

PREDICTORS OF THE ADAPTIVE PROBLEM-SOLVING OF OLDER PERSONS IN THEIR HOMES

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Abstract

As people get older, their independence may be hindered by problems that confront them in the home. To extend their independent functioning, environmental press on older individuals should be diminished but, at the same time, their ability to solve these problems themselves (proactivity) should be enhanced. The purpose of the present study was to identify the most important factors that influence proactivity. For this reason, a theoretical exploratory model was constructed that consisted of four types of factors that influence the adaptive problem-solving of the older individual and the adaptive strategies that result from this process. These factors were: (1) problem type; (2) personal factors of competence such as health, education, and knowledge; (3) factors describing the social network; and (4) factors describing the physical environment. Adaptive strategies were categorized to be physical/technical, social, personal or mental. Subsequently, the most significant factors in this model were identified, using the data of a survey among 120 elderly households. Results of the survey show that the adaptive strategy a person chooses is not only dependent on the type of problem, but also on personal qualities and physical housing. Also, the type of adaptive strategy chosen was a predictor of the perceived effectiveness of and satisfaction with the solution.

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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. The traditional way to elongate independent living for older people has been to build special, suitable houses for them. 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) who 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, stimulating older people to engage actively in adaptive behaviour in order to preserve congruence between their environment and their physical capacities, has not yet received much attention. The purpose of the present study was to test a theoretical model, describing four types of factors (personal, social and physical/environmental competence and problem type) influencing proactive adaptive

problem-solving by the older individual and the outcome of this process.

Adaptation is a process that starts when a mismatch occurs between the capacities of the individual and the characteristics of the environment. In situations where adaptation is called upon, people can generally choose their strategy from a wide range of possible alternatives. Most theories of adaptation categorize adaptive strategies into two main classes. Within the psychological domain, Lazarus and Folkman (1984) categorize coping strategies into two main groups, problem-focused coping and emotion-focused coping. Problem-focused coping processes are directed at altering the situation that is causing distress, the goal is to confront the problem directly. Emotion-focused coping processes are directed at regulating distress rather than altering the situation, for instance they can include distancing, escape-avoidance, or positive reappraisal of the situation (Folkman & Lazarus, 1990). Similarly, Brandtstädter and Renner (1990) distinguish two alternative strategies for optimizing the balance of gains and losses in personal development, involving accommodation of goals to losses and obstacles as well as active modification of the

environment in the service of ongoing goal attainment (assimilation). Finally, within the environment–behaviour domain, Lawton (1985) discriminates between environmental proactivity and reactivity. Proactivity refers to actively adjusting developmental and life circumstances to personal preferences. Reactivity, on the other hand, implies adjusting personal preferences and goal orientations to given situational forces and constraints. This last strategy is sometimes called environmental docility.

Although the distinction has not been stated explicitly in the literature, two basic dimensions seem to describe the space in which the various adaptive behaviours lie. One dimension describes the object that is adapted: the physical or social environment, the individual's behaviour, goals, perception of the environment etc. The other dimension describes whether the adaptation is proactive (goal-directed) or rather reactive. In our opinion, both dimensions are necessary for describing the adaptation. For instance, assimilation may involve several alternatives focused on the environment (Lawton, 1990): individuals can actively programme exposure to environmental demands that lie within their capability, they can ask for assistance from another person or they can use adaptive physical features of the environment. However, these two dimensions do not seem to be totally independent: proactive adaptations often involve environmental and sometimes behavioural changes, whereas reactive adaptations more often involve (unintentional) modifications of goals or perceptions.

Several studies have been performed that focused on adaptive behaviour and ageing. 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. Brandtstädter and Renner (1990) found that in a sample of adults ranging from 34 to 63 years of age, older cohorts tended to report higher levels of goal accommodation to losses. Since both these mechanisms were associated with higher satisfaction, it was concluded that neither of them was necessarily better than the other. Both strategies can be effective and they may even operate simultaneously.

