

INNOVATIVENESS AND ACCEPTANCE OF HOUSING OPTIONS AMONG THE ELDERLY

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Abstract

Increases in the elderly population and demands on the resources that the elderly have suggest that housing alternatives might provide options to maintain independence and enhance quality of life for older adults. However, acceptance of these alternatives may be influenced by the elderly's level of innovativeness in relation to housing. Roger's (1983) diffusion of innovation theory provides a basis for examining attitudes that might indicate innovativeness and influence acceptance. The purpose of this study was to examine housing innovativeness among a probability sample of 452 females. A modified scale on housing innovativeness developed by Gruber et al. (1990) was factor analyzed and revealed a similar pattern while explaining 59.6% of the variance: Factor 1 was acceptance of new housing types; Factor 2 was willingness to take a chance; and Factor 3 was acceptance of new ideas. Analysis of Variance revealed significant differences on: Factor 1 scores based upon income, and education; Factor 2 scores based upon income, education, and marital status; and Factor 3 scores based upon income and marital status. Age and current housing type of respondent had no indicated effect on innovation scores. Those with more education and income and who are married are more innovative and are more willing to accept alternative housing types.

Introduction

Many of the physical, social, and financial changes that aging adults experience create a need for changes in their living environments. Declines in sensory functions, energy levels, and mobility may result in the traditional home not fulfilling their needs to the highest degree. Neighborhood changes and changes in the family structure may also leave elderly persons in more house than they can afford or manage to maintain.

Lawton and Nahemow (1973) suggest a need for a continuum of housing options that could assist the elderly in meeting the challenges of their environment. Their framework - Ecological Theory of Adaptive Behavior - suggests that there is a relationship between the individual's competence and the press or stress of the environment in which they live. This framework suggests that a variety of housing options should be available along a continuum that ranges from very independent to a range of more supportive living arrangements to finally institutionalization.

Many options have been developed that are considered supportive and might reduce the stress involved in living alone in the existing family home including accessory apartments, ECHO housing, shared housing and board and care facilities. These options would be considered alternatives, since they are alternatives to institutionalization and/or exceptions to the traditional housing arrangements (Eckert & Murrey, 1984). Acceptance of housing alternatives by consumers, policy makers, and industry groups is a complicated, multi-layered process. Although an alternative may have many advantages for these various segments, there may also be disadvantages that limit the applicability of options. Eckert and Murrey (1984) suggest that alternative housing be viewed through an ecological model that is centered on the individual and considers the concentric circles around that individual: the

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microsystem, exosystem, and macrosystem. This holistic approach considers the home and neighborhood environment, as well as community structure and social forces.

Anderson, Chen, and Hula (1984) question many of the assumptions underlying the Ecological Theory. One of their primary concerns is the acceptance of the alternatives by the elderly. The elderly are often considered conservative and unwilling to accept new products or ideas, in housing or elsewhere. They often prefer to stay in their own home, even though they may have problems maintaining their competence in that environment. Characteristics of individuals may have a particular role in explaining their level of acceptance of alternatives (Eckert & Murrey, 1984). Particular components might be personal characteristics, as well as beliefs and values. Having a tendency to accept innovation and new ideas might be a characteristic that would lead to acceptance of alternative housing for an individual.

Rogers and Shoemaker (1971) explored the diffusion of innovation throughout society and determined that there were certain stages that people experienced as they accepted an innovative concept. These stages of the adoption process are: (1) awareness - knowledge of the innovation; (2) interest - seeking information about the innovation; (3) evaluation - a mental trial of the innovation; (4) trial - testing the innovation on a small scale; and (5) adoption - utilization of the innovation on a full scale. In Rogers's (1983) later work this process was revised to be (1) knowledge - discovering the innovation and gaining some understanding of how it functions; (2) persuasion - forming a favorable or unfavorable attitude toward the innovation; (3) decision - choice of whether to adopt or reject the innovation; (4) implementation - utilizing the innovation, and (5) confirmation - seeking reinforcement for the decision that has been made.

Rogers (1983) also indicated that people adopt innovations at different rates. The five categories that he presented were: innovators, early adopters, early majority, late majority, and laggards. There are certain characteristics of people that distinguish them as early adopters or late adopters. An early adopter is more likely to have higher levels of education, higher social status, and a higher degree of upward social mobility than later adopters.

