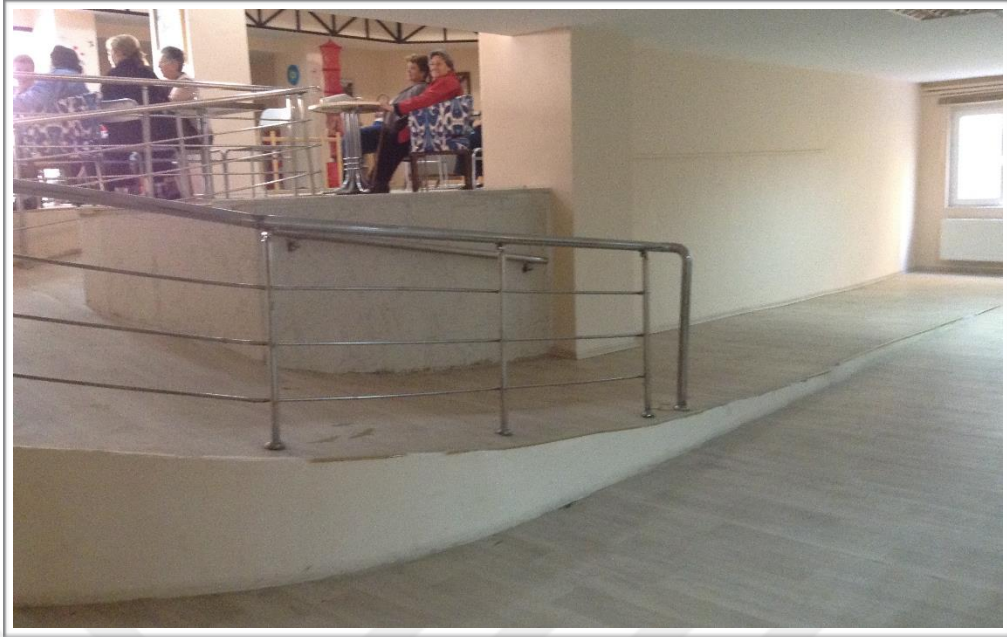


Figure B.9. The ramp to lower level

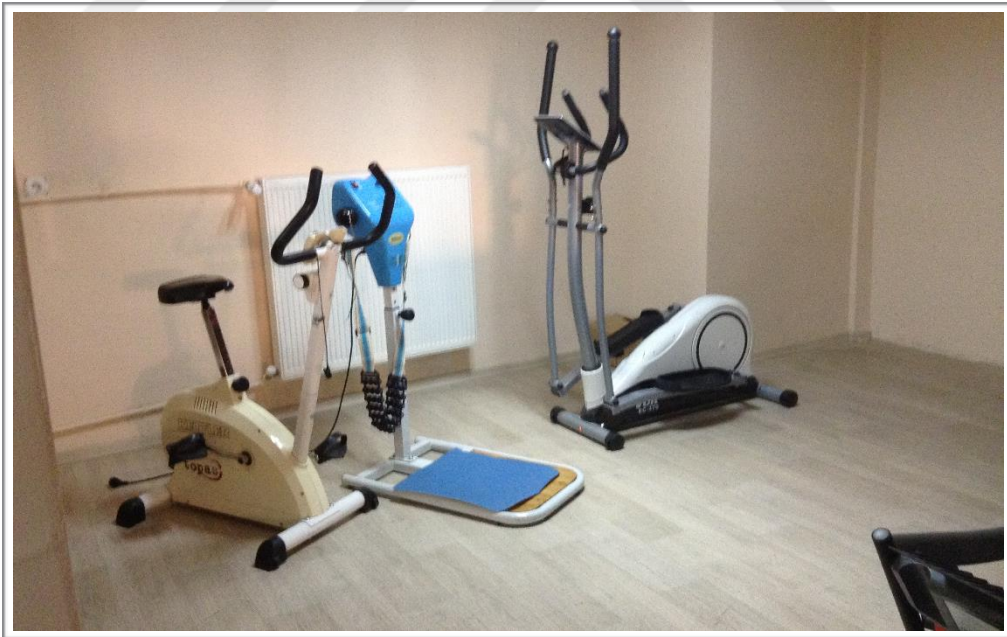


Figure B.10. The exercise area



Figure B.11. The book corner



Figure B.12. The upper level



Figure B.13. The conference room 1



Figure B.14. The conference room 2

APPENDIX C

STRUCTURED INTERVIEW (TURKISH)



Bilkent Üniversitesi İç Mimarlık ve Çevre Tasarımı

Yaşlı Merkezlerinde Kullanıcıların Mekansal Öncelikleri Anketi

Sayın katılımcı,

Bu anket Bilkent Üniversitesi İç Mimarlık ve Çevre Tasarımı bölümü yüksek lisans programı kapsamında yapılan bir araştırmanın parçasıdır.