The general purpose of the present research is to describe the problem-solving behaviour of older people in their homes and to find important factors that influence this adaptive problem-solving process, especially factors that might increase proactivity or assimilation. It differs from other research in this field in two important ways. First, whereas most of

the research done in this field explicitly or implicitly focuses on adaptation concerning problems in the social domain (e.g. Cornelius & Caspi, 1987; Brandtstädter & Renner, 1990; Blanchard-Fields *et al.*, 1995), this study, similar to Wister's (1989) work, focuses on problems in the physical domain, problems that are the result of a mismatch between individuals' physical capacities and the characteristics of their physical environment. However, although all problems stem from the physical domain, possible solutions cover the entire range from physical and social environment to personal behaviour and mental state, and from reactive to proactive.

The second difference is that instead of studying age differences in adaptive behaviour, this study investigates differences within the older age group. Although with increasing age and decreasing capacities there seems to be a shift from active to more passive modes of adapting, or from assimilative to more accommodative strategies, large differences exist between people in the older age group.

The aim of this research is to find the most important factors that influence whether a problem is solved proactively or not, and whether the environment or the person is the object of change. The range of possible factors is wide: the problem itself may be a major determinant in terms of type, difficulty and severity. Its emotional salience may also play a role in this process (Blanchard-Fields *et al.*, 1995). Intelligence, education, experience and knowledge of the individual are necessary resources for solving problems effectively, as we know from the field of everyday problem-solving. The individual's competence is an important factor according to Lawton (1985). In addition, the social network may play a role, since problems in everyday life are hardly ever solved individually. Finally, in this problem domain, housing characteristics may also be of importance. Besides trying to identify the most significant determinants of adaptive behaviour, we also studied how this behaviour was judged by the person in terms of satisfaction and effectiveness.

Theoretical framework

Our research, focused on the man–environment interaction, is performed within an ecological environmental psychology framework. 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

Modification in the physical environment	Modification in the physical environment	Modification of the home
		Use of assistive device
Adaptation in the social environment	Formal help	Formal care/meals on wheels
		Paid housekeeping
	Informal help	Help from children or friends
Personal adaptation	Change of behaviour of person or partner	Help from partner
		Change of behaviour
	Accommodation	No solution, problem persists
		Give up behaviour

FIGURE 1. Categorization of adaptive strategies.

level of competence and an environment with a given level of press. Press is defined as stimuli possessing some motivating quality to activate a cognate individual need (Lawton, 1982). 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 press, while low competence implies heightened vulnerability to environmental press. 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 press. 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 individuals attempt to change themselves or when they create environments to facilitate the 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 abstract concepts are translated into more specific constructs. Environmental press 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.

Competence can be defined in many ways. It can be defined as a purely personal characteristic referring to desirable personal qualities, lying within the

individual, occasioning the exhibition of adaptive behaviour; or as more transactional asset, as the capacity to interact effectively with the environment (Lantermann, 1976; White, 1963) and in this sense is conceptually close to control. In this study, a broad (ecological) interpretation of the term competence was used, since the goal of this project was to explore the various possibilities for promoting proactive adaptive behaviour. 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', and 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). In our research, competence includes a wider range of 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—health, knowledge and experience—competence afforded by the social network—number and type of relationships—and competence afforded by the physical environment—adaptability of the house.

Adaptive behaviour is operationalized as the problem-solving behaviour of the individual. This behaviour can be categorized based on the type of adaption that is chosen. The various adaptive strategies are categorized as presented in Figure 1. The first category encompasses modifications of the physical environment, which include changes to the

house and the use of assistive devices. The second category encompasses all the help received from people in the informal and formal social network. This last type 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 adaptive behaviour is active and goal-directed: people change their own or their partners' behaviour in the service of ongoing goal attainment. Solutions where the persons receive help from their partner are 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 coping). The problem is not solved: either it persists or the behaviour (goal) is abandoned. It should be noted that these two ways of accommodating are very different.

Study objectives

The purpose of the study was to test a theoretical model describing the various factors possibly influencing practical problem-solving and 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. Besides this, the type of solution that a person chooses is expected to be influenced by three types of competence factors. These factors of competence could also be regarded as resources that are important for solving the problems. The model comprises: (1) factors of personal competence such as health, education and knowledge; (2) factors describing the competence in the social area (number and type of contacts in network); and (3) factors describing the physical environment (adaptability and adaptedness of the house). This study was performed in order to discover which factors have the strongest influence.

