

Independent Housing and Older People

The Adaptive Problem Solving of Older Persons in their Homes

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As individuals get older, independence may be reduced by problems they are confronted with in the home. To allow for an prolongation of independent functioning, environmental pressure on older individuals should be diminished but, at the same time, individuals' ability to solve these problems themselves should also be enhanced. The purpose of the present study was to investigate the problems in older people's homes and the corresponding types of adaptations/solutions, and to test a theoretical exploratory model, describing the various factors influencing adaptive problem solving and the outcome of this process.

In this model different types of factors influence the problem solving process. These factors are: (1) the problem type; (2) personal factors of competence such as education, knowledge, and financial resources; (3) factors describing the social network and (4) factors describing the physical environment. Adaptations were categorized as physical/technical, social, personal or mental. The results of an extensive survey among 120 elderly households show that the type of adaptation a person chooses is not only dependent on the type of problem he/she is confronted with, but also on personal qualities (education level, technical knowledge/experience) and physical housing characteristics (adaptability). Implications for future research are discussed.

Keywords: ageing, independence, adaptive behaviour, adaptation.

INTRODUCTION

During the ageing process, independence is often hindered by problems in the home. These problems arise in situations where the affordances of the home do not or no longer match the needs and capacities of the inhabitants. If this kind of mismatch exists, usually a process of adaptation starts. There are various ways of adapting, but the most common categorization of these alternatives is based on what is adapted: either the person (psychological or cognitive adaptation) or the situation (environmental adaptation). Wister (1989) found that as people grow older, there is a shift from more active to more passive modes of adapting. He reported that older people would sooner adapt themselves psychologically than adapt the physical environment to their needs.

Many new housing environments specifically built for the elderly are designed with extreme care and attention for support and the compensation of decreasing capacities. This was also argued by Lawton (1990), when he stated that

the task of designing on behalf of older people has most often been construed in terms of prosthetics, that is, compensating for personal loss through environmental support. However, the proactive aspect — encouraging older people to actively engage in adaptive behaviour in order to preserve congruence between their environment and their physical capacities — has not received that much attention yet.

THEORETICAL FRAMEWORK

Our research, focused on man–environment interaction is performed within an ecological environmental psychology framework. We will consider the ecology of ageing in terms of the adaptation of man to his environment and his alteration of the environment as part of the process of human adaptation. A model of adaptive behaviour of the ageing person that is often used is the model of Lawton and Nahemow (1973). In this ecological model, adaptive behaviour is the outcome of the interaction between a person of a given level of compe-

tence and an environment with a given level of press (Figure 1).

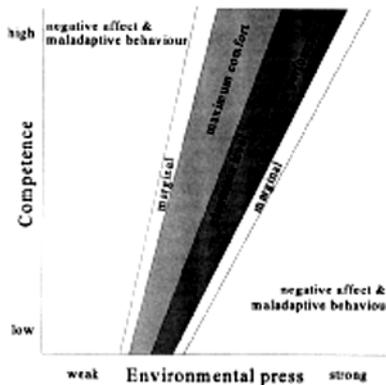


Figure 1: Model of adaptive behaviour (Lawton & Nahemow, 1973)

Behaviour varies on a dimension of adaptive to nonadaptive. In 1982, Lawton posed the environmental docility hypothesis, which suggests that high competence is associated with relative independence of the individual from the behavioural effects of environmental pressure, while low competence implies heightened vulnerability to environmental pressure. In general, the hypothesis suggests that the lower the competence of an individual is, the less able this individual will be to adapt to varying environmental pressure. In 1985 Lawton formulated the environmental proactivity hypothesis, which states that environmental resources are likely to be better used by people of higher competence. Proactivity is displayed when a person attempts to change himself or herself or when the person creates an environment to facilitate a desired behaviour. According to the proactivity hypothesis, people are more likely to use environmental resources actively and efficiently as competence increases.

