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Victoria S. Douglass

This thesis addresses the issue of comfortable and functional living environments to provide seniors with opportunities for "age in place," that is, living in one's own house after retirement. Such living environments enhance seniors' life satisfaction since the majority of seniors prefer to stay in their own houses and live independently. In order to create suitable environments for seniors, professionals need to examine the relationships between seniors' housing behaviors and their living environments. Studying seniors' housing behaviors is particularly timely now as the first generation of baby boomers enters retirement and begins making increasingly large demands for adequate housing. This exigency emphasizes the urgent need for attention and understanding toward seniors' housing behaviors. This thesis investigates two groups of factors—physical abilities and medical conditions—which influence seniors' housing behaviors, examines characteristics of the groups, and compares the influences of the groups on seniors' housing behaviors according to hypotheses that the more problems the elderly have, the more effect these problems

will have on adapting or changing housing. The thesis used data collected by Eleanor Palo Stoller, Ph.D. (with the support of a grant from the National Institute on Aging) from subjects who were elderly Finnish American retirees and other European American retirees in Florida. The results supported the assumption that the more functional and health problems the elderly have, the more changes the elderly will make to their houses. The thesis suggests further areas for research and ways to enhance seniors' housing arrangements.

Predictors of Florida Retirees' Housing Decisions and Housing Adjustments

by
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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Toshiko Yamamoto, Author

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DEDICATION

This thesis is dedicated to my parents, Nobuko and Yasunosuke Yamamoto.

Predictors of Florida Retirees' Housing Decisions and Housing Adjustments

CHAPTER I

INTRODUCTION

Background Information

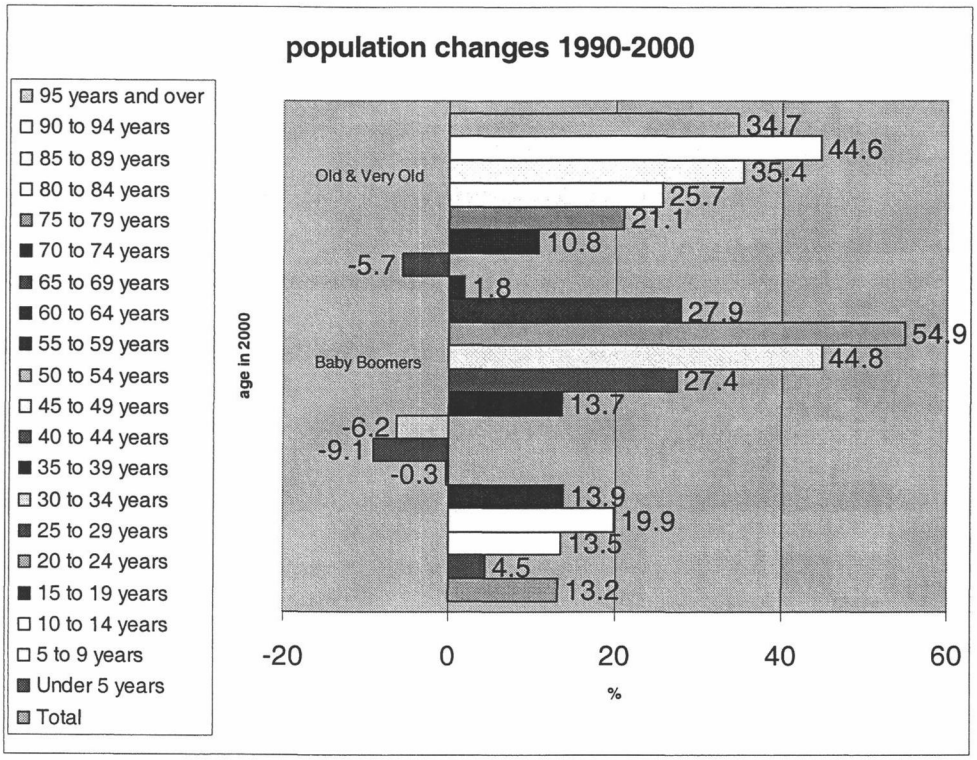
Several studies about housing decisions and adjustments have been implemented by researchers and professionals in the housing field in order to provide adequate information to develop suitable living conditions and environments. However, there seems to be a limited amount of research about senior housing decisions and adjustments. Further investigation into these issues is needed to support the elderly who wish to "age in place," which refers to living in one's own house after retirement. This is the preference of an overwhelming majority of seniors (American Society of Interior Designers, 2003). This issue is particularly timely because baby boomers will begin to enter retirement (age 65) in 2011. Baby boomers are people who were born from 1946 to 1964. The first generation of baby boomers, who were born from 1946 to 1950, numbered 17.6 million (6.2 % of the total population in the U.S.) in 2000 and had the largest percentage of change (54.9% increase) between 1990 and 2000 as compared with other age groups (U.S. Census Bureau, Census 2000 Summary File 1, p. 4).

Figure 1.1 and Table 1.1 clearly shows that the group at ages from 50 to 54 years old had the most dramatic growth. This largest growing population will be making increasingly large demands for adequate housing. Furthermore, the table shows that the two age groups, Old (75 to 83 years old) and Very Old (over 84 years old) (Gordon, 1998), have huge population increases from 1990 to 2000. This fact

emphasizes the urgent need for attention and understanding of seniors' housing decisions. Also, these facts have triggered researchers and the housing industry to investigate and develop comfortable living environments suitable for the senior population. In addition, continuing investigations will help not only baby boomers and the elderly over 75 years old, but also other generations to select appropriate houses for their current and future needs. This knowledge gained will also enhance people's awareness of the future needs for housing adjustments because of changes in health conditions and general physical abilities of the elderly in their later life.

Figure 1.1

U.S. Census Bureau, Census 2000 Summary File 1: Population Changes between 1990 and 2000



U.S. Census Bureau, Census 2000 Summary File 1, p. 4

Table 1.1

U.S. Census Bureau, Census 2000 Summary File 1: Population Changes between 1990 and 2000

Age in 2000	1990 to 2000 (%)
Total	13.2
Under 5 years	4.5
5 to 9 years	13.5
10 to 14 years	19.9
15 to 19 years	13.9
20 to 24 years	–0.3
25 to 29 years	–9.1
30 to 34 years	–6.2
Baby Boomers	
35 to 39 years	13.7
40 to 44 years	27.4
45 to 49 years	44.8
50 to 54 years	54.9
Empty Nesters*	
55 to 59 years	27.9
60 to 64 years	1.8
Young Old*	
65 to 69 years	–5.7
70 to 74 years	10.8
Old*	
75 to 79 years	21.1
80 to 84 years	25.7
Very Old*	
85 to 89 years	35.4
90 to 94 years	44.6
95 years and over	34.7

(U.S. Census Bureau, Census 2000 Summary File 1, p. 4)
*Age categories refer to "Seniors' Housing and Care Facilities" by Gordon (1998).

Purpose of the Research

This research has three purposes. The first purpose is to investigate two groups of factors that influence seniors' housing decisions and adjustments. All factors are based on self-reported responses. The first group of factors includes variables related to health and medical conditions. Examples include cancer, arthritis, emphysema, glaucoma, and depression. The second group of factors includes variables related to general physical abilities of the aging. Examples of those variables are functional abilities such as walking, running about a mile, getting in and out of a bed without help, climbing several flights of stairs, and lifting or carrying weights over 10 pounds. The second purpose of the research is to examine characteristics of those two groups of factors. This means that within each group, relationships between variables and senior housing behaviors will be examined. The last purpose of the research is to compare the influences of the above groups of factors on senior housing decisions and adjustments in order to see if there are any differences between the influences from the two groups.

Specifically, the objectives of this study are:

1) Examine the demographic characteristics of the subjects, using descriptive statistics
2) Study variables that were used in the data set
3) Select variables that include general physical abilities of the aging (group 1)
4) Select variables that include health and medical conditions (group 2)
5) Conduct factor analysis, a multiple linear regression model, and a logistic regression model to examine the influences of each group on seniors' housing decisions and adjustments

6) Interpret correlation tables for each group to find the characteristics of the variable influences on seniors' housing behaviors within each group
7) Investigate the differences of the influences between group 1 and 2

Research Questions

As the literature review will show in detail, although research about health effects on seniors' housing satisfaction has been found, it seems that research on this particular aspect of seniors' housing behaviors related to health conditions and physical abilities has not been pursued. Therefore, there is a need for research in this area. The research questions to be addressed in this study offer a valuable addition to the field. These questions focus on two main groups of variables.

I. Group 1: variables of general physical abilities of the elderly

   1) What are the main variables of the general physical ability of the elderly that influence seniors' housing decisions and adjustments?
   2) How do the variables of general physical abilities related to age influence seniors' housing decisions and adjustments?

II. Group 2: variables of health and medical conditions of the elderly

   1) What are the main variables of health and medical conditions that influence seniors' housing decisions and adjustments?
   2) How do the variables of health and medical conditions influence seniors' housing decisions and adjustments?

III. Relationships between group 1 and group 2

1) What are the differences between the influences of general physical abilities and the influences of health and medical conditions on seniors' housing decisions and adjustments?

Theoretical Framework

Theory of Housing Adjustment

This research will utilize the theory of housing adjustment that was originally proposed by Morris and Winter in 1978 and updated in 1996. The theory of housing adjustment is based on a perspective of the microsociology of the household, as well as its housing. The theory is utilized for the general population, but it has been applied to the elderly. The theory explains the influences of housing norms and constraints on housing decisions and behaviors. For example, housing that is deficient as compared to the cultural norm causes the household members to make one or more corrective actions in the following ways: 1) housing adjustments (moving to another house or changing the current house), 2) housing adaptations (redefining needs or removing constraints), and/or 3) regeneration (reorganizing the household or engaging in social action) (Morris & Winter, 1996).

Theory of Housing Adjustment for the Elderly

The theory of housing adjustment basically applies for general adult populations, including couples, families, and other households. Of particular interest

to this study is the way that the theory has also been used to consider housing adjustments by elderly and disabled populations. Morris and Winter stated:

> The housing adjustment behavior of elderly and disabled persons is similar to that of younger, able individuals. Deficits appear in the environment that produce dissatisfaction and the propensity to adjust housing. . . . For the elderly and disabled they arise from physical changes and problems. The source of the deficits is not housing that deviates from cultural norms. Rather, deficits occur in the residential environment as the result of changes in the physiological conditions of the individual (1996, pp. 217-218).

The authors emphasized that physiological changes and problems of the elderly and disabled populations create new needs that current housing does not meet. According to the theory, these new housing deficits cause the elderly and disabled to seek housing adjustments (1996).

In fact, Lee, Brandt, and McFadden (1994) stated that health status was one of significant predictors of seniors' housing satisfaction. Krofta, Morris, and Franklin (1994) emphasized that health conditions were significantly related to seeking help for the activities of daily living in three different age groups: 1) 65 to 74, 2) 75 to 84, and 3) 85 and older ($p = 0.000$ for all three groups). In addition, the authors suggested educating seniors about adjustment options and government supporting policies in order for seniors to remain independently in their houses.

Baillie and Peart (1992) also mentioned recent studies of seniors' housing satisfaction and emphasized that physical and mental health status and levels of functional ability were significant predictors of housing satisfaction. Also, in their study about elderly housing satisfaction, they found that health was one of the best

predictors of housing satisfaction among elderly married women. This means that health conditions and functional abilities influence seniors' satisfaction with their environments. Although the authors did not directly refer to housing adjustments, the authors supported the basic concepts of the theory of housing adjustment. This leads to an inference that if a senior is not satisfied with the environment, he or she is more likely to make changes or move.

In addition to the above findings from Baillie and Peart's study, they also suggested that housing satisfaction of seniors who are at a lower socioeconomic level and have poorer health should be investigated for further research. Since both health and economic status are more likely to decline with age, both issues are very important factors to investigate how the decline of health and economic status influences seniors' housing behaviors.

From the recent literature, the theory of housing adjustment has been fundamental in guiding researchers to have a better understanding about housing behaviors for seniors as well as for general adult populations. This theoretical perspective supports research on seniors' housing behaviors and is necessary for this study.

In this theory of housing adjustment, this study focuses on the first corrective action, housing adjustment. Housing adjustment is a decision to change housing environments based on problems seniors face. For example, problems might be stair climbing, difficulty maintaining a large house or a large yard, or inadequate interior and exterior door widths to accommodate walkers or wheelchairs. Such problems

might trigger a decision to move. After moving, housing deficiencies may occur again, forcing the seniors to make further adjustments according to their needs. This study will examine the factors seniors consider when selecting a house, and the factors, especially related physical abilities from aging and health conditions, that influence seniors to modify their current housing environments in order to meet their changing needs.

Hypotheses

The theory of housing adjustment states that physiological changes of the elderly and disabled populations create housing deficits that lead to housing dissatisfaction. Then, the dissatisfaction produced by the deficits, induces seniors to adjust their living environments. These logical concepts of the theory will be examined by this study; whether or not physiological changes influence seniors to select their houses or to make changes to their houses. Furthermore, this study will investigate how those physiological changes influence seniors and examine the differences between two types of physiological changes: 1) general physical abilities and 2) health and medical conditions. Three sets of hypotheses will be addressed in this study in order for researchers and professionals to have a better understanding of the theory and contribute to the theory's development:

I. Housing Decisions

1. The more difficulties with general physical abilities the elderly have, the more concerns the elderly have about selecting retirement houses.

   H_o: There are no correlations between seniors' concerns in selecting retirement houses and seniors' general physical abilities.

   H_a: There are correlations between seniors' concerns in selecting retirement houses and seniors' general physical abilities. The more difficulties with general physical abilities the elderly have, the more concerns they have about selecting retirement houses.

2. The more health and medical problems the elderly have the more concerns they have about selecting retirement houses.

   H_o: There are no correlations between seniors' concerns in selecting retirement houses and seniors' health and medical problems.

   H_a: There are correlations between seniors' concerns in selecting retirement houses and seniors' health and medical problems. The more health and medical problems the elderly have, the more concerns they have about selecting retirement houses.

II. Housing Adjustments

1. The more difficulties with general physical abilities the elderly have, the more changes the elderly will make to their houses.

   H_o: There are no correlations between seniors' decisions to make changes to their houses and their general physical abilities.

   H_a: There are correlations between seniors' decisions to make changes to their houses and their general physical abilities. The more difficulties with general physical abilities the elderly have, the more changes the elderly will make to their houses.

2. The more health and medical problems the elderly have the more changes the elderly will make to their houses.

   H_o: There are no correlations between seniors' decisions to make changes to their houses and seniors' health and medical problems.

   H_a: There are correlations between seniors' decisions to make changes to their houses and seniors' health and medical problems. The more health and medical problems the elderly have, the more changes the elderly will make to their houses.

III. Comparison between group 1 (physical abilities) and 2 (medical conditions)

   General physical abilities will have stronger correlations in influencing seniors' housing behaviors than health and medical conditions because abilities are determined by various conditions. That is, inability to climb stairs could be due to various causes.

1. Housing Decisions

   H_o: There is no difference in the way that health conditions or physical abilities influence seniors' concerns about selecting retirement houses.

   H_a: There is a difference in the way that health conditions or physical abilities influence seniors' concerns about selecting retirement houses. Physical abilities and health conditions do not influence equally, but rather physical abilities have a stronger influence.

2. Housing Adjustments

   H_o: There is no difference in the way that health conditions or physical abilities influence seniors' decisions to make changes to their houses according to their needs.

   H_a: There is a difference in the way that health conditions or physical abilities influence seniors' decisions to make changes to their houses according to their needs. Physical abilities and health conditions do not influence equally, but rather physical abilities have a stronger influence.

Definition of Terms

Age in Place

This expression stems from the aging-in-place phenomenon. This phenomenon has two components. First of all, some seniors move to houses or other living environments that are specifically selected for their retirement, and they spend the rest of their lives in the selected places. Secondly, this phenomenon can also refer to homeowners' preference for remaining in their current homes as they age and even after their retirement. In fact, Age in Place research of the American Society of Interior Designers reported that the majority of people who are over 55 years old would like to stay in their current houses after retirement (68% of the 55-64 years old group and 73% of the over 65 years old group) (p. 11).

Baby Boomers

Baby Boomers are people who were born in the period from 1946 to 1964. This period of time was characterized by an extremely high birth rate.

Household

Household is defined as the person or persons who live in an individual housing unit.

Housing Adjustment

Housing Adjustment refers to the occurrence of household members either moving to a different house or modifying the current house.

Housing Behaviors

Housing Behaviors refer to the actions that surround human living environments, i.e. purchasing a house, moving into a new house, changing interiors or exteriors of a house, organizing the household, and making decisions related to their living environment.

Housing Decisions

Housing Decisions refer to decisions related to human living environments, i.e. a decision to buy a house, a decision to move, and a decision to make alterations to a house.

Housing Deficiencies

Housing deficiencies occur when one or more characteristics of the house does not meet the cultural norm.

Living Conditions

A living condition is a state of the living environment that physically and/or psychologically influences the resident's life. A living condition includes not only a house, but also the living environment of the resident, such as yard, neighborhood, and community.

Living Environments

A living environment refers to surroundings of a person for his or her living. Both physical (houses) and psychological (relationships among household members) environments are included in this term.

Retired Migrants

Retired migrants are retirees who move from one location to another location after their retirement. Usually this term refers to the seniors who migrate from northern parts of the United States to southern parts of the United States, especially those who move from cold areas to the "Sunbelt" states. There are two types of retired migrants: temporary and permanent. Temporary retired migrants ("snowbirds") move each winter to a warm area from a cold area and stay in the warm area only for the winter season, only for six months from October to March. Whereas, permanent retired migrants decide to move to a warm climate area permanently.

Seniors

Seniors are persons who are 60 years of age and older.

Snowbirds

Snowbirds are seniors who live in northern parts of the United States and move each winter to southern parts of the United States, especially the "Sunbelt" states. They temporarily stay in those areas to have a warm, sunny climate during the winter, and then move back to their permanent homes for the rest of each year.

CHAPTER II

LITERATURE REVIEW

Research related to senior housing decisions and adjustments can be grouped into four categories: 1) Living Conditions, 2) Satisfaction, 3) Perceptions of Environments, and 4) Health. There are many studies focused on the decision processes and the triggers that cause the decision to make changes to the living environments. However, there is little research on the seniors' selection of specific features of housing. Factors that influence seniors' decisions to select houses that have specific features and/or characteristics, and factors that trigger making changes on specific areas and/or features in their living environments have not been a specific focus of these past studies.

