AGING IN PLACE: FUNCTIONAL ENVIRONMENTS:
A SURVEY AND CASE STUDY IN FLOYD COUNTY, VIRGINIA

by

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(ABSTRACT)

The problem addressed in this study was: What home modifications are made to residential environments to meet the functional capabilities of the aging in place audience? The study was conducted in two phases. In Phase I 102 Floyd County, Virginia, adults 65 years of age or older were interviewed in order to identify their task capabilities and identify the modifications being made to meet their environmental needs and task capabilities. Phase II consisted of a case study of six females taken from the Phase I sample group. This section of the study focused on the modifications identified in Phase I, the techniques used, and the reasons they were made.

The findings indicate that 26% of the adults in the study were experiencing difficulty with at least one Activity of Daily Living, 33% were experiencing difficulty with at least one Instrumental Activity of Daily Living. However, like many older adults, these individuals had a relatively high function level and wanted to stay in their home as long as possible. Modifications are being made in order to equalize the participants' function level and the
characteristics of the living environment.

Housing education programs should be targeted toward the elderly and their family members and provide more information relating to aging in place. Professionals in housing and related fields should have the knowledge necessary to advise clients on making decisions to help insure their ability to live independently as they age.
DEDICATION

There are many people who play a role in our life's goals. This is dedicated to several who have helped me achieve the particular goal of completing graduate school.

To my graduate committee, each of whom, provided encouragement and direction.

To the interviewers and participants who were instrumental in the completion of the research.

To my family, who have always supported me, whatever "road" I have taken.

And to my friends, who shared words of encouragement, technical assistance and were understanding of my time limitations.
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CHAPTER I
INTRODUCTION

Background of the Problem

American society is aging as it always has but with one major change: There is a growing number of individuals in the 65 and over age range. Within the United States, the South is experiencing the second largest increase (31.4 percent) of adults aged 65 and over (Dinkins, 1994). Rural populations in particular are projected to experience sizable increases in the old (65-75) and very old (75+) over the next quarter century. The very old population, 75 years of age and older, in Floyd County, Virginia, numbered 890 in 1990, 7% of the total population. That same segment of the population is projected to grow by 26% to 1,123 by the year 2010 (Lillywhite & Neimann, 1993). Assuming the total population is stable, this number will represent 8.75% of the total population of 12,898.

Floyd County is a rural county, population 12,000, with the Blue Ridge Parkway along its southern boundary. The county is composed of people whose families have always been in Floyd as well as those who are attracted to the county by its beauty, its rural setting, or its water quality. All water flows out of the county which means that the county gets no outside contaminants. One state route and one U.S. route connect the county to more urban areas such as Roanoke.
and Blacksburg, Virginia. Interstate 81 is 18 miles away and Interstate 77 is 26 miles away, facilitating access to the major cities of the United States.

Approximately 40% of the 8,579 employed individuals work outside of the county in the more urban areas, often within a 20-40 mile radius. Within the county there are a limited number of manufacturing businesses and several small retail businesses. Thirteen percent of the county's income is generated through farming.

The 1990 census showed housing in Floyd consisting of 4,763 units of which 3,549 are single-family units with a median value of $51,000. Floyd County not only has a population aging in place, it also attracts a number of retired or near retirement-age individuals to the county. A population projection chart of Floyd's population indicates an influx of people between the ages of 50 and 65 in the next 20 years (Lillywhite & Neimann, 1993). With this trend of a growing old old population come many concerns and problems. One of these concerns is that of housing.

As people age, many changes occur such as loss of friends, out-migration of family, poor health, and limited mobility. As these changes take place, older persons' homes become more important in their lives and also present problems for long-term occupancy (Rubenstein, Kilbride, &
Nagy, 1992). The changes older adults face necessitate that choices be made.

If the choice is to age in place, then the home ideally would provide a support system for its occupant, not more challenges. More concern needs to be placed on adaptability, flexibility, and variety (Hoglund, 1983). These three variables could increase the support for the occupant of the home.

Purpose of the Study

Statistics for Floyd County indicate that 22.8% of those over the age of 60 are living alone (Clements, 1991). The local Area Agency on Aging director indicated that one third of the agency's Floyd County congregate meal participants are in need of some level of assistance. While this audience finds itself needing assistance in advanced age, it is estimated that 53% of this population did little planning for their future housing needs (Dinkins, 1994).

Enabling the elderly to age in place safely allows them to maintain their independence for a greater length of time. Not only does aging in place have a positive effect on the elderly but it saves the state a large expenditure in support services, long-term care, and medical cost (Cates, 1990). This same savings may be experienced by family members also.
There may be only one factor that determines whether or not an elderly person remains in the home. If this older adult knows of no way to overcome a particular challenge (e.g., multiple stairs), a move from the home to a more supportive environment may be necessary. The lack of knowledge of choices is one of the factors that limits the choices made by the elderly (Rubenstein, Kilbride, & Nagy, 1992). Atchey & Miller (1975) suggested that "housing education might be a good component to have in any service delivery program aimed at the rural aged" (p.109).

Educational resources are often readily available in urban areas but limited to residents in rural areas. Community colleges, libraries, and resource agencies are not present in every rural community. A Cooperative Extension office is located in every Virginia county. It is an educational resource with a history of working with the rural population both young and old. Knowledge gained from this study will be used to develop Extension programs to help the citizens in Floyd County increase their knowledge about the resources available to them.

Statement of the Problem

There is a population that is aging in place that needs extra support. A limited amount of research has focused on the modifications made to the homes of this population to meet the environmental challenges associated with growing
older. What home modifications are made to residential environments to meet the functional capabilities of the aging in place audience? This information can then be used to enable the aging audience to better meet their housing needs. The information might also be used with younger audiences who are either planning ahead or providing support to older family members.

Specific Objectives

The overall objective of this research was to identify the modifications made to rural residential structures in Floyd County in order to align the physical capabilities and environmental demands of those who age in place. This research was conducted in two phases.

Phase I was a survey to determine the current situation of the existing living environment of older adults in Floyd County. Information was gathered through interviews with local elderly residents. To increase response rates the interviews were conducted by local volunteers who were often neighbors.

Phase II consisted of in-depth personal interviews with a small sample of the participants in Phase I in their homes. The purpose was to identify modifications that have been made to accommodate the needs of a sample of elderly people in order to identify common factors in the type of modifications or reasons for making the changes. Information
gathered will be used in developing an educational component appropriate for use in Extension educational programming.

This thesis contains information that indicates the functional levels of individuals who represent a sample of one population and the modifications they are making to their residential environments. It also contains some of the techniques and reasons accompanying the modifications made to the residential structures. While providing research-based information, this thesis also provides a basis for future research about the aging in place concept.
CHAPTER II

REVIEW OF LITERATURE

The background for this research has been gleaned from a variety of published works. The review revealed many different views and thoughts on the functional levels of the aging population. While the review did yield information on what modifications could be made to meet functional levels of the elderly, there was little to indicate what modifications were being made or had been made to provide greater support for independent living.

A home has different meanings for different individuals. The home of an elderly occupant takes on a meaning of independence, personal space, the ability to make one's own choices, a safe haven, an investment, and physical viability (Rubenstein, Kilbride, & Nagy, 1992). Others may simply see it as a structure in which to stay warm. Montgomery (as cited by Bylund, 1985) commented on the importance of the quality of housing to the elderly:

The quality of the housing environment becomes increasingly significant in the lives of many aged families and individuals; and the quality of this limited world largely determines the extent to which they will retain their independence; the amount of privacy, auditory and visual, they will experience; how often they will visit friends; their sense of place;
and their ability to exercise a measure of control over the immediate environment. Housing is a major variable physically, socially and psychologically in the lives of older persons (p.130).

For many older adults, the home is where they want to live the duration of their life. This choice is referred to as aging in place. Across the nation there are both rural and urban elderly who are facing the challenges of aging in place because staying in their homes requires some modifications to accommodate the change in the aging person's function level (Cates, 1990). Several factors affect the functional level of elderly persons and thus their ability to stay in their homes. The factors include those of environmental, psychosocial, and physical changes. Changes in the physical environment include handrails, loose steps, and door hardware.

Modifications may include a change in practice, assistance from outside, or changes within the home. Typically, older adults make three types of adjustments to their homes in an effort to age in place: bring in a boarder/roomer, change use of rooms, and add modifications to better meet the needs of the persons (Struyk & Katsura, 1987). Psychosocial changes include considerations such as loss of "significant other," proximity of family or friends, and social involvement. The significance of these factors
has been reviewed in several studies (Buch, 1982; Golant, 1992; Remnet, 1978).

The functional level, or ability to do a task, is recognized as an indicator of capability to live independently (Golant, 1992; Rubenstein, Kilbride, & Nagy, 1992). In Housing America's Elderly Golant identified specific housing problems that the elderly may experience as their functional level decreases. Golant also listed home modifications and repair programs as an option that allows older persons to remain in their homes. He stated that when faced with a threat to their independence, older adults will find solutions to enable them to stay in their home. All indications in the review of Golant's work point to the fact that modifications are being made to homes. However, Golant found limited information about what modifications are actually being made to homes of those individuals who are aging in place.

