TEMPORAL ASPECTS OF THE OUT-OF-HOME ACTIVITIES OF ELDERLY PEOPLE.

The international MOBILATE survey: Enhancing mobility in later life

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Abstract

Information on the temporal behaviour of elderly people is scarce. In most time budget research information is only available on the amount of time spent for different activities, but the distribution through the day is mostly missing.

The MOBILATE project in five European countries enables a more detailed analysis of the temporal behaviour of elderly people. The sample consists of people of 55 and older stratified by age, area and gender. The available departure and arrival times of journeys allow for a description of the activities through a day. We can relate this information to some background characteristics of people, such as country, health condition, age, gender, trip motives and urban or rural areas. This results in a better understanding of their activity patterns. Health plays a major role in the explanation of temporal behaviour. Among countries differences in behaviour exist, which partly can be explained by different climates between Northern and Southern countries.

The data give also information on the expenditure of the amount of time. Working is most time consuming, but most elderly people are retired. Visiting is most time consuming for them. Shopping is the most frequent activity out of the home.

Elderly avoid going out at times, which can be complicating the trip by darkness or by heavy traffic or by busy facilities.

Keywords

time-space behaviour, elderly, activity pattern, International Conference on Travel Behaviour Research, IATBR

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1. TEMPORAL ASPECTS OF OUT-OF-HOME ACTIVITIES OF ELDERLY PEOPLE. The international MOBILATE survey: Enhancing mobility in later life

1.1 Time in old age

Work dominates the time structure of our society: school times, the opening hours of shops and services, opening hours of leisure facilities, etc. For elderly people, this structure related to working disappears after retirement. So, in all kinds of courses for "Pension Ahead", new structures for daily activities are subjects for discussion. It seems that people do not have the ability to live without an externally enforced daily structure. After retirement elderly people have to find a new structure in their daily living pattern.
Such an ability to spend time where and when you want is a quality of life. In old age, some hindrances in people's personal physical condition and in the environment may create higher thresholds for participating in activities. This makes us wonder. How does the expenditure of time by older adults appear? Is it restricted by personal and/or environmental circumstances and can we discover more about the groups at risk?

In most research on ageing, age is the main factor in explaining changing behaviour. Age is a variable that is available in most research. But, the real explanation has to be found in those characteristics which change with age: health, social networks, income, ability to drive a car or ride a bicycle etc. These variables explain the temporal aspects of the outdoor mobility of older adults much better than age as such.

The MOBILATE research programme on the outdoor mobility of older adults offers the opportunity to analyse the use of time by elderly people related to these personal background variables. So, the objective of this paper is to present the personal and environmental factors that have a real influence on the use of time by older adults. In a period with growing road congestion, the temporal behaviour of an increasing group of elderly people is a very relevant issue from a societal point of view.

1.2 The MOBILATE approach

In 2000, the European project MOBILATE was carried out in five European countries (Finland, Eastern and Western Germany, Hungary, Italy and The Netherlands) with 3,950 people aged over 55. This survey consisted of a questionnaire covering many background variables and a diary form for the journeys made during a period of two days. These two sources together offer a good opportunity for further analysis of the behaviour of older people. For each journey from home back to home in the diary, we know the mode used, the travel motives and destinations, the departure and arrival times and some qualitative conditions of the journey.

In this paper, we focus on the analysis of the temporal aspects of out-of-home activities and also upon the differences between different groups of people. We have information on the personal characteristics of people and their social network, the residential context, leisure behaviour and health conditions. This enables us to get more insight into the background of the

temporal aspects of their behaviour. We complemented the descriptive information about personal background variables with both a categorical analysis and a regression analysis, in order to explain more of this background to the out-of-home behaviour of the elderly.

Health is an important factor in these analyses. Therefore, we had to find a good integrative solution for the three different ways health that had been measured in the survey. The first one was an ADL-scale consisting of the sum score of ten items measuring the physical abilities of people (walking, climbing stairs, carrying goods etc.). These items were measured from 0 = no problem, 1 = some problem to 2 = serious problem. The sum score goes from 0 (no problem) to 20 (serious problems with all aspects). The second measurement concerned the level of physical activity (1 = hardly any physical activity to 4 regular physical exercise, several times a week). And the third measurement concerned a self-rated opinion of their own physical condition (1 = very poor to 5 = very good).