Living Conditions

DeMerchant and Beamish (1995) reported characteristics for universal design recommendations. They categorized specific recommendations for universal design. Those categories are exterior, general interior, kitchen, bathroom, laundry/utility, living/dining, and bedroom/storage. The list of specific recommendations is very useful for researchers to compare between the professional recommendations and actual changes in living environments that are made to meet senior residents' needs. This comparison helps researchers understand the gap between designers and users. Also, this reveals behaviors of the elderly population toward housing adjustments. Understanding those behaviors is important for housing professionals to improve the

senior housing market and to provide environments with services and appropriate levels of challenge for seniors' quality of life.

Sandra Newman (2003) examined living conditions of the elderly in the United States. She investigated whether their living conditions were appropriate for the elderly to live in the community and how the 1990 Americans with Disabilities Act influenced disability and housing status. In this study, she found three important aspects. First, there were correlations between income and dwelling modifications. The relationship between income and dwelling modifications was significant; when a senior person had higher income, the probability and number of unmet needs decreased. Second, there was a strong relationship between housing deficiencies and unmet needs for modification. This means that if a house is unsuitable for changes, residents cannot make modifications for their needs. Third, predictors of unmet needs and modifications were based on how much the resident had housing-related difficulties or assistance needs. She found that in the past few years, several frequent dwelling modifications–changes in ramps, handrails, grab bars, accessible bathrooms, and extra wide doors and hallways–have been significantly increasing.

Further, Newman mentioned *residual disability,* an important issue about dwelling modifications for the disabled and elderly populations. *Residual disability* refers to a situation in which the house's deficiency still remains after a resident has made changes to meet his or her needs. This is caused by the mismatch between the adjustments and the resident's disability condition (Newman, 2003). Newman's findings, including *residual disability*, have revealed facts about the current living

conditions of the elderly, and emphasized the importance of information from residents to understand their needs for care and services. By better understanding the needs of the elderly, housing professionals can provide appropriate housing and neighborhood environments.

Living conditions for the elderly were also studied by Doris K. Williams (1994). Williams examined the reports of housing adequacy and discovered two major differences by gender and age. First, she expected that 57.9 men out of 2323 men claimed inadequacy of housing, but actually 41 men reported inadequacy. However, 60 women out of 1731 women reported inadequacy, and the expected value was 43.1 women. Those differences were significant at 0.01 level. There were no variables related to marital status, so marital status was not controlled in this study. Second, older respondents (over 85 years) identified increasing inadequacies in their housing. As a person gets older, the person experiences more inadequacy because of decreasing flexibility and mobility. In addition, Williams recommended that housing arrangements for the elderly need to be individualized because of the diverse elderly population. She theorized that individualized living environments significantly help the elderly to remain in their own houses and communities.

Summary

The importance of living conditions of the elderly population, including special recommendations and considerations, is a major theme of research findings. This theme is emphasized by the following studies.

DeMerchant and Beamish studied characteristics for universal design. Their categorized recommendations are very important for professionals to understand basic knowledge about living conditions suitable for the elderly and disabled people. Also, those recommendations are very useful for researchers to examine the relationships between recommended alterations to the users' environments and actual changes that are made by users.

Newman (2003) and Williams (1994) focused on different issues of senior living environments; however, both emphasized similar aspects to improve the environments for quality of life. They explained the importance of individualized living environments for the elderly. As Newman mentioned about *residual disability*, even after modifications, some inadequacies still remained because the modifications were done without sufficiently considering the particular user's needs or because the needs were not fully known. Williams also mentioned individualized housing arrangements as an important element to design senior housing and help them be able to stay in their houses and communities. Since housing adequacy in Williams' study widely varies with seniors' age and gender, living environments for the elderly should be individualized according to their ongoing, chronological aspect of disability needs and preferences.

Satisfaction

The following studies provide excellent fundamental approaches to housing satisfaction: "Effects of Conditions and Satisfactions," "Determinants of Housing Satisfaction for Older Married and Unmarried Women in Florida," and "The Relationship of Housing Costs and Quality to Housing Satisfaction of Older American Homeowners: Regional and Racial Differences."

Lee, Brandt, and McFadden (1994) focused on seniors' decisions to move (decision processes) and housing satisfaction. They investigated the relationship between preferences to move after retirement and three aspects that related to housing (constraints, conditions, and satisfactions). This study utilized Morris and Winter's *housing adjustment model.* The theory was supported in finding a significant relationship between preferences to move and four intervening variables (current tenure condition, current city condition, neighborhood satisfaction, and housing satisfaction). Also, seven exogenous variables (age, education, gender, marital status, health status, location, and income sources) directly influenced the dependent variable (propensity to move). If an elderly person was "older, better educated, healthier, lived in metropolitan areas, and had more income sources after retirement," (p. 46) he or she was more likely to consider moving within the ten years after retirement. However, female and/or non-married preretirees were less likely to consider moving because of lower financial status. The findings imply that psychological states of the elderly, such as neighborhood and housing satisfaction, are important in decisions to remain in the community as well as obtaining sufficient income sources and better health conditions.

For further studies to improve the elderly housing field, the study suggested that researchers should investigate retirement housing preferences.

Baillie and Peart studied factors of housing satisfaction (1992). The researchers explored different factors in housing satisfaction between married and unmarried elderly women in Florida. They found both differences and similarities between married and unmarried women.

Baillie and Peart created a table with expected factors found in their review of literature. The following is the table of selected variables:

Table 2.1

Variables Selected as Possible Determinants of Housing Satisfaction

	From Literature	Exploratory Variables
Personal Variables	Age	Perceived adequacy in Income
	Health	Number of living children
	Actual Income	Introvert/Extrovert
	Education	
		Number of people in Household
Housing Variables	Tenure	Hobbies
	Number of rooms	Collections
	Structure Type	
	Adequacy of House Size	
	Right mount of things	
Neighborhood Variables	Neighborhood satisfaction	Location
		Date of last move
		Facility for elderly

(Baillie & Peart, 1992, p. 103)

With the above variables in Table 1, Baillie and Peart conducted a discriminant analysis. Factors influencing housing satisfaction for married women were housing size, neighborhood satisfaction, and the perception that they had the right amount of things in their houses–"whether they felt they had the right amount of things in their home" as compared with adequate closet and storage space (Baillie & Peart, 1992, p. 102). All variables are significant at 0.001 level. Factors influencing housing satisfaction for unmarried women were age, number of people in the household, number of living children, adequacy of housing size, neighborhood satisfaction, income, tenure, and whether or not they had hobbies. However, these variables were significant at 0.05 level only if they were related to each other (multivariate analysis) – each variable separately was not significant, except the variable of neighborhood satisfaction. Both groups reported housing size and neighborhood satisfaction. For married women, the strongest predictor was having the right amount of things in their home. Personal possessions of senior women are very important for them to keep memories of their lives. In order to organize those things effectively without safety hazards, they need adequate space in their houses. This leads to their housing satisfaction. For unmarried women, the strongest predictor was being able to live alone. They would like to be independent despite their age and would like to control and feel free in their houses. This also leads to their housing satisfaction. These findings clearly showed that the elderly population has diverse life experiences, cultures, and values. It is vital for researchers and other professionals to understand

individual differences of the elderly to conduct further research or to develop comfortable living environments for the elderly.

Zhu and Shelton (1996) had three purposes in their studies related to housing satisfaction:

1) to examine the housing cost and housing quality of homeowners who were 65 and over in 1991.
2) to investigate the effects of elderly homeowners' housing cost and quality on their residential satisfaction in 1991.
3) to test if such effects are different by region and race.

(p. 19)

There were two hypotheses: 1) housing cost and quality influence housing satisfaction of the elderly homeowners and 2) housing satisfaction based on cost and quality have differences in race and region. Housing quality was measured according to a housing deficiency index with 16 observations of housing features, such as plumbing, kitchen, heating, electrical and physical structure etc.

The main finding was that the majority of the elderly in this study generally had high housing satisfaction even if some housing deficiencies were found. Also, they found that housing quality was the significant influential factor on housing satisfaction. Both white and non-white households responded that the lower the housing deficiency, the higher the housing quality. For the relationship between costs and satisfaction, there was a significant difference by race. Only white senior homeowners who were paying higher monthly costs for their home reported higher satisfaction with their home than seniors, including white and other races, who had lower costs for their houses.

Summary

There are three important commonalities in the research. First, neighborhood satisfaction significantly influences housing satisfaction. This was reported by Lee, Brandt, & McFadden (1994) and by Baillie & Peart (1992). Second, income was an influential factor for the elderly in housing satisfaction and for the propensity to move at retirement. Third, another influential factor for the elderly was age; the older a senior, the higher the housing satisfaction, or the higher the desire to move.

Perceptions of Environments

Researchers have investigated seniors' perceptions of their environments. Shea and Inman (1994) explained that seniors' well-being was influenced by their environmental conditions and how seniors perceive their environments. The environments were systematically categorized in the Ecological Model that derived from environmental psychology, and environment and behavior research. They studied a use of the Ecological Model as a framework in housing designs for the elderly population. By utilizing the model, Shea and Inman emphasized the importance of psychological (Microsystem), social (Exosystem), and cultural (Macrosystem) criteria as well as physical (Mesosystem) criteria in order to create successful senior living environments.

Perceptions of environmental adaptation are described by McFadden and Brandt (1993), and perceptions of the difficulty in staying in current housing are described by Sherman and Combs (1997).

McFadden and Brandt (1993) investigated how pre-retirees (between ages 40 and 65 years) view their future housing, especially what factors influence the future elderly to determine whether they plan proactively to change their environment to meet their aging needs. In order to examine the views of the future elderly, the person-environment interaction model was used as the main theoretical perspective. The model suggests that human behaviors and satisfaction are based on the balance between environmental influences (*press*) and the individual's ability to manage the environmental influences (*competence*).

In this study, McFadden and Brandt found that environments significantly influenced individuals' perceptions. For example, preference for privacy and housing type selection were significantly related; the majority of the respondents living in single family housing preferred to stay in single family housing in the first ten years of retirement. Further, preference for staying in one's home (aging in place) led to proactive assessment of ways of accommodating or creating a wheelchair accessible environment.

Sherman and Combs explored factors influencing seniors' perceptions of the difficulty in staying in their current houses when they advance in age (1997). The main finding emphasized that the elderly were not likely to see any difficulty in staying in their current houses when they get older unless they have health and mobility problems and/or live in a community far away from important supports and services. The study mentioned that the elderly are very uncomfortable about acknowledging possible physical limitations and problems, or obtaining accessibility

devices that might stigmatize them as disabled people (Christenson, 1990). For this issue, the researchers recommended educational programs to help seniors understand future physical challenges and make adjustment plans for these problems.

Summary

There is a similarity in the above studies. Both studies found that the perceptions of the elderly are significantly affected by their environments. This aspect is particularly explained by the Ecological Model. Shea and Inman (1994) used the Ecological Model to explain how human environments can be categorized into different systems.

McFadden and Brandt (1993) also emphasized that individuals' perceptions are significantly influenced by their environments. This finding supported the person-environment interaction model.

Sherman and Combs (1997) found that seniors' experiences of health and mobility problems influenced their perceptions of the difficulty in staying in their current houses when they advance in age. They also found that not only physical but also psychological influences from environments were related to seniors' perceptions of the difficulty of staying in their current houses.

Because environment is the major influential factor for seniors' housing decisions and satisfaction, it is vital for researchers and housing professionals to consider environmental influences on any issues and problems in the housing field.

Health

Two studies related to health under housing decisions and housing adjustment have been found. Those are "Type of Housing and Emotional Health of Senior Citizens" (Valliant and Furac, 1993) and "Housing, Health, and the Need for Help in Older Households: Differences Among Age Cohorts" (Krofta, Morris, and Franklin, 1994).

Valliant and Furac (1993) investigated how types of housing influence the emotional health of senior citizens. They used three housing conditions as independent variables (detached unit, multi unit, and institution) and three emotional health conditions as dependent variables (depression, self-esteem, and anxiety) to examine the correlations among variables. The researchers hypothesized that elderly people in detached units and institutional settings would have lower self-esteem and higher depression and anxiety than elderly people in multiunit housing. Further, the study mentioned that satisfactory housing conditions lead to greater life satisfaction which enhances mental health.

Valliant and Furac (1993) found that men living in an institution were more depressed than men in detached units, but women in detached and multiunit dwellings were significantly higher in anxiety than men in those situations. In addition, significant and positive relationships between income and education, and between education and perceived health, were found. This means that income status could determine one's choice of housing and enhances life satisfaction, including a positive

perception of health. This finding was consistent with the past research (Seccombe and Lee, 1986).

Krofta, Morris, and Franklin (1994) examined how household characteristics, health status, and housing status influenced the need for help with living activities (mobility, household tasks, and personal care). Three age cohorts of households (65-74, 75-84, and over 85) were investigated. The researchers found that health conditions were significantly related to the need for help in all cohorts. For the group 65 to 74 years old, the subjects' ethnic minority status was significantly related to the need for help. For the group 75 to 84 years old, age and economic status were significantly related to the need for help. For the group over 85 years old, housing with inadequately equipped conditions was significantly related to the need for help. In addition, the researchers discovered that age alone was not a sufficient criterion to determine the need for help.

Summary

The above two articles show a similarity related to housing satisfaction and health status. Both studies emphasize that housing satisfaction and health conditions are significantly and positively interrelated. If a senior has a better health status, the senior is more likely to be satisfied with his or her house. Also, if housing satisfaction is high, this will enhance life satisfaction and a better psychological health.

Further, it is found that not only physical, but also psychological health is the one of most important factors for senior living environments. Mental health

enormously influences the senior's ability to live independently in a community. When addressing issues related to health, it is important for researchers to develop further studies in the field of elderly living environments.

Summary of Literature Review

By organizing articles into the four categories, important aspects for elderly housing decisions and housing adjustment have emerged. The following is a list of those aspects:

1) Individualized living environments are important for the elderly to be motivated to live comfortably and independently in their own houses.
2) Neighborhood satisfaction significantly influences housing satisfaction.
3) Sufficient income leads to housing satisfaction and motivation to relocate and/or make adjustments.
4) Age has significant relationships with housing satisfaction and moving.
5) Environmental influences (physical, psychological, social, and cultural) are important factors for seniors' housing decisions and satisfaction.
6) Better health conditions are the foundation of high housing satisfaction.

The above six aspects help researchers identify potential predictors in seniors' housing decisions and adjustments. Furthermore, as the theory of housing adjustment emphasizes physiological changes, health conditions and functional abilities are important predictors of seniors' housing behaviors. This research especially focuses on factors related to seniors' health and medical conditions and general physical abilities.

Since there seems to be a limited number of studies that have examined factors related to health and medical conditions and general physical abilities, this study will contribute to the further development of the elderly housing field and gerontology research.

CHAPTER III

METHODOLOGY

Data Set

The data used in this study were collected by Eleanor Palo Stoller, Ph. D. with the support of a grant from the National Institute on Aging (Grant R01 AG10791, National Institute on Aging, U.S. Department of Health and Human Services). The variables that will be examined in this study are those related to housing decisions (Question No. 63), housing adjustments (Question No. 64), demographic information, general physical abilities from aging, and health and medical conditions.

Sampling Design

The subjects were elderly Finnish American retirees and other European American retirees in Florida. All had migrated to a retirement location in Florida from a northern part of the United States after their own or their spouses' retirement. For the sample screening, temporary residents who stayed in Florida for less than six months were eliminated ("snowbirds"). Residents who were selected as subjects for this study were considered permanent residents. In addition, only one respondent from each household was selected for this study.

The sample was randomly selected from telephone directories that were obtained from lists of members of retiree organizations. A subsample whose ethnicity was European American was collected from the initial telephone screening. Then, another subsample whose ethnicity was Finnish American was recognized through this

telephone screening and from snowball sampling techniques. By using the above systematic sampling, 593 retired migrants (393 Finnish Americans and 200 other European Americans) were selected. The response rate was 82.6 % of the total sample.

Description of the Sample

The respondents were 60 years old and older, with the mean age of the sample at 75.2 years old, and a standard deviation of age of 6.2 years. Female respondents were 56.1 % of the total. The percentage of respondents married or living with a partner was 57.0; the percentage of widowed was 33.8; the percentage of divorced or separated was 5.0; the percentage of never married was 4.1. For level of education, the median was 12 years. The following shows the levels of education amongst the respondents:

Not graduated from high school	23.6 %
High school graduate	36.2 %
Some postsecondary education	22.3 %
Baccalaureate degrees	17.8 %

Table 3.1 and Figure 1.2 show households' total income before taxes. The response rate for income was 86.0 %. That is, 86% of the respondents provided information about their income level. The mean range of annual income was between $20,000 and $24,999. This result is similar to the median income of households who are 65 years old and older in the U.S. (U.S. Census Bureau, Current Population Survey, 2002 and 2003 Annual Social and Economic Supplements). The median income in 2002 of this age group in the U.S. was $23,152, and the median income in

2002 of all households in the U.S. was $42,409. This means that the data used for this study compares accurately with general data for the U.S. population as a whole.

Figure 1.2 shows that the values are almost normally distributed although nearly one-third of 30.7 % (16.5 + 14.2 %) of the respondents' income falls in the range between $10,000 and $19,999. Having one-third of the respondents at this relatively lower annual income level between $10,000 and $20, 000 might mean that the survey subjects might have made fewer housing changes or adaptations due to financial constraints.

Table 3.1

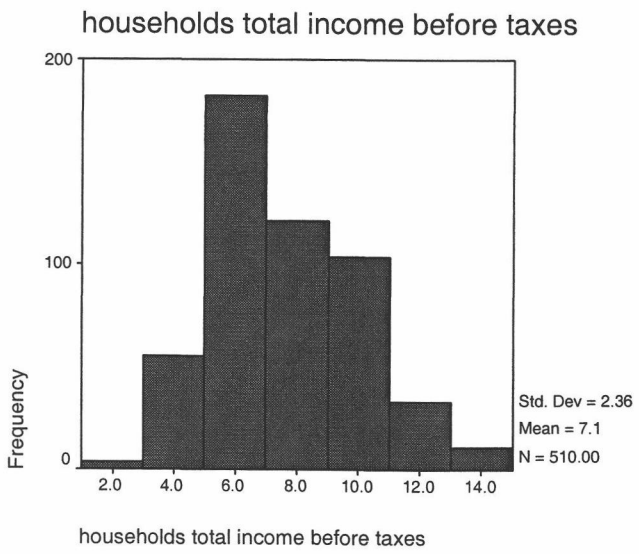
Households Total Income before Taxes

INCOME households total income before taxes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00 $3,000 to $4,999	4	.7	.8	.8
	3.00 $5,000 to $7,499	16	2.7	3.1	3.9
	4.00 $7,500 to $9,999	39	6.6	7.6	11.6
	5.00 $10,000 to $14,999	98	16.5	19.2	30.8
	6.00 $15,000 to $19,999	84	14.2	16.5	47.3
	7.00 $20,000 to $24,999	61	10.3	12.0	59.2
	8.00 $25,000 to $29,999	60	10.1	11.8	71.0
	9.00 $30,000 to $39,999	60	10.1	11.8	82.7
	10.00 $40,000 to $49,99	44	7.4	8.6	91.4
	11.00 $50,000 to $74,99	28	4.7	5.5	96.9
	12.00 $75,000 to $99,99	5	.8	1.0	97.8
	13.00 $100,000 or more	11	1.9	2.2	100.0
	Total	510	86.0	100.0	
Missing	System	83	14.0		
Total		593	100.0		

Figure 1.2

Households Total Income before Taxes



Questions in the Data Set

Eleanor Palo Stoller, Ph.D. has a large number of questions (182 variables) in her dataset. For this study, Questions 63 and 64 will be used to address the issues of seniors' housing decisions and adjustments. The following is a list of contents for Question 63 and 64—each option that senior responded to is described in the Dependent Variables section:

1) Question 63:

First, think back to the time you moved into your current residence. When you selected your current residence, how much consideration did you give to the following factors?