Anketten alınacak sonuçlar kullanıcıların yaşlı merkezleri ile ilgili beklentilerinin anlaşılmasına yardımcı olacaktır.

Katılımcıların kimlikleri ve kişisel bilgileri hiçbir yabancı kurum veya kuruluş ile paylaşılmayacaktır. Yayınlanan sonuçlarda katılımcıların mahremiyeti korunacaktır.

1. Bölüm – Demografik Bilgiler
Yaş:
Cinsiyet: ☐ Erkek ☐ Kadın
Medeni Durum: ☐ Bekar ☐ Dul ☐ Evli
Eğitim Seviyesi: ☐ Okuryazar ☐ İlkokul ☐ Ortaokul ☐ Lise ☐ Lisans ☐ Lisansüstü
Meslek: ☐ Emekli ☐ Çalışmakta ☐ Ev Hanımı

2. Bölüm - Mekandaki Sosyal Faktörler					
Mekanı Ziyaret Sıklığı:					
Ayda 1	Ayda 2	Haftada 1 - 2	Haftada 3 - 4	Haftada 5	
Mekanda Geçirilen Süre:					
1 saatten az	1 - 2 saat arası	2 - 3 saat arası	3 - 4 saat arası	4 saatten fazla	
Mekandaki Arkadaş Sayısı:					
1 - 3	4 - 6	7 - 10	10 - 15	15 ve üzeri	
Mekandaki Arkadaşlar ile Görüşme Sıklığı:					
Ayda 1	Ayda 2	Haftada 1 - 2	Haftada 3 - 4	Haftada 5	
Mekanda Arkadaş Grubu: ☐ Yok ☐ Var					
Varsa; Mekandaki Arkadaş Grubundaki Kişi Sayısı:					
1 - 3	4 - 6	7-10	10-15	15 ve üzeri	
Mekanda Katılınan Sosyal Etkinlikler					
Film / Seminer / Konser	Yiyecek / İçecek	Okuma	Sohbet / Buluşma	Oyun Oynama	Egzersiz Grubu

3. Bölüm - Mekandaki Çevresel Faktörler				
Aydınlatma				
Sizin için bu tür bir mekanda yeterli gün ışığı olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Sizin için bu tür bir mekanda yeterli yapay aydınlatma olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Renk Kullanımı				
Sizin için bu tür bir mekanda canlı renklerin kullanılmış olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Sizin için bu tür bir mekanda nötr renklerin kullanılmış olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Fiziksel Faktörler				
Sizin için bu tür bir mekanda sıcaklığın uygun olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Sizin için bu tür bir mekanda akustiğin uygun olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli

Mobilya				
Sizin için bu tür bir mekanda mobilyalardaki malzemelerin uygun olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Sizin için bu tür bir mekanda mobilyaların rahat ve kullanışlı olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Sizin için bu tür bir mekanda mobilyaların farklı şekillerde düzenlenebilir olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Mekan Kalitesi				
Sizin için böyle bir mekanda tavan yüksekliğinin önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Sizin için böyle bir mekanda ev tipi dekorasyon olmasının önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Sizin için böyle bir mekanda zeminde kullanılan malzemenin uygunluğunun önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli
Sizin için böyle bir mekanda duvarlarda kullanılan malzemenin uygunluğunun önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli

Sizin için böyle bir mekanda tavanda kullanılan malzemenin uygunluğunun önem derecesi nedir?				
Hiç önemli değil	Önemsiz	Ne önemli, ne önemsiz	Önemli	Çok önemli



APPENDIX D

STRUCTURED INTERVIEW (ENGLISH)



Bilkent University Interior Architecture and Environmental Design

Survey on Priorities of Users in Senior Centers

Dear participant,

This survey is part of a graduate studies research conducted in Bilkent University Interior Architecture and Environmental Design Department.

Results from this survey will help researchers understand priorities of users in senior centers.

Identities and personal information of participants will not be shared with any third party person or company. The privacy of participants will be protected in published results.