Innovativeness as a personality characteristic would seem to be necessary in people who are likely to be early adopters of an innovation, such as alternative housing, and critical in initiating the adoption of a new concept or product. Rogers and Shoemaker (1971) defined innovativeness as a person's willingness to adopt an innovation. Being in the forefront of the adoption of the innovation was a critical component that Rogers (1983) presented, while Midgely (1977) stressed that adopting the innovation without social information about the product was a characteristic of the true innovator.

Adopting an innovation as it relates to housing has been explored by several researchers (Gruber, Beamish, Carter, Shelton, & Weber, 1990; Kwon, 1991; and Till, 1988); however, the concept has not been used to explore the reaction of the elderly to specific housing types planned for their needs. The purpose of this study was to examine the housing innovativeness of elderly women.

Background

The concept of innovativeness has been measured by researchers looking at consumer products and housing. Leavitt and Walton (1974) examined trait innovativeness and found their scale to be reliable in distinguishing innovators from non-innovators. Price and Ridgeway (1982) developed an innovativeness scale that they were able to compare with innovative behavior or use of product.

Both of these scales were adapted by housing researchers examining community barriers and incentives to affordable housing options, i.e. apartments, manufactured housing, and energy efficient designs (Gruber, et al., 1990; Kwon, 1991; and Till, 1988). Twenty-six items were used in their scale and were factor analyzed with sub-samples of the study sample. Gruber, et al. (1990), factor analyzed the responses of the total sample of 4,672 household respondents using principal-component analysis with Varimax rotation. Six factors emerged: New Housing Types; Repair and Fix Things; Chance Taking/Experimentation; Housing Designs and Ideas; Improvement and Utility; and Appearance versus Comfort. These same six factors plus Home Improvement resulted when the same scale was ana-

lyzed from a sample of 785 housing intermediaries (builders, realtors, lenders, and other local officials and businesses involved in the housing process). When these factors were compared with selected demographic characteristics, there were relationships between specific subscales and age, sex, education, and income for the household and the intermediary samples.

Till (1988) had factor analyzed these same items for a sub-sample of the data. Only households and intermediaries in Alabama were included in her sample, and a maximum likelihood factor procedure was used. Still, the five factors that resulted from her analysis were consistent with Gruber, et al. (1990). The factors were: Active Innovativeness; Traditional; Craftsmanship; Semi-active Innovativeness; and Passive Innovativeness. Till (1988) found that Active Innovativeness, Traditional, and Craftsmanship Factors were related to respondent characteristics. Household respondents who were actively innovative were young, female, and black. Traditional household respondents were older, widowed, less educated, had lower incomes, and were renters living in apartments. The household respondents that scored higher on the craftsmanship factor were married males, mobile home dwellers, and homebuyers.

Kwon (1991) examined only the older population of this sample (1,878 over age 55). She also used the principal-component factor analysis with Varimax rotation and identified six factors: Experimentation and New Design/Ideas; New Housing Types; Repair & Fix Things; Improvement & Utility; Appearance Versus Comfort; Risk Taking. Kwon notes that four of the factors she identified were the same as the factors identified by Gruber, et al. (1990), while one of hers (Experimentation and New Design/Ideas) was a combination of the third and fourth factors they identified. See Table 1 for a summary of previously identified housing innovativeness factors.

Kwon (1991) found that age was related to the following factors: Experimentation and New Design/Ideas, New Housing Types, Repair and Fix Things, and Appearance vs. Comfort; with younger respondents scoring higher on these factors than older respondents. Education was related to the Experimentation and New Design/Ideas factor, the New Housing Types factor and the Improvement and Utility factor, with highly educated respondents scoring higher on the first two factors and lower on the last factor. Income was also related to four factors: New Housing Types, Repair and Fix Things, Improvement and Utility, and Appearance vs. Comfort. Higher Income respondents had higher score on all of these factors except the Improvement and Utility factor. Sex and marital status were related to the Repair and Fix Things factors, with men and married individuals scoring higher on this factor. The type of house the respondents lived in was related to the New Housing Type and Repair and Fix Things factors with mobile home residents being the most innovative on these factors and apartment residents being the least innovative. Homeowners were more innovative on the New Housing Types and the Repair and Fix Things Factors, while renters scored more highly on the Improvement and Utility factor.

Table 1. Housing innovativeness factors identified in previous studies.