By means of a cross tabulation, these measurements were combined into four levels of health:

- 1 = serious problems with ADL, physical activity level 1 or 2 and a poor physical mobility
- 2 or 3 = a mixture of the middle positions on these three variables
- 4 = no ADL problem, physical activity level 3 and 4 and good physical mobility.

Finally, the satisfaction people had with their own health (rated 0-10) is used as a check for the validity of the combined health indicator. The mean satisfaction varies from 3.5 for people with poor health, via 6.0, and 7.5 to 8.1 for the healthiest groups. The integral health variable is used in several parts of the analyses presented in this paper.

Time as a variable can have two different meanings:

- the **amount of time** is expressed in this analysis in as an average number of hours out-of-home and a total number of hours spent outdoors;
- the **point in time**: is expressed as the distribution of activities during the day, i.e.: how many people are active outdoors at specific times.

This is discussed in more detail in section three from a theoretical point of view. We have analysed the MOBILATE data from both the perspectives of time, and for different groups within our total population of older adults. In section four, we present the distribution of activities throughout the day. All these graphs are based upon the observed data without weighting. To get graphs with a smooth line we had to work with a progressive mean, calculated as a mean of five periods. This also compensates for the tendency that people have to mention round times for departure and arrival of journeys. After this descriptive part of section four, we elaborate more on these time patterns by background characteristics and by distinguishing between groups of activities. Section five presents the conclusion of the paper, and section six broadens the discussion about the research on the time space behaviour of older adults.

1.3 Temporal aspects of the mobility of older people

In explaining the mobility behaviour of people, temporal aspects play an important rôle. The central idea is that people use their time (in a more or less efficient and effective way) within

a fixed time budget. Time can be decisive in two ways for the temporal behaviour of people. In the time paths, as described by Hägerstrand (1970), the point in time and the amount of time needed to cover distances are very important for the spatial range people have and the opportunities they have in order to carry out different activities (Chapin, 1974; Parkes and Thrift, 1986; Pred, 1984; van Reisen, 1997; Dijst, 1995). For research, these two perspectives offer the opportunity to understand more about the travel behaviour of people.
Moreover, people who are working the field of traffic management are also interested in the temporal aspects of the mobility of older people. They worry about increasing numbers of people of older age and within this, the group of very old people, and how they (will) use transport facilities. The future group of elderly will have grown up in a time which had more spatial mobility than ever. Better financial conditions for (early) retirement mean that older adults (will) have more time, more money and more cars to allow them to be mobile (OECD, 2001).

It is worthwhile discussing this possible future hyper-mobile tranche of elderly and if it can be based upon the actual travel behaviour of the present generation of older people. Today's traffic problems and the increasing number of traffic jams are related to the concentration of commuting and recreational trips in time Will the mobility of elderly people contribute to this concentration? Or will this mobility take place outside the peak hours and consume less space by using slower transport means such as cycling and walking?

1.4 Temporal aspects of the daily activities of elderly people

1.4.1 Distribution of mobility throughout a day

Figures 1 and 2 show the percentage of people active out of the home between 6 a.m. and 9 p.m. For these graphs the time between six and nine has been divided into periods of five minutes. What the graph now shows is the percentage of the group concerned which is active outdoors in each of the time periods.

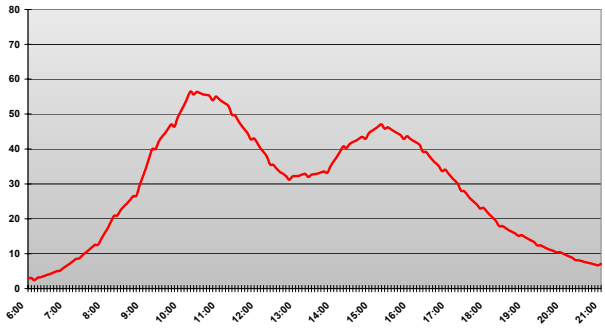

Figure 1 People active outdoors from 06:00 – 21:00 in five European countries in total