In our research, these general theoretical and rather abstract concepts are translated into more specific constructs. *Environmental pressure* is operationalized as the problems that people are confronted with in their own homes. More specifically, only problems due to a mismatch between the house and the person's decreasing physical capacities are considered. Lawton defined "*competence*" as "the upper theoretical limit of capacity of the individual to function in the areas of biological health, sensation-perception, motoric behaviour, and cognition", although he admits that "the term competence represents, to be sure, a limited aspect of all that might be included in the P component of the ecological equation" (Lawton, 1982). Since the goal of this project is to explore the various possibilities for promoting proactive adaptive behaviour, a broader (ecological) interpretation of the term competence was used: it includes all

possible resources and competences not only of the person, but of the whole problem situation, that might positively influence adaptive behaviour. The competence needed here is related to efficiently solving environmental problems occurring in the home. This includes both personal competence aspects (e.g. health, knowledge, experience, financial resources), competence afforded by the social network (e.g. number and type of relationships), and competence afforded by the physical environment (e.g. adaptability of the house).

The *adaptive behaviour* is operationalized as the problem solving behaviour of the individual. This behaviour can be categorized based on the type of adaptation that is chosen. The various adaptive strategies are categorized as presented in Figure 2.

This was done on the basis of theory. The first category encompasses changes to the physical environment, that include changes to the house and the use of assistant devices.

	Adaptation in the Physical Environment	Adaptation of the House
		Use of Assisting Device
Adaptation in the Social Environment	Formal Help	Formal Care Givers/Meals on Wheels
		Paid Housekeeping
	Informal Help	Help from Children or Friends
Personal Adaptation	Change of Behaviour of Person/Partner	Help from Partner
		Change of Behaviour
	Accommodation	No Solution, Problem Persists
		Give Up Behaviour

Figure 2. Categorization of Adaptive Strategies

The second category encompasses all the help received from people in the informal and formal social network. This last type (formal) includes help received from the various types of formal care givers, meals on wheels and paid housekeeping or, in other words, help that can be hired. The third category includes “personal” solutions. These can be divided into two types. The first type of personal adaptive behaviour is active and goal-directed: the person changes his/her or his/her partners behaviour in the service of ongoing goal attainment. The solution where the person receives help from his/her partner is placed in the third category instead of the second, because in this survey a couple was regarded much more as one entity than as two individuals. The second type of personal adaptive strategy is passive and not goal-directed (accommodative). The problem is not solved: either it persists or the behaviour (goal) is abandoned. It should be noted that these two possible ways of “accommodation” may be very different.

STUDY OBJECTIVES

The purpose of the study was to investigate the problems in older people’s homes and the corresponding types of adaptations/solutions and to test a theoretical exploratory model, describing the various factors possibly influencing adaptive problem solving and more specifically the outcome of this process: the type of adaptive strategy chosen. In this model, various factors influence the problem solving process and the type of solution: the first factor is the type of problem which logically has strong implications for the type of solution. In addition, a set of personal aspects of competence such as health, education, knowledge and financial resources, factors describing the social network (number

and type of contacts in network) and factors describing the physical environment (adaptability and adaptedness of the house) are expected to influence the type of solution a person chooses. The various competence factors are expected to have different impacts on the problem solving process. Health is expected to influence the number, severity and type of problems. The same holds for the adaptability of the home, since it is the interaction between these two aspects that generates the problems. These variables will probably not influence the problem solving process directly. People with higher education levels are hypothesized to analyse a problem situation better and, therefore, be more successful.

The same is expected of people with better social networks, since they can call in the help of others in the problem solving process. People with more knowledge of possible physical/technical solutions or better financial resources are expected to choose more physical adaptations than others.

Table 1. Descriptive Variables of Persons in Sample by Gender

	Female	Male	All
Mean Age	75.5	77.4	76.0
Total Number	86	26	112
Living Alone	50	12	62 (55%)
Living with Partner	36	14	50 (45%)

The same is expected of people living in more adaptable homes, in which physical modifications should be easier and less costly. In general, we expect that education, knowledge, financial resources, social contacts and adaptability of the home are related to more proactive and successful adaptation strategies.