A person's ability to perform a task is recognized as a method of measurement. The units of measurement are the activities of daily living (ADL) and the instrumental activities of daily living (IADL) (Rubenstein, Kilbride, & Nagy, 1992). The ADLs include eating, dressing, bathing, toileting, walking, getting in and out of bed or chair, and getting outside. The IADLs include preparing meals,
shopping, managing money, using the telephone, and doing light and heavy housework.

The ability or inability of a person to perform a given task may be affected by various factors. Professionals are recognizing the interactive relationship between the elderly and their environment, or as Rubenstein, Kilbridge, and Nagy (1972) stated, "Environments and their users exist in interaction" (p.19). Faletti (1984) referred to two outlooks on how a person and the environment relate. In the first, the performance of a task is "a joint product of person and environment" (p.193). The second recognizes the need for "modifying the environment to make the environment more supportive" (p.194).

Theoretical Model

The theoretical framework for this study is based on Faletti's Human Factors Model of Person-Environment Transactions (Figure 1). Faletti's (1984) model is "one approach to operationalizing a person-environment model of functional behavior in human factors terms"(p.201). This model takes into consideration the person's capabilities and the environment's characteristics in relation to one specific task. Faletti (1984) described this as "the person-environment fit" (p.203). Faletti's Human-Factors Model of Transactions provides a framework to look at a person's capability to perform a task within their environment,
Figure 1. Components of a human factors approach to person-environment transactions. Paletti (1984)
independent of his or her age or stage in life.

**Task Issues**

The accomplishments attained in a day require that many tasks be performed. The aging process can create a decreased ability to perform certain tasks. Studies have shown that, among the non-institutionalized elderly population, 13% have difficulty with at least one ADL, 18% have difficulty with at least one IADL, and 20% have difficulty with one ADL and one IADL (Golant, 1992).

This decreased task performance ability of some elderly is a risk to their safety. When a task is performed unsuccessfully there is a chance of an accident. The American Association of Retired Persons (1986) has stated, "Safety and accident prevention are keys to staying healthy for older adults" (p.27). When the ability to perform a task is impaired, many older adults find someone else to perform it. Another suggestion from the National Institute on Aging (1991) is to make simple changes in the home in order to prevent accidents and injuries.

**Environmental Issues**

The rural elderly often experience environmental characteristics that are different from those of their urban counterparts. A greater proportion of homeowners are in rural America, where half of the homes were built before 1940 (Bylund 1985). When housing problems are considered,
the reference is often made as to the severity of the problem. Seventy-two percent of the elderly's housing with moderate and severe problems is occupied by rural residents (Dinkins, 1994). Discussion with Floyd County residents indicate that during the time prior to the 1950s features such as indoor plumbing and electricity were not a given in Floyd County housing. To compound the situation, the rural elderly have fewer services available for use than the urban elderly (Jurich, Smith, & Polson 1983).

Paul Grayson, an architect and research consultant, stated that "the environment can control people and therefore, people need to take charge of the environment so that it works with them (Grossman, 1991). He also suggested that "to reduce the tendency toward accidents, the environment must adapt to young, old, short, tall, able and disabled people" (p.47). According to Faletti's model (1984) the characteristics of the environment that could be changed are the spaces, objects, cues, and controls.

**Person Issues**

A person's capability to perform a task is affected by the aging process. The aging process can create changes in vision, hearing, muscle strength, coordination, and reflexes (National Institute on Aging, 1991). Assumptions are often made that a person of one age must be just like another of the same age. It is now more widely recognized that there
is a diversity in the aging population and that the "miseries" of aging often are experienced after the age of 75 (Longino, Soldo & Manton, 1990). This population over 75 is often referred to as the old old.

More research is required to discover how members of the aging in place population are meeting the challenges of changing functional levels. Faletti (1984) specifically stated that research should contain more field research instead of laboratory and that it should apply to current housing as opposed to new construction.

The three purposes of this study, then, were to:

1. identify the elderly's functional capability to perform particular tasks.

2. identify what modifications the elderly are making to meet the demands of their residential environment.

3. review the techniques and reasons associated with the modifications that were made to the homes.

Empirical Model

For this study the Activities of Daily Living (ADL) and the Instrumental Activities of Daily Living (IADL) are the measures of the person's capabilities. The characteristics of the environment listed in the theoretical model are applied to the dwelling.

Phase I of this study examined the variable of
person's capability as measured by task performance. The second variable in Phase I consisted of the modifications made to the environment. The third variable, the techniques and reasons associated with the modifications made to the elderly's environment, are included in Phase II.

Summary

This chapter summarizes some of the meanings home has for various audiences. When considering the older population the home can be a safe haven or a constant challenge. Performance of daily tasks can create challenges when hindered by personal inequalities or barriers in the home environment. Research indicates that when striving for independent living and faced with limited task performance modifications are made to the environment.

Faletti's Human-Factors Model of Transactions (1984) was the model used as a conceptual foundation for this study. The study has three purposes, to identify the elderly's task performance capabilities, the modifications being made, and the techniques and reasons behind the modifications. These purposes are accomplished in two phases. Phase I was focused on the task capabilities and the modifications being made. Phase II was focused on how the modifications were made and why.
CHAPTER III

THE SURVEY - PHASE I

The intent of this section of the study was to discover the task capabilities of a sample group of the older residents of Floyd County, Virginia. The study also identified the modifications that were being made to meet the environmental needs and task capabilities. Information gleaned from Phase I then provided the foundation for Phase II.

Methodology

Because no previous research was found to use as a foundation, it was necessary to develop a process by which to conduct the research. The elements of this process are explained in the following sections.

Empirical Model

The empirical model was based on Faletti's (1984) model of Human Factors Approach to Person-Environment Transactions. Faletti's model is based on the premise that person and environment do relate to each other and should be in equilibrium for effective task performance. A person's success in performing a task depends on his or her capability and the demands of the environment. Faletti recognized that if the environment is not supportive of the task performance, there may need to be modification to the environment.
The variables considered in this study were that of task performance and modifications residents made to adapt the demands of their living environment. Task performance was measured by asking the participants about their capabilities of performing a particular task. The modification variable was identified by the participants.

**Instrumentation**

The interview schedule was designed to identify the person's capabilities and modifications made to the environment. The person's capabilities were identified with a series of questions about the person's ability to perform activities of daily living. Additional items were designed to elicit information about modifications to the environment.

Participants were asked about their capabilities to perform each of the activities of daily living (ADL) and instrumental activities of daily living (IADL) (Table 1). The task of getting in and out of a chair was expanded to two tasks. One part had to do with getting in and out of a dining chair, the second getting in and out of a living room chair. The rationale was that the different designs of these chairs involve different levels of performance.

In order to identify the modifications made to the participant's environment, the instrument included questions relating to changes made in the home to facilitate
### TABLE 1

**Activities Of Daily Living (ADL) And Instrumental Activities Of Daily Living (IADL) Used In Survey**

**Activities Of Daily Living (ADL)**
- Getting out of living room chair
- Getting out of dining chair
- Eating
- Walking
- Getting in/out of bed
- Dressing
- Toileting
- Bathing
- Getting outside

**Instrumental Activities Of Daily Living (IADL) Used In Survey**
- Telephoning
- Shopping
- Meal preparation
- Housework
- Money management
performance of the tasks. A separate question focused on their attitude toward their home. Another question was added to determine the age group in which the interviewee belonged. Instrument questions were created by the researcher except for the question pertaining to the subject's attitude toward her home that was taken from a study by Lovingood, Bliezner, and Hill (1987).

The instrument was pilot tested with eight members of the Floyd County Family and Community Education club. To alleviate confusion, the wording of one question was changed. The words "such as rising and lowering" were added to the question referring to the task of going to the bathroom in order to emphasize the logistics of the task and not the physiological action. A copy of the interview schedule can be found in Appendix A.

Data Collection

The data were collected through interviews. Therefore, the study included both a sample selection and an interviewer selection process.

Sample Selection

Floyd County, Virginia, was selected for the study since it is a rural county and 7.8% of the total county population is 75 years of age or older. It was also an area accessible to the researcher. The number to include as the sample size was determined by beginning with 7.8% of the
county population 75 years of age and older. And then adding approximately one-third more allowing for those who might refuse to participate. The sample was obtained by using the snowball technique. Each volunteer who agreed to work with the study selected five or six individuals, who met the criteria, to participate.

The criteria for the sample group included:

must be 75 years of age or older
must be able to perform at least one out of eight ADLs and three of five IADLs by self

The sample group was required to be 75 years of age or older since this is the age at which the designation turns to old old. Research also has indicated that this is the age group that begins to experience more of the "miseries" of aging (Longino, Soldo, Manton 1990).

The sample consisted of 104 individuals, 102 of whom were included in the data analysis. One did not sign the permission form, and the second asked to be removed from the study. Of the 102, 23 were men and 79 were women, or approximately one man for every three women. Of these individuals, 22 were couples and lived in the same household.