Part 1 - Demographic Information
Age:
Sex: ☐ Male ☐ Female
Marital Status: ☐ Single ☐ Widowed ☐ Married
Education Level: ☐ Literate ☐ Elementary ☐ Secondary ☐ High ☐ Undergraduate ☐ Graduate
Occupation: ☐ Retired ☐ Working ☐ Housewife

Part 2 - Social Factors in the Senior Center					
Visit Frequency of the Senior Center:					
1 / per month	2 / per month	1 - 2 / per week	3 - 4 / per week	5 / per week	
Time Spent in the Senior Center:					
Less than 1 hour	Between 1 - 2 hours	Between 2 - 3 hours	Between 3 - 4 hours	More than 4 hours	
Number of Friends in the Senior Center:					
1 - 3	4 - 6	7 - 10	10 - 15	More than 15	
Meeting Frequency with Friends in the Senior Center:					
1 / per month	2 / per month	1 - 2 / per week	3 - 4 / per week	5 / per week	
Has a Social Group in the Senior Center: ☐ No ☐ Yes					
If Yes; Number of Friends in the Social Group in the Senior Center:					
1 - 3	4 - 6	7-10	10-15	More than 15	
Social Activities Participated In:					
Movie / Seminar / Concert	Food / Beverages	Reading	Meeting / Chatting	Playing Games	Exercise Group

Part 3 - Environmental Factors in the Senior Center				
Lighting				
How do you rank the importance of natural daylighting in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
How do you rank the importance of artificial lighting in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
Color Schemes				
How do you rank the importance of a bright color scheme in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
How do you rank the importance of neutral color scheme in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
Physical Factors				
How do you rank the importance of thermal comfort in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
How do you rank the importance of acoustical comfort in a senior center?				
Not important at all	Not important	Neutral	Important	Very important

Furniture				
How do you rank the importance of furniture materials in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
How do you rank the importance of furniture ergonomics and comfort in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
How do you rank the importance of furniture arrangements in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
Space Quality				
How do you rank the importance of ceiling height in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
How do you rank the importance of home-like decoration in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
How do you rank the importance of floor materials in a senior center?				
Not important at all	Not important	Neutral	Important	Very important
How do you rank the importance of wall materials in a senior center?				
Not important at all	Not important	Neutral	Important	Very important

How do you rank the importance of ceiling materials in a senior center?				
Not important at all	Not important	Neutral	Important	Very important



APPENDIX E

OBSERVATION SHEET



Observation Sheet														
Date	Weekday	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	Event	# at Event	Exercise	# at Exercise
5.3.15	Th										S / M / C		Y / N	
6.3.15	F										S / M / C		Y / N	
9.3.15	M										S / M / C		Y / N	
10.3.15	Tu										S / M / C		Y / N	
11.3.15	W										S / M / C		Y / N	
12.3.15	Th										S / M / C		Y / N	
13.3.15	F										S / M / C		Y / N	
16.3.15	M										S / M / C		Y / N	
17.3.15	Tu										S / M / C		Y / N	
18.3.15	W										S / M / C		Y / N	
19.3.15	Th										S / M / C		Y / N	
20.3.15	F										S / M / C		Y / N	
23.3.15	M										S / M / C		Y / N	
24.3.15	Tu										S / M / C		Y / N	
25.3.15	W										S / M / C		Y / N	

S = Seminar, M = Movie Screening, C = Concert, Y = Yes, N = No

APPENDIX F

STATISTICS



Table F.1. Findings of factorial analysis 1

Rotated Component Matrix^a

	Component		
	1	2	3
Social Group	-,876	-,028	,003
Number of Friends in Social Group	,832	,265	,105
Time Spent	,624	,131	,092
Frequency of Meeting with Friends	,182	,934	-,074
Visit Frequency	,006	,908	-,099
Number of Friends	,542	,641	,134
Occupation	,253	,062	,809
Sex	-,091	-,123	,741
Education Level	-,419	,055	-,643
Age	,439	-,017	-,520

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,327	33,273	33,273	3,327	33,273	33,273	2,616	26,160	26,160
2	2,079	20,787	54,060	2,079	20,787	54,060	2,217	22,173	48,333
3	1,366	13,659	67,719	1,366	13,659	67,719	1,939	19,386	67,719
4	,980	9,797	77,516						
5	,641	6,406	83,921						
6	,530	5,295	89,217						
7	,451	4,505	93,722						
8	,364	3,640	97,362						
9	,135	1,349	98,711						
10	,129	1,289	100,000						

Extraction Method: Principal Component Analysis.