METHODS

Sample

A total of 112 respondents were visited and interviewed (26 male, 86 female). They all lived independently, alone or with a spouse, in different neighbourhoods in larger and smaller cities in the Netherlands. Ages ranged between 63 and 93, mean age was 76.0. Approximately 55% of the respondents lived alone, the others with a spouse. According to general Dutch statistics \pm 40% of people over 65 are living alone, 60% with a partner (Timmermans, 1993). The composition of our sample is roughly in accordance with the Dutch figures, although the proportion of female respondents is relatively high. In Table 1 it is shown that a relatively greater part of the older women are living alone, which is in accordance with figures of the total Dutch population of the elderly.

Data collection

The research consisted of an interview with the respondent, a questionnaire filled out by the respondent and, in case of a two-person household, the partner and a checklist on housing characteristics. The interviews were held in the homes of the respondents. The survey was carried out by nine interviewers, who were students with interviewing experience. They were trained for one day, approximately one week before the first interviews started. Every visit started with an interview. The interview consisted of both closed and open-ended questions. At the end of the interview, the respondents and, if possible, their partners, were asked to fill out a questionnaire, that consisted mainly of multiple-choice questions. After the respondents gave their permission, the interviewer filled out the inventory on the house, if necessary with the help of

the respondent. This concluded the visit, that took 1.5 to 2 hours on average.

The interview started with a 19-item somatic complaints list (17-item list of Klerk & Huijsman (1992) with two extra items: forgetfulness and fatigue). Subjects were asked to report the degree of the complaint on a 4 point scale. In order to make interpretations easier, the total health score was inverted, so that higher scores were related to better health.

Prompted by the answers to the medical inventory, respondents were then asked to report all problems that (had) existed in their homes due to these infirmities, whether these had already been solved or not. Type and (if relevant) place of occurrence were noted. After the interviewer had noted every problem, she showed the participants a list of possible types of problems, to help to remind them of possible other problems that had occurred. If the respondents remembered some more problems, these were also noted. The problems were categorized after the survey. Then one or more problems were discussed in more detail.

For the different phases in the problem solving process (recognizing a problem, thinking of possible solutions, planning and realizing a solution) the involvement of the respondents and others in the social network were recorded. Finally, respondents scored their satisfaction with and the effectiveness of these solutions on a 5-point scale. In the last part of the interview the number, type and frequency of contact with people in their social network were recorded (aspects of "social competence").

The questionnaire addressed several topics. It included measurements of age, gender, general satisfaction, housing satisfaction and futurity (subjective appraisal of future independence) which will not be discussed in this paper. It also included measurements of aspects of personal competence: the financial situation of the respondents was measured using two 5-point items, translated from Devlin (1980); educational level was measured on a 4-point scale and knowledge level was determined using a 16-item multiple choice test, developed to measure

basic knowledge of building practice, building procedures and special adaptations for senior citizens.

The inventory on characteristics of the home is based on the “Seniorenlabel” [*Seniors’ label*] (Scherpenisse *et al.*, 1993). This is a checklist, developed by the Stichting Experimenten Volkshuisvesting (SEV) in The Netherlands. It is used to determine the appropriateness of a home for older people. It contains items on four fields of attention: safety, accessibility, living comfort, and adaptability.

Houses may receive 10, 5 or 3 points for a specific item, depending on its relative importance. If a house or a complex of houses scores enough points on this checklist, it receives the “Seniors’ label”. The full Senioren label-checklist consists of three parts, concerning the home, the general facilities and the neighbourhood. In this survey only the first part was used. To this sub-list a number of extra items were added, concerning furniture arrangement and a few other specific aspects.

In order to fill out the inventory, it was necessary for the interviewer to see (and measure) the bathroom and bedroom(s), the kitchen, the hall and the living room. The sum of the scores on the safety, accessibility and living comfort aspects was calculated and named “adaptedness” (actual affordances of the home, as opposed to “adaptability”, which is a score on the ease with which the home can be adapted to provide certain affordances in the future).

RESULTS

The number of problems due to the physical limitations that were reported varied between 0 and 14 ($M = 4.9$, $SD = 2.8$). The percentage of solved problems varied between 0 and 100% ($M = 74\%$, $SD = 0.28$). For the problem solving processes that were discussed in detail, respondents reported that in 57% of the cases, they had been actively involved throughout the entire process.