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 adaptedness of the home, since it is the interaction between these two aspects that generates the problems. These factors 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 for 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 are expected to choose more physical adaptations than others. The same is expected for people who live in more adaptable homes, in which physical modifications should be easier and less costly. In general, we expect that education, knowledge, social contacts and adaptability of the home are related to more proactive and successful adaptation strategies.

Method

Sample

A total of 112 respondents participated in the study (26 male, 86 female). They all lived independently, alone or with a spouse, in different neighbourhoods in various cities in the Netherlands. Ages ranged between 63 and 93, mean age 76.0 years. Approximately 55 per cent of the respondents lived alone, the others with a spouse. According to general Dutch statistics, 40 per cent of people over 65 live alone and 60 per cent 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. Since older persons who did not have any physical limitations did not participate in the study, the general health of our sample will be somewhat lower than that of the Dutch older population. In Table 1 it is shown that a relatively greater part of the older women are living alone, which is in accordance with figures from the total Dutch population of elderly.

Data collection

The research consisted of an interview with the respondent, a questionnaire filled out by the respondent and, in the case of a two-person household, the partner, and a checklist on housing characteristics.

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 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 1 week before the first interviews started. The interviewers were instructed to visit several neighbourhoods with different qualities and diverse types of housing, in which they looked for people older than 65, by asking people living there. In every street only one older household could be interviewed. Every visit started with an interview that consisted of both closed- and open-ended questions. At the end of the interview, the respondents and, if possible, their partners filled out a questionnaire that consisted mainly of multiple-choice questions. After the respondents gave their permission, the interviewer filled out the inventory on the home, if necessary with the help of the respondent. This concluded the visit, which took 1.5 to 2 h 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]. Respondents reported the degree of the complaint on a 4-point scale (0=not at all, 3=quite a lot). 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 then reported 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 interviewers had noted every problem, they showed the respondents a list of possible types of problems, to help remind them of possible other problems that had occurred. If the respondent 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. Besides a number of topics that were not discussed here,¹ the solutions for these problems were scored by the respondents on 5-point scales on satisfaction (0=not satisfied, 4=very satisfied) and effectiveness (0=not effective, 4=very effective). 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 aspects of personal competence: one item measured education level (4-point) and a 16-item multiple-choice test was developed to measure basic knowledge of building practice, building procedures and special modifications for senior citizens. It also included measurements of general

satisfaction, housing satisfaction and futurity (subjective appraisal of future independence) which will not be discussed in this paper.

The inventory of 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 in four areas of concern: safety, accessibility, living comfort and adaptability. The items are weighted with 10, 5 or 3 points, depending on their relative importance. If a home or a complex of homes scores enough points on this checklist, it receives the 'Seniors' label'. The full Seniorenlabel checklist consists of three parts, concerning the home, the general facilities and the neighbourhood. In this survey, however, only the first part was used. To this sublist a number of extra items were added, for example concerning furniture arrangement. 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 physical limitations that was reported varied between 0 and 14 ($M=4.9$, $S.D.=2.8$). The percentage of solved problems varied between 0 and 100 per cent ($M=0.74$, $S.D.=0.28$).

Type of problem and adaptive strategies

The reported problems were initially categorized into 18 different groups. This categorization was not based on the type of physical limitation, but on the activity respondents reported to have problems with. In order to reduce this number, a correspondence analysis was performed with these problem types as rows and adaptive strategies as columns. Correspondence analysis is a multivariate method for exploring cross-tabular data by converting such tables into graphical displays, called 'maps', and related numerical statistics (Greenacre & Blasius, 1994). It is a valuable exploratory technique, not so much in testing, but rather in understanding the information contained in these tables.²

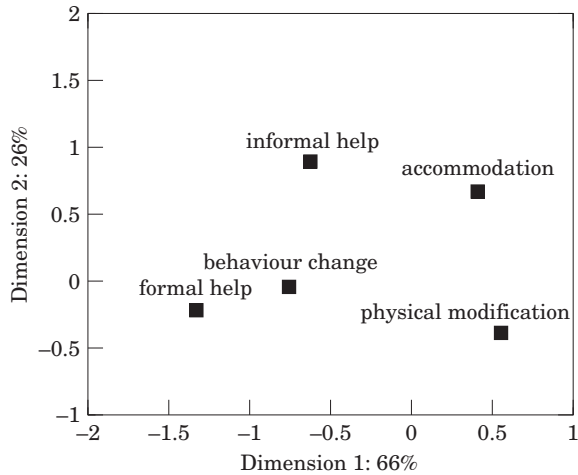


FIGURE 2. Correspondence analysis: column scores.