**Selection and Training of Interviewers**

The researcher asked for volunteers from the local Family and Community Education (FCE) Clubs to serve as
interviewers. Each of the 17 volunteers agreed to identify five to six elderly Floyd County residents and conduct the interviews.

Volunteers were required to attend one training session held in the Town of Floyd. Three dates (February 10, 11, and 13, 1995) were selected in an effort to meet volunteer scheduling needs. The first training session, which most volunteers attended, required two hours. The following sessions with only a few in attendance required 30 - 50 minutes.

The training session contained an overview of the study, procedures to follow, distribution of the interview schedules, and selection of interviewee names. Interviewers identified names of those they would approach and were requested to contact the researcher if there were any changes in their list. A master list of subjects who were to be contacted was kept in an effort not to have any elderly resident approached by multiple interviewers. Interview training materials can be found in Appendix C. The interviewers received no compensation for their involvement in this study. At the end of the interview process the interviewers were invited to a 'Thank You' tea and presented with a small gift.

**Interview Process**

The volunteers first made contact by telephone to
set a date and time for the interviews and obtain directions to the subjects' homes. The interviews were conducted in the subjects' homes during the period of February 13 to 22, 1995, with one exception. One interview was conducted at the request of the interviewee after a Sunday church service in the Willis area of the county. After the interviews the volunteers gave the directions to the homes to the researcher for referral during Phase II.

Before the interviews began the participants were asked to sign a consent form. During the interviews, the volunteers asked the subjects the questions listed on the interview schedule and recorded their responses in writing. If a husband and wife were both to be interviewed, the volunteers requested that the one not being interviewed leave the room. This request was made so that one spouse would not sway the other's responses.

The interview schedule was completed in 15 to 20 minutes, depending on the subjects' responses. However, some interviews were longer because some volunteers stayed to visit. Upon completion of the interview, the volunteers returned the completed interview schedules to the researcher.

Data Analysis

After all the interview schedules had been returned each subject was given an identification number. All
possible responses from the interview schedule were given a numeric code in order that they could be programmed into a computer program for analysis. The schedules were coded by the researcher.

A descriptive analysis was used for this study. Data were reviewed for frequency and range as well as measures of central tendency and dispersion.

Findings

The purpose of Phase I was to identify what modifications were being made to meet the functional capabilities of the aging-in-place audience. Phase I also identified the number of interviewees who had made modifications.

The sample for this study consisted of 102 adults, all 75 years of age or older. Fifty percent of the adults were within the age category of 75 - 79 years, 28.5% were 80 - 84 years, and 21.5% were 85 years of age or older. The breakdown of the group by sex revealed that 77.5% were female and 22.5% were males. When the sample in this study was compared to their cohorts within the New River Valley, which includes the counties of Giles, Pulaski, and Montgomery and the city of Radford, there were some similarities. The breakdown by age within the Valley was within one or two percent of the study's breakdown by ages. The male to female ratio is almost one to one in the Valley
as compared to a one to three ratio in the study.

While the study focused on residents of Floyd County, Virginia, residence in the county of Floyd and which ones that lived within the Town of Floyd was recorded. The reason for this was to see if there were any differences or similarities between the two groups. Ninety percent of the sample lived within the county and the other 10% lived within the Town of Floyd.

Living Situation

One of the requirements for participants of this study was that they live independently, though not necessarily alone. Within this study individuals comprising a married couple were considered to be living by themselves. The rationale for this was that they had not changed their living situation to include a new care provider.

One question on the interview schedule asked which of several statements about their living arrangements would be their ideal choice (Table 2). This question was included as an indicator of whether or not the elderly population preferred to age in place. The 102 responses to this question indicated that 87.2% wanted to remain in their home. Of that 87.2%, three individuals were willing to have someone move into their present residence with them.
### TABLE 2

**Ideal Living Situation**

*N = 100*

<table>
<thead>
<tr>
<th>Living Situation</th>
<th>Indicated as Ideal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live here by self</td>
<td>73</td>
</tr>
<tr>
<td>Stay here by self and pay someone</td>
<td>13</td>
</tr>
<tr>
<td>to help take care of the house</td>
<td></td>
</tr>
<tr>
<td>Move to place where maintenance and repairs are handled by someone else</td>
<td>10</td>
</tr>
<tr>
<td>Stay here and have someone move in who could help take care of house</td>
<td>3</td>
</tr>
<tr>
<td>Move closer to people who could help take care of the house</td>
<td>2</td>
</tr>
<tr>
<td>Move in with someone else</td>
<td>1</td>
</tr>
</tbody>
</table>
The remaining 12.8% were willing to move. The findings indicate that there is a strong desire to maintain independence.

The interviewer also was requested to indicate if the subject's ideal living situation was the present situation with a yes or no response. Of the 102 responses to the question, 74% indicated the participants were living in their ideal situation. The remaining answered they were not. Because the study required a yes or no response it is not known which of the living situations were the ideal living situations.

**Capabilities and Modifications**

Faletti's model focuses on the person's capability and the environmental demand and how that affects the outcome of a person's activity performance. In this study, capability was measured through the person's ability to perform an ADL or IADL task. The environmental demand of Faletti's model was not measured but was considered to be inherent in the residential environment of the subjects. The adaptive outcome, modifications, or changes made to the residential environment, were measured by recording the occurrence of modifications.

Each question referred to one particular task and had four parts (Appendix 1). The first part of the question asked if the subject had difficulty carrying out that
particular task. The second part of the question asked if any changes had been made to help with the task. The third part of the question was answered if changes had been made and asked what they were. The fourth was answered if no changes were made and asked why changes had not been made.

The questions were grouped in such a way that the ADL tasks were grouped together and the IADL tasks were grouped together. This was done to facilitate any comparisons or conclusions that might be drawn in the research process. A review of the responses to the first part of the question, performance of tasks, indicated that there is a relatively small percentage experiencing difficulty with either the ADLs or the IADLs.

The greatest number experiencing a difficulty with an ADL task was 27% with that of walking. The task with the least number experiencing difficulty was that of getting in and out of a dining chair with 4% (Table 3). The ADL tasks walking and bathing were difficult for approximately one fourth of the participants as shown in Table 3. Of the IADL tasks, more subjects experienced difficulty with the task of housework (34%) than with any of the other IADLs (Table 3). The tasks with which the participants experienced the most difficulty were ones that involved the mobility of their legs and might also involve bending. On the whole,
TABLE 3
Performance Of Tasks And Occurrence Of Modifications

<table>
<thead>
<tr>
<th></th>
<th>Experiencing Difficulty</th>
<th>Making Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td><strong>Activities Of Daily Living</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In/out living rm chair</td>
<td>13.7</td>
<td>6.8</td>
</tr>
<tr>
<td>In/out dining chair</td>
<td>3.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Eating</td>
<td>7.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Walking</td>
<td>27.0</td>
<td>14.0</td>
</tr>
<tr>
<td>In/out bed</td>
<td>4.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Dressing</td>
<td>10.7</td>
<td>10.7</td>
</tr>
<tr>
<td>Toileting</td>
<td>10.7</td>
<td>12.7</td>
</tr>
<tr>
<td>Bathing</td>
<td>22.5</td>
<td>13.6</td>
</tr>
<tr>
<td>Getting outside</td>
<td>15.6</td>
<td>14.7</td>
</tr>
<tr>
<td><strong>Instrumental Activities Of Daily Living</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephoning</td>
<td>11.7</td>
<td>11.7</td>
</tr>
<tr>
<td>Shopping</td>
<td>21.5</td>
<td>6.8</td>
</tr>
<tr>
<td>Meal Preparation</td>
<td>11.8</td>
<td>10.8</td>
</tr>
<tr>
<td>Housework</td>
<td>34.6</td>
<td>17.3</td>
</tr>
<tr>
<td>Money Management</td>
<td>4.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>

N = Total number of respondents.
A small percentage (.9-6.9) of the modifications made are anticipatory.
this audience was experiencing little difficulty. When comparing the responses of the males to that of the females there seemed to be no noticeable male/female differences.

Sections of the interview questionnaire had no response for some of the participants. There was no indication whether this was an oversight in the interviewers' process or if an indication that no modification had been made. Therefore, the response number differs from that of the previous section of the question and is indicated in the results (Table 4).

Golant stated that older adults will find solutions to enable them to stay in their own homes (Golant, 1992). These solutions may take the form of modifications. The responses in this study indicated that modifications are being made although the number making changes is not large. The ADL task with the greatest number of modifications was that of bathing, with 18.6% of the 102 respondents. The number of ADL modifications being made, listed in descending order are: bathing 18.6%, getting outside 14.7%, walking 14.0%, toileting 12.7%, dressing 10.7%, eating 6.9%, getting in and out of living room chair 6.8%, getting in and out of bed and getting in and out of dining chair 1.9%. When the IADL modifications are listed in descending order they begin with housework 17.3%, followed by telephoning 11.7%, meal preparation 10.8%, shopping 6.8%, and money management 1.9%.
When the two groups of responses, experiencing difficulty and making modifications, are compared it seems the majority of those experiencing difficulty are making modifications. Closer inspection of the data reveals that some of the modifications are anticipatory; i.e., made before they are experiencing difficulty. The percentage of anticipatory modifications is small, no greater than 6.9% of the responses to any one task. Most of these modifications were in relation to the IADLs.