Problems and adaptive strategies

The reported problems were initially categorized into 18 different groups. Then a correspondence analysis was performed with these problem types as rows and adaptive strategies as columns. Problem types that were close to each other both in the “solution-space” and as regards content were then clustered. This resulted in seven categories of problems (Table 2).

The category “Housekeeping/preparing meals” consisted of 71% of general, arduous or specific housekeeping problems and 29% of problems related to preparing hot meals. The latter problems were rather varied; they in-

cluded problems with cutting and peeling, pouring off vegetables and standing during cooking.

The second category, “Personal hygiene”, included problems with getting dressed (75%) and all problems in the bathroom that were not incorporated in “Mobility” (e.g. taking a shower, washing hair, slipping).

The “Mobility” category consisted of problems related to getting in and out of the bath (8%), getting up from the toilet (20%), walking in general (15%), specific obstacles (6%, mainly thresholds), stair climbing (30%) and getting up from chair or bed (22%).

Table 2: Frequencies and Percentages of Problems and Adaptive Strategies

	Physical Adaptation	Formal Help	Informal Help	Change of Behaviour	Accommodation	Total
Housekeeping/ Preparing Meals	9 6.9%	69 53.1%	11 8.5%	33 25.4%	8 6.2%	130 26.4%
Personal Hygiene	29 55.8%	12 23.1%		3 5.8%	8 15.4%	52 10.5%
Mobility	125 72.3%	1 0.6%	1 0.6%	9 5.2%	37 21.4%	173 35.1%
Hobby/ Leisure Time	17 25.8%		2 3.0%	7 10.6%	40 60.6%	66 13.4%
Lifting/Reaching Up Bending/Kneeling	6 23.1%		2 7.7%	1 3.8%	17 65.4%	26 5.3%
Home Upkeep	4 18.2%	1 4.5%	7 31.8%		10 45.5%	22 4.5%
Security/ Communication	21 87.5%			1 4.2%	2 8.3%	24 4.9%
Total	211 42.8%	83 16.8%	23 4.7%	54 11.0%	122 24.7%	493 100.0%

The fourth category “Hobby/leisure time” consisted of problems related to performing hobbies and spending leisure time (77%), having visitors (12%) and general fatigue (12%). In the fifth category, problems with lifting heavy things and reaching high (37%) were grouped with bending and kneeling (63%).

The category “Home upkeep” only consisted of problems related to serious maintenance jobs of the home. In the final category, “Security/communication”, problems related to using the telephone and doorbell (54%) were grouped with security-related problems (46%).

In the following cross-tabulation a summary of the frequencies of these problems with the chosen adaptive strategies is given.

This cross-tabulation already indicates that the type of solution that is (or is not) chosen depends on the type of problem (Pearson $\chi^2(24) = 413, p < .001$; Goodman & Kruskal I with adaptive strategy dependent = 0.35). Table 2 shows that problems with housekeeping and preparing meals are relatively often solved by arranging formal help (paid housekeeper, meals on wheels), while mobility problems are often solved by physical adaptations (e.g. installing an elevator in case of a problem with stair-climbing) and problems with hobbies are often not solved.

Personal competence and adaptive strategies

The relationships between personal competence factors and adaptive strategies were studied. Based on the problems and the solutions respondents reported, scores were calculated on the five adaptive strategies for every respondent, that indicated the proportion of problems he/she

had solved in that particular way. First bivariate correlations (Table 3, first 3 columns) were computed between these proportions and the personal competence variables: education level, knowledge and financial situation (Spearman’s rank correlations for education level since it was measured on a 4-point scale).

Education level is also correlated with knowledge (Spearman 0.33, Sig 0.00) and financial situation (Spearman 0.41, Sig 0.00), but due to the distribution of this variable, partial correlations could not be computed.

Then one-way analyses of variance were performed with the adaptation types as dependent variables and education level or knowledge level as a factor. For this reason, the knowledge variable was recoded into a 4-point scale. The two highest education levels were combined because of the small number of cases in each group.