Table F.2. Findings of factorial analysis 2

Rotated Component Matrix^a

	Component			
	1	2	3	4
Furniture Ergonomics	,835	,084	,006	,297
Furniture Materials	,767	,378	,060	,168
Thermal Comfort	,642	,118	,244	-,056
Furniture Arrangements	,635	,204	,104	-,419
Acoustical Comfort	,578	,231	,287	,081
Materials Floor	,152	,858	-,102	,105
Materials Ceiling	,263	,793	,320	,066
Materials Walls	,302	,779	,282	,092
Daylight	,319	-,166	,738	,068
Artificial Lighting	-,079	,325	,722	-,156
Ceiling Height	,215	,268	,557	-,016
Bright Colours	,107	,243	,170	,809
Neutral Colours	,005	-,022	,250	-,787
Home-like Decoration	,395	,020	,475	,508

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4,858	34,697	34,697	4,858	34,697	34,697	2,939	20,993	20,993
2	1,820	12,996	47,694	1,820	12,996	47,694	2,497	17,835	38,828
3	1,439	10,278	57,971	1,439	10,278	57,971	2,041	14,578	53,406
4	1,248	8,914	66,886	1,248	8,914	66,886	1,887	13,480	66,886
5	,978	6,984	73,870						
6	,825	5,892	79,762						
7	,635	4,537	84,298						
8	,540	3,856	88,154						
9	,443	3,161	91,315						
10	,315	2,248	93,562						
11	,291	2,082	95,644						
12	,277	1,976	97,620						
13	,177	1,265	98,886						
14	,156	1,114	100,000						

Extraction Method: Principal Component Analysis.

Table F.3. Findings of correlations

Correlations → Demographics * Demographics

Gender * Occupation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16,349 ^a	2	,001
N of Valid Cases	60		

a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is ,80.

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Nominal by Nominal	Phi	,522			,001
	Cramer's V	,522			,001
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Occupation * Education Level

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Nominal by Nominal	Phi	,710			,000
	Cramer's V	,502			,000
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Correlations → Demographics * Social

Age * Presence of Social Group

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval	Pearson's R	-,439	,102	-2,743	,000 ^c
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Correlations → Demographics * Activity

Gender * Movie Seminar Concert

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11,250 ^a	1	,001		
N of Valid Cases	60				

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 8,00.

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Nominal by Nominal	Phi	,433			,001
	Cramer's V	,433			,001
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Gender * Playing Games

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	15,469 ^a	1	,000		
N of Valid Cases	60				

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 6,40.

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Nominal by Nominal	Phi	,508			,000
	Cramer's V	,508			,000
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Correlations → Demographics * Physical

Age * Bright Colours

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval	Pearson's R	-,402	,119	-2,575	,001
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Gender * Bright Colours

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval	Pearson's R	,682	,071	7,101	,000 ^c
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Gender * Neutral Colours

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval	Pearson's R	-,567	,076	-5,242	,000 ^c
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Occupation * Bright Colours

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval	Pearson's R	,514	,071	4,558	,000 ^c
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Occupation * Neutral Colours

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval	Pearson's R	-,398	,112	-3,306	,002 ^c
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Correlations → Social * Social

Number of Friends * Visit Frequency

Number of Friends * Frequency of Meeting Friends

Frequency of Meeting Friends * Visit Frequency

Number of Friends in Social Group * Time Spent

Number of Friends in Social Group * Number of Friends

Number of Friends in Social Group * Frequency of Meeting Friends

Number of Friends in Social Group * Presence of Social Group

Correlations

			Number of Friends	Visit Frequency	Time Spent	Frequency of Meeting with Friends	Number of Friends in Social Group	Social Group
Spearman's rho	Number of Friends	Correlation Coefficient		,453**		,623**	,638**	
		Sig. (2-tailed)		,001		,000	,000	
		N		60		60	60	
	Visit Frequency	Correlation Coefficient	,453**			,809**		
		Sig. (2-tailed)	,001			,000		
		N	60			60		
	Time Spent	Correlation Coefficient					,551**	
		Sig. (2-tailed)					,000	
		N					60	
	Frequency of Meeting with Friends	Correlation Coefficient	,623**	,809**			,404**	
		Sig. (2-tailed)	,000	,000			,000	
		N	60	60			60	
	Number of Friends in Social Group	Correlation Coefficient	,638**		,551**	,404**		-,720**
		Sig. (2-tailed)	,000		,000	,000		,000
		N	60		60	60		60
	Social Group	Correlation Coefficient					-,720**	
		Sig. (2-tailed)					,000	
		N					60	

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations → Social * Activity

Presence of Social Group * Reading

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10,545 ^a	1	,001		
N of Valid Cases	60				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 3,60.