0 = No consideration at all
1 = Some consideration
2 = A great deal of consideration

2) Question 64

In the past 12 months, have you changed your home in any of the following ways?

0 = No
1 = Yes

(Stoller, 1998, Questionnaire pp. 39-40)

Independent Variables

Independent variables that will be used to analyze the data are as follows:

1) Demographics
(i.e. age, sex, marital status, income, occupations (SEI), education, lifetime moves)

2) General physical abilities from aging
(i.e. ability to exercise, get in and out of the bed without help, climb several flights of stairs, lift or carry weights over 10 pounds)

3) Health and medical conditions
(i.e. arthritis, diabetes, asthma, emphysema, depression, vision problems, hearing problems, heart attack, cancer, rating your health)

Dependent Variables

Dependent variables that will be used to analyze the data are as follows:

1) Question 63:

a. Finding a one-level residence
b. Finding a home that is easy to take care of
c. Finding a place where someone else does the yard work
d. Finding a place with more labor-saving devices
(i.e. dishwasher)
e. Finding a place with fewer physical barriers
(i.e. no stairs, an elevator)
f. Finding a place nearer services
(i.e. grocery store, clinic)
g. Finding a home with built-in safety or assistance features
(i.e. handrails, nonslip floors, easy to reach shelves)

2) Question 64:

a. Rearranged furniture so you can hold on to it as you move around the house
b. Kept things close by within easy reach

c. Installed more telephones or a telephone with an amplifier
d. Removed throw rugs or put nonslip tape on throw rugs
e. Removed objects you might fall over
f. Put extra lighting on stairs
g. Put things on lower shelves so you can reach them
h. Confined living quarters to one floor to avoid stairs
i. Added safety or assistance features
(i.e. handrails, grab bars, a seat in the tub or shower, taped rugs)
j. Installed a personal emergency response system, or "lifeline" monitor
k. Other (specify)

Statistical Analyses

The Statistical Program for Social Sciences (SPSS, version 11) will be used to analyze the data. Frequencies will be reported for all variables. The data will be further analyzed using Factor Analysis for both housing decisions and housing adjustments, a Multiple Linear Regression Model for housing decisions, and a Logistic Regression Model for housing adjustments. Statistical significant level is set at the 0.05 ($p \leq 0.05$).

Rationale for Using Factor Analysis for Housing Decisions and Housing Adjustments

Factor Analysis is appropriate for this study for two reasons. First of all, Factor Analysis can be used as a confirmatory tool to examine a hypothesis that explains particular variables. Secondly, this analysis can group interrelated predictor variables together into clusters where the variables within each cluster are highly correlated with each other.

Factor Analysis groups the variables and then uses the Principal Component Analysis with a Varimax Rotation and a Promax Rotation. This means that the Principal Component Analysis is used as an exploratory tool to reveal patterns of intercorrelations among variables. In order to comprehend the Rotation Analysis, a special representation (grid) of the principal factors (groups of variables) is visualized. In a grid, each axis represents the principal factors; the actual variables in the data are placed along it with numbers on each axis. Those placements of the variables in the grid are based on the variables' correlation strengths as compared the factor group. This correlation strength is obtained by the comparison between a main factor and a variable. The coordinates of each variable are called loading values. After placing each variable on the grid, the Rotation Analysis rotates those axes in order to find the best possible correlation strengths (loading values) by the comparison between a variable and each principal factor.

The Rotation Analysis has several techniques to investigate relationships between variables and principal factors. In this research, a Varimax Rotation and a Promax Rotation will be utilized. A Varimax Rotation is an orthogonal rotation that examines factors that are not correlated. A Promax Rotation, on the other hand, is an oblique rotation and has flexibility to let factors be slightly correlated. After implementing those rotations, the researcher can find the optimized loading values for each factor to discover the best combinations of factors for analyzing the data and to confirm whether the choices of variables in each factor are best or not. If the researcher is not satisfied with the choices of variables, he or she can change undesired

variables from each factor or even omit factors; this means that he or she can add or remove those undesired variables or exclude factors from analyzing the data. Then, the researcher repeats this action until he or she is satisfied with the combinations of factors. After finding the best factor combinations, these factors are used as new variables to create correlation tables and conduct other statistical applications.

This analysis is useful for this study because there are many variables that may be related to each other. By using this analysis, the researcher can create the principle factors in which variables in each principle factor as a group influence seniors' housing behaviors. In this way, interpretations of so many variables are organized, understood, and generalized.

Therefore, using both rotations to find out the best combinations of factors makes the Factor Analysis such a useful tool for interpreting the results of the data. For these reasons, this study will be using this Factor Analysis to create the rational variable combinations for interpreting the data.

Rationale for Using a Multiple Linear Regression Model and a Hierarchical Linear Regression Model for Housing Decisions

Multiple Linear Regression will be used to investigate seniors' housing decisions. This statistical method explains linear relationships between one continuous Dependent Variable and two or more Independent Variables, including continuous, categorical, and dummy variables. For this reason, a Multiple Linear Regression Model is appropriate for analyzing seniors' housing decisions that were determined by

one continuous outcome variable (Dependent Variable) and several predictor variables (Independent Variables) in this study.

Linear Regression allows researchers to determine four main results:

1) the statistical significance of the correlation between outcome and predictor variables
2) the direction and strength of the correlation
3) the statistical form (prediction equation) that best defines the correlation
4) the amount of variance in the outcome variable which can be explained by the predictor variable(s)

By determining the above four results, researchers can analyze the relationships between the outcome variable and the predictor variables, and make scientific inferences about the relationships. In this way, the relationships between predictors and seniors' housing decisions will be analyzed, and general ideas about seniors' behaviors toward selecting retirement houses will be discovered.

In addition to Multiple Linear Regression, Hierarchical Linear Regression will also be useful to analyze the relationships between several predictors and seniors' housing decisions. This model will specifically analyze the results described in # 4 above. Hierarchical Linear Regression explains how much each of the predictor variables contributes toward the explained variance in the outcome variable. This means that different levels of influences of each predictor variable on the outcome are determined by the statistical model. With this Hierarchical Linear Regression Model, researchers will find which predictor variable is the most influential for seniors in selecting their retirement houses. For example, a variable that is related to physical abilities is much more influential than variables such as age and gender, for seniors to select their houses.

Rationale for Using a Logistic Regression Model for Housing Adjustments

Logistic Regression will be utilized to analyze housing adjustments. This statistical technique is appropriate for two reasons. First of all, housing adjustment is a dichotomized dependent variable: whether a senior participant changed his or her living environment according to his or her needs. A Logistic Regression Model can estimate the relationship between predictors and binomial outcome variables. Secondly, by understanding the relationship between predictors and binomial outcome variables, this model also gives researchers a greater amount of information about the probability of a person from this sample changing living environments based on several factors, such as household composition, health conditions, and support from the community. Therefore, this model helps researchers make inferences about senior housing adjustments.

CHAPTER IV

RESULTS

Frequencies

Dependent Variables: Housing Adjustments

Table 4.1 shows that only small percentages of seniors actually changed their living environments for each category. The smallest percentage (0.7 %) of seniors put extra lighting on stairs. The largest percentage (11.3 %) of seniors kept things close by within easy reach. As Table 4.1 illustrates, the majority of seniors did not change their environments.

However, those numbers might not completely represent seniors' needs in the entire elderly population in the United States since the results were from data which were originally collected for a particular case study. In addition, seniors tend to stay with traditions, and they might not so often change their living environments even though they have some difficulties with the environment.

This study focused on this small portion of the sample, which includes participants who actually changed their environments.

Table 4.1

Frequencies: Housing Adjustments

Dependent Variables	Yes %	No %	Total % (Missing %)
Rearranged furniture	3.9	95.6	99.5 (0.5)
Kept things close	11.3	88.0	99.3 (0.7)
Installed more telephones	7.6	91.6	99.2 (0.8)
Removed throw rugs	6.6	92.9	99.5 (0.5)
Removed objects	6.7	92.7	99.5 (0.5)
Put extra lighting	0.7	91.2	91.9 (8.1)
Put things on lower shelves	7.3	91.7	99.0 (1.0)
Confined living quarters to one floor	1.9	88.9	90.7 (9.3)
Added safety or assistance features	8.3	91.1	99.3 (0.7)
Installed a personal emergency system	1.5	97.8	99.3 (0.7)
Other	5.7	92.9	98.7 (1.3)

Independent Variable: General Physical Abilities

Table 4.2 shows that the majority of seniors (about 90 % or over) did not have any problems in the mild indoor activity, sensory ability, and basic daily living activity categories. However, this percentage changes for the relatively strenuous activity category. In the category of relatively strenuous activity, only 64.7 % of the seniors did not have any problems, while 20.3 % had a little difficulty, 12.9 % had somewhat more difficulty, and 2.0 % had great difficulty with or complete inability to perform relatively strenuous activities. These seniors who cannot manage to do a relatively strenuous activity may have difficulty interacting with their living environments.

Therefore, it was expected that the seniors, who found the activities very difficult, might have changed their environments.

Table 4.2

Frequencies: General Physical Abilities

Independent Variables	Not*	A Little*	Somewhat*	Very*
Relatively Strenuous Activity	64.7	20.3	12.9	2.0
Mild Indoor Activity	94.1	4.6	0.4	0.5
Sensory Ability	90.0	5.6	3.3	0.5
Basic Daily Living Activity	89.4	8.7	0.7	0.3

Note. The values are expressed in percents.
* *Not* = Not at all difficult
Little = A little difficult
Somewhat = Somewhat difficult
Very = Very difficult/can't do

Independent Variable: Health & Medical Conditions

Table 4.3 shows that the majority of the seniors (about 86 % or over) did not have problems of digestive, respiratory, diabetes & vascular complications, kidney, bladder, & urinary, or liver & iron-poor blood. For the two categories of vision and emotional conditions, about 81 % of the seniors did not have difficulties with their conditions; about 15 % had difficulties, but they were not bothered by the difficulties they had; and about 3 % had difficulties that bothered them somewhat. For the category of osteoarticular conditions, 70.9 % of the seniors did not have difficulties with their health problems; 25.5 % had difficulties, but they were not bothered by the

difficulties that resulted from the health problems; 3.2 % had difficulties that bothered them somewhat; and 0.2 % had difficulties with the health problems that bothered them great deal. For the category of problems of memory, 65.3 % of the seniors did not have any problems with loss of memory; 13.0 % had memory problems, but they were not bothered by the problems; 18.5 % had memory problems that bothered them somewhat; and 2.9 % had memory problems that bothered them great deal.

Overall, Osteoarticular problems and problems of memory are most distinguishable among all nine categories. After these two, the next two conditions that were most bothersome for the seniors in this particular research were vision and emotional problems, as shown in Table 4.3 below.

Table 4.3

Frequencies: Health and Medical Conditions

Independent Variables	Have No Problem*	Not Bothered*	Bothered Somewhat*	Bothered Great Deal*
Osteoarticular	70.9	25.5	3.2	0.2
Digestive	97.1	1.9	0.5	0.2
Respiratory	91.3	5.4	2.2	0.7
Vision	81.0	14.9	3.2	0.7
Emotional	81.2	15.6	2.9	0.0
Diabetes & Vascular Complications	89.8	9.5	0.5	0.0
Kidney, Bladder, & Urinary	86.3	11.2	1.7	0.5
Liver & Iron-Poor Blood	96.4	2.9	0.4	0.0
Problems of Memory	65.3	13.0	18.5	2.9

Note. The values are expressed in percents.
**Have No Problem* = Does not have problem
Not Bothered = Has a problem but not bothered at all
Bothered Somewhat = Has a problem which bothered somewhat
Bothered Great Deal = Has a problem which bothered a great deal

Housing Decisions

The frequency table (Table 4.4) shows the years that each respondent has lived in West Palm Beach (WPB) in Florida. Only 3 respondents have lived there for less than one year (between one day and 11 months). Respondents who have lived there for less than two years (more than 12 months and less than 23 months) total 11. Respondents who have lived there for less than three years (more than 24 months and less than 35 months) total 19. The maximum years of residence for this group is 40 years, and the mean is 16.5 years.

Respondents who have lived there for less than one year should be selected for this study in order to examine the causal relationships between housing decisions and physical abilities and the relationships between housing decisions and medical conditions. For most accurate correlations, physical abilities and medical conditions should be current at the time seniors make their decisions to move or select their retirement houses. Since physical abilities and medical conditions, especially for seniors, can change in a relatively short time, these factors, which are assessed at the moment of the interview, cannot be accurately used as predictors for seniors' decisions that are taken more than one year before.

There are only three respondents in Dr. Stoller's data who have lived in West Palm Beach for less than one year. This sample is too small to conduct any statistical analyses for the purpose mentioned above. Therefore, the research questions about housing decisions will not be addressed in this study. However, this data is suitable for examining effects on housing adjustments, which are covered in the following analysis.

Table 4.4

Years Living in WPB

Years	Frequency	Percent
0	3	0.5
1	11	1.9
2-5	66	11.1
6-15	192	32.3
16-25	228	38.5
26-40	93	15.7
Total	593	100.0

Factor Analysis

General Physical Abilities from Aging

A Promax Rotation was conducted for a Factor Analysis in order to find factors (groups of predictor variables). Within each factor, variables were moderately to strongly correlated with each other. There were 17 physical function variables.

Demographic variables, such as age, sex, marital status, income, and education, were first added to the physical function variables to conduct a Promax Rotation. However, variables including demographic variables did not create appropriate combinations for grouping variables. Therefore, demographic variables were taken out from this investigation, and a rotation was conducted with only physical function variables.

All 17 variables were used to conduct a rotation, which grouped into components. The Pattern Matrix table (Table 4.6) in the SPSS results shows 4 components. The following is a list of 4 components each of which has a similarity in variables:

Component 1 (CFUN 1): relatively strenuous activity (mobility such as being able to walk, climb, lift, kneel, run, etc.)
Component 2 (CFUN 2): mild indoor activity (mobility such as being able to pick up, reach, and walk)
Component 3 (CFUN 3): sensory ability (vision and hearing)
Component 4 (CFUN 4): basic daily living activity (mobility such as being able to sit, get up, and get in and out of bed)

Table 4.5

Component Correlation Matrix for Physical Abilities

Component	1	2	3	4
1	1.00			
2	.466	1.00		
3	.335	316	1.00	
4	.457	.370	.190	1.00

Table 4.6

Pattern Matrix for Physical Abilities

Variables	Component			
	1	2	3	4
Climb several flights of stairs	.882			
Walk several blocks	.873			
Climb one flight of stairs without stopping	.833			
Lift or carry weights over 10 pounds	.789			
Stoop, kneel or crouch	.761			
Pull or push large objects	.673			
Run or jog about a mile	.600			
Walk one block	.586			
Pick up a dime from a table		.774		
Reach or extend arms above head		.731		
Walk across the room		.534		
Read a newspaper with glasses			.903	
Read a street sign			.892	
Hear the radio or the TV set			.561	
Sit for about 2 hours				.912
Get up from a chair				.693
Get in or out of bed without help				.565

Health and Medical Conditions

A Promax Rotation was also used for variables related to health and medical conditions in order to find factors (groups of predictor variables). Within each factor, variables were moderately to strongly correlated with each other. There were 31 variables for health and medical conditions.

Demographic variables, such as age, sex, marital status, income, and education, were first added to the medical condition variables to conduct a Promax Rotation. However, variables including demographic variables did not create appropriate combinations for grouping variables. Therefore, demographic variables were taken out from this investigation, and a rotation was conducted with only medical condition variables.

After several attempts with the Promax Rotation, finally 26 variables were grouped into 9 components. This model with 9 components was the best combination among other combinations. Therefore, this model was used for conducting Regression Analyses. The Pattern Matrix table (Table 4.7) in the SPSS results shows the 9 components. The following is a list of the 9 components each of which has a similarity in variables:

Component 1 (CMD 1):	Osteoarticular Problems (i.e. Arthritis, Backaches, Osteoporosis, Broken Hip)
Component 2 (CMD 2):	Digestive Problems (i.e. Stomach Ulcers, Diarrhea, Abdominal Pain, Vomiting)
Component 3 (CMD 3):	Respiratory Problems (i.e. Asthma, Emphysema, Shortness of Breath)

Component 4 (CMD 4): Vision Problems
(i.e. Vision Problems with glasses, Glaucoma, Cataracts)

Component 5 (CMD 5): Emotional Problems
(i.e. Feeling Sad, Depressed, Emotional, Trouble Falling Asleep)

Component 6 (CMD 6): Diabetes and Vascular Complications
(i.e. Diabetes, Stroke, Heart Attack).
A person with diabetes, especially if the person is old, is very likely to have vascular complications such as stroke and coronary disease (heart attack).

Component 7 (CMD 7): Kidney, Bladder, Urinary Problems
(i.e. Kidney, Bladder, Urinary Tract Problems).
Kidney, bladder, and urinary tract belong to the same system (excretory system).

Component 8 (CMD 8): Liver and Iron-Poor Blood Problems
(i.e. Anemia)
Liver is related to iron absorption, and liver problems can lead to Anemia.