In the interview process the subjects were asked what changes they had made without any examples being given. After all the responses had been returned, a list of modifications was compiled and given an identification number for analysis purposes. The category "other" contained commentlike responses as opposed to specific examples.

In Faletti's model of person-environment transactions (Figure 1), the environmental demands include certain characteristics. These environmental characteristics include space; size or configuration, objects; type, size, shape, and operating characteristics. The modifications the subjects have made are the outcome of the disparity between environment demand and task capability. The modifications are often made to the environment characteristics since modifying task capability often is not possible.
### TABLE 4

**Specific Modifications Being Made**

<table>
<thead>
<tr>
<th>Task and Modification</th>
<th>Making Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Activities Of Daily Living**

**Getting Out Of Living Room Chair**
- Chair modification   5
- Purchased new chair  1
- Gets help            1

**Getting Out Of Dining Chair**
- Push up from side     2
- Gets help             1

**Eating**
- Change dinnerware     1

**Walking**
- Uses cane             8
- Uses walker           6
- Other (walking stick, moves slower) 5
- Uses wheelchair       2

**Getting in/Out Of Bed**
- Gets help             2
- Built up bed          2

**Dressing**
- Gets help             2
- Selects front closure clothing 2
- Other (does carefully, tugs sweaters) 2

**Toileting**
- Added bars            7
- Pulls up on something 4
- Other (pottie chair, gets help) 3
- Elevated seat         2

**Bathing**
- Added bars            10
- Takes showers         5
- Added seat in tub     5
- Other(spongebaths,tub grips,has technique) 5
(Table 4 continued)

**Getting Outside**
- Added rails: 8
- Uses cane: 7
- Other (has help, wheelchair, doesn't go out): 3
- Added ramp: 1

**Instrumental Activities Of Daily Living**

**Telephoning**
- Added amplifier: 6
- Added to number of phones: 5
- Other (talks louder, big buttons, portable): 5
- Hearing aid

**Shopping**
- Someone else does shopping: 9
- Someone helps them with shopping: 7
- Other (mail order, agency transportation): 4

**Meal Preparation**
- Receives help with preparation: 8
- Other (cooks less, change kitchen): 4
- Food attained without preparation: 3

**Housework**
- Receives help: 24
- Other (does less, does all but windows): 2

**Money Management**
- Receives help: 8
When the modifications are examined more carefully a wide range of solutions is found (Table 4). The majority of modifications falls in the category of change of practice. This category includes the use of a cane or a walker and the change from baths to showers. In many cases the modification was to get help from someone. There are modifications that fall into the category of changes to the residential structures. Those modifications involving structural changes include the addition of grab bars to aid in the task of bathing and toileting. Ramps and rails were added to help in getting outside. Also in this category was the modification of building up the bed to help with getting in and out of bed.

Summary

All of the findings were a key to what is happening within this sample group as related to person-environment transactions. The information recorded in this section was the basis for the second phase of the study. Some of the modifications made that were recorded in Phase I are more closely examined in Phase II.
CHAPTER IV
THE CASE STUDY - PHASE II

The purpose of this chapter is to report the methodology and findings from the second part of this study. This section includes a more in-depth report of the situation of six elderly Floyd County residents who comprise a representative sample of the 102 individuals interviewed in Phase I.

Methodology

The methodology applied in Phase II differed from that in Phase I. The individuals involved in this part of the study were the researcher and the smaller sample audience as opposed to the interviewers and the original sample audience. There were also changes in the sample selection and the instrument.

Empirical Model

Faletti's model of Human Factors Approach to Person - Environment Transactions (1984) suggests that there is an adaptive outcome in the performance of a task when there is a disparity between a person's capability and environmental demands. Within this study the outcome would be that of the modifications a person makes to the residential environment. Phase II examined the modifications in an attempt to determine how those modifications had been made and why.
**Instrumentation**

The objective of Phase II was to conduct a more in-depth interview to identify modifications that have been made to accommodate the functional abilities of the elderly. The instrument was developed by the researcher, pilot tested with one person, and revised.

The final instrument included the same questions for each subject but focused on the particular modifications each one made. Questions are also included that ask specific details about the house. An interviewer's review of the situation, as reported by Lovingood, Blieszner, and Hill (1987), was included as part of the instrument. A copy of the interview schedule and review can be found in Appendix B.

**Data Collection**

The data collection process contained a smaller sample size and as a case study was handled in a different format than Phase I. Because the interviewees had participated in Phase I they were not asked to sign a second consent form.

**Sample Selection**

The sample for Phase II was randomly selected from those 30 subjects, who had made modifications, and had indicated in the initial interview that they would be willing to take part in Phase II. Eleven others had made modifications but had requested they not to be contacted for
the next part of the study. An attempt was made to include a variety of types of modifications. The researcher first made a list of the number of modifications made by each interviewee as indicated on the surveys. From the list 12 subject numbers were randomly selected from those that indicated they had made modifications. Twelve were selected for the list to allow for those not willing to take part in the case study. After the telephone numbers were retrieved from the records, each person on the list was called and asked to participate in Phase II. The first list of 12 did not yield the ultimate goal of 10 subjects determined manageable for study, thus the selection process was repeated. Still the 10 subjects were not obtained and due to time constraints the case study was completed with six subjects.

The sample of six females also contained one who was unique. Decisions in building her home were based on the goal to age in place. The sample contained no males—simply by default. The selection was made using the keyed information which did not indicate the subject's sex.

**Interview Process**

The interviewer contacted prospective subjects to set a date and time for the interview. Several chose not to participate and another subject had to be contacted in order to reach the required number of subjects. The researcher
proposed to record the interview sessions on audio tape but found subjects preferred not to be recorded. The researcher recorded in writing any information that was volunteered during conversation that provided some insight into the situation of the subject. The six interviews were conducted by the researcher in the subjects' homes between March 20 and 24, 1994, and lasted an average of 45 minutes.

Procedure

Instrumentation of Phase II consisted of an Interviewer's Review and the Interview Schedule (Appendix B). This interviewer recorded observations concerning the interviewees and their home in the Interview Record. The Interview Schedule consisted of questions about both the house and the specific modification. Questions one through three dealt with the specific modifications made:

1) How did (the particular modification they made) help you to carry out the task of (specific ADL or IADL)?

1A) Did you make the modification before or after you actually needed it?

2) Where did you get the idea to make the particular modification and how to do it?

3) Is that modification satisfactory or would you like to improve or change it?

Each interviewee was asked the same questions, for each of the modifications they had made. Interviewees were also
asked what resources they use to find new information in order to discover how future information might be distributed.

Information was obtained in reference to the house for the purpose of comparing the situation in Floyd County to the findings available from other sources. During the interviews the researcher encouraged the older adults to enter into a conversation. The responses were recorded by hand, as a tape recorder was not acceptable. The information shared with the interviewer revealed more about the interviewee than the interview schedule questions alone would have.

Data Analysis

The interview schedules were coded for easy reference, with the subjects identified by the same numbers as in Phase I for ease of cross referencing. The data gathered during Phase II were compiled and reviewed for common factors in the type of modifications or reasons for making the changes. The information was used to create an explanation for some of the findings.

Findings

What follows in this section is a narrative review of what was revealed in this phase of the study. To protect the privacy of the interviewee only the information shared with the interviewer or observed by the interviewer is included,
and each interviewee is identified by a fictitious name. Any conclusions or discussion of that information will be included in the summary of this research.

The overall purpose of this section was to discover more about how modifications were made and why. As would be expected in a case study situation, a wider range of information was gathered than would have been possible without human contact. Facts about each older adult are presented; comparisons are made in the summary of this section.

The final sample group of Phase II consisted of six females. Two of them were in the 75-79 years of age group, three were between 80 and 84 years of age, and one was older than 85 years of age.

MABEL

Mabel, 80-84 years of age, is a retired elementary teacher and principal in Floyd County. This short gray haired lady still speaks with the strong voice that she must have used in the classroom. She has few, if any, problems with her hearing and vision. Three or four years ago Mabel fell and broke her hip. After a long recuperation period at a nursing home, she is living alone in her home. Arthritis and the weak hip have made it harder for her to do things she did before. Mabel now uses a walker inside and outside of
the house.

She is active in her church, the local units of the Daughters of the American Revolutionary, Virginia Federation of Women's Clubs, and Retired Teachers Association, but her level of participation has changed. Before her surgery Mabel attended local, regional, and state meetings of these organizations. She says she can't anymore but does not allude to why she cannot. She can no longer drive and says that not being able to "just go" bothers her. As we prepared for the interview she pointed to the card table filled with stacks of old papers, pictures, and church bulletins. Her church is celebrating their 40th year and she was preparing facts for the minister.

Mabel has been widowed for a number of years and has no children. However, she does have a support base that seems to be meeting her needs. Friends take her to church or to meetings and a lady comes in to clean her home two days a week and often brings her mail in (even if she is just passing by and sees the mail still in the box). Mabel's support base also includes her nieces who take her shopping or bring clothing for her approval, take her to doctor's appointments, and try to see that her needs are met.