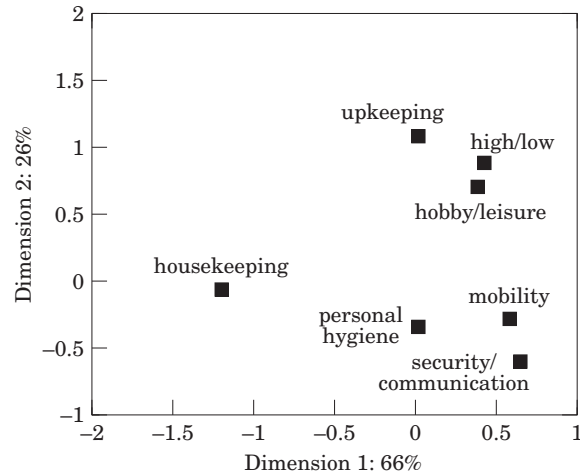


FIGURE 3. Correspondence analysis: row scores.

Problem types that were close to each other both in the ‘solution-space’ and as regards to content were clustered. This resulted in seven categories of problems. In Table 2 a summary of the frequencies of these problems with the chosen adaptive strategies is given. The cross-tabulation indicates that the type of solution that is (or is not) chosen depends on the type of problem, $\chi^2(24, N=493)=413, p<0.001$; Goodman & Kruskal λ with adaptive strategy dependent=0.35. The results of a second correspondence analysis, with these seven problem categories presented in Figures 2 and 3, show how the various problem types are related when they are projected on the solution-space that is described by two dimensions. The first dimension can be interpreted as describing the range between help from others to managing on your own, the second as running from informal to formal adaptations. The various problem types have clearly different orientations in this solution-space. These figures indicate that problems with housekeeping and preparing meals are relatively often solved by arranging formal help (paid housekeeper, meals on wheels) while mobility prob-

lems are often solved by physical modifications (e.g. installing an elevator in case of a problem with stair-climbing) and problems with hobbies are often not solved at all.

Competence and adaptive strategies

The relationships between the various 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 number and proportion of problems they had solved in that particular way. First we performed a linear hierarchical regression analysis on the number of problems people reported. Health and possibly age were expected to influence this variable. Besides these variables, the other competence factors were entered in the equation in the second step of the analysis. Only health had a significant effect, $\beta=-0.64, p<0.001$, indicating that people with better health reported less problems.

TABLE 2
Distribution of adaptive strategies by problem type (per cent)

	Physical modification	Formal help	Informal help	Change of behaviour	Accommodation	Total	
						N	%
Housekeeping/preparing meals	7	53	8	25	6	130	26
Personal hygiene	56	23		6	15	52	11
Mobility	72	1	1	5	21	173	35
Hobby/leisure time	26		3	11	61	66	13
Lifting/reaching high bending/kneeling	23		8	4	65	26	5
Home upkeep	18	5	32		45	22	4
Security/communication	88			4	8	24	5
Total	43	17	5	11	25	493	100

Then we performed a similar analysis on the number of unsolved problems people reported. In the first step again health was the only significant predictor, but in the second step, adaptability of the house had a significant negative effect as well. However, the total r^2 was rather low. Results of both analyses are summarized in Table 3. In Table 4, bivariate correlations between the indicators of competence are reported, as well as the zero order correlations between these indicators and the five proportionate scores of the adaptive strategies.

After trying to explain the numbers of solved and unsolved problems, we performed stepwise linear regression analyses on the proportions of adaptive strategies respondents had chosen, to find the most important predictors among the competence variables of the type of adaptation. All competence factors were allowed to enter the equation simultaneously.³ The results of these analyses are reported in Table 5. Some modest but significant correlations existed for every adaptive strategy. However, only one significant predictor was entered for every strategy.