Component 9 (MDCOND 5): Problems of Memory

Table 4.7

Component Correlation Matrix for Health and Medical Conditions

Component	1	2	3	4	5	6	7	8	9
1	1.00								
2	.076	1.00							
3	.149	-.018	1.00						
4	.221	.077	.216	1.00					
5	.132	.117	.139	.069	1.00				
6	.093	-.019	.200	.106	.269	1.00			
7	.111	.150	.150	.102	.158	.206	1.00		
8	120	.029	.009	076	-.122	-.013	-.032	1.00	
9	.093	.056	.058	.030	-.043	-.083	-.083	.199	1.00

Table 4.8

Pattern Matrix for Health and Medical Conditions

Variables	Components								
	1	2	3	4	5	6	7	8	9
Arthritis or rheumatism	.717								
Frequent backaches or other problems	.670								
Problems with feet or legs	.658								
Osteoporosis	.620								
Broken hip	.423								
Stomach or intestinal ulcer		.722							
Diarrhea		.700							
Abdominal or stomach pains		.693							
Repeated vomiting		.578							
Asthma			.793						
Emphysema, chronic bronchitis			.781						
Shortness of breath			.664						
Vision problems (with glasses)				.813					
Glaucoma				.745					
Cataracts				.664					
Feeling sad or depressed					.744				
Emotional, nervous or psychiatric problems					.674				
Trouble falling asleep at night					.517				
Diabetes						.703			
A stroke or cerebrovascular accident						553			
Heart attack/coronary heart disease						.535			
Other urinary tract disorders							.840		
Kidney or bladder problems							.673		
Liver disease								.748	
Anemia or iron-poor blood								.679	
Problems of memory									.792

Logistic Regression for Housing Adjustment with General Physical Abilities from Aging

Logistic Regression was used to examine relationships between housing adjustment variables (dependent variables) and four groups of variables related to general functions (independent variables). These four groups – Components 1, 2, 3, and 4 – were created by Factor Analysis to conduct a Logistic Regression model for housing adjustments. The following is a list of the four components:

Component 1 (CFUN 1): relatively strenuous activity (mobility such as being able to walk, climb, lift, kneel, run, etc.)
Component 2 (CFUN 2): mild indoor activity (mobility such as being able to pick up, reach, and walk)
Component 3 (CFUN 3): sensory ability (vision and hearing)
Component 4 (CFUN 4): basic daily living activity (mobility such as being able to sit, get up, and get in and out of bed)

The relationships between each of the 11 housing adjustment variables (ways how seniors changed their living environments) and the above four components were examined by analyzing statistical elements in the result tables in the SPSS program. Table 4.9 presents the independent and dependent variables used in this study.

Table 4.9

Independent and Dependent Variables

Variable types	*Variable names*		*Variable description*
Independent variables	General Physical Abilities	CFUN1 (Component 1)	Relatively strenuous activity
		CFUN2 (Component 2)	Mild indoor activity
		CFUN3 (Component 3)	Sensory ability
		CFUN4 (Component 4)	Basic daily living activity
	Medical Conditions	CMD1 (Component 1)	Osteoarticular
		CMD2 (Component 2)	Digestive
		CMD3 (Component 3)	Respiratory
		CMD4 (Component 4)	Vision
		CMD5 (Component 5)	Emotional
		CMD6 (Component 6)	Diabetes & Vascular Complications
		CMD7 (Component 7)	Kidney, Bladder, & Urinary
		CMD8 (Component 8)	Liver related & Iron-Poor Blood
		MDCOND5 (Component 9)	Memory

Variable types	*Variable names*	*Variable description*
Dependent variables	homchg1 (re641)	Rearranged furniture so you can hold on to it as you move around the house
	homchg2 (re642)	Kept things close by within easy reach
	homchg3 (re643)	Installed more telephones or a telephone with an amplifier
	homchg4 (re644)	Removed throw rugs or put nonslip tape on throw rugs
	homchg5 (re645)	Removed objects you might fall over
	homchg6 (re646)	Put extra lighting on stairs
	homchg7 (re647)	Put things on lower shelves so you can reach them
	homchg8 (re648)	Confined living quarters to one floor to avoid stairs
	homchg9 (re649)	Added safety or assistance features (handrails, grab bars, a seat in the tub or shower, taped rugs)
	homchg10 (re6410)	Installed a personal emergency response system or "lifeline" monitor
	homchg11 (re6411)	Other

Three statistical elements appear in the result tables that were discussed in this chapter. Those elements are 1) overall model significance (χ^2 $_{Model}$ and p), 2) additional variance accounted for over the null model (*Nagelkerke* R^2), and 3) the significance of each predictor in the model (χ^2 $_{Wald}$ and p). The result tables where these elements appear are: Omnibus Tests of Model Coefficients tables, Model Summary tables, and Variables in the Equation tables (Table 4.11 to Table 4.47). The following chart shows which element appears in which table:

Table 4.10

Components of Omnibus Tests of Model Coefficients, Model Summary, and Variables in the Equation

Elements	Tables
1) Overall model significance (χ^2 $_{Model}$ and p)	Omnibus Tests of Model Coefficients
2) Additional variance accounted for over the null model (*Nagelkerke* R^2)	Model Summary
3) Significance of each predictor in the model (χ^2 $_{Wald}$ and p)	Variables in the Equation

Dependent Variable 1 (re641): Rearranged furniture so you can hold on to it as you move around the house

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior rearranged furniture is significant, $\chi^2_{Model} = 31.920$, $p = 0.000$.

Table 4.11

Omnibus Test for Dependent Variable 1

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	31.920	4	.000
	Block	31.920	4	.000
	Model	31.920	4	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

From Table 4.12 one can calculate the odds for a randomly selected senior from the sample of this study of rearranging furniture without using any predictor. The odds are 23 / 590 or 0.0389 to 1. This means that roughly 1 out of every 26 seniors rearranged furniture.

Table 4.12

Frequencies for Dependent Variable 1

	Frequency	*Percent*
No = 0	567	95.6
Yes = 1	23	3.9
Missing	3	0.5
Total	593	100.0

If another predictor of rearranging furniture is added to this prediction, the odds will change. The following is an interpretation of additional variance to the basic odds.

Knowing a senior's functional abilities allows researchers to predict an additional 19.4 % (*Nagelkerke* $R^2 = 0.194$) over the null model of the variance in rearranging furniture.

Table 4.13

Model Summary for Dependent Variable 1

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	155.663	.053	.194

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CFUN 1)

For the Multiplicative Effects of relatively strenuous activity on rearranging furniture, it was found that for one unit of increase in difficulty of performing relatively strenuous activity, the odds of rearranging furniture significantly increase by a factor of 1.979 ($e^{0.683}$), $\chi^2_{Wald} = 4.936$, $p = 0.026$. The following chart shows this positive relationship:

Independent Variable Relatively Strenuous Activity		Dependent Variable Rearranging Furniture	
Not at all difficult	1	No	0
A little difficult	2	Yes	1
Somewhat difficult	3		
Very difficult/can't do	4		

That is, a senior who had some difficulty with relatively strenuous activity is 1.979 times more likely to rearrange furniture for convenience and safety than a senior who did not have any difficulty with these activities. In other words, the more difficulties a senior has in doing relatively strenuous activity, the more likely is that senior to rearrange furniture.

Component 3 (CFUN 3)

For the Multiplicative Effects of sensory ability on rearranging furniture, it was found that for one unit of increase in difficulty of sensory ability, the odds of rearranging furniture significantly increase by a factor of 2.221 ($e^{0.798}$), $\chi^2_{Wald} = 7.171$, $p = 0.007$. That is, a senior who had some difficulty with sensory ability is 2.221 times more likely to rearrange furniture than a senior who did not have any difficulty with these abilities. In other words, the more difficulties a senior has in sensory ability, the more likely is that senior to rearrange furniture.

Table 4.14

Variables in the Equation for Dependent Variable 1

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	.683	.307	4.936	1	.026	1.979
	CFUN2	-.046	.459	.010	1	.921	.955
	CFUN3	.798	.298	7.171	1	.007	2.221
	CFUN4	.523	.443	1.393	1	.238	1.688
	Constant	-6.602	.744	78.798	1	.000	.001

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 2 (re642): Kept things close by within easy reach

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior kept things close by within easy reach is significant, $\chi^2_{Model} = 73.467$, $p = 0.000$.

Table 4.15

Omnibus Tests for Dependent Variable 2

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	73.467	4	.000
	Block	73.467	4	.000
	Model	73.467	4	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 23.3 % (*Nagelkerke* $R^2 = 0.233$) over the null model of the variance in keeping things close by within easy reach.

Table 4.16

Model Summary for Dependent Variable 2

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	338.808	.118	.233

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CFUN 1)

For the Multiplicative Effects of relatively strenuous activity on keeping things close by within easy reach, it was found that for one unit of increase in difficulty of performing relatively strenuous activity, the odds of keeping things close significantly increase by a factor of 2.570 ($e^{0.944}$), $\chi^2_{Wald} = 23.824$, $p = 0.000$. That is, a senior who had some difficulty with relatively strenuous activity is 2.570 times more likely to keep things close than a senior who did not have any difficulty with these activities. In other words, the more difficulties a senior has in doing relatively strenuous activity, the more likely is that senior to keep things close.

Component 3 (CFUN 3)

For the Multiplicative Effects of sensory ability on keeping things close, it was found that for one unit of increase in difficulty of sensory ability, the odds of keeping things close significantly increase by a factor of 2.171 ($e^{0.775}$), $\chi^2_{Wald} = 12.474$, $p = 0.000$. That is, a senior who had some difficulty with sensory ability is 2.171 times more likely to keep things close than a senior who did not have any difficulty with these abilities. In other words, the more difficulties a senior has in sensory ability, the more likely is that senior to keep things close.

Table 4.17

Variables in the Equation for Dependent Variable 2

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	.944	.193	23.824	1	.000	2.570
	CFUN2	-.515	.357	2.078	1	.149	.598
	CFUN3	.775	.219	12.474	1	.000	2.171
	CFUN4	.520	.302	2.961	1	.085	1.682
	Constant	-5.255	.505	108.150	1	.000	.005

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 3 (re643): Installed more telephones or a telephone with an amplifier

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior installed more telephones or a telephone with an amplifier is significant, $\chi^2_{Model} = 11.769$, $p = 0.019$.

Table 4.18

Omnibus Tests for Dependent Variable 3

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	11.769	4	.019
	Block	11.769	4	.019
	Model	11.769	4	.019

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 4.8 % (*Nagelkerke* $R^2 = 0.048$) over the null model of the variance in installing more telephones or a telephone with an amplifier.

Table 4.19

Model Summary for Dependent Variable 3

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	305.362	.020	.048

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CFUN 1)

For the Multiplicative Effects of relatively strenuous activity on installing more telephones or a telephone with an amplifier, it was found that for one unit of increase in difficulty of performing relatively strenuous activity, the odds of installing more telephones or a telephone with an amplifier significantly increase by a factor of 1.577 ($e^{0.455}$), $\chi^2_{Wald} = 4.313$, $p = 0.038$. That is, a senior who had some difficulty with relatively strenuous activity is 1.577 times more likely to install more telephones or a telephone with an amplifier than a senior who did not have any difficulty with these activities. In other words, the more difficulties a senior has in doing relatively strenuous activity, the more likely is that senior to install more telephones or a telephone with an amplifier.

Table 4.20

Variables in the Equation for Dependent Variable 3

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	.455	.219	4.313	1	.038	1.577
	CFUN2	.009	.407	.001	1	.982	1.009
	CFUN3	-.059	.307	.036	1	.849	.943
	CFUN4	.374	.349	1.151	1	.283	1.454
	Constant	-3.855	.497	60.112	1	.000	.021

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 4 (re644) Removed throw rugs or put nonslip tape on throw rugs

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior removed throw rugs or put nonslip tape on throw rugs is significant, $\chi^2_{Model} = 43.255$, $p = 0.000$.

Table 4.21

Omnibus Tests for Dependent Variable 4

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	43.255	4	.000
	Block	43.255	4	.000
	Model	43.255	4	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 18.4 % (*Nagelkerke* $R^2 = 0.184$) over the null model of the variance in removing throw rugs or putting nonslip tape on throw rugs.

Table 4.22

Model Summary for Dependent Variable 4

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	243.451	.071	.184

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CFUN 1)

For the Multiplicative Effects of relatively strenuous activity on removing throw rugs or putting nonslip tape on throw rugs, it was found that for one unit of increase in difficulty of performing relatively strenuous activity, the odds of removing throw rugs or putting nonslip tape on throw rugs significantly increase by a factor of 2.393 ($e^{0.872}$), $\chi^2_{Wald} = 14.208$, $p = 0.000$. That is, a senior who had some difficulty with relatively strenuous activity is 2.393 times more likely to remove throw rugs or put nonslip tape on throw rugs than a senior who did not have any difficulty with these activities. In other words, the more difficulties a senior has in doing relatively strenuous activity, the more likely is that senior to remove throw rugs or put nonslip tape on throw rugs.

Component 3 (CFUN 3)

For the Multiplicative Effects of sensory ability on removing throw rugs or putting nonslip tape on throw rugs, it was found that for one unit of increase in difficulty of sensory ability, the odds of removing throw rugs or putting nonslip tape on throw rugs significantly increase by a factor of 2.211 ($e^{0.793}$), $\chi^2_{Wald} = 10.401$, $p = 0.001$. That is, a senior who had some difficulty with sensory ability is 2.211 times more likely to remove throw rugs or put nonslip tape on throw rugs than a senior who did not have any difficulty with these abilities. In other words, the more difficulties a senior has in sensory ability, the more likely is that senior to remove throw rugs or put nonslip tape on throw rugs.

Table 4.23

Variables in the Equation for Dependent Variable 4

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	.872	.231	14.208	1	.000	2.393
	CFUN2	-.804	.436	3.409	1	.065	.447
	CFUN3	.793	.246	10.401	1	.001	2.211
	CFUN4	.511	.362	1.990	1	.158	1.667
	Constant	-5.403	.588	84.414	1	.000	.005

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 5 (re645): Removed objects you might fall over

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior removed objects in order to avoid falling over them is significant, $\chi^2_{Model} = 43.259$, $p = 0.000$.

Table 4.24

Omnibus Tests for Dependent Variable 5

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	43.259	4	.000
	Block	43.259	4	.000
	Model	43.259	4	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 18.4 % (*Nagelkerke* $R^2 = 0.184$) over the null model of the variance in removing objects in order to avoid falling over them.

Table 4.25

Model Summary for Dependent Variable 5

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	243.447	.071	.184

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CFUN 1)

For the Multiplicative Effects of relatively strenuous activity on removing objects in order to avoid falling over them, it was found that for one unit of increase in difficulty of performing relatively strenuous activity, the odds of removing objects significantly increase by a factor of 1.812 ($e^{0.595}$), $\chi^2_{Wald} = 6.182$, $p = 0.013$. That is, a senior who had some difficulty with relatively strenuous activity is 1.812 times more likely to remove objects in order to avoid falling over them than a senior who did not have any difficulty with these activities. In other words, the more difficulties a senior has in doing relatively strenuous activity, the more likely is that senior to remove objects in order to avoid falling over them.

Component 3 (CFUN 3)

For the Multiplicative Effects of sensory ability on removing objects in order to avoid falling over them, it was found that for one unit of increase in difficulty of sensory ability, the odds of removing objects significantly increase by a factor of 2.411 ($e^{0.880}$), $\chi^2_{Wald} = 13.264$, $p = 0.000$. That is, a senior who had some difficulty with sensory ability is 2.411 times more likely to remove objects in order to avoid falling over them than a senior who did not have any difficulty with these abilities. In other words, the more difficulties a senior has in sensory ability, the more likely is that senior to remove objects in order to avoid falling over them.

Table 4.26

Variables in the Equation for Dependent Variable 5

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	.595	.239	6.182	1	.013	1.812
	CFUN2	-.018	.398	.002	1	.965	.982
	CFUN3	.880	.242	13.264	1	.000	2.411
	CFUN4	.399	.369	1.168	1	.280	1.490
	Constant	-5.672	.580	95.561	1	.000	.003

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 6 (re646): Put extra lighting on stairs

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior put extra lighting on stairs is significant, $\chi^2_{Model} = 12.152$, $p = 0.016$.

Table 4.27

Omnibus Tests for Dependent Variable 6

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	12.152	4	.016
	Block	12.152	4	.016
	Model	12.152	4	.016

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 26.6 % (*Nagelkerke* $R^2 = 0.266$) over the null model of the variance in putting extra lighting on stairs.

Table 4.28

Model Summary for Dependent Variable 6

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	35.076	.022	.266

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

It was found that the whole model with CFUN 1, CFUN 2, CFUN 3, and CFUN 4 was significant to predict whether or not a senior put extra lighting on stairs; however, each predictor was not significant for this prediction.

Table 4.29

Variables in the Equation for Dependent Variable 6

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 [a]	CFUN1	.777	.797	.950	1	.330	2.174
	CFUN2	.968	1.112	.759	1	.384	2.633
	CFUN3	-2.331	1.649	1.997	1	.158	.097
	CFUN4	1.307	.927	1.986	1	.159	3.693
	Constant	-7.371	2.124	12.045	1	.001	.001

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 7 (re647): Put things on lower shelves so you can reach them

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior put things on lower shelves in order to reach them is significant, $\chi^2_{Model} = 46.501$, $p = 0.000$.

Table 4.30

Omnibus Tests for Dependent Variable 7

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	46.501	4	.000
	Block	46.501	4	.000
	Model	46.501	4	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 19.0 % (*Nagelkerke* $R^2 = 0.190$) over the null model of the variance in putting things on lower shelves in order to reach them.

Table 4.31

Model Summary for Dependent Variable 7

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	255.361	.077	.190

Significance of Each Predictor in the Model (χ^2 $_{Wald}$ and p)

Component 1 (CFUN 1)

For the Multiplicative Effects of relatively strenuous activity on putting things on lower shelves in order to reach them, it was found that for one unit of increase in difficulty of performing relatively strenuous activity, the odds of putting things on lower shelves significantly increase by a factor of 2.664 ($e^{0.980}$), χ^2 $_{Wald}$ = 18.754, p = 0.000. That is, a senior who had some difficulty with relatively strenuous activity is 2.664 times more likely to put things on lower shelves than a senior who did not have any difficulty with these activities. In other words, the more difficulties a senior has in doing relatively strenuous activity, the more likely is that senior to put things on lower shelves in order to reach them.

Table 4.32

Variables in the Equation for Dependent Variable 7

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	.980	.226	18.754	1	.000	2.664
	CFUN2	-.400	.387	1.067	1	.302	.670
	CFUN3	.488	.253	3.719	1	.054	1.629
	CFUN4	.456	.343	1.769	1	.184	1.578
	Constant	-5.558	.572	94.487	1	.000	.004

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 8 (re648): Confined living quarters to one floor to avoid stairs

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior confined living quarters to one floor to avoid stairs is significant, $\chi^2_{Model} = 19.260$, $p = 0.001$.