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Nominal by Nominal	Phi	,419			,001
	Cramer's V	,419			,001
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Presence of Social Group * Meeting Friends

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	16,335 ^a	1	,000		
N of Valid Cases	60				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 1,20.

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Nominal by Nominal	Phi	,522			,000
	Cramer's V	,522			,000
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Correlations → Social * Physical

Visit Frequency * Acoustical Comfort

Correlations

			Visit Frequency	Acoustical Comfort
Spearman's rho	Visit Frequency	Correlation Coefficient		,402**
		Sig. (2-tailed)		,001
		N		60
	Acoustical Comfort	Correlation Coefficient	,402**	
		Sig. (2-tailed)	,001	
		N	60	

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations → Activity * Activity

Reading * Meeting Friends

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	13,846 ^a	1	,000		
N of Valid Cases	60				

a. 2 cells (50,0%) have expected count less than 5. The minimum expected count is 3,20.

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Nominal by Nominal	Phi	-,480			,000
	Cramer's V	,480			,000
N of Valid Cases		60			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Correlations → Activity * Physical

Movie Seminar Concert * Bright Colours

Correlations

		Film Screening / Seminars / Concerts	Bright Colours
Film Screening / Seminars / Concerts	Pearson Correlation		-,400**
	Sig. (2-tailed)		,002
	N		60
Bright Colours	Pearson Correlation	-,400**	
	Sig. (2-tailed)	,002	
	N	60	

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations → Physical * Physical

		Correlations													
		Daylight	Artificial Lighting	Bright Colours	Neutral Colours	Thermal Comfort	Acoustical Comfort	Furniture Materials	Furniture Ergonomics	Furniture Arrangements	Ceiling Height	Home-like Decoration	Materials Floor	Materials Walls	Materials Ceiling
Spearman's rho	Daylight		.417** ,001 60												
	Artificial Lighting	.417** ,001 60											.425** ,001 60		
	Bright Colours			-.504** ,000 60							.401** ,001 60				
	Neutral Colours			-.504** ,000 60											
	Thermal Comfort							.426** ,001 60	.495** ,000 60						
	Acoustical Comfort							.556** ,000 60	.405** ,001 60		.427** ,001 60				.502** ,000 60
	Furniture Materials					.426** ,001 60	.556** ,000 60		.661** ,000 60	.439** ,000 60	.498** ,000 60		.549** ,000 60	.535** ,000 60	
	Furniture Ergonomics					.495** ,000 60	.405** ,001 60	.661** ,000 60		.408** ,001 60					
	Furniture Arrangements							.439** ,000 60	.408** ,001 60						
	Ceiling Height										.444** ,000 60				
Home-like Decoration			.401** ,001 60			.427** ,001 60	.498** ,000 60			.444** ,000 60					
Materials Floor													.591** ,000 60	.608** ,000 60	
Materials Walls			.425** ,001 60				.549** ,000 60					.591** ,000 60		.767** ,000 60	
Materials Ceiling						.502** ,000 60	.535** ,000 60					.608** ,000 60	.767** ,000 60		

Spearman's rho

** Correlation is significant at the 0.01 level (2-tailed).

Table F.4. Findings of Independent T-test 1

Differences among Recoded Groups → Age Groups

Group Statistics

	Age Recoded	N	Mean	Std. Deviation	Std. Error Mean
Sex	Younger Old	36	1,72	,454	,076
	Older Old	24	1,42	,504	,103
Social Group	Younger Old	36	1,25	,439	,073
	Older Old	24	1,00	,000	,000
Playing Games	Younger Old	36	1,86	,351	,058
	Older Old	24	1,54	,509	,104
Bright Colors	Younger Old	36	3,94	1,120	,187
	Older Old	24	3,21	1,532	,313

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Sex	Equal variances assumed	3,787	,056	2,444	58	,018	,306	,125	,055	,556
Social Group	Equal variances assumed	69,600	,000	2,781	58	,007	,250	,090	,070	,430
Playing Games	Equal variances assumed	24,181	,000	2,882	58	,006	,319	,111	,098	,541
Bright Colors	Equal variances assumed	5,663	,021	2,151	58	,036	,736	,342	,051	1,421