MOBILATE Survey 2000, N=3950

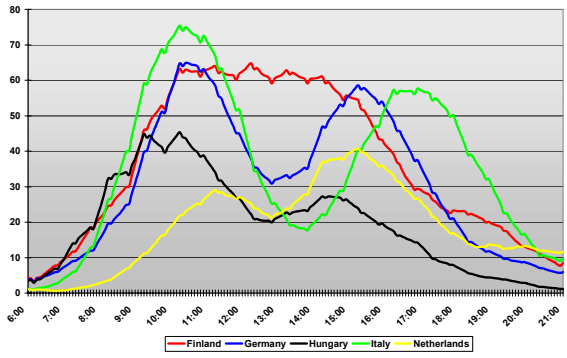

Figure 2 People active outdoors from 06:00 – 21:00 in five European countries

MOBILATE Survey 2000, N=3950

Figure 1 shows that around 11:00 the peak of outdoor activity occurs with nearly 60% of the subjects out of their home. During lunchtime some people go back home and a new peak comes between 15:00 and 16:00 with nearly 50% out of doors.

Figure 2 shows the diversity between countries. Italy has the highest peak of outdoor mobility in the morning. Between 10 and 11 more than 70% of the people are not at home. This peak is even a little bit earlier than in the other countries. They have a clear dip around lunchtime and in the late afternoon outdoor activity starts again with a peak between 16.00 and 17.00, when about 55% of people are away from home.

Finland has a totally different pattern. They start later and between 10.00 and 14.00 around 60% of people are away from home. They go back home earlier than the Italians. The other countries all have two peaks of activity: one in the morning and one in the afternoon. In Hungary this afternoon peak is rather low and in the Netherlands it is higher than in the morning. The Dutch respondents seem to be slow starters and they go back home rather early, but in the evening they are relatively often away from home.

The motives for the journeys have been reduced to eight 'arbitrary' categories, which have enough participants to trace them in overviews (Figures 3 – 8 refer):

Work:	work
Visiting:	visiting, baby-sit, care for someone
Shop:	visit to shop, attending services, health care facilities
Recreation:	coffee, cultural event, association, gardening, short trip
Sport:	sport, fishing
Walk:	walk
Other:	religious, accompany, education
Home:	not active outdoors (out of the home).

An overview of the five countries is interesting as a first step. These graphs illustrate clearly the differences between them. As discussed, all countries have a distribution of two peaks and a dip during lunchtime; while Finland alone has a totally different pattern.
A relatively large part of the Finnish and German sample is still working and workers start rather early. In the Netherlands, Italy and Hungary only a small part of the sample still works at this older age.
'*Visiting other people'* has no clear peak, but time for this activity comes mostly during lunchtime and the early afternoon.
'*Shopping*', '*attending services and (health) facilities*' is typically an activity that takes place in the morning. In the Dutch and Finnish situations this peak is not as evident as in the other countries. '
In East Germany and Italy relatively more time is spent in recreational activities compared to the other countries.
Activities, which can be typified as sport, are not so favoured in all countries, with the exception of Finland. This is partly compensated by a higher participation in walking in Italy and both parts of Germany.