Table 4.33

Omnibus Tests for Dependent Variable 8

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	19.260	4	.001
	Block	19.260	4	.001
	Model	19.260	4	.001

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 19.5 % (*Nagelkerke* $R^2 = 0.195$) over the null model of the variance in confining living quarters to one floor to avoid stairs.

Table 4.34

Model Summary for Dependent Variable 8

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	87.927	.035	.195

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CFUN 1)

For the Multiplicative Effects of relatively strenuous activity on confining living quarters to one floor to avoid stairs, it was found that for one unit of increase in difficulty of performing relatively strenuous activity, the odds of confining living quarters to one floor significantly increase by a factor of 2.368 ($e^{0.862}$), $\chi^2_{Wald} = 4.020$, $p = 0.045$. That is, a senior who had some difficulty with relatively strenuous activity is 2.368 times more likely to confine living quarters to one floor to avoid stairs than a senior who did not have any difficulty with these activities. In other words, the more difficulties a senior has in doing relatively strenuous activity, the more likely is that senior to confine living quarters to one floor to avoid stairs.

Component 3 (CFUN 3)

For the Multiplicative Effects of sensory ability on confining living quarters to one floor to avoid stairs, it was found that for one unit of increase in difficulty of sensory ability, the odds of confining living quarters to one floor significantly increase by a factor of 2.612 ($e^{0.960}$), $\chi^2_{Wald} = 6.237$, $p = 0.013$. That is, a senior who had some difficulty with sensory ability is 2.612 times more likely to confine living quarters to one floor to avoid stairs than a senior who did not have any difficulty with these abilities. In other words, the more difficulties a senior has in sensory ability, the more likely is that senior to confine living quarters to one floor to avoid stairs.

Table 4.35

Variable in the Equation for Dependent Variable 8

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	.862	.430	4.020	1	.045	2.368
	CFUN2	-.595	.668	.795	1	.373	.551
	CFUN3	.960	.384	6.237	1	.013	2.612
	CFUN4	.581	.605	.922	1	.337	1.787
	Constant	-7.348	1.098	44.793	1	.000	.001

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 9 (re649): Added safety or assistance features (i.e. handrails, grab bars, a seat in the tub or shower, taped rugs)

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 4 as predictors of whether or not a senior added safety or assistance features is significant, $\chi^2_{Model} = 65.979$, $p = 0.000$.

Table 4.36

Omnibus Tests for Dependent Variable 9

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	65.979	4	.000
	Block	65.979	4	.000
	Model	65.979	4	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 24.6 % (*Nagelkerke* $R^2 = 0.246$) over the null model of the variance in adding safety or assistance features.

Table 4.37

Model Summary for Dependent Variable 9

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	266.010	.107	.246

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CFUN 1)

For the Multiplicative Effects of relatively strenuous activity on adding safety or assistance features (i.e. handrails, grab bars, a seat in the tub or shower, taped rugs), it was found that for one unit of increase in difficulty of performing relatively strenuous activity, the odds of adding safety or assistance features significantly increase by a factor of 3.127 ($e^{1.140}$), $\chi^2_{Wald} = 26.097$, $p = 0.000$. That is, a senior who had some difficulty with relatively strenuous activity is 3.127 times more likely to add safety or assistance features than a senior who did not have any difficulty with these activities. In other words, the more difficulties a senior has in doing relatively strenuous activity, the more likely is that senior to add safety or assistance features.

Table 4.38
Variable in the Equation for Dependent Variable 9

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	1.140	.223	26.097	1	.000	3.127
	CFUN2	.093	.361	.067	1	.796	1.098
	CFUN3	.241	.260	.865	1	.352	1.273
	CFUN4	.355	.330	1.155	1	.283	1.426
	Constant	-5.950	.578	105.880	1	.000	.003

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 10 (re6410): Installed a personal emergency response system or "lifeline" monitor

Overall Model Significance (χ^2_{model} and p)

The whole model that includes Components 1 to 4 as predictors of whether or not a senior installed a personal emergency response system or "lifeline" monitor is not significant, $\chi^2_{Model} = 3.439, p = 0.487$.

Table 4.39

Omnibus Tests for Dependent Variable 10

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	3.439	4	.487
	Block	3.439	4	.487
	Model	3.439	4	.487

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 4.4 % (*Nagelkerke* $R^2 = 0.044$) over the null model of the variance in installing a personal emergency response system or "lifeline" monitor. However, this model is not significant.

Table 4.40

Model Summary for Dependent Variable 10

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	81.125	.006	.044

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

It was found that each model as well as the whole model with CFUN1, CFUN2, CFUN3, and CFUN4 was not significant to predict whether or not a senior installed a personal emergency response system or "lifeline" monitor.

Table 4.41

Variable in the Equation for Dependent Variable 10

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 [a]	CFUN1	.296	.488	.369	1	.544	1.345
	CFUN2	-.364	1.020	.127	1	.721	.695
	CFUN3	.780	.464	2.823	1	.093	2.182
	CFUN4	-.134	.900	.022	1	.882	.875
	Constant	-5.351	1.194	20.085	1	.000	.005

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Dependent Variable 11 (re6411): Other Changes

Overall Model Significance (χ^2_{model} and p)

The whole model that includes Components 1 to 4 as predictors of whether or not a senior changed their homes in any ways is not significant, $\chi^2_{Model} = 6.897$, $p = 0.141$.

Table 4.42

Omnibus Tests for Dependent Variable 11

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	6.897	4	.141
	Block	6.897	4	.141
	Model	6.897	4	.141

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 3.3 % (*Nagelkerke* $R^2 = 0.033$) over the null model of the variance in changing home in any ways. However, this model is not significant.

Table 4.43

Model Summary for Dependent Variable 11

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	252.084	.012	.033

Significance of Each Predictor in the Model (χ^2 Wald and p)

It was found that each model as well as the whole model with CFUN1, CFUN2, CFUN3, and CFUN4 was not significant to predict whether or not seniors changed their homes in any ways. Overall significance is addressed in the summary of this section again.

Table 4.44

Variables in the Equation for Dependent Variable 11

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CFUN1	.054	.264	.042	1	.838	1.056
	CFUN2	-.152	.480	.100	1	.752	.859
	CFUN3	.240	.322	.555	1	.456	1.272
	CFUN4	.730	.390	3.495	1	.062	2.075
	Constant	-3.977	.540	54.186	1	.000	.019

a. Variable(s) entered on step 1: CFUN1, CFUN2, CFUN3, CFUN4.

Logistic Regression for Housing Adjustment with Health and Medical Conditions

Logistic Regression was used to examine relationships between housing adjustment variables (dependent variables) and nine groups of variables related to health and medical conditions (independent variables). These nine groups – Components 1, 2, 3, 4, 5, 6, 7, 8, and 9 – were created by Factor Analysis to conduct a Logistic Regression model for housing adjustments. The following is a list of the nine components:

Component 1 (CMD 1):	Osteoarticular Problems (i.e. Arthritis, Backaches, Osteoporosis, Broken Hip)
Component 2 (CMD 2):	Digestive Problems (i.e. Stomach Ulcers, Diarrhea, Abdominal Pain, Vomiting)
Component 3 (CMD 3):	Respiratory Problems (i.e. Asthma, Emphysema, Shortness of Breath)

Component 4 (CMD 4): Vision Problems
(i.e. Vision Problems with glasses, Glaucoma, Cataracts)

Component 5 (CMD 5): Emotional Problems
(i.e. Feeling Sad, Depressed, Emotional, Trouble Falling Asleep)

Component 6 (CMD 6): Diabetes and Vascular Complications
(i.e. Diabetes, Stroke, Heart Attack)
A person with diabetes, especially if the person is old, is very likely to have vascular complications such as stroke and coronary disease (heart attack).

Component 7 (CMD 7): Kidney, Bladder, Urinary Problems
(i.e. Kidney, Bladder, Urinary Tract Problems)
Kidney, bladder, and urinary tract belong to the same system (excretory system).

Component 8 (CMD 8): Liver and Iron-Poor Blood Problems
(i.e. Anemia)
Liver is related to iron absorption, and liver problems can lead to Anemia.

Component 9 (MDCOND 5): Problems of Memory

The relationships between each of the 11 housing adjustment variables (ways that seniors changed their living environments) and the above nine components were examined by analyzing statistical elements in the result tables in the SPSS program. The following is a list of independent and dependent variables to examine relationships between the variables:

Table 4.9

Independent and Dependent Variables

Variable types	*Variable names*		*Variable description*
Independent variables	General Physical Abilities	CFUN1 (Component 1)	Relatively strenuous activity
		CFUN2 (Component 2)	Mild indoor activity
		CFUN3 (Component 3)	Sensory ability
		CFUN4 (Component 4)	Basic daily living activity
	Medical Conditions	CMD1 (Component 1)	Osteoarticular
		CMD2 (Component 2)	Digestive
		CMD3 (Component 3)	Respiratory
		CMD4 (Component 4)	Vision
		CMD5 (Component 5)	Emotional
		CMD6 (Component 6)	Diabetes & Vascular Complications
		CMD7 (Component 7)	Kidney, Bladder, & Urinary
		CMD8 (Component 8)	Liver related & Iron-Poor Blood
		MDCOND5 (Component 9)	Memory

Variable types	*Variable names*	*Variable description*
Dependent variables	homchg1 (re641)	Rearranged furniture so you can hold on to it as you move around the house
	homchg2 (re642)	Kept things close by within easy reach
	homchg3 (re643)	Installed more telephones or a telephone with an amplifier
	homchg4 (re644)	Removed throw rugs or put nonslip tape on throw rugs
	homchg5 (re645)	Removed objects you might fall over
	homchg6 (re646)	Put extra lighting on stairs
	homchg7 (re647)	Put things on lower shelves so you can reach them
	homchg8 (re648)	Confined living quarters to one floor to avoid stairs
	homchg9 (re649)	Added safety or assistance features (handrails, grab bars, a seat in the tub or shower, taped rugs)
	homchg10 (re6410)	Installed a personal emergency response system or "lifeline" monitor
	homchg11 (re6411)	Other

As mentioned in the variables related to general physical abilities from aging, three statistical elements appear in the result tables that were discussed in this chapter. Those elements are 1) overall model significance (χ^2 $_{Model}$ and p), 2) additional variance accounted for over the null model (*Nagelkerke* R^2), and 3) the significance of each predictor in the model (χ^2 $_{Wald}$ and p). The result tables where these elements appear are: Omnibus Tests of Model Coefficients tables, Model Summary tables, and Variables in the Equation tables (Table 4.11 to Table 4.47). The following chart shows which element appears in which table:

Table 4.10

Components of Omnibus Tests of Model Coefficients, Model Summary, and Variables in the Equation

Elements	Tables
1) Overall model significance (χ^2 $_{Model}$ and p)	Omnibus Tests of Model Coefficients
2) Additional variance accounted for over the null model (*Nagelkerke* R^2)	Model Summary
3) Significance of each predictor in the model (χ^2 $_{Wald}$ and p)	Variables in the Equation

Dependent Variable 1 (re641): Rearranged furniture so you can hold on to it as you move around the house

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior rearranged furniture is significant, $\chi^2_{Model} = 41.607$, $p = 0.000$.

Table 4.45

Omnibus Tests for Dependent Variable 1

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	41.607	9	.000
	Block	41.607	9	.000
	Model	41.607	9	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

A frequency table (Table 4.12) shows the odds of a randomly selected senior from the sample of this study rearranging furniture. The odds are 23 / 590 or 0.0389 to 1. This means that roughly 1 out of every 26 seniors rearranged furniture. If another predictor of rearranging furniture is added to this prediction, the odds will change. The following is an interpretation of additional variance to the basic odds.

Table 4.12

Frequencies for Dependent Variable 1

	Frequency	*Percent*
No = 0	567	95.6
Yes = 1	23	3.9
Missing	3	0.5
Total	593	100.0

Knowing a senior's health and medical conditions allows researchers to predict an additional 24.3 % (*Nagelkerke* $R^2 = 0.243$) over the null model of the variance in rearranging furniture.

Table 4.46

Model Summary for Dependent Variable 1

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	152.738	.068	.243

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CMD1)

For the Multiplicative Effects of osteoarticular problems on rearranging furniture, it was found that for one unit of increase in levels of osteoarticular problems, the odds of rearranging furniture significantly increase by a factor of 2.872 ($e^{1.055}$), $\chi^2_{Wald} = 8.233$, $p = 0.004$. The following chart shows this positive relationship:

Independent Variable Osteoarticular Problems		Dependent Variable Rearranging Furniture	
Does not have problem	1	No	0
Has problem, but not bothered at all	2	Yes	1
Has problem bothered somewhat	3		
Has problem bothered great deal	4		

That is, a senior who had osteoarticular problems that bothered him or her somewhat is 2.872 times more likely to rearrange furniture than a senior who had problems but was not bothered by the problems. In other words, the more osteoarticular problems a senior has, the more likely is that senior to rearrange furniture.

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on rearranging furniture, it was found that for one unit of increase in levels of vision problems, the odds of rearranging furniture significantly increase by a factor of 3.398 ($e^{1.223}$), $\chi^2_{Wald} = 17.873$, $p = 0.000$. That is, a senior who had vision problems that bothered him/her somewhat is 3.398 times more likely to rearrange furniture than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to rearrange furniture.

Component 6 (CMD6)

For the Multiplicative Effects of diabetes and vascular complications on rearranging furniture, it was found that for one unit of increase in levels of diabetes or vascular complication problems, the odds of rearranging furniture significantly increase by a factor of 2.570 ($e^{0.944}$), $\chi^2_{Wald} = 3.936$, $p = 0.047$. That is, a senior who had diabetes or vascular complication problems that bother him/her somewhat is 2.570 times more likely to rearrange furniture than a senior who had problems but was not bothered by the problems. In other words, the more diabetes or vascular complication problems a senior has, the more likely is that senior to rearrange furniture.

Component 7 (CMD7)

For the Multiplicative Effects of kidney, bladder, and urinary problems on rearranging furniture, it was found that for one unit of increase in levels of kidney, bladder, or urinary problems, the odds of rearranging furniture significantly increase by a factor of 2.437 ($e^{0.891}$), $\chi^2_{Wald} = 6.434$, $p = 0.011$. That is, a senior who had kidney, bladder, or urinary problems that bothered him/her somewhat is 2.437 times more likely to rearrange furniture than a senior who had problems but was not bothered by the problems. In other words, the more kidney, bladder, or urinary problems a senior has, the more likely is that senior to rearrange furniture.

Table 4.47

Variables in the Equation for Dependent Variable 1

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	1.055	.368	8.233	1	.004	2.872
	CMD2	-1.066	1.063	1.006	1	.316	.344
	CMD3	.001	.416	.000	1	.997	1.001
	CMD4	1.223	.289	17.873	1	.000	3.398
	CMD5	-.207	.408	.258	1	.612	.813
	CMD6	.944	.476	3.936	1	.047	2.570
	CMD7	.891	.351	6.434	1	.011	2.437
	CMD8	-.662	.923	.514	1	.473	.516
	MDCOND5	-.396	.291	1.849	1	.174	.673
	Constant	-6.937	1.617	18.397	1	.000	.001

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 2 (re642): Kept things close by within easy reach

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior kept things close by within easy reach is significant, $\chi^2_{Model} = 54.513$, $p = 0.000$.

Table 4.48

Omnibus Tests for Dependent Variable 2

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	54.513	9	.000
	Block	54.513	9	.000
	Model	54.513	9	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 17.4 % (*Nagelkerke* $R^2 = 0.174$) over the null model of the variance in keeping things close by within easy reach.

Table 4.49

Model Summary for Dependent Variable 2

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	362.840	.088	.174

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CMD1)

For the Multiplicative Effects of osteoarticular problems on keeping things close by within easy reach, it was found that for one unit of increase in levels of osteoarticular problems, the odds of keeping things close significantly increase by a factor of 2.002 ($e^{0.694}$), $\chi^2_{Wald} = 9.295$, $p = 0.002$. That is, a senior who had osteoarticular problems that bothered him/her somewhat is 2.002 times more likely to keep things close than a senior who had problems but was not bothered by the problems. In other words, the more osteoarticular problems a senior has, the more likely is that senior to keep things close.

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on keeping things close, it was found that for one unit of increase in levels of vision problems, the odds of keeping things close significantly increase by a factor of 2.443 ($e^{0.893}$), χ^2_{Wald} = 19.889, p = 0.000. That is, a senior who had vision problems that bother him/her somewhat is 2.443 times more likely to keep things close than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to keep things close.

Table 4.50

Variables in the Equation for Dependent Variable 2

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	.694	.228	9.295	1	.002	2.002
	CMD2	.079	.432	.033	1	.855	1.082
	CMD3	.181	.237	.581	1	.446	1.198
	CMD4	.893	.200	19.889	1	.000	2.443
	CMD5	.259	.234	1.235	1	.266	1.296
	CMD6	.452	.307	2.170	1	.141	1.571
	CMD7	-.126	.274	.210	1	.647	.882
	CMD8	-.119	.523	.052	1	.820	.888
	MDCOND5	.129	.152	.725	1	.395	1.138
	Constant	-5.944	.856	48.277	1	.000	.003

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 3 (re643): Installed more telephones or a telephone with an amplifier

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior installed more telephones or a telephone with an amplifier is significant, $\chi^2_{Model} = 23.078$, $p = 0.006$.

Table 4.51

Omnibus Tests for Dependent Variable 3

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	23.078	9	.006
	Block	23.078	9	.006
	Model	23.078	9	.006

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 9.2 % (*Nagelkerke* $R^2 = 0.092$) over the null model of the variance in installing more telephones or a telephone with an amplifier.

Table 4.52

Model Summary for Dependent Variable 3

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	294.692	.038	.092

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CMD1)

For the Multiplicative Effects of osteoarticular problems on installing more telephones or a telephone with an amplifier, it was found that for one unit of increase in levels of osteoarticular problems, the odds of installing more telephones or a telephone with an amplifier significantly increase by a factor of 1.936 ($e^{0.661}$), $\chi^2_{Wald} = 6.353$, $p = 0.012$. That is, a senior who had osteoarticular problems that bothered him/her somewhat is 1.936 times more likely to install more telephones or a telephone with an amplifier than a senior who had problems but was not bothered by the problems. In other words, the more osteoarticular problems a senior has, the more likely is that senior to install more telephones or a telephone with an amplifier.