TABLE 3
Linear regression analyses for predicting number of problems and number of unsolved problems

Variable	Number of problems		Number of unsolved problems	
	B	β	B	β
Step 1				
Age	0.07	0.16	0.04	0.17
Health	-0.25	-0.60**	-0.05	-0.26**
Step 2				
Age	0.08	0.17	0.03	0.13
Health	-0.27	-0.64**	-0.05	-0.25*
Education level	0.43	0.14	0.13	0.09
Knowledge level	0.07	0.06	-0.01	-0.02
Network size	0.22	0.06	0.02	0.01
Adaptability	0.00	0.00	-0.02	-0.23*
Adaptedness	-0.01	-0.14	0.00	-0.04

Note. Analysis with number of problems: $r^2=0.36$ for Step 1; $\Delta r^2=0.04$ for Step 2. Analysis with number of unsolved problems: $r^2=0.09$ for Step 1; $\Delta r^2=0.06$ for Step 2.
* $p<0.05$, ** $p<0.01$.

TABLE 4
Bivariate correlations between indicators of coping competence and zero order correlations between indicators and adaptive strategies

	1	2	3	4	5	6	7	8	9
1 Alone	×								
2 Age	0.33*	×							
3 Gender	0.10	-0.13	×						
4 Health	0.03	0.12	-0.12	×					
5 Education level	0.08	-0.14	-0.14	0.23*	×				
6 Knowledge	-0.40*	-0.25*	-0.03	0.06	0.30*	×			
7 Network size	0.10	0.04	0.05	-0.19*	-0.16	-0.13	×		
8 Adaptability	-0.23*	-0.14	0.09	0.12	0.24*	0.22*	-0.15	×	
9 Adaptedness	-0.22*	-0.18	0.21*	-0.15	0.04	0.14	0.07	0.40*	×
Physical modification	-0.01	-0.14	-0.13	-0.03	0.26**	0.20*	0.04	0.12	0.04
Formal help	0.16	0.11	0.13	-0.12	-0.20*	-0.20*	-0.01	-0.11	-0.07
Informal help	0.23*	0.27**	-0.01	0.10	-0.01	-0.17	0.07	-0.02	0.01
Change of behavior	-0.35**	-0.24*	0.05	0.02	-0.01	0.09	-0.07	0.20*	0.17
Accommodation	0.03	0.10	0.01	0.07	-0.15	-0.09	-0.03	-0.23*	-0.13

Note. 'Alone' and 'gender' are dichotomous variables, high scores represent living alone vs with partner, and female vs male.
* $p<0.05$, ** $p<0.01$.

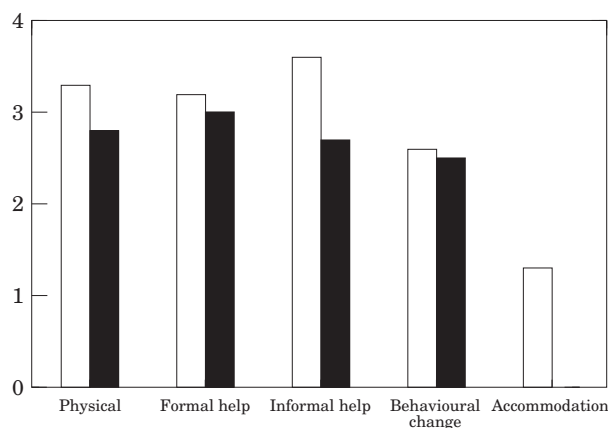


FIGURE 4. Satisfaction (□) and effectiveness (■) of adaptations.

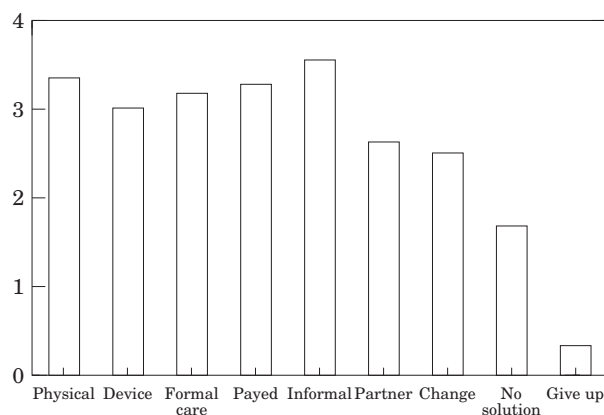


FIGURE 5. Satisfaction with types of adaptations.