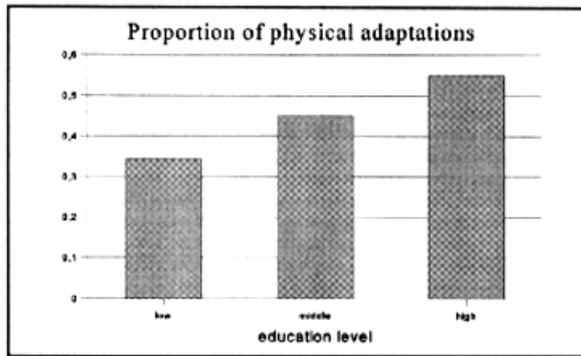


Figure 3: Physical adaptations by education level

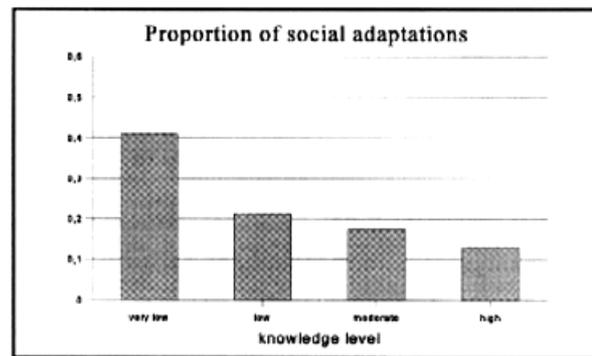


Figure 4: Social adaptations by knowledge level

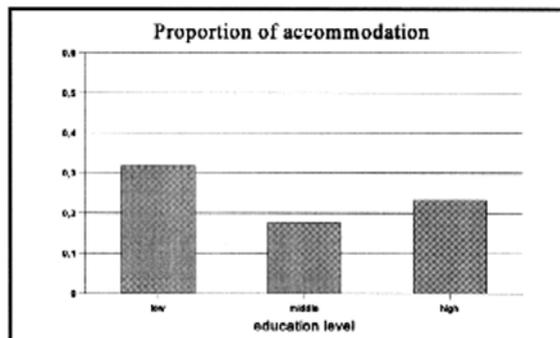


Figure 5: Accommodation by education level

For the analyses with proportion of physical adaptations only the analysis with education level entered as factor gave significant results ($F(2,97) = 3.62$, $p = 0.03$). T-tests showed that the proportion of physical adaptation for the “high” education group was significantly higher than in the “low” education group (one-tailed $p = 0.006$, see Figure 3).

For the analyses with the proportion of formal help as the dependent variable, no significant results were found, but when the two types of help (adaptation in social environment) were combined, the analysis with knowledge level entered as factor gave significant results ($F(3,100) = 3.81$, $p = 0.013$). T-tests showed that the proportion of received help for the “very low knowledge” group was significantly higher than the moderate knowledge group (1-tailed $p = 0.035$) and the high knowledge group (1-tailed $p = 0.020$, see Figure 4).

The analysis with the proportion of accommodation as the dependent variable and educational level entered as a factor rendered marginally significant results ($F(2,97) = 2.64$, $p = 0.076$). T-tests indicated that the proportion of “accommodation” for the low education group was significantly higher than for the middle education group (1-tailed $p = 0.013$, see Figure 5).

Social competence and adaptive strategies

No significant correlations were found between

the social network variables and the adaptive strategies.

Environmental competence and adaptive strategies

Bivariate rank correlations were computed between the adaptability and adaptedness of the house and the adaptive strategies. Results are shown in Table 3 (4th and 5th column). The adaptability of the house is inversely related to the proportion of accommodation.

DISCUSSION AND CONCLUSIONS

This paper is the first in a series about the present survey-study. The aim was to test a theoretical explorative model and to identify the factors that significantly influence adaptive problem solving and the outcome of this process: whether a problem is solved proactively or not, and whether the environment or the person is the object of change.

Relationships between problems, various “competence” variables and adaptive strategies for problems in homes have been discussed.

Problems and adaptive strategies

The data in Table 2 show that the type of solution does indeed depend heavily on the type of problem. The data presented in this paper do not point out the reasons for this phenomenon.