The home in which Mabel lives is within the Town of Floyd on one of the main highways. The brick structure, a ranch style, was built in 1958 and includes a basement and
attached carport. The home appears to be in good condition but is not accessible to a person with disabilities. There is one step, without a railing or other support, from the carport floor to the side door. The front door of the house is up three steps from a concrete walk that joins the driveway. Mabel commented that most of the deliverymen were nice and brought packages to the front door.

Since she returned home after having the broken hip, Mabel has made several modifications to her home or routine. As mentioned before, she now uses a walker to aid her movement. Until the fall and hip surgery she did not need the walker or any other support. Hip difficulties have also made it necessary to place an elevated seat in the tub. Mabel admits that she only uses it when someone is there with her because she doesn't feel real secure about the seat. She says she takes "sponge baths" most of the time.

Several modifications have been made to Mabel's IADL's. She does more of her shopping by mail now, stores more in her kitchen and less in her basement, and has moved items in the kitchen so they are easier to reach. She also has had more telephones added throughout the house so that she can reach one before the caller hangs up. She has a telephone in the bedroom, kitchen, and living room. All of these modifications were made after the need made them necessary.

When asked what changes she would like to make to her
home, Mabel said she wished she had an area for her washer, dryer, and freezers upstairs instead of in the basement. She has a railing on both sides of the basement stairs to hold to and will go into the basement if someone is at the house, but otherwise has no access to these appliances. She would also like a railing at the step from the carport into the side door. She said she's made inquiries but no one seems to know how to add one to the concrete and brick surfaces.

As a retired educator Mabel had several questions for the interviewer of this study. One of her questions - "Are others being interviewed handicapped also?" Mabel seems to be adjusting to the changes in her life and not letting them stop what she likes to do. She obviously has not sat down to watch life go by.

SUE

Sue walked slowly but appeared to have no major disabilities. As the interview progressed she mentioned that she had been released from the hospital recently following kidney surgery. Sue, 80 - 84 years of age, wore glasses and seemed to have no difficulty with her hearing.

Sue has not been widowed long and lives alone. Her family seems to provide a very strong support base. At the time of the interview her sister, from Roanoke, was staying with her. Increasing health problems have affected her
function level and her daughter-in-law helps with the majority of the heavy housework. Her son, she mentioned, helps with the heavier outdoor upkeep of her home. Family members also provide transportation and run errands.

Sue and her husband lived in a trailer and followed the construction teams he worked with to the various sites. They built the home where she now lives in the early 1970s. Sue's home is in the county of Floyd yet only a half mile off the main highway and five minutes from town. The house, a one-story brick structure, has no basement and the primary entrance is at ground level. At the time the house was built some useful features were included: grab bars in shower stalls and a seat in one shower stall. The interviewer observed that the hallway to the bedrooms and baths was narrow and may not accommodate a wheelchair should the need arise.

After one of her hospital stays Sue found it more difficult to get up from the sofa. Her son stacked several boards, two high, under the sofa cushions to provide more support (Figure 2). Although the modification works well, it still needs to be cut down a little to match the shape of the sofa more exactly.

Tubes that were placed in Sue's body during the kidney operation created difficulty in lifting up from the toilet. Sue has been holding on to the cabinet to help pull herself
Figure 2. Modification to Sofa.
up, she says that "it does what I wanted." Grab bars were discussed, and she was unsure if they would fit although she agreed that they might help. Sue's health problems also will not allow her to do the heavy housework. Her daughter-in-law visits one day a week to do the heavy housework and windows.

Sue still does most of her cooking but would like to change the kitchen shelves or their arrangement as she has difficulty reaching many of them. One feature she's proud of is the placement of the washer and dryer in the kitchen. This makes them very convenient and accessible for her.

When asked about resources for finding new information Sue mentioned her family once again and the telephone book. It is obvious from the times that her family entered into the interview that she has a strong support system there and that they are an important aspect of her life. While Sue seemed to have a positive attitude about life the - frustration was obvious, too, as she spoke of the doctor's orders not to mow, garden, or clean. She said "I enjoy doing things myself, have always worked."

BETTY

Betty, 80-84, seemed quite youthful. She was expecting company and agreed to be interviewed mid-afternoon after
having breakfast with a sister, a weekly ritual. Betty wears glasses but seems to have no difficulty hearing. At the present there are no signs of any physical disabilities but she mentioned trouble with arthritis in her knees. She doesn't walk as much as she did in the past because the traffic on her road has increased, but uses a treadmill most of the time as a substitute.

Although she does not seem to require extra help in her daily life, Betty does have a support base there for her needs. Her support base is her family and friends. She mentioned that she goes walking, shopping, and out to eat with her friends. Betty has two daughters and three sons. One son is a contractor and another the county building inspector. She said her children help with making the major decisions and doing things around the house.

Betty has been widowed for 23 years and lives by herself, approximately three miles from town, in a brick house her husband built in 1970. The house, which seems to be in excellent condition, is a one-story brick home with a basement. A feature that is not a problem now, but could present challenges in the future, is the entry options into the home. The house is located on a hillside with a basement garage on the front. The steep drive had an equally steep set of steps that lead to the front door. There is a back door at ground level but there is no way to get to it.
without going up the hill at the front.

At this point Betty has only made one modification to her home, the addition of a grab bar in the bathtub. She made the modification after it was needed. Actually, it was a gift from a son and his wife who also installed it for her. She says that it helps her get in and out of the tub safely.

Betty has not discovered any changes to her home that she'd like to make at this time. She did say that the washer and dryer are in the basement. This could be a hindrance should managing the basement stairs become difficult.

MARY

This petite lady is 87 years of age and to look at her one might say she is frail. As the interview progressed, however, it was clear she is not frail. The interview was timed to coincide with the nap of the young man, three years of age, that she was caring for. Mary has several challenges but none that she lets become a stumbling block to doing what she wants to do. She has arthritis in her hands yet crochets and quilts; she says that it helps maintain limberness in her fingers. She has some vision difficulty but wears glasses and still reads the Bible on a regular basis. Her hearing is not as keen as it was in the past but she has made some modifications to help there.
Mary is a very active volunteer in her community and provides support for friends, neighbors, and fellow church members, and as yet has needed little for herself. Mary has a son and a daughter-in-law who do not live within the county. It was obvious during the interview, as she mentioned her family often, that they still provide a great amount of support.

The house Mary lives in is located a few miles out of town on one of the major highways. She and her late husband built the brick one story ranch in 1971. The house has a basement, carport, and two entries, both of which are at ground level. Outside, the yard and porch are full of blooming flowers that Mary has planted and cares for. The only feature that may be a problem in the future is the bathroom. Should a wheelchair ever become necessary access would be limited.

Mary has made several minor modifications in her home. Her son purchased a recliner for her that she says was not really needed but it helps her to get her feet up. She has also started wearing mostly front closure clothing because her arthritis has made it difficult to manage back zippers and closures. She also made reference to the fact that her daughter-in-law, a clothing and textiles professor, sends her items from her wardrobe that she is cycling out. This is another indication of the support her family provides.
Her arthritis has made it difficult for Mary to get in and out of the bathtub. She devised a movement that helps her get out of the tub more easily. Using her method puts her weight on her elbow, not her hand. The movement is illustrated below (Figure 3) as a way to explain what she does. Mary says that it will work for awhile, then she will consider bars or whatever she might need.

Mary has a portable telephone that was also a gift from her son. She says that because she carries the telephone wherever she goes she could call for help if she fell. It also is easier to hear when close at hand. She says she likes the phone.

Mary seems to be content with her living arrangement as she would make no changes in her house. She says it is convenient and easy to navigate. She pointed out the doors are wide if her needs change in the future. The basement houses a utility room, her canned goods, pieces for rag rugs, and an extra table and chairs. This is acceptable at the present, but Mary says it could be a problem if she could not navigate the stairs in the future.

When asked what resources she would use to find information Mary had no idea. She did share with the interviewer that she only completed seventh grade, but has written poems and Sunday School curriculum, taught herself
Figure 3. Modification of movement as related to bathing.
to type, and keeps family records and dates. This seems to indicate that Mary has no problem finding the information she needs or making changes.

PAT

Pat, 75 - 79, is also a petite woman. She wears glasses, experiences some hearing difficulties, and appears to have no physical difficulties. (This interview was scheduled mid-morning so that Pat could help her husband build and repair fences). Later in the interview she did mention that her back does sometimes present problems. Pat takes an active part in her church, Family and Community Education group, and the farm.

It's clear that family is very important to Pat. The family room wall is filled with pictures of family members and events. Pat said they host the family reunion of 100+ people every three years. She also mentions her son doing this or that around that the house for them. The primary source of support for Pat is her family.