Factor Identified	Gruber et al. (1990)	Kwon (1991)	Till (1988)
1	New Housing Types	New Housing Types	Traditional
2	Repair and Fix Things	Repair and Fix Things	Craftsmanship
3	Chance Taking/ Experimentation Housing Designs and Ideas	Experimentation and New Design/Ideas	Active Innovative Passive Innovative
4	Improvement and Utility	Improvement and Utility	Semi-active Innovativeness
5	Appearance vs. Comfort	Appearance vs. Comfort	
6		Risk-taking	

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Only a few of the factors identified in each of the above studies were truly examining innovativeness. Factors such as Craftsmanship, Repair and Fix Things, and Improvement and Utility did not address innovativeness, but rather home improvement-related activities. In examining Innovativeness in more detail and exploring its use in determining acceptance of alternatives, items from these factors would not be needed.

Further, the factors related to innovativeness were consistently related to demographics and housing characteristics that should be examined for validation of theory development. These studies suggest that age, education, marital status, income, sex, race, tenure, and housing type are demographic and housing characteristics that should be examined to better understand the concept of Innovativeness and the characteristics that influence it.

The purpose of this study was to examine the relationship between selected demographic characteristics and measures of innovativeness and acceptance of specific alternative housing types among the elderly.

Method

Sample

This analysis is based on a sample of 452 members of the Virginia Extension Homemakers Council (VHEC). A random sample of the VHEC membership (N = 7655) was taken and surveys mailed to 750 VHEC members. There were 452 complete surveys returned; a response rate of 60.3%. Only one follow-up post card was sent because of budgetary limitations.

The mean age of the sample was 70.5 with a range of 56 to 93 years. Slightly less than 1% of the population were males and 1.0% of the respondents were male. Fifty-five percent of the sample were married at the time of the survey and 36% were widowed; 35.1% were living alone. Of those not living with their spouse, 4.1% were living with a child, 2.1% with others who were not family members. Thirty-two percent were high school graduates and 13.5% were college graduates; 45% reported more than 12 years of schooling. The majority (88.8%) lived in their own homes, while only 3.9% lived in apartments, and 2.5% in mobile homes. Almost 10% worked full or part time, while 36.5% volunteered their time with 4.2% of the volunteers also working. Twenty-five percent reported annual household incomes over \$30,000. The next most frequent income range (15.1%) was \$10,000-14,999, followed by \$15,000-19,999 (14%), \$20,000-24,999 (13.3%), \$5,000-9,999 (12.8%), and \$25,000-29,999 (8.7%). Only 3.7% reported incomes less than \$5,000. The most common sources of household income were social security (81.4%), savings investments (59.9%), and pensions (53.4%). Income from rental property (15.8%) and work outside the home (15.4%) were the next most common sources of household income followed by farm or business income (9.6%). Fewer than 1% reported using reverse annuity mortgage as a source of income.

Measurement

It was previously noted that the level of personal innovativeness as a measure of willingness to adopt an innovation related to housing had been examined by several researchers (Till, 1988; Gruber et al., 1990; and Kwon, 1991). A modified scale on innovativeness toward housing, developed by Gruber et al. (1990), containing 16 items measured on a four point Likert scale was used in this study. Items from that previous scale not related to innovativeness and new ideas were not included in this study. A principal component factor analysis with a Varimax rotation was used to examine the innovativeness toward housing scale in order to identify the underlying constructs. Missing values were addressed using the pairwise deletion method. Only factor solutions with eigenvalues greater than 1.0 were used in the analysis.

The three factors and the associated variables resulting from the factor analysis are shown in Table 2. The magnitude of the item loadings indicate that each one adequately represented its assigned construct. The three factors identified explained 59.6% of the variance. For this study, the factors are identified as: Factor I - Acceptance of New Housing Types; Factor II - Willingness to Take a Chance; and Factor III - Acceptance of New Ideas.

Factor I closely approximates a factor identified by Kwon (1991) in her study of rural elderly and their acceptance of nontraditional housing types using this scale. Factors II and III similarly approximate factors identified by Gruber, et. al. (1990) in their study which sought to develop an innovativeness toward housing scale. One-way analysis of variance and t-tests were used to compare mean factor scores of the housing innovativeness scale by selected respondent characteristics. Significant variance in mean scores between groups identified in the one-way analysis was further analyzed using the Duncan multiple range test to establish pairs of groups with significantly different mean scores. Group means identified as not equal in the t-test procedure were tested using the separate variance estimate to confirm significant difference between group means.