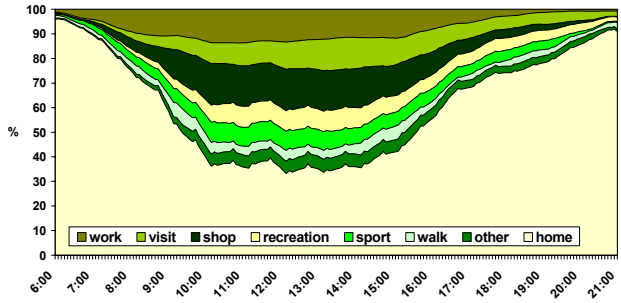

Figure 3 People active outdoors from 06:00 – 21:00 in Finland

MOBILATE Survey 2000, N=610

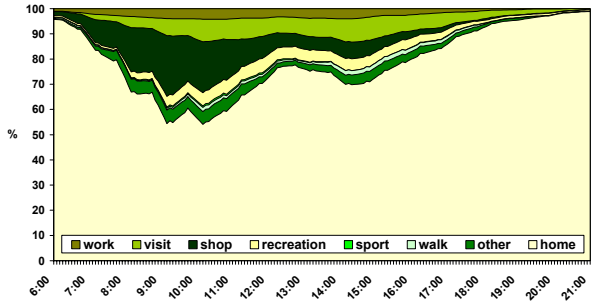

Figure 4 People active outdoors from 06:00 – 21:00 in Hungary

MOBILATE Survey 2000, N=605

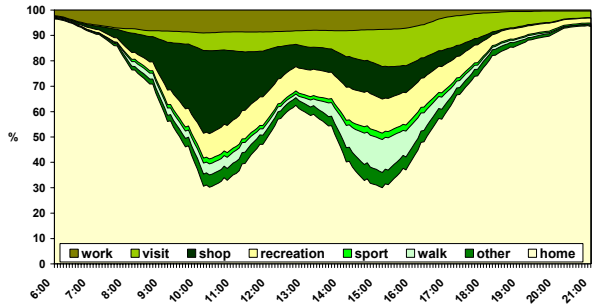

Figure 5 People active outdoors from 06:00 – 21:00 in East Germany

MOBILATE Survey 2000, N=768

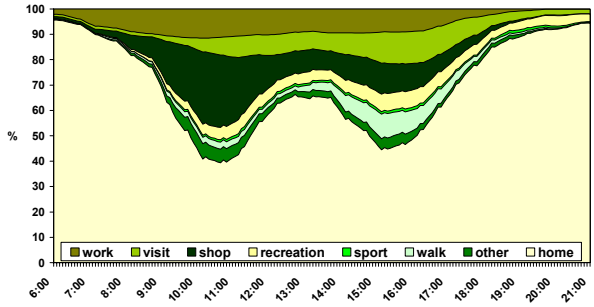

Figure 6 People active outdoors from 06:00 – 21:00 in West Germany

MOBILATE Survey 2000, N=751

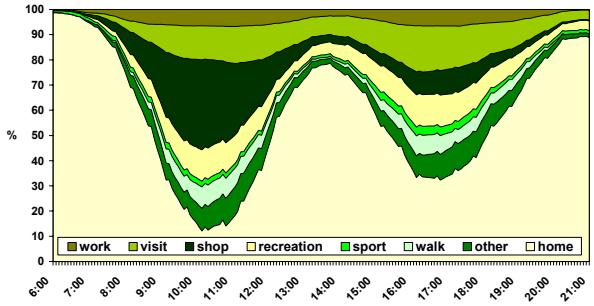

Figure 7 People active outdoors from 06:00 – 21:00 in Italy

MOBILATE Survey 2000, N=600

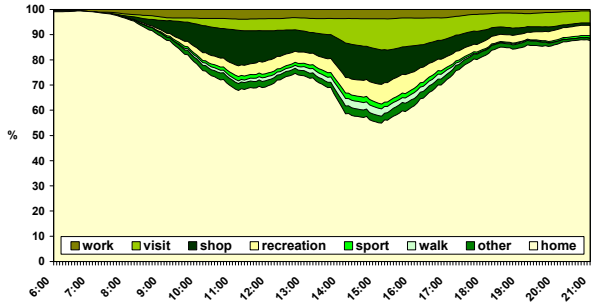

Figure 8 People active outdoors from 06:00 – 21:00 in the Netherlands

MOBILATE Survey 2000, N=616

In The Netherlands and Hungary there is a rather low participation in outdoor activities. In Hungary most people go out in the morning and in the Dutch case the afternoon is the time to

go out. Noticeable are the two high peaks in Italy and the deep dip during lunchtime. Is this a left-over from the siesta? Climate is a part of the explanation for the striking differences between Italy and Finland. The shorter day in Finland could explain why people stay outdoors more during a shorter part of the day.

1.4.2 Background variables in the explanation of mobility in time

An interesting step in the analysis is the effect of some other characteristics of the sample. Explicit variables, such as urban and rural living environment, gender and age are introduced and discussed here. Table 1 shows the differences in the time spent out-of-home by sub-groups signified by residential area, age and gender.

Table 1 Number of minutes spent out-of-home by area, age and gender

Age	Gender	Urban	Rural
< 74	Male	226	173
	Female	181	128
>75	Male	125	96
	Female	87	55
	Total N	1,702	1,754

MOBILATE Survey 2000, N=3,950, not weighted

Table 1 clearly shows the differences between urban and rural areas. In the urban areas more time is spent out of doors than in rural areas. It may be that the better availability of facilities in urban environments is a part of the explanation for their greater use. Furthermore, men go out more than women and older people stay at home more than younger old people.

Herz (1982) has discussed this obvious relation between the types of areas and outdoor behaviour. Based on the ideas of Gans (1968) he formulates the hypothesis that people's behaviour is affected to a much greater extent by their socio-economic status, stage in life cycle, occupation, income and age than by their environments. Table 1 has shown that the differences between these environments remain evenly controlled by age and gender.