The farm house Pat and her husband live in was his family home. It is located on a dirt road approximately eight miles out of the Town of Floyd. Pat shared some of the changes the house has seen since she and her husband moved in. The house, originally one room, was built in 1902. Pat's in-laws raised 10 children in the house and she and
her husband moved in with the in-laws when they married. The house has been added on to over the years with the last addition, a bathroom and plumbing, made in 1952. The tar shingle-sided house is a two story home with three bedrooms, kitchen, living room and family/dining area, and a bathroom. The back doors and front door are at ground level. Pat and her husband use the downstairs bedroom and the bathroom is downstairs so there are no stairs to create barriers.

Pat has made few modifications to her home. One of the modifications listed on the survey was that of a grab bar in the bathroom. During the interview it was revealed that the bar has been purchased but is still on a shelf waiting to be installed because it is not needed as of yet. In the middle of the back walkway is an incline where steps have been added (Figure 4). Pat said her son felt it would be good to have a railing so he made and installed a railing for them. She said it worked, they haven't fallen since it's been up.

Pat broke her leg several years ago and a second telephone was bought at that time. She says that the telephone is helpful in the family room. She also commented that she "don't know what I would do" when asked if there were other changes that she would like to make. She did later mention changing the seals on the doors and possibly having new floors.
Figure 4. Modification made to outside stairs.
When asked what resources she uses to find new information, Pat's reply was "most of what we have done, have done by ourselves with the help of the children." She also said that it depended on what the need was, that a book or someone who is knowledgeable would be a resource.

DORIS

The last interviewee was Doris. Doris is in the 75 - 79 age group. She wore glasses but had no apparent disabilities. Doris is a small framed person and the quietest of all those interviewed. She was less open with unsolicited information than any of the others. During the conversation she never mentioned taking part in activities with family members or friends. She did mention the person who administered the survey who she also works with at the local library. This lead the interviewer to believe that at this time she has a limited support base.

Doris' house gave the appearance of being in excellent condition. The single-story ranch has no basement, two bedrooms, and a brick exterior. The back door is at ground level but the front entrance has a small porch with four steps. The house was built in 1962 by Doris and her husband who is now deceased. It was built with her elderly father in mind as she had been living with him prior to her marriage and he was not able to live alone. The house should not
present any problem if Doris continues "to age in place."
The interviewer did not see the bathroom or bedrooms so it
is unknown if they would allow for a wheelchair. This could
be a future barrier for Doris.

Doris had made only one modification; she had replaced
the front stoop with a deck-like porch. This was more of a
cosmetic modification than functional, although the new
railing offers more support. When Doris and her husband
planned the house their goal was to make it accessible for
her father and for them because they "knew they wouldn't get
any younger and were building for comfort."

The home is all on one level with one exit at ground
level. The back entry is also near the driveway so there is
less distance to carry items in, especially groceries. The
only change she would like to make is the addition of
another telephone. If she seeks new information she would
use the telephone yellow pages as one of her resources.

Summary

The findings of Phase II revealed that 14 of the 18
modifications reported were made after they were needed,
three were made before they were needed. One person
responded that they had grab bars for the bathroom that had
not been installed. The modifications made by these women
included addition of railings, modifications to sofas,
addition of telephones, and addition of seat to tub. The
number of modifications made by each subject ranged from one to 10. When asked if the modifications were satisfactory, each response was positive. The responses were satisfactory, o.k., and yes. One response, "suits present situation" indicated that these women recognized that there may be a change in their capabilities as time goes on.

In order to discover some of the resources used to make modification decisions, two questions were asked of each adult. The first question asked where the idea for the modification originated. The responses were: it was themselves, it was out of necessity, and it was suggested by a family member other than themselves.

When asked where they would go to find new information, to learn about something new, the respondents seemed unsure of how to answer. The replies included family members, books, not sure, self, and telephone books. Two statements that were made-- "most of what have done, have done by self or with help of children" and "enjoy doing things by self, always worked" -- hint at the self-sufficient nature of this age group.

The findings revealed an audience with a relatively high function level. Information from both this and Phase I was used as the basis for conclusions about this study. Responses from interviewees may also stimulate questions for future research.
CHAPTER V

SUMMARY OF STUDY

This study began in Phase I with a survey of a sample of the elderly population in Floyd County, Virginia. This section of the study was designed to discover their task capabilities and to identify the modifications that were being made to meet the environmental needs and task capabilities. Phase II of this study involved a sample to the original audience and the researcher in a case study. Identify how the modifications were made and why.

It is in this chapter that the findings from both phases of this study are brought together. The findings are reviewed for any significance, implications, or limitations of this research. Also in this chapter are recommendations or implications for future research.

Discussion

The findings reveal answers to the question that directed this study. Discussion of the research will begin with a review, relating the findings to the Faletti model. The second part of this section will address the research question.

Faletti (1984) believed that as a task is performed a person's capability and the demand of the environment will create a disparity or an equivalence resulting in an adaptive outcome. The person capability was measured in this
study through the person characteristics, also known in this research as ADL and IADL. The adaptive outcome measured in this study was that of modifications to the person's environment characteristics.

After glancing at the data, one might think that the research indicates an unusually high functional level in the sample group. The number of adults in this study reporting that they were experiencing difficulty with at least one ADL were 27 or 26% of the total group. Recent research indicates that 13% of non-institutionalized adults experience difficulty with at least one ADL (Golant, 1992). Those in this study that report difficulty with at least one IADL were 33%, however Golant (1992) stated that at least 18% of the non-institutionalized adults have difficulty with at least one IADL. When this information is compared with Golant's findings then, the sample used in Floyd County seems to have a function level lower than the average of those in Golant's study.

Research indicates that older adults change one or more qualitative variables as age-related function declines (Longino, Soldo & Manton, 1990). Longino, et.al continued their statement by giving examples of these changes such as addition of a grab bar or ramp. Findings of this study indicate that modifications or changes are being made. This research also reveals the classification of the
modifications as related to the task being performed, information not available in current research.

The most difficulty was experienced with the ADLs of walking, bathing, and getting outside. A greater number of modifications were made in these same areas but there is no correlation between the percentage of difficulty and the percentage of modifications made. For instance, walking was the task with the greatest number experiencing difficulty, but it was third in the ranking of number of modifications being made (Table 6). The task of bathing was the second capability experiencing the most difficulty; it was the task where the majority of the modifications were made. This lack of correlation is repeated throughout the ADL tasks.

Yet, the lack of correlation does not carry through to the IADLs. The IADL task where the most difficulty is experienced is housework, also the area where the greatest number of modifications are being made. The task of managing money is low on the scale of difficulty and modifications. The other three IADLs, telephoning, meal preparation, and shopping, are not in the same order when the level of difficulty and prescience of modifications are compared. But there is very little difference between each of the tasks, five and 10 percent.
TABLE 5

Performance Of Tasks And Occurrence Of Modifications

(Arranged in descending order)

<table>
<thead>
<tr>
<th>Experiencing Difficulty</th>
<th>Making Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
</tr>
</tbody>
</table>

Activities of Daily Living

<table>
<thead>
<tr>
<th>Walking</th>
<th>27.0</th>
<th>Bathing</th>
<th>18.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathing</td>
<td>22.5</td>
<td>Getting outside</td>
<td>14.7</td>
</tr>
<tr>
<td>Getting outside</td>
<td>15.6</td>
<td>Walking</td>
<td>14.0</td>
</tr>
<tr>
<td>Living room chair</td>
<td>13.7</td>
<td>Toileting</td>
<td>12.7</td>
</tr>
<tr>
<td>Dressing</td>
<td>10.7</td>
<td>Dressing</td>
<td>10.0</td>
</tr>
<tr>
<td>Toileting</td>
<td>10.7</td>
<td>Eating</td>
<td>6.9</td>
</tr>
<tr>
<td>Eating</td>
<td>7.9</td>
<td>Living room chair</td>
<td>6.8</td>
</tr>
<tr>
<td>In/out bed</td>
<td>4.9</td>
<td>Dining chair</td>
<td>1.9</td>
</tr>
<tr>
<td>Dining chair</td>
<td>3.9</td>
<td>In/out bed</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Instrumental Activities of Daily Living

<table>
<thead>
<tr>
<th>Housework</th>
<th>34.6</th>
<th>Housework</th>
<th>17.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopping</td>
<td>21.5</td>
<td>Telephoning</td>
<td>11.7</td>
</tr>
<tr>
<td>Telephoning</td>
<td>11.7</td>
<td>Meal prep.</td>
<td>10.8</td>
</tr>
<tr>
<td>Meal preparation</td>
<td>11.8</td>
<td>Shopping</td>
<td>6.8</td>
</tr>
<tr>
<td>Money management</td>
<td>4.9</td>
<td>Money management</td>
<td>1.9</td>
</tr>
</tbody>
</table>

60
The reason why the task with the greatest amount of difficulty was not also the area with the most modifications is unknown. One reason for the disparity might be that the modifications being made within the task of bathing are easier or less expensive than those within the task of walking. The modifications listed for bathing (Table 4) are added bars, takes showers, added seat to tub, and gets help. The modifications listed for walking are uses cane, walker, wheelchair, and walking stick, and goes slower. Yet, when the two lists are compared it would seem that acquiring a cane, walker, or walking stick would be easier and involve less expense than the purchase and installation of bathroom grab bars.