Table 2. Factor analysis of innovativeness toward housing scale.

Factor	Item	Variance Explained	Factor Loading
I	Builders waste time building new housing types.	41.8%	.74
	New housing types cost more than they are worth.		.73
	I would rather not waste my time with some new ideas.		.71
	I would like a house not require learning new ways of doing things.		.69
	When taking chances, I'd rather be safe than sorry.		.64
II	Changing technology, especially in housing, is a waste of time and money.	11.1%	.63
	I like to take a chance.		.79
	I like to experiment with new ways of doing things.		.77
	I enjoy looking at new housing designs in magazines.		.71
	Some contemporary housing is stimulating.		.70
III	The unusual house is often a waste of time and money.	6.7%	.61
	I like to try new and different things.		.74
	I like housing that is a little different.		.72
	I am very curious about how new things work.		.72
	I often try to find out more about new housing types.		.64
	I like to think about new ideas even if they turn out to be a waste of time.	.54	

Note: Factor I-Acceptance of new housing types.
 Factor II-Willingness to take a chance.
 Factor III-Acceptance of new ideas.

Results

The relationship between mean factor scores and income level of the respondents was examined. It had been anticipated that those with lower incomes would be less innovative toward housing (Till, 1988) and that those with more income would be more innovative or more willing to experiment, as they are better able to take financial risks (Rogers & Shoemaker, 1971). While significant differences between groups means were found, an examination of Table 2 reveals that a strict pattern of higher income being associated with higher mean factor scores was not present. It is interesting to note that the highest mean score for Acceptance of New Housing Types was the group with household income between \$15,000 and \$19,999. This group had the second and third highest mean score of the seven income groups for Willingness to Take a Chance and Acceptance of New Ideas, respectively. Overall, however, the data reveal that greater housing innovativeness is associated with higher income.

The mean innovativeness and factor scores by education level were also examined. Table 3 shows that more innovative individuals are likely to be more educated. Interestingly, those respondents with high school education had the highest mean innovativeness scores and were more accepting of new housing types than those with education beyond high

Table 3. Mean housing innovativeness scores by annual income.

Housing Innovativeness	Less than \$5,000	\$5,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$19,999	\$20,000 to \$24,999	\$25,000 to \$29,999	More than \$30,000	F-PROB
Overall Innovativeness (Range 16-64)	29.25 ^{abcd}	29.66 ^{efgi}	35.01 ^{ae}	37.59 ^{di}	34.46 ^e	37.40 ^{eh}	35.94 ^{bg}	.0000
Factors:								
Acceptance of new housing Types (Range: 6-24)	12.19 ^{abc}	12.70 ^{defg}	15.21 ^{ae}	16.02 ^{egh}	14.25 ^h	15.52 ^{bf}	14.64 ^d	.0003
Willingness to take a chance (Range: 5-20)	8.07 ^{abcd}	8.71 ^{efgh}	9.78	11.06 ^{eg}	10.54 ^{ac}	11.1 ^{dh}	10.68 ^{bf}	.0003
Acceptance of new ideas (Range: 5-20)	9.00	8.25 ^{abcde}	10.03 ^{ab}	10.51 ^c	9.67 ^a	10.78 ^e	10.62 ^d	.0003

Note: Higher mean scores are associated with greater Housing Innovativeness. Mean Innovativeness scores with superscripts are significantly different at the .05 level. Those with same superscript are not significantly different from each other. (Duncan)

school. This finding is inconsistent with other studies (Rogers, 1983; Till, 1988). High Willingness to Take a Chance and Acceptance of New Ideas scores were also associated with higher levels of education.

Table 4. Mean housing innovativeness scores by education.