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on installing more telephones or a telephone with an amplifier, it was found that for one unit of increase in levels of vision problems, the odds of installing more telephones or a telephone with an amplifier significantly increase by a factor of 1.882 ($e^{0.632}$), $\chi^2_{Wald} = 7.062$, $p = 0.008$. That is, a senior who had vision problems that bothered him/her somewhat is 1.882 times more likely to install more telephones or a telephone with an amplifier than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to install more telephones or a telephone with an amplifier.

Table 4.53

Variables in the Equation for Dependent Variable 3

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	.661	.262	6.353	1	.012	1.936
	CMD2	-.178	.553	.104	1	.747	.837
	CMD3	-.240	.335	.511	1	.475	.787
	CMD4	.632	.238	7.062	1	.008	1.882
	CMD5	-.004	.283	.000	1	.989	.996
	CMD6	-.099	.405	.060	1	.807	.906
	CMD7	.396	.269	2.169	1	.141	1.486
	CMD8	.185	.579	.102	1	.749	1.204
	MDCOND5	.235	.170	1.911	1	.167	1.265
	Constant	-5.129	.993	26.694	1	.000	.006

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 4 (re644): Removed throw rugs or put nonslip tape on throw rugs

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior removed throw rugs or put nonslip tape on throw rugs is significant, $\chi^2_{Model} = 31.140$, $p = 0.000$.

Table 4.54

Omnibus Tests for Dependent Variable 4

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	31.140	9	.000
	Block	31.140	9	.000
	Model	31.140	9	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 13.3 % (*Nagelkerke* $R^2 = 0.133$) over the null model of the variance in removing throw rugs or putting nonslip tape on throw rugs.

Table 4.55

Model summary for Dependent Variable 4

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	256.115	.051	.133

Significance of Each Predictor in the Model (χ^2 $_{Wald}$ and p)

Component 1 (CMD1)

For the Multiplicative Effects of osteoarticular problems on removing throw rugs or putting nonslip tape on throw rugs, it was found that for one unit of increase in levels of osteoarticular problems, the odds of removing throw rugs or putting nonslip tape on throw rugs significantly increase by a factor of 2.039 ($e^{0.713}$), $\chi^2_{Wald} = 6.702$, $p = 0.010$. That is, a senior who had osteoarticular problems that bothered him/her somewhat is 2.039 times more likely to remove throw rugs or put nonslip tape on throw rugs than a senior who had problems but was not bothered by the problems. In other words, the more osteoarticular problems a senior has, the more likely is that senior to remove throw rugs or put nonslip tape on throw rugs.

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on removing throw rugs or putting nonslip tape on throw rugs, it was found that for one unit of increase in levels of vision problems, the odds of removing throw rugs or putting nonslip tape on throw rugs significantly increase by a factor of 1.721 ($e^{0.543}$), $\chi^2_{Wald} = 4.717$, $p = 0.030$. That is, a senior who had vision problems that bothered him/her somewhat is 1.721 times more likely to remove throw rugs or put nonslip tape on throw rugs than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to remove throw rugs or put nonslip tape on throw rugs.

Component 6 (CMD6)

For the Multiplicative Effects of diabetes and vascular complication problems on removing throw rugs or putting nonslip tape on throw rugs, it was found that for one unit of increase in levels of diabetes or vascular complication problems, the odds of removing throw rugs or putting nonslip tape on throw rugs significantly increase by a factor of 2.171 ($e^{0.775}$), $\chi^2_{Wald} = 4.770$, $p = 0.029$. That is, a senior who had diabetes or vascular complication problems that bothered him/her somewhat is 2.171 times more likely to remove throw rugs or put nonslip tape on throw rugs than a senior who had problems but was not bothered by the problems. In other words, the more diabetes or vascular complication problems a senior has, the more likely is that senior to remove throw rugs or put nonslip tape on throw rugs.

Table 4.56

Variables in the Equation for Dependent Variable 4

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	.713	.275	6.702	1	.010	2.039
	CMD2	.229	.478	.230	1	.631	1.258
	CMD3	-.140	.330	.180	1	.671	.869
	CMD4	.543	.250	4.717	1	.030	1.721
	CMD5	.462	.277	2.784	1	.095	1.588
	CMD6	.775	.355	4.770	1	.029	2.171
	CMD7	.018	.312	.003	1	.953	1.018
	CMD8	.017	.583	.001	1	.977	1.017
	MDCOND5	.065	.191	.116	1	.733	1.067
	Constant	-6.771	1.014	44.600	1	.000	.001

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 5 (re645): Removed objects you might fall over

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior removed objects in order to avoid falling over them is significant, $\chi^2_{Model} = 45.115$, $p = 0.000$.

Table 4.57

Omnibus Tests for Dependent Variable 5

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	45.115	9	.000
	Block	45.115	9	.000
	Model	45.115	9	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 18.8 % (*Nagelkerke* $R^2 = 0.188$) over the null model of the variance in removing objects in order to avoid falling over them.

Table 4.58

Model Summary for Dependent Variable 5

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	247.409	.074	.188

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CMD1)

For the Multiplicative Effects of osteoarticular problems on removing objects in order to avoid falling over them, it was found that for one unit of increase in levels of osteoarticular problems, the odds of removing objects significantly increase by a factor of 2.122 ($e^{0.752}$), $\chi^2_{Wald} = 7.343$, $p = 0.007$. That is, a senior who had osteoarticular problems that bothered him/her somewhat is 2.122 times more likely to remove objects in order to avoid falling over them than a senior who had problems but was not bothered by the problems. In other words, the more osteoarticular problems a senior has, the more likely is that senior to remove objects in order to avoid falling over them.

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on removing objects in order to avoid falling over them, it was found that for one unit of increase in levels of vision problems, the odds of removing objects significantly increase by a factor of 2.831 ($e^{1.041}$), $\chi^2_{Wald} = 19.326$, $p = 0.000$. That is, a senior who had vision problems that bothered him/her somewhat is 2.831 times more likely to remove objects in order to avoid falling over them than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to remove objects in order to avoid falling over them.

Table 4.59

Variables in the Equation for Dependent Variable 5

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	.752	.278	7.343	1	.007	2.122
	CMD2	.377	.460	.672	1	.412	1.458
	CMD3	-.194	.329	.348	1	.555	.824
	CMD4	1.041	.237	19.326	1	.000	2.831
	CMD5	.322	.283	1.295	1	.255	1.379
	CMD6	.657	.367	3.209	1	.073	1.929
	CMD7	.176	.301	.344	1	.557	1.193
	CMD8	.054	.579	.009	1	.926	1.055
	MDCOND5	-.057	.199	.082	1	.774	.944
	Constant	-7.429	1.029	52.144	1	.000	.001

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 6 (re646): Put extra lighting on stairs

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior put extra lighting on stairs is not significant, $\chi^2_{Model} = 7.268$, $p = 0.609$.

Table 4.60

Omnibus Tests for Dependent Variable 6

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	7.268	9	.609
	Block	7.268	9	.609
	Model	7.268	9	.609

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 15.9 % (*Nagelkerke* $R^2 = 0.159$) over the null model of the variance in putting extra lighting on stairs. However, this model is not significant.

Table 4.61

Model Summary for Dependent Variable 6

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	40.018	.013	.159

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

It was found that each predictor as well as the whole model with 9 components was not significant to predict whether or not a senior put extra lighting on stairs.

Table 4.62

Variables in the Equation for Dependent Variable 6

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	1.308	.790	2.742	1	.098	3.698
	CMD2	-.352	1.684	.044	1	.834	.703
	CMD3	-1.271	1.645	.597	1	.440	.281
	CMD4	-.238	.946	.063	1	.802	.788
	CMD5	.849	.790	1.154	1	.283	2.336
	CMD6	.889	1.158	.589	1	.443	2.432
	CMD7	-.265	.996	.071	1	.790	.767
	CMD8	-29.816	8527.979	.000	1	.997	.000
	MDCOND5	.272	.527	.267	1	.606	1.313
	Constant	21.943	8527.980	.000	1	.998	3.387E+09

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 7 (re647): Put things on lower shelves so you can reach them

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior put things on lower shelves in order to reach them is significant, χ^2_{Model} = 36.273, $p = 0.000$.

Table 4.63

Omnibus Tests for Dependent Variable 7

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	36.273	9	.000
	Block	36.273	9	.000
	Model	36.273	9	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 14.7 % (*Nagelkerke* $R^2 = 0.147$) over the null model of the variance in putting things on lower shelves in order to reach them.

Table 4.64

Model Summary for Dependent Variable 7

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	271.286	.060	.147

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CMD1)

For the Multiplicative Effects of osteoarticular problems on putting things on lower shelves in order to reach them, it was found that for one unit of increase in levels of osteoarticular problems, the odds of putting things on lower shelves significantly increase by a factor of 1.881 ($e^{0.632}$), $\chi^2_{Wald} = 5.537$, $p = 0.019$. That is, a senior who had osteoarticular problems that bothered him/her somewhat is 1.881 times more likely to put things on lower shelves than a senior who had problems but was not bothered by the problems. In other words, the more osteoarticular problems a senior has, the more likely is that senior to put things on lower shelves in order to reach them.

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on putting things on lower shelves in order to reach them, it was found that for one unit of increase in levels of vision problems, the odds of putting things on lower shelves significantly increase by a factor of 2.131 ($e^{0.756}$), $\chi^2_{Wald} = 10.861$, $p = 0.001$. That is, a senior who had vision problems that bothered him/her somewhat is 2.131 times more likely to put things on lower shelves than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to put things on lower shelves in order to reach them.

Table 4.65

Variables in the Equation for Dependent Variable 7

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	.632	.269	5.537	1	.019	1.881
	CMD2	.415	.454	.837	1	.360	1.515
	CMD3	.247	.274	.816	1	.366	1.281
	CMD4	.756	.230	10.861	1	.001	2.131
	CMD5	.294	.278	1.115	1	.291	1.341
	CMD6	.635	.346	3.368	1	.066	1.887
	CMD7	-.609	.422	2.082	1	.149	.544
	CMD8	.027	.588	.002	1	.963	1.027
	MDCOND5	-.050	.193	.066	1	.797	.951
	Constant	-6.175	.987	39.112	1	.000	.002

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 8 (re648): Confined living quarters to one floor to avoid stairs

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior confined living quarters to one floor to avoid stairs is not significant, $\chi^2_{Model} = 13.220$, $p = 0.153$.

Table 4.66

Omnibus Tests for Dependent Variable 8

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	13.220	9	.153
	Block	13.220	9	.153
	Model	13.220	9	.153

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's functional abilities allows researchers to predict an additional 13.4 % (*Nagelkerke* $R^2 = 0.134$) over the null model of the variance in confining living quarters to one floor to avoid stairs. However, this whole model is not significant.

Table 4.67

Model Summary for Dependent Variable 8

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	94.132	.024	.134

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on confining living quarters to one floor to avoid stairs, it was found that for one unit of increase in levels of vision problems, the odds of confining living quarters to one floor significantly increase by a factor of 3.254 ($e^{1.180}$), $\chi^2_{Wald} = 9.389$, $p = 0.002$. That is, a senior who had vision problems that bothered him/her somewhat is 3.254 times more likely to confine living quarters to one floor to avoid stairs than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to confine living quarters to one floor to avoid stairs.

Table 4.68

Variables in the Equation for Dependent Variable 8

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	.218	.534	.166	1	.683	1.243
	CMD2	-.296	1.171	.064	1	.800	.744
	CMD3	-.426	.653	.425	1	.514	.653
	CMD4	1.180	.385	9.389	1	.002	3.254
	CMD5	.535	.536	.997	1	.318	1.707
	CMD6	.625	.644	.942	1	.332	1.869
	CMD7	-.019	.710	.001	1	.978	.981
	CMD8	.427	.889	.231	1	.631	1.533
	MDCOND5	-.220	.404	.295	1	.587	.803
	Constant	-7.102	1.793	15.691	1	.000	.001

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 9 (re649): Added safety or assistance features (i.e. handrails, grab bars, a seat in the tub or shower, taped rugs)

Overall Model Significance (χ^2_{model} and p)

Overall, the model that includes Components 1 to 9 as predictors of whether or not a senior added safety or assistance features is significant, $\chi^2_{Model} = 54.379$, $p = 0.000$.

Table 4.69

Omnibus Tests for Dependent Variable 9

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	54.379	9	.000
	Block	54.379	9	.000
	Model	54.379	9	.000

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 20.2 % (*Nagelkerke* $R^2 = 0.202$) over the null model of the variance in adding safety or assistance features.

Table 4.70

Model Summary for Dependent Variable 9

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	283.114	.088	.202

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 1 (CMD1)

For the Multiplicative Effects of osteoarticular problems on adding safety or assistance features (i.e. handrails, grab bars, a seat in the tub or shower, taped rugs), it was found that for one unit of increase in levels of osteoarticular problems, the odds of adding safety or assistance features significantly increase by a factor of 2.831 ($e^{1.041}$), $\chi^2_{Wald} = 16.926$, $p = 0.000$. That is, a senior who had osteoarticular problems that bothered him/her somewhat is 2.831 times more likely to add safety or assistance features than a senior who had problems but was not bothered by the problems. In other words, the more osteoarticular problems a senior has, the more likely is that senior to add safety or assistance features.

Component 2 (CMD2)

For the Multiplicative Effects of digestive problems on adding safety or assistance features (i.e. handrails, grab bars, a seat in the tub or shower, taped rugs), it was found that for one unit of increase in levels of digestive problems, the odds of adding safety or assistance features significantly increase by a factor of 2.238 ($e^{0.805}$), $\chi^2_{Wald} = 4.295$, $p = 0.038$. That is, a senior who had digestive problems that bothered him/her somewhat is 2.238 times more likely to add safety or assistance features than a senior who had problems but was not bothered by the problems. In other words, the more digestive problems a senior has, the more likely is that senior to add safety or assistance features.

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on adding safety or assistance features (i.e. handrails, grab bars, a seat in the tub or shower, taped rugs), it was found that for one unit of increase in levels of vision problems, the odds of adding safety or assistance features significantly increase by a factor of 2.043 ($e^{0.714}$), $\chi^2_{Wald} = 9.540$, $p = 0.002$. That is, a senior who had vision problems that bothered him/her somewhat is 2.043 times more likely to add safety or assistance features than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to add safety or assistance features.

Component 6 (CMD6)

For the Multiplicative Effects of diabetes and vascular complication problems on adding safety or assistance features (i.e. handrails, grab bars, a seat in the tub or shower, taped rugs), it was found that for one unit of increase in levels of diabetes or vascular complication problems, the odds of adding safety or assistance features significantly increase by a factor of 2.529 ($e^{0.928}$), $\chi^2_{Wald} = 7.598$, $p = 0.006$. That is, a senior who had diabetes or vascular complication problems that bothered him/her somewhat is 2.529 times more likely to add safety or assistance features than a senior who had problems but was not bothered by the problems. In other words, the more diabetes or vascular complication problems a senior has, the more likely is that senior to add safety or assistance features.

Table 4.71

Variables in the Equation for Dependent Variable 9

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	1.041	.253	16.926	1	.000	2.831
	CMD2	.805	.389	4.295	1	.038	2.238
	CMD3	-.375	.366	1.052	1	.305	.687
	CMD4	.714	.231	9.540	1	.002	2.043
	CMD5	-.025	.279	.008	1	.928	.975
	CMD6	.928	.337	7.598	1	.006	2.529
	CMD7	.487	.266	3.363	1	.067	1.628
	CMD8	-.512	.684	.560	1	.454	.599
	MDCOND5	-.314	.199	2.494	1	.114	.730
	Constant	-6.698	1.033	42.087	1	.000	.001

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 10 (re6410): Installed a personal emergency response system or "lifeline" monitor

Overall Model Significance (χ^2_{model} and p)

The whole model that includes Components 1 to 9 as predictors of whether or not a senior installed a personal emergency response system or "lifeline" monitor is significant, $\chi^2_{Model} = 18.955$, $p = 0.026$.

Table 4.72

Omnibus Tests for Dependent Variable 10

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	18.955	9	.026
	Block	18.955	9	.026
	Model	18.955	9	.026

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 21.7 % (*Nagelkerke* $R^2 = 0.217$) over the null model of the variance in installing a personal emergency response system or "lifeline" monitor.

Table 4.73

Model Summary for Dependent Variable 10

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	74.168	.032	.217

Significance of Each Predictor in the Model (χ^2_{Wald} and p)

Component 4 (CMD4)

For the Multiplicative Effects of vision problems on installing a personal emergency response system or "lifeline" monitor, it was found that for one unit of increase in levels of vision problems, the odds of installing a personal emergency response system or "lifeline" monitor significantly increase by a factor of 2.902 ($e^{1.066}$), $\chi^2_{Wald} = 6.457$, $p = 0.011$. That is, a senior who had vision problems that bothered him/her somewhat is 2.902 times more likely to install a personal emergency response system or "lifeline" monitor than a senior who had problems but was not bothered by the problems. In other words, the more vision problems a senior has, the more likely is that senior to install a personal emergency response system or "lifeline" monitor.

Table 4.74

Variables in the Equation for Dependent Variable 10

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	-.697	.692	1.013	1	.314	.498
	CMD2	1.407	1.077	1.707	1	.191	4.084
	CMD3	-44.039	3977.249	.000	1	.991	.000
	CMD4	1.066	.419	6.457	1	.011	2.902
	CMD5	.574	.631	.828	1	.363	1.775
	CMD6	1.284	.732	3.075	1	.079	3.611
	CMD7	-.454	1.000	.206	1	.650	.635
	CMD8	-30.755	7269.834	.000	1	.997	.000
	MDCOND5	-.234	.470	.248	1	.618	.791
	Constant	67.203	8286.677	.000	1	.994	1.534E+29

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Dependent Variable 11 (re6411): Other Changes

Overall Model Significance (χ^2_{model} and p)

The whole model that includes Components 1 to 9 as predictors of whether or not seniors changed their homes in any ways is not significant, $\chi^2_{Model} = 9.105$, $p = 0.428$.

Table 4.75

Omnibus Tests for Dependent Variable 11

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	9.105	9	.428
	Block	9.105	9	.428
	Model	9.105	9	.428

Additional Variance Accounted for Over the Null Model (Nagelkerke R^2)

Knowing a senior's health and medical conditions allows researchers to predict an additional 4.3 % (*Nagelkerke* $R^2 = 0.043$) over the null model of the variance in changing a home in any ways. However, this model is not significant.

Table 4.76

Model Summary for Dependent Variable 11

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	250.356	.015	.043

Significance of Each Predictor in the Model (χ^2 Wald and p)

It was found that each model as well as the whole model with 9 components was not significant to predict whether or not seniors changed their homes in any ways. Overall significance is addressed in the summary of this section again.