Another explanation for the choice of bathroom modifications may be the safety factor. Bathrooms are the place of 25% of home accidents, a point often publicized and featured in safety education. Falls are the second greatest causes of accidental death in the United States (Grossman, 1991). Given these facts, making the most modifications within the task of bathing seems reasonable. There are many possible answers why more modifications are made in one area but there were no findings in this study that indicate a definite conclusion to this question of modification frequency in relationship to a particular task.

A third explanation for the disparity may be a public-
personal issue. The cane or walker is visible to all and indicates a need for assistance. The bathroom grab bars are also an indication of needing assistance but, because they are in a private area, it's not a fact everyone would be aware of.

The homes of the sample audience of Phase II were not in keeping with recent research. Five of the six homes were 20 years of age or younger, the sixth was 93 years of age. A study by Bylund (1985) indicated that 50% of the rural elderly housing units had been built prior to 1940, and the 1990 Census found 23.9% of Floyd's homes to be more than 50 years of age. Since there is no record of the age of houses in Phase I, this question should be added in a replication of this study.

The research question asks what modifications are being made to the residential environments to meet the functional capabilities of the aging in place audience. Table 4 lists the different modifications and the frequency of each. Getting help is listed as the modification for several of the tasks. While this does aid in maintaining the independence of the older adult, it does not change the residential environment.

Several of the other modifications do not change the environment. They are does not go outside, cooks less, takes "sponge baths," and has special technique in bathing. One
could propose that if a change were made to the older adult's environment these modifications might not be necessary. If the person that does not go outside had a ramp at the main entrance or railings along the steps, she might be able to venture outside. The "sponge baths" might be unnecessary if the bathing area included a tub or shower unit that was easy to negotiate.

Golant (1992) found that older people are less likely to initiate home modifications. The findings in this study indicated that the idea for the modifications originated primarily within the family. Resources that the case study participants said they would use to find new information also included family members and self. Only one person said she would consult a book, an outside source. This is in keeping with the self-sufficient nature of the older rural population. This self-sufficiency might also be limiting the options to modify their environment and better meet their function levels.

Research has shown that 84%-86% of the elderly population prefer living alone in their home and not moving (Dinkins, 1994, Rubenstein, Kilbride, Nagy, 1992). A majority of those involved in this study, 86%, also indicated that they wanted to stay in their home. They also indicated ways of coping in order to stay in their homes.

Researchers have found that the ability of the elderly
to cope with requirements of independent living depends on household operation activities, housing consumption alternatives, and health related activities (Reschovsky & Newman, 1990). Given that the older adults want to age in place and that what affects their abilities to cope is known, it should be possible to provide resources to enable them to age in place.

Conclusions

All the facts of this study and the related research have been considered in the formation of the following statements. This section contains conclusions drawn from this study, implications for other professionals, and suggestions for future research.

The older adults in this study:
1) are making modifications, both to tasks and their environment, in order to equalize their function level and the characteristics of their environment.
2) do want to stay in their own homes as long as possible; i.e., age in place.
3) particularly those 75 years of age and older, have a relatively high function level.
4) most often wait until after the need arises before making modifications to their environment.

This study also answered the research question - What home modifications are made to residential environments to
meet the functional capabilities of the aging in place audience? Examples of the home modifications made include: adding grab bars, adding an elevated toilet seat, adding handrails, purchasing new or altering furniture. The complete listings of modifications are reported in both Phase I and Phase II findings.

Implications

Housing education is recognized as being a good component for rural elderly programming (Atchey, 1975) and would increase the knowledge base of modification options. This fact and the findings of this study lead to the following implications:

1) Those working with rural elderly audiences should make more readily available to them information related to ways of coping with functional level changes, such as modifications, different skills, or changes of practice.

2) Interior designers, architects, builders, and remodelers should have the knowledge base that would allow them to advise their clients in making decisions that may affect their future independence; e.g., entries without stairs or bathrooms and bedrooms on both levels of a multi-story home.

3) Based on findings of strong family support, educators should target family members of the elderly for housing programs, not just the elderly audience.
4) Efforts should be made to help aging persons plan ahead for "aging in place housing," just as they plan for retirement savings.

Faletti's (1984) Human Factors Model of Person-Environment Transactions is based on the premise that person and environment relate to each other in task performance. The environment in Faletti's model relates primarily to the physical environment. Yet, this research indicates that social/family support is a recurring factor in the ability of the subjects to perform a task successfully. Thus, future researchers should adjust Faletti's model to include social support aspects within the environmental issues of the theoretical model.

Future Research

Each bit of research discovers much but also uncovers much that is unknown. Issues for further research that were brought to light in this project include:

1) A long range study of what precipitates the decision to make modifications.

2) Similar process that considers a more detailed look at the person's capabilities. Instead of looking at a particular ADL or IADL, break it down to each mini-task it takes to carry out an ADL/IADL. This might help to better define what modifications are needed in the homes.

3) A comparison study of two groups of older adults--One
group that received housing education programs and one that did not. Does the education have an effect on how older adults meet their function levels?

4) A study of anticipatory modifications being made. Are they a result of family influence, an attempt to simplify a task, or the result of an educational effort?

After the completion of a task the thought--I should have done it this way--often comes to mind. Any replications of this study might consider the following changes:

1) Plan for the surveys in Phase I to be administered by the researcher or other professional/para-professionals who have knowledge of the subject matter.

2) Include a greater number of case studies, as this provides both qualitative and quantitative data and a truer picture of the situation.
REFERENCES


Hoglund, J. D. (1983). *The intangible qualities of*


APPENDIX A

Informed Consent Form

Interview Schedule, Phase I
Informed Consent for Participants of Investigative Projects

TITLE OF PROJECT: Aging in Place: Environmental Supports: A Survey and Case Study in Floyd County, VA.
PRINCIPAL INVESTIGATOR: Laquita Dawn Barnes

You are invited to participate in a study about housing modifications. This study involves interviews for the purpose of determining what modifications are made to meet a person's functional capabilities. This study involves 104 subjects in addition to yourself.

The time and conditions required for you to participate in this project are that you are 75 years of age or older, and can perform at least 3 of the tasks you may do on a periodical basis-preparing meals, shopping, managing money, using the telephone, and doing light and/or heavy housework and can perform at least 6 of the following tasks you do on a daily basis-eating, dressing, bathing, going to the bathroom, walking, getting in and out of a chair or the bed and getting outside. You may be selected to take part in the second phase of this study, at which time the researcher will meet with you.

Your participation in the project will provide
information that will be helpful to young old adults in planning their housing for their old old years. No guarantee of benefits has been made to encourage you to participate.

The results of this study will be kept strictly confidential. At no time will the researchers release the individual results of the study to anyone other than individuals working on the project without your written consent. The information you provide will have your name removed and only a number will identify you during analyses and any written reports of the research. The case study may use fictitious names.

The case study will be taped. These tapes will only be reviewed by the researcher and will be erased after the completion of the process.

You are free to withdraw from this study at any time without penalty. This research project has been approved, as required, by the Institutional Review Board for projects involving human subjects at Virginia Polytechnic Institute and State University, and by the Department of Housing, Interior Design, and Resource Management.

I know of no reason I cannot participate in this study. I understand I am to answer the questions asked
of me, to the best of my ability. And I understand that I may be asked to participate in phase two, the case study.

DATE_________________SIGNATURE________________________________________
SUBJECT'S PERMISSION

I have read and understand the informed consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project.

If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project.

Should I have questions about this research or its conduct, I will contact:

Laquita Dawn Barnes_________ 745-4592
Investigator

Rebecca Lovingood_________ (703)231-6541
Faculty Advisor

Ernest R. Stout_________ (703)231-9359
Chair, IRB
Research Division
THE PURPOSE OF THIS SURVEY IS TO DISCOVER WHAT MODIFICATIONS OR CHANGES, IF ANY, PEOPLE ARE MAKING TO THEIR HOMES IN AN ATTEMPT TO CONTINUE TO PERFORM CERTAIN TASKS. THESE FIRST TASKS ARE THE ACTIVITIES WE DO EACH DAY; eating, dressing, bathing, going to the bathroom, walking, getting in and out of a chair or bed, and getting outside AND THE SECOND GROUP OF TASKS ARE THOSE WE DO PERIODICALLY, THAT WOULD BE EASY FOR SOMEONE ELSE TO HELP US WITH; preparing meals, managing money, using the telephone, shopping, and doing light housework and heavy housework. LET'S CONSIDER THE FIRST TASKS.

1. Do you have any difficulty carrying out the task of getting in and out of a living room chair?

_____YES  _____NO

Have you made any changes to your home to help with this task?  _____YES  _____NO

If yes, what changes have you made?  ________________

________________________________________________

If no, why have you not?  __________________________

________________________________________________

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2. Do you have difficulty carrying out the task of getting in and out of a dining chair? ____YES ____NO
   Have you made any changes to your home to help with this task? _______YES _______NO
   If yes, what changes have you made? 
   
   If no, why have you not? 