Table 3: Correlations between Personal and Environmental Competence and Adaptive Strategies

	Educational Level (Rank Correlations)	Knowledge	Financial Situation	Adaptability (Rank)	Adaptedness (Rank)
Proportion of Physical Adaptations	.25 Sig .01	.20 P= .04	.05 P= .62	.11 Sig .26	.03 Sig .74
Proportion of Formal Help	-.21 Sig .03	-.20 P= .04	-.18 P= .08	-.05 Sig .63	-.04 Sig .68
Proportion of Informal Help	.12 Sig .26	-.17 P= .09	.13 P= .19	-.13 Sig .18	-.13 Sig .18
Proportion of Behaviour Changes	-.01 Sig .96	.09 P= .38	.19 P= .07	.16 Sig .11	.16 Sig .11
Proportion of Accommodation	-.19 Sig .06	-.09 P= .37	-.09 P= .39	-.35 Sig .00	-.16 Sig .10

However, preliminary qualitative analyses of data gathered in the interviews indicate that several factors are important here. The necessity for the problem to be listed seems important. If someone keeps in themselves already of importance to people working in the field of housing for the elderly.

While presently most of the attention in this field goes to solving problems in the “practical” field (ADL and IADL), other types of problems (e.g. leisure-time related) have up to now often been neglected. The fact though that many older people have to give up their hobbies and other leisure activities may pose a great threat on their well-being.

Aspects of personal competence

Analyses showed that besides the type of problem, which is a major determinant of the type of adaptation people choose, other variables are related to certain adaptive strategies. First it was shown that, in accordance with the hypotheses, people with a higher educational level and/or higher knowledge scores were more likely to choose physical adaptation strategies and less likely to choose help from others. A higher educational level was also related to lower proportions of accommodation. People with a lower education level are less likely to choose an effective adaptation strategy. Although the same relationships were hypothesized between these strategies and financial resources, no significant results were found in this respect.

Aspects of social competence

Although social contacts were hypothesized to be of importance, no relationships were found between social network variables and adaptive strategies. This could be due to the fact that we chose the wrong measures of characteristics of

the social network. However, a more probable explanation is that almost all respondents in this problem to be listed seems important. If someone keeps in they met on a regular basis, someone to turn to for help in solving a problem or for assistance, when this was necessary. If a significant number of respondents in our sample had lacked these contacts, the results might have been different.

Aspects of environmental competence

People who live in more adaptable homes, in which physical modifications should be easier and less costly, were hypothesized to choose relatively more physical adaptations. It was shown that people living in homes that scored higher on the variable “adaptability” were more likely to choose an effective adaptation strategy and less likely to choose “accommodation”. No differences were found between the proportion of social and physical adaptive strategies.

CONCLUSIONS

Three factors besides the type of problem proved to have a significant relationship with the type of adaptive strategy that is chosen: knowledge, educational level, and adaptability of the house. In general, it seems that these three “resources” provides the person with more “control” over the situation. The more resources are available, the more likely a person is to proactively engage in the adaptation process and to choose an assimilative strategy and more specifically, a physical/technical one.

A note of caution should be given here. The analyses of the influence of the various variables have all been performed separately. Due to the diverse types of data, a combined analysis

could not be performed (yet). This study should be seen as the first step and a strong indication to continue this line of work.

This paper is the first in a series about the present survey-study. The general purpose of the study was to describe the problem solving behaviour of older people in their homes, e.g. the individual's role in this process as well as the roles of others and the types of adaptive solutions that result from this process. Secondly, the aim was to test a theoretical explorative model, describing the various factors influencing adaptive problem solving and the outcome of this process. In this paper the results concerning this second purpose have been presented. Relationships between problems, various "competence" variables and adaptive strategies for problems in homes have been discussed.

In the near future we are planning to investigate the influence of personal and environmental "competence" aspects in greater depth. An important question is whether it is actual competence or rather a sense of competence that is of most importance. Results of future research should provide us with possible ways to enhance people's ability to actively interact with their physical environment, so that they themselves can proactively maintain a "congruence" or "fit" between their physical capacities and the physical environment. It is our strong belief that to allow for longer independent functioning, one should not only try to diminish the environmental pressure on the older individual but also to enhance the individual's ability to solve these problems.

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