The proportion of problems respondents solved with modifications of the physical environment was positively related to their education level. The proportion of problems respondents solved by accepting formal help was negatively related to this variable. In the regression analysis with the proportion of informal help as the dependent variable, 'living alone' was the only predictor. Persons living alone received more help from their children than persons living with their partner. These latter persons received help from their partner more often, as reflected in the analysis of change of behavior. The proportion of accommodative adaptations was related negatively to the adaptability of the home.

Satisfaction and effectiveness

For the problems that were discussed in detail, respondents reported their satisfaction with and the perceived efficacy of the adaptive strategy on 5-point scales. Effectiveness scores were only given for the

first four types of adaptation. Results are shown in Figure 4.

One-way analyses of variance (ANOVAs) were performed with 'effectiveness' and 'satisfaction' as dependent variables, respectively. Although the analysis with 'effectiveness' did not render significant results, the analysis with 'satisfaction' did, $F(4,177)=27.77$, $p<0.001$. Two-tailed t -tests showed that satisfaction with environmental and both formal and informal social adaptation strategies was significantly higher than satisfaction with personal goal-directed adaptive strategies [$t(104)=2.86$, $p<0.005$; $t(53)=2.50$, $p=0.015$; $t(23)=2.68$, $p=0.013$, respectively] which in turn was significantly higher than satisfaction with 'accommodation', $t(42)=3.72$, $p=0.001$.

The same analysis was also performed with the more detailed categorization of solutions as factor variable (Figure 5). Again results proved to be significant, $F(8, 173)=16.90$, $p<0.001$. Two-tailed

TABLE 5

Summary of linear regression analyses for predicting proportions of the various types of adaptive strategies

	Physical adaptation	Formal help	Informal help	Change of behaviour	Accommodative adaptation
1 Alone	-0.7	0.10	0.26*	-0.33**	0.03
2 Age	-0.8	0.02	0.18	-0.02	0.01
3 Gender	-0.09	0.10	-0.04	0.17	-0.03
4 Health	-0.02	-0.13	0.17	-0.02	0.07
5 Education level	0.25*	-0.27**	-0.02	0.04	-0.04
6 Knowledge	0.12	-0.19	-0.09	-0.03	0.03
7 Network size	0.16	-0.06	-0.01	-0.02	-0.12
8 Adaptability	0.08	-0.03	0.05	0.15	-0.27
9 Adaptedness	0.02	-0.01	0.08	0.08	0.03

Note. 'Alone' and 'gender' are dichotomous variables, high scores represent living alone vs with partner, and female vs male. * $p<0.05$, ** $p<0.01$.

t-tests showed that satisfaction with 'modifications of the home' and 'informal help' was significantly higher than satisfaction with 'help from partner' ($t(67)=2.42, p=0.018$; $t(15)=2.61, p=0.020$) and 'change of own behaviour' ($t(67)=2.65, p=0.010$; $t(15)=2.23, p=0.041$), satisfaction with 'help from partner' was in turn significantly higher than satisfaction with 'no solution' ($t(25)=2.04, p=0.052$). Satisfaction with 'use of assistive device', 'formal care' and 'paid help' was also higher than satisfaction with 'no solution' (all $p<0.001$). Satisfaction with 'giving up' was significantly lower than satisfaction with all other adaptive strategies (all $p<0.004$).

Discussion

The aim of this study was to identify those factors in a theoretical, exploratory model that have a significant influence on whether a problem is solved proactively or not, and whether the environment or the person is the object of change.