3. Do you have any difficulty carrying out the task of eating? ____YES ____NO
   Have you made any changes to your home to help with this task? _______YES _______NO
   If yes, what changes have you made? 

   If no, why have you not? 

4. Do you have any difficulty carrying out the task
of walking? _______YES _______NO

Have you made any changes to your home to help with this task? _______YES _______NO

If yes, what changes have you made? ________________________________

_______________________________________________________________

If no, why have you not? ________________________________

_______________________________________________________________

5. Do you have any difficulty carrying out the task of getting in and out of bed? _______YES _______NO

Have you made any changes to your home to help carry out this task? _______YES _______NO

If yes, what changes have you made? ________________________________

_______________________________________________________________

If no, why have you not? ________________________________

_______________________________________________________________

6. Do you have difficulty carrying out the task of dressing? _______YES _______NO

Have you made changes to your home to help with this task? _______YES _______NO
If yes, what changes have you made? __________

If No, why have you not? __________

7. Do you have any difficulty carrying out the task of going to the bathroom, such as rising and lowering?
   _____YES   _____NO
   Have you made any changes to your home to help with this task?   _____YES   _____NO
   If yes, what changes have you made? __________
   If no, why have you not? __________

8. Do you have any difficulty carrying out the task of bathing?   _____YES   _____NO
   Have you made any changes to your home to help with this task?   _____YES   _____NO
   If yes, what changes have you made? __________
If no, why have you not?

9. Do you have any difficulty carrying out the task of getting outside? _____YES _____NO
   Have you made any changes to your home to help with this task? _____YES _____NO
   If yes, what changes have you made?

   If no, why have you not?

LET'S LOOK AT THE IADLS NOW..............

10. Do you have any difficulty carrying out the task of using the telephone? _____YES _____NO
    Have you made any changes to your home to help with this task? _____YES _____NO
    If yes, what changes have you made?

    If no, why have you not?
11. Do you have any difficulty carrying out the task of shopping? ______YES ______NO

Have you made any changes to your home to help with this task? ______YES ______NO

If yes, what changes have you made?_________

________________________________________________________________________

If no, why have you not? ________________

________________________________________________________________________

12. Do you have any difficulty carrying out the task of preparing meals? ______YES ______NO

Have you made any changes to your home to help with this task? ______YES ______NO

If yes, what changes have you made? ________

________________________________________________________________________

If no, why have you not? ________________

________________________________________________________________________
13. Do you have any difficulty carrying out the task of doing light or heavy housework? _____YES _____NO

Have you made any changes to your home to help with this task? _____YES _____NO

If yes, what changes have you made? ________________

______________________________________________

If no, why have you not? _________________________

______________________________________________

14. Do you have any difficulty carrying out the task of managing money? _____YES _____NO

Have you made any changes to your home to help with this task? _____YES _____NO

If yes, what changes have you made? ________________

______________________________________________

If no, why have you not? _________________________

______________________________________________

15. In which of the following age categories do you fit? _____75-79 _____80-84 _____85+
I'D LIKE TO ASK YOU A COUPLE OF QUESTIONS ABOUT YOUR ATTITUDE TOWARD YOUR HOME.

16. Now about keeping this home repaired, maintained, cleaned, and all the tasks involved in running the household. I will read some statements and would like you to tell me which one you would choose if you could have an ideal situation.

[INDICATE IF RESPONSE IS RESPONDENT'S PRESENT SITUATION.  ______YES ______NO

1) live here by myself ______

2) stay here and pay someone to help take care of the house ______

3) stay here and have someone move in who could help me take care of the house ______

4) move to a place where maintenance and repairs are handled by someone else ______

5) move closer to people who could help me take care of the house ______

6) move in with someone else ______

17. If you were able to change anything about your house as it is now, would you change anything?

_______ YES _________ NO

If yes, what would you change? _________
THANK YOU FOR ALLOWING ME TO ASK YOU THESE QUESTIONS. IF YOU ARE SELECTED TO TAKE PART IN THE CASE STUDY OF THIS PROJECT, DAWN BARNES, THE RESEARCHER, WILL CONTACT YOU.
APPENDIX B

Interview Schedule, Phase II
PART II

THE FOLLOWING QUESTIONS RELATE TO YOUR RESPONSES TO THE
SURVEY SEVERAL WEEKS AGO. I WOULD LIKE TO ASK MORE
DETAILED INFORMATION ABOUT THE MODIFICATIONS YOU HAVE
MADE AND TAPE THE SESSION, IF I MAY. PLEASE FEEL FREE
TO MAKE ADD ANYTHING YOU THINK MIGHT BE OF INTEREST.

(Questions asked for each modification)

1. How did (the particular modification they made)
help you to carry out the task of (the specific ADL or
IADL)? ________________________________________
______________________________________________
______________________________________________

1A. Did you make the modification before or after you
actually needed it? _____before _____after
______________________________________________
______________________________________________

2. Where did you get the idea to make that particular
modification and how to do it? _____________________
______________________________________________
______________________________________________

3. Is that modification satisfactory or would you
like to improve or change it? _____________________
______________________________________________
______________________________________________

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4. Are there other changes you would like to make, but are unsure how to go about it? YES NO
WHAT?

5. What resources do you use when you want to find new information?

6. What's not on the main level in your home? Is that a problem for you?

7. What year, approximately, was your home built?

8. Is there anything you would like to share about your home, changes you have made, or carrying out any of the daily tasks/activities?
Other statements - information

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

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_____________________________________________________________________

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APPENDIX C

Interview Training

* Confidentiality Form
* Volunteer Training Procedures
* Training Materials
  - Response Form
  - Interviewer's List
  - Phone Conversation
VOLUNTEERS' AGREEMENT OF CONFIDENTIALITY

You have agreed to participate in a study involving information about others. Because of the personal nature of the information you will collecting it is imperative that it be kept confidential.

I, _______________________________, understand that I am to keep all information that I learn during the interview confidential. I will be able to share the information with the researcher, only.

Signature_________________________ Date__________
Facts to remember during interview procedure ---------

Speak slowly and clearly.

Once you have begun the interview process please don't break the flow of the questions.

A husband and wife may both be interviewed but, please conduct the interview with only the one being interviewed in the room.

Even though the interviewee is agreeing to the terms of the interview, please be sure they do meet the criteria of age and task performance.

The interviews can be started any time after the training and completed by 2/22/95.

I will call you the first of next week to see if you have any questions. If at any time you need to call me please do. My office number is 745 - 9307, home is 745 - 4592. If I'm not in please leave a message and I'll return the call.

Please check to see if you have space on your calendar for an appreciation tea, March 12 mid afternoon.

I found asking the survey questions and recording the answers took approximately 15 minutes. That time will vary depending on the responses and capabilities of the interviewee.

Materials you will receive, to be returned 2/22
- Clipboard
- Pencils
- Surveys, one per folder
- Pen
- Interviewers list
- Response page for #16
Steps to conducting the surveys

Have all materials together and ready to go.

Call interviewee to arrange time for you to arrive.

Remove survey from manila envelope.

Give one copy of consent form to interviewee with a pen.

Read the consent form and ask her/him to sign it.

Exchange pen and signed form for unsigned consent form and permission form, this is for their records.

Begin survey questions. Write down the response to each question.

Before asking question number 16, hand interviewee the response form. This allows time to think about the answer and not what each choice was.

Thank the interviewee for participating and enclose survey in envelope.
Response choices for Item 16

1) live here by myself
2) stay here and pay someone to help take care of the house
3) stay here and have someone move in who could help me take care of the house
4) move to a place where maintenance and repairs are handled by someone else
5) move closer to people who could help me take care of the house
6) move in with someone else
INTERVIEWER'S LIST

Interviewer's Number ___

<table>
<thead>
<tr>
<th>NAME</th>
<th>PHONE</th>
</tr>
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<tbody>
<tr>
<td>Alice Hypes</td>
<td>745-1234</td>
</tr>
</tbody>
</table>

*(Please include directions to the participant's home)*

**EXAMPLE**

Route 221 to left on route 456, follow approx.
1 mile turn right onto 239, first house on left.
POSSIBLE PHONE CONVERSATION

(Can be used as you set up interview session,
especially if you do not know the person)

Hello, Alice Hypes? This is ____________,
I'm hoping you can help me. I have volunteered to help
a student with her graduate work. I would like to take
fifteen minutes of your time and ask you a few
questions. You would need to sign a permission form so
I would need to come to your home.
VITA

Laquita Dawn Barnes

Education: Graduated from New Castle High School, Craig County, Virginia in 1977; Bachelor of Science degree in Home Economics -- Interior Design with a minor in Business, Radford University, 1981; Master of Science in Housing and Certificate in Gerontology at VPI & SU May 1996.


Honors and Awards: Kappa Omicron Nu

Professional Organizations:
Virginia Association of Family and Consumer Sciences, 1988 to present;
American Association of Family and Consumer Sciences, 1988 to present;
Virginia Association of Extension Home Economists, 1988 to present;
National Association of Extension Home Economists, 1988 to present.

Other Organizations:
Virginia 4-H All Stars, 1975 to present
Virginia Federation of Woman's Clubs, 1982 to present