Table 4.77

Variables in the Equation for Dependent Variable 11

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CMD1	.562	.299	3.539	1	.060	1.753
	CMD2	-.716	.825	.753	1	.386	.489
	CMD3	.155	.352	.194	1	.660	1.168
	CMD4	.350	.281	1.545	1	.214	1.419
	CMD5	-.265	.363	.532	1	.466	.767
	CMD6	-.119	.468	.064	1	.800	.888
	CMD7	.465	.319	2.118	1	.146	1.592
	CMD8	.239	.659	.132	1	.717	1.270
	MDCOND5	-.302	.234	1.665	1	.197	.739
	Constant	-3.557	1.227	8.405	1	.004	.029

a. Variable(s) entered on step 1: CMD1, CMD2, CMD3, CMD4, CMD5, CMD6, CMD7, CMD8, MDCOND5.

Summary

Overall, both sets of components related to general physical abilities and health and medical conditions were significant predictors for researchers to see whether a senior changes his or her house to meet new needs. The model with four components of physical abilities had nine significant results out of the eleven dependent variables. The model with nine components of medical conditions had eight significant results out of the eleven dependent variables. The following (Table 4.78) is a list of the dependent and independent variables which show the significant results.

Table 4.78

Summary 1: Overall Model Significance

Dependent Variables		*Independent Variables* Overall Model Significance	
		Physical Ability	Medical Conditions
re641	Rearranged furniture	0.000	0.000
re642	Kept things close	0.000	0.000
re643	Installed more telephones	0.019	0.006
re644	Removed throw rugs	0.000	0.000
re645	Removed objects	0.000	0.000
re646	Put extra lighting	0.016	Not Significant
re647	Put things on lower shelves	0.000	0.000
re648	Confined living quarters to one floor	0.001	Not Significant
re649	Added safety or assistance features	0.000	0.000
re6410	Installed a personal emergency response system	Not Significant	0.026
re6411	Other	Not Significant	Not Significant

In addition, within those physical ability and medical condition variables, certain sets of variables were more influential than others. For example, for physical abilities, two main components significantly influenced seniors to change their living environments: 1) relatively strenuous activity and 2) sensory ability. For medical conditions, two main components significantly influenced seniors to change their

living environments: 1) osteoarticular problems (significant in 7 categories) and 2) vision problems (significant in 9 categories). In addition to those two main components, the following is a list of the components which appeared to be significant: 3) diabetes and vascular complications (significant in 3 categories), 4) digestive problems (significant in one category), and 5) kidney, bladder, and urinary problems (significant in one category). Summary Table 2 shows those significant components.

Summary: General Physical Abilities due to Aging

The results show that two main components were significantly influential for seniors to change their living environments. Component 1 (CFUN 1: relatively strenuous activity) appeared to be significant for eight out of eleven dependent variables. Component 3 (CFUN 3: sensory ability) appeared to be significant for five out of eleven dependent variables.

With these significant eight and five cases, for the Multiplicative Effects of both relatively strenuous activity and sensory ability on each dependent variable, all cases showed that for one unit of increase in levels of each independent variable, the odds of each dependent variable significantly increase. For example, all significant relationships showed that the more difficulties a senior has in doing relatively strenuous activity or with sensory abilities, the more likely it is that the senior will change the living environment.

Hypothesis Testing: General Physical Abilities

The following hypothesis was tested in terms of the effects of general physical abilities on housing adjustments.

1. The more difficulties with general physical abilities that the elderly have, the more changes the elderly will make to their houses.

   H_o: There are no correlations between seniors' decisions to make changes to their houses and their general physical abilities.

   H_a: There are correlations between seniors' decisions to make changes to their houses and their general physical abilities. In fact, the more difficulties with general physical abilities that the elderly have, the more changes the elderly will make to their houses.

As mentioned in the above summary for general physical abilities, there were significant correlations between seniors' decisions to change their houses and their certain physical abilities, although the odds of changing were relatively small. For example, the odds in all those significant correlations increased by a factor of less than 3.2. This means that seniors who have difficulties with physical abilities are, at the most, only 3.2 times more likely to change their environments. Nevertheless, the results indicated that the more difficulties with physical abilities that the elderly have, the more changes the elderly will make to their houses. Therefore, from the results, the null hypothesis (H_o) was rejected.

Summary: Health and Medical Conditions

The results show that five CMD components were significantly influential for seniors to change their living environments. Component 4 (CMD 4: vision problems) appeared to be significant for nine out of eleven dependent variables. Component 1 (CMD 1: osteoarticular problems) appeared to be significant for seven out of eleven dependent variables. Component 6 (CMD 6: diabetes and vascular complications) appeared to be significant for three out of eleven dependent variables. Component 2 (CMD 2: digestive problems) appeared to be significant for one out of eleven dependent variables. Component 7 (CMD 7: kidney, bladder, and urinary problems) appeared to be significant for one out of eleven dependent variables.

With these significant cases, for the Multiplicative Effects of each component on each dependent variable, all cases showed that for one unit of increase in levels of each independent variable, the odds of each dependent variable significantly increase. For example, all significant relationships showed that the more medical problems a senior has, the more likely it is that the senior will change the living environment.

Hypothesis Testing: Health and Medical Conditions

The following hypothesis was tested in terms of health and medical conditions for housing adjustments.

2. The more health and medical problems the elderly have, the more changes the elderly will make to their houses.

   H_o: There are no correlations between seniors' decisions to make changes to their houses and seniors' health and medical conditions.

H_a: There are correlations between seniors' decisions to make changes to their houses and seniors' health and medical conditions. In fact, the more health and medical problems the elderly have, the more changes the elderly will make to their houses.

As mentioned in the above summary for health and medical conditions, there were significant correlations between seniors' decisions to change their houses and their health and medical conditions, although the odds of changing were relatively small. For example, the odds in all those significant correlations increased by a factor of less than 3.4. This means that seniors with medical problems are, at the most, up to 3.4 times more likely to change their environments. However, the results indicated that the more medical problems the elderly have, the more changes the elderly will make to their houses. Therefore, from the results, the null hypothesis (H_o) was rejected.

Hypothesis Testing: Comparison between Two Groups

The third hypothesis was addressed by comparing two categories used above — general physical abilities, and health and medical conditions:

Declining general physical abilities will have stronger correlations in influencing seniors' housing behaviors than will health and medical conditions because abilities are affected by various conditions. That is, inability to climb stairs could be due to several causes.

H_o: There is no difference in the way that health conditions or physical abilities influence seniors' decisions to make changes to their houses according to their needs.

> H_a: There is a difference in the way that health conditions or physical abilities influence seniors' decisions to make changes to their houses according to their needs. In fact, physical abilities and health conditions do not influence equally, but rather physical abilities have a stronger influence.

As mentioned in the above overall summary, both sets of factors related to physical abilities and medical conditions were significant predictors in order to examine seniors' housing adjustments.

However, there were slight differences between the two categories. Table 4.78 (*Summary 1: Overall Model Significance*) illustrates the differences. For the overall model significance, there were 9 physical ability significances and 8 medical condition significances out of the 11 dependent variables for both categories. In addition, two dependent variables—putting extra lighting on stairs and confining living quarters to one floor—were significantly correlated with physical abilities, but not with medical conditions. One dependent variable—installing a personal emergency response system —was significantly correlated with medical conditions, but not with physical abilities.

From the above results, it is determined that the null hypothesis (H_o)—"there is no difference in the way that health conditions or physical abilities influence seniors' decisions to make changes to their houses"—was rejected. Furthermore, this study did discover which of the two categories of factors exerted a greater influence over housing decisions.

However, the difference in influence by physical abilities or medical conditions was very small. In order to investigate and analyze the differences more accurately, further studies with a larger sample size should be conducted.

Table 4.79

Summary 2: Each Component Significance

Dependent Variables		*Independent Variables* Each Component Significance	
		Physical Abilities	Medical conditions
re641	Rearranged furniture	Strenuous 0.026 Sensory 0.007	Osteoarticular 0.004 Vision 0.000 Diabetes 0.047 Kidney 0.011
re642	Kept things close	Strenuous 0.000 Sensory 0.000	Osteoarticular 0.002 Vision 0.000
re643	Installed more telephones	Strenuous 0.038	Osteoarticular 0.012 Vision 0.008
re644	Removed throw rugs	Strenuous 0.000 Sensory 0.001	Osteoarticular 0.010 Vision 0.030 Diabetes 0.029
re645	Removed objects	Strenuous 0.013 Sensory 0.000	Osteoarticular 0.007 Vision 0.000
re646	Put extra lighting	Not Significant	Not Significant
re647	Put things on lower shelves	Strenuous 0.000	Osteoarticular 0.019 Vision 0.001
re648	Confined living quarters to one floor	Strenuous 0.045 Sensory 0.013	Vision 0.002
re649	Added safety or assistance features	Strenuous 0.000	Osteoarticular 0.000 Digestive 0.038 Vision 0.002 Diabetes 0.006
re6410	Installed a personal emergency response system	Not Significant	Vision 0.011
re6411	Other	Not Significant	Not Significant

CHAPTER V

DISCUSSION

Overall Interpretation

From the summary tables 1 and 2 in the Chapter IV (results section), it is found that seniors are more likely to change their living environments in order to meet their needs if they have problems with general physical abilities or medical conditions. These findings clearly support the theory of housing adjustments which emphasizes physiological changes and problems of the elderly as influential factors for seniors to seek housing adjustments.

In fact, seniors' housing adjustment behaviors are seen in the frequency tables. The frequency tables show that very few seniors actually made changes to their housing environments. However, those seniors who made changes were those seniors who were more likely to have problems with general physical abilities and/or medical conditions. In other words, overall, physical abilities and/or medical conditions influenced seniors to make changes in their living environments. This finding makes sense because levels of physical abilities and medical conditions are very important, especially for seniors, in interacting with their living environments.

Furthermore, the findings emphasize that certain groups of variables are more influential on seniors to make alterations. Those groups of variables are:

General physical abilities:

- relatively strenuous activity
- sensory ability

Health and medical conditions:

- osteoarticular problems
- vision problems
- diabetes and vascular complications
- digestive problems
- kidney, bladder, and urinary problems

The variable group of relatively strenuous activity significantly influenced most of the dependent variables, except putting extra lighting on the stairs, installing a personal emergency response system, or changing their environments any other way. A person who has difficulty with strenuous activities, such as running, climbing, lifting, and kneeling, is less mobile and more likely to have difficulty with interacting with the living environment. Therefore, the person needs to make adjustments to the living environment in order to live safely and comfortably. This might be the reason why the variable group of relatively strenuous activity was the most influential factor for seniors to change their environments.

In addition to the strenuous activity group, the sensory ability group, as well as the group of vision problems, were important predictors for seniors' housing adjustment behaviors. These variable groups include vision and hearing abilities. If a person has difficulties with vision and/or hearing, a person might want to make his or her living environment safer; therefore, the person is more likely to change the environment to meet new needs. In fact, the group of vision problems in the medical condition category was also the most influential factor in that category.

For the medical condition category, the next influential factor was the group of osteoarticular problems, such as arthritis, backaches, osteoporosis, and broken hips. These types of problems, which have symptoms such as body pains, might repeat and last longer; therefore, these problems might become influential causes of difficulty in performing strenuous activities. If a person has arthritis or backaches, this person is more likely to have difficulty with running, climbing, bending, lifting, and kneeling. At the same time, this person might have difficulty dealing with their living environments, leading him or her to change it.

Diabetes and vascular complication problems can relate to mobility difficulties. If a person had a stroke or coronary disease, even after recovering, this person is more likely to be confined. Therefore, this person may need to change the environment to be more comfortable and convenient. For example, if this person uses a wheelchair, he or she would like to keep things close by within easy reach.

The groups of digestive problems, and kidney, bladder, and urinary problems, appeared to have significant relationships in one category. A senior with digestive problems is more likely to add safety or assistance features, such as handrails, grab bars, a seat in the tub or shower, and taped rugs. This makes sense because if a senior has digestive and/or urinary problems, he or she uses the bathroom more often than a senior who does not have those problems. Therefore, this senior would like to make a functional bathroom for safety and convenience, and so is more likely to add handrails and/or grab bars in the bathroom.

Other Findings

Two of the dependent variables were not predicted; neither by the overall model, nor by one of the individual models separately. First of all, the dependent variable of installing a personal emergency response system did not have any significant effects due to physical ability components. That is, this dependent variable was not predicted by the physical ability factors, but was predicted by the medical condition factors. This might be due to the fact that having merely a decrease in physical ability (expected for older people) is not an enough reason for installing emergency systems. On the other hand, a serious medical condition, such as a history of heart attack, might prompt a senior to install emergency systems in order to get urgent medical attention that is immediately provided by emergency systems. In fact, the findings show that the dependent variable had significant effects from the medical condition components.

The other dependent variable which was not predicted by medical conditions is putting extra lighting on stairs. This might be due to the fact that seniors with serious or some levels of medical conditions might have been living in one-story houses or might have already restricted use to lower floors, so those seniors may not have been interested in adding extra lighting on stairs.

In addition to the above confounding factors toward two dependent variables, which were not predicted by any of the physical ability or medical condition variables, other confounding effects should be considered for this study.

First of all, accuracy of participants' responses might have been affected by confounding factors. Since this data was only collected with "self-reported" responses of the elderly, the responses might not have been completely valid. This means that seniors might not have remembered what they or their families had arranged for their living environments in the past twelve months, and then, the respondents answered "no" instead of "yes," when the interviewer asked questions. For example, a senior respondent might have forgotten the new grab bars in the bathroom which had been added by one of his or her children eleven months ago. When the researcher asked this senior about changes, the answer was not correct, but the researcher recorded this incorrect answer. This is also considered as one of the limitations.

Another confounding effect is misleading questions. This means that respondents' answers might have been very much dependent on how the interviewer asked the questions. If the interviewer clearly emphasized that he or she wanted to know what changes had been made to a respondent's house, regardless of who changed the house, the respondent would correctly understand the questions. For example, a respondent did not personally arrange furniture or put all things close by for easy reach because he or she had difficulty with relatively strenuous activity. Then, this respondent answered "no" to the interviewer for the questions. However, actually one of the respondent's children had made furniture arrangements or put things close by for easy reach for this respondent. Those changes were actually made by the respondent's family member, but not by the respondent himself or herself. This is an example of how some questions might have been misunderstood by respondents.

Since all respondents were elderly, and some might have had hearing problems, this confounding factor might have influenced responses in this study.

In order to avoid the above confounding effect, the interviewer should explain the questions very clearly and speak slowly with relatively a high-toned voice. In addition, the interviewer should use a set of questions in writing and/or should ask two types of questions; 1) did you move it? and 2) did someone else move it for you? By using these interview techniques, the interviewer can understand who made decisions to move and who actually made the changes. Then, the interviewer can accurately collect data for each variable. It is vital for researchers to train interviewers to collect accurate data from their interviews or train themselves to be skillful interviewers. That is one of the effective ways for researchers to reduce measurement errors and increase validity of their studies.

Limitations of the Research

This research has two major limitations related to housing decisions because Dr. Stoller's data being used here was originally collected to examine migration patterns and social behaviors of European American retirees in Florida with a special emphasis on the Finnish American ethnicity.

First of all, it would be difficult to draw correlations between seniors' housing decisions and their health conditions or physical abilities, unless their health conditions or physical abilities are current at the time they make decisions to move or select their particular houses. In Dr. Stoller's data, the amount of time the subject had

resided in a house varies from a few months to several years. Therefore, for some participants, since their health conditions and physical disabilities may have been recent developments, their decisions to move to their current houses several years before might not have been influenced by current health conditions and physical abilities.

However, in this project, in order to minimize this limitation, only participants who recently moved to their retirement houses should have been selected from the data to examine the relationships between seniors' housing decisions and health conditions. However, as mentioned in the results section, the relationships about housing decisions could not be examined because the data has only three respondents who have lived in Florida for less than one year.

One way to minimize this limitation would have been to ask some more specific questions, such as when the health problems started and what influenced the decision to move or to change their living environments. Also, the researchers could have asked if health had been one of the factors that determined the decision to move or to change their housing environment. These questions imply a retrospective longitudinal research design.

Secondly, in Dr. Stoller's data, one particular ethnic background dominated the total participant population because the data were collected for other purposes. Finnish Americans represented 63.47% of the total participants, and the rest of the participants (36.53%) were European Americans. This creates a type of selection bias in which the researcher focuses on a particular group of individuals. It would be very difficult to

make generalizations from the results since all participants were white, and the majority of them were exclusively Finnish Americans. In addition, because of this ethnic selection bias, there could be confounding variables, such as cultural norms and values, all of which could influence the outcomes of seniors' decisions to select their particular houses and to make changes to their current houses according to their needs. This means that influences from particular cultural norms and values on seniors' housing decisions and adjustments could be much stronger than influences from health conditions and general physical abilities of aging.

This limitation of the applicability of the research could not be eliminated since the majority of the subjects are from only one ethnic background. However, if the participants are the second or third generation Finnish Americans and European Americans, this limitation could be alleviated. For example, all American citizens, except Native Americans, either immigrated themselves or have ancestors from other countries. Caucasian Americans of second, third, or fourth generation would typically be more increasingly American with their ethnic identity. Therefore, they would not usually have exceptional differences in terms of their physical conditions, cultural attitudes, and/or housing behaviors. This increased Americanization would tend to mitigate the limitations in the original research selection bias.

On the one hand, although the ethnic limitation would be mitigated with the above reason, researchers would still need to consider that generalizations from this research cannot be absolutely correlated to other specific ethnic populations because of the selection bias. On the other hand, this ethnic limitation suggests the importance

of further developments for research in the senior housing field. The suggestion is to compare seniors' housing behaviors according to different ethnic backgrounds. This comparison would lead to particular inferences about each ethnic group in terms of seniors' housing behaviors. This would also contribute to the improvement of senior living environments for such a diverse senior population in the United States.

In addition to the above two major limitations related to housing decisions, there might be two minor concerns that researchers need to pay attention to in order to analyze the data accurately: the relative objectivity or subjectivity of subjects' responses to questions about 1) their health conditions and 2) the level of medical conditions and physical disabilities. The first concern relates to whether seniors' responses are accurate or not. Seniors might not answer honestly about their health conditions since they tend to pretend to have good health even though they may have some problems with their bodies or minds, such as pains of arthritis or rheumatism and feeling sad or depressed. In general, seniors would like to answer that they feel fine if researchers ask them about their current health conditions.

The second concern is about the degree of medical conditions and physical disabilities. The degree of medical conditions and physical disabilities should be clearly defined with appropriate measurements for each condition and disability. For example, it is very important to identify the levels of diabetes with certain symptoms and the levels of difficulties with walking or climbing stairs. Acknowledging those levels significantly affects the accuracy of data analyses. Since the variables of health conditions and physical abilities were not collected with detailed measurements, it

would be difficult for researchers to generalize precisely the results to apply to the whole senior population of European Americans in the United States.