SPSS-Answertree (SPSS, 2001) can be used as a statistical technique to divide the sample, controlled for inter-actions, in sub-groups, which have a maximal contrast on the time spent outdoors. In a first analysis we have used only some structural variables such as gender, age, income, education, size of household, residential area, available means of transport: private or public. Income and education have been used as ordinal variables (low to high); a more detailed specification was impossible for these variables with such differences between countries. The sub-group, which goes out the least (33 minutes in a day) consists of the very old women (older than 75-84). The most active group (307 minutes out-of-home) consists of highly educated, younger-old people with a high income.

Age is the first variable which makes a difference in going out. This is not very surprising considering the high correlation (0.41 $p<0.01$) between age and health. If health is added as a variable, then this is the first step in splitting up the groups. In the other case the age group of people younger than 85 are split up by available modes or by income and as a last step gender; residential area and education also play a rôle. This finding seems to affirm the hypothesis that structural variables explain more of this outdoor behaviour than the environmental characteristics represented by urban or rural area.

1.4.3 Distribution of types of outdoor activities during the day

A more detailed analysis with the distribution of these outdoors activities during the day also shows that the differences in activity pattern between urban and rural areas tend in the expected direction. Urban people go out more. In the rural area about 50% stay out of their homes during the morning peak; in the urban area this is about 65%. This gap of 15% is caused mainly by the motives '*shopping*', '*attending services*' and '*recreation*'. The sometimes "supposed" closer social climate of rural areas cannot be seen in the figures for recreational activities or visiting.

Age could be another explanatory variable. During the busy morning peak 70% of the younger people of 55 to 74 are out of their homes compared to only 40% of the people of 75 plus. Most of this difference can be explained by the retirement from work and a minor part by the decrease of participation in activities such as shopping and attending services. The decrease can be further explained by the reduction of obligatory activities rather than voluntary activities. Early in the evening the younger elderly are out of their homes more than the 75 plus people.

Gender is also a part of the explanation. During the busy morning peak only 20% of men stay at home compared to more than 50% of the women.

1.4.4 Health as an explanatory factor in out-of-home activities

Age, as such, is seldom the real explanation for differing behaviour. More probably, decreasing health condition is the explanation, as shown in the high correlation between them. Figure 9 presents the daily activity patterns of four groups with different health conditions. This graph clearly shows the lesser amount of time spent outdoors, when health conditions are poor. The next graphs make clear what types of activities play a major rôle in this decrease.