Table F.5. Findings of Independent T-test 2

Differences among Recoded Groups → Genders

Group Statistics					
	Sex	N	Mean	Std. Deviation	Std. Error Mean
Age	Male	24	74,42	7,518	1,535
	Female	36	70,86	6,123	1,021
Education Level	Male	24	4,75	,608	,124
	Female	36	4,31	,856	,143
Occupation	Male	24	1,08	,282	,058
	Female	36	1,89	1,008	,168
Movies / Seminars / Concerts	Male	24	1,92	,282	,058
	Female	36	1,50	,507	,085
Playing Games	Male	24	1,46	,509	,104
	Female	36	1,92	,280	,047
Bright Colours	Male	24	2,54	1,285	,262
	Female	36	4,39	,728	,121
Neutral Colours	Male	24	4,33	,761	,155
	Female	36	2,97	1,108	,185

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Age	Equal variances assumed	1,126	,293	2,011	58	,049	3,556	1,768	,016	7,096
Education Level	Equal variances assumed	1,959	,167	2,198	58	,032	,444	,202	,040	,849
Occupation	Equal variances assumed	340,020	,000	-3,807	58	,000	-,806	,212	-1,229	-,382
Movies / Seminars / Concerts	Equal variances assumed	79,091	,000	3,658	58	,001	,417	,114	,189	,645
Playing Games	Equal variances assumed	50,582	,000	-4,489	58	,000	-,458	,102	-,663	-,254
Bright Colours	Equal variances assumed	11,655	,001	-7,101	58	,000	-1,847	,260	-2,368	-1,327
Neutral Colours	Equal variances assumed	2,844	,097	5,242	58	,000	1,361	,260	,841	1,881

Table F.6. Findings of Independent T-test 3

Differences Among Recoded Groups → Education Level Groups

Group Statistics

	EduRec	N	Mean	Std. Deviation	Std. Error Mean
Sex	High School & Below	31	1,74	,445	,080
	University & Above	29	1,45	,506	,094
Occupation	High School & Below	31	2,03	1,016	,182
	University & Above	29	1,07	,258	,048
Movies / Seminars / Concerts	High School & Below	31	1,55	,506	,091
	University & Above	29	1,79	,412	,077
Bright Colours	High School & Below	31	4,03	1,224	,220
	University & Above	29	3,24	1,354	,251
Neutral Colours	High School & Below	31	3,19	1,302	,234
	University & Above	29	3,86	,953	,177

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Sex	Equal variances assumed	7,396	,009	2,391	58	,020	,294	,123	,048	,539
Occupation	Equal variances assumed	465,091	,000	4,956	58	,000	,963	,194	,574	1,352
Movies / Seminars / Concerts	Equal variances assumed	14,220	,000	-2,046	58	,045	-,245	,120	-,484	-,005
Bright Colours	Equal variances assumed	,626	,432	2,376	58	,021	,791	,333	,125	1,457
Neutral Colours	Equal variances assumed	4,501	,038	-2,256	58	,028	-,669	,296	-1,262	-,075

Table F.7. Findings of Independent T-test 4

Differences Among Recoded Groups → Occupation Groups

Group Statistics					
	OccuRec	N	Mean	Std. Deviation	Std. Error Mean
Sex	Had a Job	44	1,45	,504	,076
	Housewife	16	2,00	,000	,000
Education Level	Had a Job	44	4,77	,642	,097
	Housewife	16	3,69	,602	,151
Movies / Seminars / Concerts	Had a Job	44	1,80	,408	,062
	Housewife	16	1,31	,479	,120
Reading	Had a Job	44	1,50	,506	,076
	Housewife	16	1,88	,342	,085
Bright Colours	Had a Job	44	3,25	1,332	,201
	Housewife	16	4,75	,447	,112
Neutral Colours	Had a Job	44	3,77	1,138	,172
	Housewife	16	2,81	1,047	,262

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Sex	Equal variances assumed	1856,000	,000	-4,308	58	,000	-,545	,127	-,799	-,292
Education Level	Equal variances assumed	,309	,580	5,882	58	,000	1,085	,184	,716	1,455
Movies / Seminars / Concerts	Equal variances assumed	2,480	,121	3,870	58	,000	,483	,125	,233	,733
Reading	Equal variances assumed	54,686	,000	-2,740	58	,008	-,375	,137	-,649	-,101
Bright Colours	Equal variances assumed	14,158	,000	-4,396	58	,000	-1,500	,341	-2,183	-,817
Neutral Colours	Equal variances assumed	,001	,975	2,949	58	,005	,960	,326	,308	1,612