Problems and adaptive strategies

As was expected, the type of solution or adaptive strategy a person chooses depends heavily on the type of problem. The results of the correspondence analysis presented in Figure 2 show how the various problem types are related when they are projected on the solution space that is described by two dimensions. The various problem types have clearly different orientations in this solution space (Figure 3). The data presented in this paper do not point out the reasons for this phenomenon. However, preliminary qualitative analyses of the data gathered in the interviews indicate that several factors are important here. The availability and familiarity of solutions might be important. It is very likely that in the area of personal hygiene and mobility, instrumental solutions are more common than in the area of housekeeping and even more so than in leisure time-related areas. In this sense, the results presented in Table 2 ('problems and solutions') are in itself already of importance to people working in the field of housing for the elderly. While presently most of the attention to this field goes to solving problems in the 'practical' field [ADL (activities of daily living) and IADL (instrumental ADL)], 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 lei-

sure activities may pose a great threat to their well-being.

Another possible explanation for the variety in adaptive strategies people choose for different problems might be related to issues of relevance or centrality of the activities to the older person. One may expect that persons will be differently motivated to solve problems that lie in central domains than to solve problems that are perceived as less important to the self (Brandtstädter *et al.*, 1993). This idea provides an interesting focus for a future study.

Competence factors

Besides the rather trivial relationship between the health of respondents and the number of problems they report, competence variables were predominantly apparent in explaining different types of adaptive strategies. It was shown that the scores of the respondents on these variables were not related to the number of problems people reported, nor to the number of problems that were solved, except for the adaptability of the home.

Analyses showed that besides the type of problem, which is a major determinant of the type of adaptation people choose, other factors are related to certain adaptive strategies. Personal competence factors—education and knowledge of building procedures and technical solutions—were related to more physical modifications and less formal help. Although social contacts were hypothesized to be of importance, no relationships were found between social network variables and adaptive strategies, except for the variable 'living alone'. 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 survey had at least one or two people whom 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.

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. This effect was not directly supported by the data. It was shown that people living in homes that scored higher on the variable 'adaptability' were more likely to choose a goal-directed change of behaviour and less likely to choose 'accommodation'.

Three competence factors besides the type of problem proved to have a significant relationship with the type of adaptive strategy that is chosen: basic knowledge of building practice, procedures and special modifications, education level and adaptability of the home. In general it seems that these three 'resources' provide the person with more control over their situation. The more resources are available, the more likely a person is to engage proactively in the adaptation process and find an effective and satisfying strategy. The fact that different adaptive strategies produced significantly different levels of satisfaction provides an important reason for trying to stimulate proactivity in problem-solving among older people. Furthermore, Lawton (1990) argued that the very fact of proactivity contributed to self-respect among severely impaired older individuals. These findings lead us to conclude that this type of research will prove important in the future.

All in all, while the role of the type of problem was very obvious, the role of the competence variables in this study was modest. Although some relationships have been found between these rather objective variables and adaptive behaviour, the findings in this regard may seem somewhat disappointing. However, more qualitative findings of this study do render some clues as to the important determinants of adaptive behaviour. On several occasions people explained not choosing proactive solutions for their problems in terms of perceived difficulty of solutions, the amount of effort that had to be invested or insecurity about being able to find and organize modifications. These observations triggered the idea of investigating the influence of perceived competence, or rather, perceived control in this process. Control and control beliefs are relevant in view of this study, since they are often thought to change with age and in addition play an important role in how people direct their own development and how they cope with challenges and problems (e.g. Festinger, 1957; Bandura, 1986; Brandtstädter & Baltes-Götz, 1990; Aldwin, 1991). The influence of perceived control on behaviour may even be more important than actual control and will therefore be the focus of a future study.

A brief note of caution should be given here. The analyses of the influence of the competence variables and the type of problem have been performed separately. Due to the diverse types of data, a combined analysis could not be performed. 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. Second, 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.

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Notes

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(1) The remaining measurements are discussed in a second paper by the same authors (in press).

(2) Correspondence analysis can be used to investigate both the magnitude and the substantive nature of the association between the row and column categories of the cross-tabulation. Primary concepts are profiles (of row or column percentages), masses (weight proportional to the number of respondents) and chi-squared distances.

(3) Since bivariate Pearson correlations and Spearman rank correlations of education level with the proportion variables were very similar, education level was used in the regression analyses, although it was only measured on a 4-point scale.

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