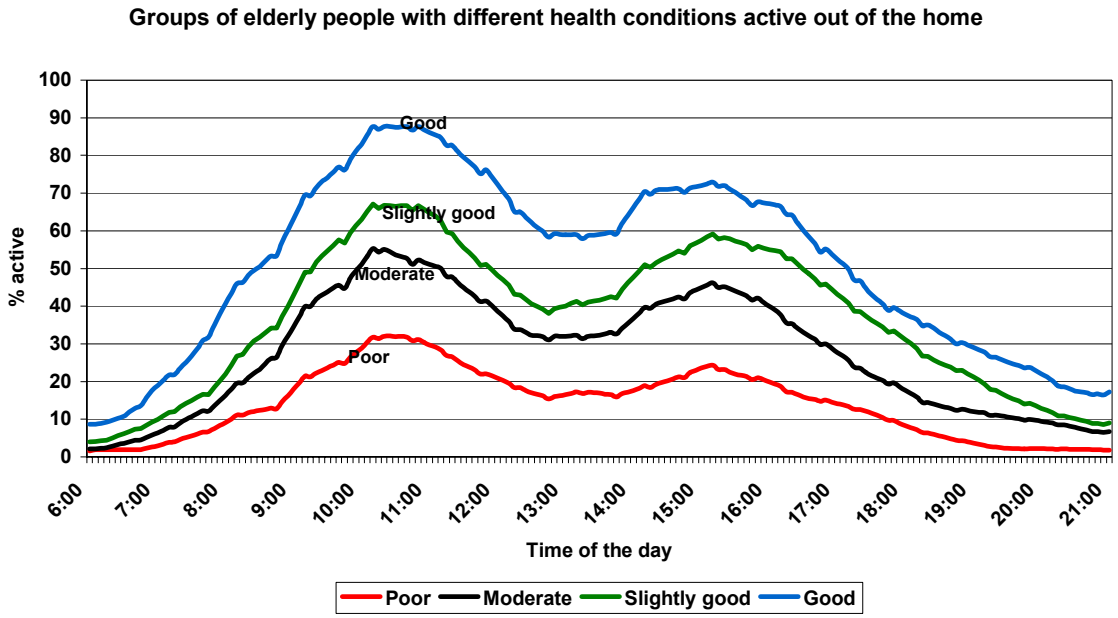

Figure 9

MOBILATE Survey 2000, N=3950

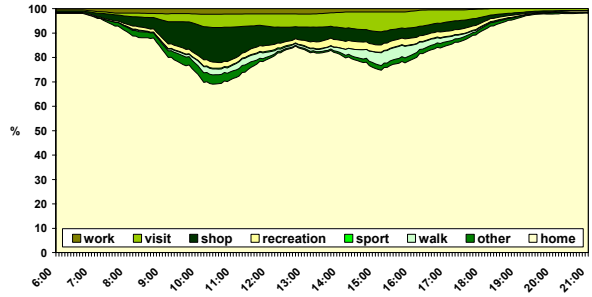

Figure 10 Outdoor activities in five European countries by elderly with poor health

MOBILATE Survey 2000, N=3950

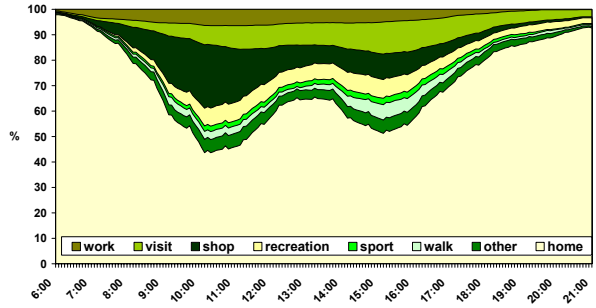

Figure 11 Outdoor activities in five European countries by elderly with moderate health

MOBILATE Survey 2000, N=3950

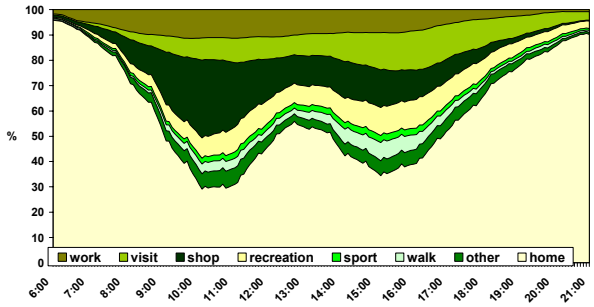

Figure 12 Outdoor activities in five European countries by elderly with slightly good health

MOBILATE Survey 2000, N=3950

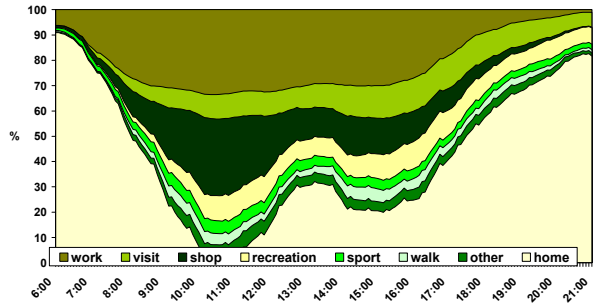

Figure 13 Outdoor activities in five European countries by elderly with good health

MOBILATE Survey 2000, N=3950

The more journeys people make with more than one motive, the more the total amount of time outdoors becomes over-estimated by counting the same journey for motives in different categories. With decreasing health the time spent on out-of-home activities also decreases. The healthiest group spends a lot of time at work. This is also the reason for an early start. Additionally they go more out during the evening. The other people with slightly good health go out to work less and that makes a difference. In the groups with poor or very poor health we see that work has disappeared totally and that they also spend less time on non-working activities.

The daily pattern is similar for all groups. Except for the workers, older people avoid the peaks in the morning and in the afternoon. People with poor health tend to stay at home in the evening. These graphs make clear that health plays an important rôle in the level of outdoor activity.

1.4.5 Expenditure of time on different activities explained

In order to analyse the time spent by elderly people on different activities, we have summarised the time spent by a person for a specific activity category and then calculated the time per day during the interview period. The next table shows an overview of the average number of minutes a day spent for several categories of activities by people in urban or rural areas differentiated by gender and age.