However, despite those limitations, a broad generalization from Dr. Stoller's data to white European populations in general will be applicable and useful. This study shows the basic knowledge of the relationships between senior housing behaviors and health conditions and between senior housing behaviors and physical abilities.

CHAPTER VI

CONCLUSIONS

Implications from the Research

The results based on Dr. Stoller's data clearly show that there were not many strong predictors influencing seniors' housing decisions and adjustments. Neither of the variables (medical conditions or physical abilities of the elderly) strongly influenced seniors' decisions to change the environments according to their needs although there were several significant relationships between variables. This means that seniors in the Finnish and European American populations in Florida generally did not pay so much attention to their living environments even though they had some degree of difficulty or some problems caused by aging.

One of the reasons for this result might be their attitude toward stigmatizing. Many seniors might not like to live in the place that has exceptionally wide hallways and doors, and grab bars and handrails in the bathroom because those facilities signal disabilities and could lead to stigmatization. In order to eliminate this kind of concern, there are some suggestions for housing educators, architects, designers, builders, and other related professionals, such as health professionals (Steggell, Yamamoto, Lee, & Stoller, 2004). The following suggestions could help improve housing choices for seniors.

One suggestion would be for housing educators. They should educate seniors to consider present and future needs for their houses. For example, local senior organizations could schedule informative programs about maintaining psychological

and physical health in later life and preventing possible accidents that might occur inside and around the house. In addition, those organizations could invite health professionals to speak to seniors in order to encourage pre-planning for their retirement housing. In one case, seniors' lack of planning for their future housing might be due to lack of awareness of options for local supports and options for designs and facilities that help seniors live in comfortable environments.

Furthermore, there are some suggestions for professors and instructors in colleges who educate prospective designers and teach them design classes. Those educators could teach students about housing for special populations, such as seniors and the disabled, with important factors that influence seniors' or disabled persons' housing behaviors. The instructors would also provide students with assignments in which students can participate in design competitions. Those competitions would not only motivate students to create functional and aesthetic designs, but also would train students to discover new attractive universal designs and ADA facilities with new technology.

The second suggestion would be to professionals who create senior housing, such as architects, interior designers, and builders. They should design attractive universal designs and ADA facilities as well as redesign or renovate facilities that have negative aesthetic properties from accessibility elements. For example, designers would use unique color and/or design themes, for creating a bathroom with ADA facilities. In this way, those facilities, such as grab bars and handrails, would become parts of the whole bathroom design rather than being emphasized as negative symbols

of disabilities. In addition, designers would use materials in attractive ways. For example, wood instead of ordinary metal might be used for grab bars in a bathroom that emphasizes nature as a design theme.

The third suggestion would be to health professionals. As mentioned above, health professionals should also educate seniors to be aware of their future changes in health conditions, consider their retirement houses to accommodate their future needs, and/or consider possible alterations in their houses for their present and future needs. For example, a county health department could organize senior fairs to introduce local health support programs for seniors and to promote new facilities or products that help seniors have comfortable daily living.

Lastly, the most important suggestion would be to all those senior housing related professionals. Those professionals should make efforts to widely spread functional and aesthetic universal designs and ADA facilities to all generations through education, creation, promotion, and marketing. For example, government programs should investigate public buildings with ADA accessibility and proactively support commercial and residential facilities to meet accessibility requirements. In those ways, people will be gradually exposed to accessible environments. If universal designs and ADA accessible facilities were wide-spread within and outside the home, people would not feel stigmatized by those designs and facilities. Making environments accessible would be one of the main future goals for professionals to accomplish in order to create safe, healthy, and comfortable living environments for all generations.

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APPENDICES

Appendix A

Institutional Review Board

Application for Research Involving Human Participants

OREGON STATE UNIVERSITY

INSTITUTIONAL REVIEW BOARD
APPLICATION FOR RESEARCH INVOLVING HUMAN PARTICIPANTS

Please read through the entire application before beginning. All material, including this cover sheet, must be typed and submitted to the Human Protections Administrator, Office of Sponsored Programs and Research Compliance, 312 Kerr Administration Building, with the required number of copies for the type of review (see below). **Incomplete applications will delay the review process.** Send an e-mail to *IRB@oregonstate.edu* or call (541) 737-3437 with any questions.

Protocol No. _____

Principal Investigator: Dr. Victoria Douglass **E-mail:** douglassv@oregonstate.edu

Department: Design and Human Environment **Telephone:** 737-0982

Project Title: Predictors of Florida Retirees' Housing Decisions and Housing Adjustments

Type of Project: ☐ **OSU Faculty or Staff Research Project** ☒ **Student Project or Thesis**
☐ **Courtesy Faculty Research Project** (see page 4 for additional information)

Student Researcher: Toshiko Yamamoto

Type of review requested:

☒ Exempt from Full Board review — see ATTACHMENT A for a complete listing of Exempt categories. *Allow a minimum of one week for the initial review and additional time for required modifications, if requested. Submit one copy of the complete application (with the original signature of the Principal Investigator) and indicate reason(s) for exemption on Attachment A.*

☐ Expedited review — see ATTACHMENT B for a complete listing of Expedited categories. *Allow a minimum of one month for the initial review and additional time for required modifications, if requested. Submit three complete copies of the application (one copy must have the original signature of the Principal Investigator) and indicate reason(s) for expedited review on Attachment B.*

☐ Full Board review — *a schedule of upcoming Full Board meetings and submission deadlines can be found at:* http://osu.orst.edu/research/RegulatoryCompliance/HumanSubjects.html. *Submit sixteen complete copies of the application (one copy must have the original signature of the Principal Investigator) with each page numbered.*

External Funding *(present or proposed)*: ☒ **No** ☐ **Yes**

If yes, Sponsor Name: _____ *(include one complete copy of the grant application for all PHS/DHHS/NIH funding, clearly flag and highlight any pages referencing human participants, indicate whether funding is received directly or through a subaward)*

Project Start Date *(i.e., recruitment of human participants)*: June, 2004

All research staff involved in this project must receive training in the ethical use of human participants in research. To document this training, the Certification of Education form (available at: http://osu.orst.edu/research/RegulatoryCompliance/HumanSubjects.html) must be submitted. This form needs to be submitted only once for each researcher.

CERTIFICATION OF EDUCATION – Please indicate if the form has been previously submitted:

Principal Investigator: ☒ **Yes** ☐ **No*** **Student Researcher:** ☒ **Yes** ☐ **No***

Additional Research Staff *(attach additional sheet if necessary)*:

Name:	**Role in project:**	**Previously submitted:**
____	____	☐ **Yes** ☐ **No***
____	____	☐ **Yes** ☐ **No***
____	____	☐ **Yes** ☐ **No***
____	____	☐ **Yes** ☐ **No***
____	____	☐ **Yes** ☐ **No***

***If not previously submitted, please submit the Certification of Education form immediately. IRB review of the proposed project will not occur until the appropriate Certification of Education form for each research staff member has been received.**

Principal Investigator's assurance and compliance statement:

- I agree to accept responsibility for the scientific and ethical conduct of this project.
- If this project is approved, I agree to submit ***any*** modifications to the approved project to the IRB for review and approval prior to implementation (including changes in research staff, external funding sources, changes in wording to the consent form, etc.).
- I agree to promptly report all adverse events that may occur as a result of this study.
- I agree not to start any part of this study involving human participants (including participant recruitment) until I have received full IRB approval.
- I will submit any requested information in a timely manner.

Conflict of Interest Statement: Could the results of the study provide a potential financial gain to you, a member of your family, or any of the co-investigators that may give the appearance of a potential conflict of interest?

☒ **No** ☐ **Yes** (please describe any potential conflicts of interest in a cover letter and disclose in the informed consent document)

If acting as an advisor for a student project:

- I agree to be the point of contact between the IRB and the student investigator(s) for all communication (students will not receive communications directly).
- I agree to oversee the student research and to ensure the project's methods and the model are sound and ethical.

\Redacted for privacy

Signed _____ Date 20 May 2004

Principal Investigator

Attachments *(applications must include each of the following items if appropriate to the proposed research project)*: The protocol for the proposed study must be attached to these forms using the headings and order specified below, with each item identified and addressed separately, or the application review will be delayed. **Use lay language throughout the application.**

1. **Brief Description.** A brief description (one paragraph) of the significance and objectives of this project in lay terms. Include the intended use for this research (e.g., publication, presentation, program evaluation, etc.).

2. **Participant Population.** Include a complete description of the participant population:

   - The number of participants to be recruited (or approximate number if specific number is not known)
   - Participant characteristics (a justification is required if the participant population is restricted to one gender or ethnic group or unique population)
   - Method of selection

   Please indicate if the participant population is **not** restricted to any gender or ethnic group.

3. **Methods and Procedures.** A description of the methods and procedures to be used during this research project. Outline the chronological sequence of events involving human participants, beginning with recruitment. Forward written copies of **all** recruitment materials. Include the estimated time commitment for a participant's involvement.

4. **Risks.** A description of the risks (if any) to the participants involved in this research and how those risks will be minimized. Please indicate if there are no foreseeable risks to participants.

5. **Benefits.** A description of the benefits (if any) to the participants involved in this research. Please be sure to indicate if there are no direct benefits to participants.

6. **Compensation.** Include a description of any compensation that will be given to participants. Include details concerning the conditions under which research participants would receive partial payment or no payment at all (e.g., withdrawing early from the study).

7. **Informed Consent Process.** A description of the methods and the **process** by which informed consent will be obtained and documented. Assent and informed consent document templates are available at: http://www.orst.edu/research/RegulatoryCompliance/HumanSubjects.html.

8. **Anonymity or Confidentiality.** A description of the method by which anonymity or confidentiality of the participants' identity and information will be maintained.

9. **Attachments.** Applications must include each of the following as applicable to the proposed research.

☐ ***Recruitment Materials:*** A copy of *any* advertising (e.g., posters or fliers) that will be used to recruit participants, including verbal announcements or scripts for initial telephone contact.

☐ ***Informed Consent Information.*** The informed consent information, ***as it will be distributed to potential participants*** (i.e., on Departmental letter head, with a one-inch margin at the top of the page for the IRB approval stamp), including parental permission and child assent documents. The informed consent information must include the pertinent items from the "Basic Elements of Informed Consent" and must be in lay language (written at the eighth grade reading level).

☐ ***Questionnaire, Survey, Testing Instrument.*** A copy of any questionnaire, survey, or testing instrument (if any) to be used in this project.

☐ ***Debriefing Materials.*** A copy of any debriefing materials utilized, either in written form or orally presented.

☐ ***Letters of Approval.*** Written letters of approval from each cooperating school, hospital organization, club, or similar type of group (if subjects are obtained through this type of group or organization, a written letter of approval, from an individual authorized to approve such activities, is required).

Instructions for Selected Items on Application Forms

Protocol No.: Leave this space blank; a protocol number will be assigned by the IRB.

Principal Investigator: If more than one investigator is involved in this project, list the investigator who will be the primary point of contact between the IRB and the research team.

Principal Investigator E-mail: Important!! E-mail is the primary means for communication with the Principal Investigator (PI). Be sure to check your e-mail regularly after submitting an application.

Department Address: If PI does not have a campus mailing address, provide a US mail address. Notification of IRB approval is sent via campus mail or US mail to the PI only.

Type of Project: Indicate if the project is a faculty or staff research project, a student research project, or a courtesy faculty research project. Courtesy faculty members do not receive salary from Oregon State University. An Unaffiliated Investigator Agreement form (available from the Human Protections Administrator) must be completed before the IRB application will be approved.

Student Researcher: If more than one student researcher is involved, list the student researcher who will be chiefly responsible for coordinating the IRB review process with the Principal Investigator.

Type of Review Requested: Be sure to *read and indicate* on the Exempt from Full Board Review Category form (ATTACHMENT A) or Expedited Review Category form (ATTACHMENT B) why you believe the project should receive the type of review indicated.

External Funding: Indicate if research is being conducted with funds from outside of Oregon State University (e.g., PHS/DHHS/NIH, a corporation, a foundation, etc.). Include the Sponsor's name in the space provided. If the Sponsor is PHS/DHHS/NIH, include one complete copy of the grant application for all PHS/DHHS/NIH funding, clearly flag and highlight any pages referencing human participants, indicate whether funding is received directly or through a subaward.

CERTIFICATION OF EDUCATION form: All research staff involved in the design or conduct, have access to the human subjects, or have access to identifying and confidential information are responsible for completing the required training as detailed on the form and submitting a signed copy of the form to the Human Protections Administrator. *Applications will not be reviewed until CERTIFICATION OF EDUCATION forms have been received for all research staff.*

Additional Research Staff: Indicate the individual's name, role in the project (e.g., co-investigator, student researcher, lab member), and if the CERTIFICATION OF EDUCATION form has been previously submitted.

Exempt from Full Board Review Category form (ATTACHMENT A): Attach and indicate reason(s) for exemption on this form.

Expedited Review Category form (ATTACHMENT B): Attach and indicate reason(s) for Expedited review on this form.

Radiation Exposure Checklist (ATTACHMENT C): This form must be completed **only** if the proposed study involves the use of ionizing radiation.

Research with Human Materials Checklist (ATTACHMENT D): This form must be completed **only** if the proposed study involves the use of blood or any other potentially infectious material or research with human cell lines and products made from human source material.

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ATTACHMENT A
EXEMPT FROM FULL BOARD REVIEW CATEGORIES

Exempt from Full Board review means that the proposed research activities (1) present no more than minimal risk to human participants, and (2) involve only procedures listed in one or more of the following categories. *If you believe your project meets criteria for the exempt classification, check each category below that applies.* **The IRB retains the right to change the review category when warranted by the nature of the research and/or inclusion of vulnerable subject populations.**

☐ (1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as research on regular and special education instructional strategies, or research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

☐ (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

☐ (3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under the above category section (2) if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

☒ (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

☐ (5) Research and demonstration projects which are designed to study, evaluate, or otherwise examine: (i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payments for benefits or services under those programs.

☐ (6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the US Department of Agriculture.

If the project does not fall into one of the above categories, continue to Attachment B.

Note: Research involving audio or videotaping cannot be reviewed at the Exempt from Full Board review level.

Application for Research Involving Human Participants

1. **Brief Description.**

This research will use a set of secondary data to examine seniors' housing decisions and adjustments. The data was collected by Eleanor Palo Stoller, Ph. D. with the support of a grant from the National Institute on Aging (Grant R01 AG10791, National Institute on Aging, U.S. Department of Health and Human Services).

The research has three purposes. The first purpose is to investigate two groups of factors that influence seniors' housing decisions and adjustments. The first group of factors includes variables related to health and medical conditions. The second group of factors includes variables related to general physical abilities of the aging. The second purpose of the research is to examine characteristics of those two groups of factors. The last purpose of the research is to compare the influences of the above groups of factors on seniors' housing decisions and adjustments in order to see if there are any differences between the influences from the two groups.

2. **Participant Population.**

The subjects were elderly Finnish American retirees and other European American retirees in Florida. All had migrated to a retirement location in Florida from a northern part of the United States after their own or their spouses' retirement. Only one respondent from each household was selected for this study. There were 593 retired migrants (393 Finnish Americans and 200 other European Americans). Ages of the respondents were 60 years old and older.

3. **Methods and Procedures.**

The sample was randomly selected from telephone directories that were obtained from lists of members of retiree organizations. A subsample whose ethnicity was European American was collected from the initial telephone screening. Then, another subsample whose ethnicity was Finnish American was recognized through this telephone screening and from snowball sampling techniques.

4. **Risks.**

This study will not generate physical or psychological risks for the participants.

5. **Benefits**.

This study will provide opportunities for the elderly participants to be more aware of their living environments. This is beneficial for the participants since they will consider about their living environments to be safe and comfortable for their life satisfaction.

6. **Compensation**.

There is no compensation for the participants in this study.

7. **Informed Consent Process**.

This process was already taken care of the original researchers who collected the data.

8. **Anonymity or Confidentiality**.

Data will be kept confidential to the extent permitted by law. Although highly unlikely, under the Freedom of Information Act (FOIA), an individual outside the research team may request access to research data.

All data will be placed in a room which will be locked so that researchers can strictly keep the data confidential. The data can only be handled by researchers. If the study is published in a journal or other written materials or is used for oral presentations, the subjects will not be identified in any way.

Appendix B

Institutional Review Board

Approval for Research Involving Human Participants

OSU Oregon State University

Institutional Review Board • Office of Sponsored Programs and Research Compliance
Oregon State University, 312 Kerr Administration Building, Corvallis, Oregon 97331-2140
T 541-737-3437 | F 541-737-3093 | IRB@oregonstate.edu
http://oregonstate.edu/research/RegulatoryCompliance/HumanSubjects.html

TO: Victoria Douglass,
Design and Human Environment

RE: Predictors of Florida Retirees' Housing Decisions and Housing Adjustments
(Student Researcher: Toshiko Yamamoto)

IRB Protocol No. 2583

The referenced project was reviewed under the guidelines of Oregon State University's Institutional Review Board (IRB). The IRB has **approved** the application. This approval will expire on **5/23/2005**. This new request was reviewed at the Exempt from Full Board level. A copy of this information will be provided to the full IRB committee.

- Any proposed change to the approved protocol, informed consent form(s), or testing instrument(s) must be submitted using the MODIFICATION REQUEST FORM. Allow sufficient time for review and approval by the committee before any changes are implemented. Immediate action may be taken where necessary to eliminate apparent hazards to subjects, but this modification to the approved project must be reported immediately to the IRB.
- In the event that a human participant in this study experiences an outcome that is not expected and routine and that results in bodily injury and/or psychological, emotional, or physical harm or stress, it must be reported to the IRB Human Protections Administrator within three days of the occurrence using the ADVERSE EVENT FORM.
- If a complaint from a participant is received, you will be contacted for further information.
- Please go to the IRB web site at:
http://osu.orst.edu/research/RegulatoryCompliance/HumanSubjects.html to access the MODIFICATION REQUEST FORM and the ADVERSE EVENT FORM as needed.

Before the expiration date noted above, a Status Report will be sent to either close or renew this project. It is imperative that the Status Report is completed and submitted by the due date indicated or the project must be suspended to be compliant with federal policies.

If you have any questions, please contact the IRB Human Protections Administrator at IRB@oregonstate.edu or by phone at (541) 737-3437.

Redacted for privacy

Date: 5/24/04

Laura K. Lincoln
Human Protections Administrator
Institutional Review Board

pc: 2583 file