Housing Innovativeness and Factors	EDUCATION			F-PROB
	Less than High School	High School Graduate	Beyond High School	
Overall innovativeness (Range 16-64)	31.30 ^{ab}	35.72 ^a	35.04 ^b	.0028
Factors:				
Acceptance of new Housing Types (Range 6-24)	13.11 ^{ab}	15.30 ^b	14.40 ^a	.0028
Willingness to take a chance (Range 5-20)	9.21 ^{ab}	10.37 ^a	10.46 ^a	.0357
Acceptance of new ideas (Range 5-20)	8.77	10.06 ^a	10.18 ^a	.0094

Note: Higher mean scores are associated with greater Housing Innovativeness. Mean Innovativeness scores with superscripts are significantly different at the .05 level. Those with same superscript are significantly different from each other. (Duncan)

The relationship between marital status and the three housing innovativeness factors was examined using the t-test. The results are presented in Table 4. The hypothesis that the population means are equal was rejected because the observed significance level is less than .05. The separate variance estimate was then used to test the hypothesis that the mean factor scores for the two groups were significantly different. The data indicate that marital status is not a significant factor in the Acceptance of New Housing Types. Those respondents who were married had significantly higher mean factor scores for the factors of Willingness to Take a Chance and Acceptance of New Ideas. This outcome appears consistent with Till (1988) who found that widowed people were less likely to be innovative in housing. Also, Kwon (1991) found that non-married and widowed elderly were less innovative than married people and less willing to take a chance. Age and housing type were not found to be significantly related to overall Innovativeness scores or the three factors.

Discussion

This study examined the Innovativeness Toward Housing scale following Till (1988), Gruber et al. (1990) and Kwon (1991) using principal-component factor analysis to identify three underlying factors: Acceptance of New Housing Types, Willingness to Take a Chance, and Acceptance of New Ideas. This analysis is based on a theory of innovativeness (Rogers and Shoemaker, 1971) and is the first study (N=452), to our knowledge, to explore this concept with the elderly and their reaction to specific housing types designed for their needs.

The study validated the measurement of innovativeness in a housing context among a second sample. The factors identified here were consistent with previously identified components. This study identifies clear relationships between selected demographic characteristics of elderly women, their innovativeness characteristics and their acceptance or willingness to adapt specific housing opinion developed for their needs. It is recognized that certain other factors, as identified by Lawton and Nahemow (1973), may also be involved.

Examination of the data revealed that various mean factor scores were significantly different among and between groups based upon education level, annual household income,

Table 5. T-test values for mean housing innovativeness scores by marital status.

Mean Score (SD)	Housing Innovativeness Factors (Range)			
	Overall Innovativeness (16-64)	Acceptance of New Housing (6-24)	Willingness to Take Chance (5-20)	Acceptance of New Ideas (5-20)
Married	35.48 (7.5)	14.737 (3.747)	10.542 (3.162)	10.20 (2.70)
Widow/Not Married	33.41 (12.10)	14.205 (5.479)	9.724 (4.237)	9.4811 (4.214)
F-Value	2.43	2.14	1.79	2.44
Probability	.000	.000	.000	.000
T-Value ^a	2.04	1.14	2.21	2.03
Degrees of Freedom	292.57	305.97	325.72	292.22
Probability	.042	.256	.028	.043

^aSeparate Variance Estimate

and marital status. The respondent's age apparently had no significant effect on individual innovativeness. Generally, those with higher income had higher mean factor scores on the three factors. Those with more education had higher mean factor scores on all three factors, and those respondents who were married had higher mean scores on factors I and II, Willingness to Take a Chance and Acceptance of New Ideas, respectively. While marital status caused no significant difference in mean scores on Factor I, Acceptance of New Housing Types, was found based upon material status.

The utilization of a housing innovativeness concept has application to specific housing issues. As policy makers and practitioners seek ways to improve the quality of life and delay or prevent nursing home care for the elderly, they must do so with fewer resources. The results of this study may help in identifying those subsets of the elderly who are most likely to respond to innovative housing options and housing related products and technology, thereby increasing the likelihood of acceptability and utilization of alternatives.

The implication for those individuals and agencies wishing to introduce innovative housing related products, technology, or living options may be the identification of the subpopulation that is targeted to begin the "market penetration" process that will hopefully lead to acceptance by the broader market. For example, efforts to introduce changes in zoning ordinances to allow innovative living arrangements or housing types (shared housing and ECHO housing, for example) might be first introduced to those married, with higher education, and more income in order to improve chances for acceptance of the innovative idea. The strategy would then become to encourage the acceptance by the more innovative groups to influence the zoning board and those less innovative segments of the elderly population, and eventually other members of the community, to adopt the change in zoning to allow the innovation. Further study of the concept of innovativeness and its application in housing for the elderly is needed in order that its application to programming and policy development can be implemented. Utilizing this scale in predicting acceptance of alternative housing and new housing products and technology should be conducted to further understand its usefulness and application.

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