Table 2 Average amount of time spent on different activities by age, gender and area person a day

	Urban				Rural			
Duration per person/day	55 - 74		75+		55 – 74		75+	
	Male	Female	Male	Female	Male	Female	Male	Female
Work person/day	64	30	4	1	48	28	4	0
Visiting person/day	45	42	27	23	36	30	25	21
Shopping pers/day	65	72	45	38	49	48	34	25
Recreation pers/day	45	31	29	17	28	18	23	8
Sport person/day	16	10	10	2	10	6	4	2
Walking pers/day	15	12	17	8	12	10	9	4
Other act. pers/day	19	16	14	10	13	18	15	10

MOBILATE Survey 2000, N=3,950

Table 2 shows the average amount of time spent per person per day and this is not related to the frequency of these activities. The older group no longer works. People in the rural areas spend less time on nearly all activities. Women spend less time, except for shopping by the younger age group. The same conclusions can be found for the same analysis, but now restricted only to people who did the activities concerned (table 3).

Table 3 Average times spent for different activities by age, gender and area person a day, only for people who did these activities

	Urban				Rural			
Duration per person/day	55 - 74		75+		55 – 74		75+	
	Male	Female	Male	Female	Male	Female	Male	Female
Work person/day	376	296	262	165	307	319	163	7
Visit person/day	171	142	124	139	130	114	118	11
Shopping pers/day	101	105	82	73	99	93	82	7
Recreation pers/day	180	172	152	140	156	135	138	10
Sport person/day	173	142	156	95	134	110	102	14
Walking person/day	72	68	76	50	66	65	55	4
Other act. pers/day	128	118	107	96	82	82	92	6

MOBILATE Survey 2000, N=3,950

Differences are similar as in Table 2but the times spent are much higher. This is clearest for activities, which have been undertaken by fewer people: working, recreation and sport. Most activities take more than two hours together with the trip to and from. Only walking is mostly done for about one hour.

We have seen in both tables that also with age the amount of time spent for activities goes down. In the background health will play a major rôle. A direct relation between health and level of activity can be checked.

Table 4 Average amount of time spent for different activities by health condition

	Poor	Moderate	Slightly Good	Good
Working pers/d	5	17	37	101
Visiting pers/d	18	33	41	42
Shopping p/d	29	49	60	64
Recreation p/d	8	21	34	39
Sport pers/day	1	7	9	19
Walking p/d	6	10	13	14
Other act. p/d	6	15	18	20

MOBILATE Survey 2000, N=3,950

The tendency is clear: the better the condition of health, the more activities people undertake. This is most clearly seen for work. For most activities, people with poor health are rather inactive. The differences are rather small between people with slightly good or good conditions. Summarising the total time for all out-of-home activities we see that people with poor health go out for approximately one hour (72 minutes) and people with good health for about four hours (304 minutes).

In 1979 Mohr studied the activity patterns in the German KONTIV mobility database. He found that elderly people spend about one hour more out-of-home living in a one-person-household than those living in a multi-person-household. We have made a new variable calculated by summing up all durations of journeys and dividing them by two for the number of days: the mean expenditure of time out-of-home per day.

Table 5 Mean numbers of minutes out-of-home by household size

	<65	65 – 74	75 – 84	85+
One person household	224	133	108	57
Multi- person household	205	129	91	39
Total	1,088	1,087	1,448	32

MOBILATE Survey 2000, N=3,950

Table 5 shows that people in one-person-households spend slightly more time outdoors than people in multi-person-households. These differences, however, are much smaller than one hour as was found by Mohr. With increasing age there is, at the same time, a decrease of time spent out of the home.

Herz (1982) distinguishes seven sub-groups of the population. Only two of them consist of elderly people. He makes a distinction between car owners and non-owners as relevant for the time budget and he expects that car-owners have more outdoors leisure, especially in urban areas with a greater potential for places of activity. This hypothesis has been confirmed by our data. In Table 6 we illustrate the relation between car availability and health on the one hand and the time spent outdoors on the other. One may expect that health also affects the use of a car.

Table 6 Mean numbers of minutes out-of-home by health condition and by car availability in the household in urban and rural areas.

	Urban			
	Poor	Moderate	Slightly good	Good
Car available in household	113	234	278	336
No car available in household	84	133	185	200
Total	254	718	662	18
	Rural			
	Poor	Moderate	Slightly Good	Good
Car available in household	86	159	205	323
No car available in household	39	80	120	140
Total	313	745	583	33

MOBILATE Survey 2000, N=3,950, weighted

Table 6 shows that despite the health condition the availability of a car goes together with more time spent outdoors. Nevertheless, whether a car is available or not, people with better health go out more often. The table also shows clearly that the availability of a car creates an important condition and that in urban area people spend more time outdoors than in rural areas. It is not so clear if this can only be explained by the facilities available. One could also hypothesise that in rural areas people more often have spaces out of doors, which are not perceived as going out: such as a garden or farmyard.

In the interpretation of the figures we have to realise the differences between urban and rural areas. The rural area has fewer one-person households, fewer high incomes, fewer highly educated and fewer public transport users, but more car owners. Concerning health condition there is no difference between the areas.

This relationship to car availability does not disappear when controlled by gender. Men go out more and among them are mainly the people with a car (200 vs.89 min.). Among women

again a car available goes together with more outdoor activity (148 vs. 90 min.). Herz (1982) stresses this rôle of car availability by posing: "*the richer supply of leisure opportunities in the city and the greater need for these activities among housewives and pensioners in the city is reflected in the leisure time budgets of those groups only where a car is available*."

A more general question belonging to this subject concerns the relationship to the quality of life. We have asked people how satisfied they are with their life as a whole. The correlation between this life-satisfaction with the total time out of the home is not very high, at 0.16, and this relationship descends to 0.05 when controlling for health. This means that health is much more relevant.

1.5 Conclusions on the temporal aspects of the mobility of older people

In the explanation of out-of-home mobility health contributes the most to the explanation. But, this is not the only factor. The location, where people live, makes a difference. In the urban areas people go out more. This can be related to the greater availability of opportunities, but the need can be more than in rural areas, where the house and direct belongings both allow and ask for more outdoor activities, which are not experienced and measured as out of home. Men go more out and the younger (-old) people are more active out of their home. The availability of a car plays a rôle in all these conditions. This means of transport enables more activities to be undertaken.

The distribution of out-of-home time over the day is in line with some statements people do over their temporal behaviour. They avoid the busy hours and they prefer to travel in the daytime, avoiding darkness. Except for work, the peak for outdoor activities is in the middle of the morning or the afternoon. They avoid the rush hour in the morning, during lunchtime and in the evening.

Shopping is mostly done in the morning and visiting other people and sport and recreation are more activities for the afternoon. People seem to start with the most obligatory activities, which belong to the daily tasks.

Most time is expended for working, when people still are at work. Visiting takes also a lot of time. When people visit other people, then they spend about three hours on this activity on average, for recreation and sport are the figures rather similar. Shopping is not so time consuming, but from the analysis of the trips we know that this is the most frequent activity (Lamoen & Tacken, 2002).

No clear relation can be found to the satisfaction with the whole of life and the level of outdoor mobility. The weak correlation between outdoor mobility and life satisfaction disappears when controlled for health. The relation seems primarily to be explained by health.

In our findings we see a tendency to change from the fast modes to the slow modes as walking and cycling, when the health condition deteriorates. Brög. (1998) states the same. Rosenbloom (2000) doubts this change to the more environmental friendly modes.

The daily activity pattern changes slightly by a decline of the health condition, but more clearly decreases the duration of the time spent out of the home.

1.6 Discussion

So far, the time-space behaviour of elderly people has not had so much attention in behavioural research. A solid theoretical background for this behaviour is missing. With a general tendency in most European countries, in which the share of elderly people grows to one third, their outdoor mobility is a relevant factor in the total transport and traffic. This outdoor mobility is also an important condition for the independence of people and their ability to organise their lives.

Going to work is no longer the main structural factor in the daily life of older people. Their pattern seems to be the opposite of the workers' pattern in a certain way. They avoid the busy times on the highways and in the shops and services. However, the new generation of elderly is changing very rapidly. The financial base is much stronger because of a better pension system. This will enforce the present tendency that the car is the dominant transport mode. This group has many more driving licenses (even among women) and cars, and they have the financial sources to use them. They are more familiar with today's traffic. One may expect that they will continue with this more mobile life, which is extensive.

The daily activity patterns can be described by the types, time and durations of activities. A good method to relate these patterns to specific groups of elderly is missing.

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