

The Role of Driving in Maintaining Mobility in Later Life: A European View

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H. Mollenkopf, F. Marcellini, I. Ruoppila, Z. Széman, M. Tackén, R. Kaspar, H.-W. Wahl, The Role of Driving in Maintaining Mobility in Later Life: A European View, Gerontechnology 2002; 1(4): 231 - 250. Elderly people whose physical strength and sensory abilities are waning are often in particular need of a car in order to deal with daily demands and to join in social or cultural activities. However, the number of pensioner households that own a car varies greatly according to region, age, gender and size of the household. This article first describes the access of older people to private cars and the predominant modes of transport used by them in urban and rural areas of six European regions in five countries. In the second part, the authors analyse the importance of driving compared to the other travel modes, and doing so, the distinction between: (a) people who own and drive a car themselves, (b) people who use a car as passengers only, and (c) people who do not have a car available in their households. Finally, the satisfaction of these groups with their possibilities to get where they want to go, as well as the variance in mobility satisfaction, is explored by means of descriptive and explanatory analyses. The paper concludes by reflecting on the major challenges arising from the present findings in terms of future urban and traffic planning.

Keywords: Europe, driving, outdoor mobility, automobile, transportation

In the face of the constantly increasing number of old and very old people as the general population ages and traffic volume and congestion perpetually grow, the driving behaviour of older men and women has become an issue of general interest for about three decades now¹⁻⁸.

While for many years the focus of research in this field has been on improving the safety of older drivers⁹⁻¹⁹ and on driving problems caused by chronic illnesses, sensory and mobility impairments, or Alzheimers' disease and related disorders²⁰⁻²⁴ (See also the papers of Ball et al., Owsley, and Sagawa in this issue), attention is now turning to the challenges which more and more older drivers face when they are no longer able to drive²⁵⁻²⁷. This has become particularly important in the USA, where the vast majority of the adult population is dependent on the private automobile: 'Driving one's own car is the option used by most persons in the United States today to obtain the mobility necessary to maintain their connections to society,' states Burkhardt^{28, p.98}, and Freund^{29, p.146} reiterates the popular assertion that 'We are a country in love with the automobile ...'. The number of motor vehicles per household has grown considerably since the 1970s when a family usually owned one car. In 1995, the number of vehicles was equal to the number of licensed drivers per household^{30, p.105}. In 1999, the median commute to work was 10 miles, and almost 80% of the workers commuted to work by car, driving themselves^{30, p.98}.

Dependence on the private car has been increasing among older Americans, too. They do not make work trips any more, but replace those trips with other trips taken by car. Between 1983 and 1995, the percentage of trips taken by car jumped from 87% to 92% among persons aged 70 to 74, that is, among those who were already using this mode of transportation relatively extensively in 1983. The increase was even more substantial (over 16%) among those aged 80 to 84 years. This means that there is no cohort

of older Americans that takes fewer than eight out of ten trips in a car^{31, p.38, 15-16, 28}.

In Europe, elderly people - at least currently - are far less 'auto-mobile' or self-mobile than in the USA. They make significantly fewer trips per day and travel fewer miles than comparable American elders^{31, 32, p.30}, and the share of pensioner households that own one or more cars still varies greatly, depending on the size of household, age, gender, income, and the country they are living in^{7, 33}. However, this relation will change in the coming years when the generation of people for whom driving a car has become a matter of course reach retirement age. Carrying a license and owning a car are becoming more and more frequent for each successive cohort of retired men. The statistics are increasing even more rapidly among women, slowly diminishing the current gender gap³⁴⁻³⁸. Thus, travel trends are moving in the same direction as in the US, albeit - as Rosenbloom suggests^{31, p.16}, with a certain time-lag.

There are several reasons for this development and the resulting growth in traffic volume. Changes in urban and regional structures, the functional and spatial separation between living and work, and between leisure and the activities required to provide for one's daily needs all contribute to the trend toward growing numbers of older drivers. These divisions make it necessary to bridge the widening gap between functional areas. Furthermore, in Europe too, traffic policy and planning have been oriented towards increased motorisation since the 1950s. The provision of extended road infrastructure accelerated extensive suburban development, the establishment of industrial and commercial enterprises beyond residential areas, and the outward relocation of private households which, in turn, increased the necessity to commute. The shift to private passenger transport often coincided with cutbacks in public transport, and the once dense network of retail shops gave way to suburban supermarkets and downtown shopping cen-

tres oriented to car users as customers. Thus, the interrelated trends of urban decentralisation, decreasing public transport services, dispersal of travel origins and destinations, and increasing automobile use mutually reinforce each other. People also have more time and more money to spend on cars and on growing travel demands^{30,p 85}. People 'tend to increase the distances they travel roughly in proportion to increases in their incomes, particularly as they start to access faster modes.'^{39,p 2-6}.

Most of all, however, societal and individual necessities, modern values and economic interests complement one another^{28, 40-41}. Mobility (the ability to move about) and traffic (the transportation of people, goods, and news) have been key factors in the emergence of modern states in the course of history. They have been the prerequisite, engine, and outcome of economic development in modern societies. Over and above that, they are essential factors in developing and maintaining more than just society at large.

Every member of society finds that mobility is more than just a basic human need for physical movement. It has become an ever more important precondition of ensuring the ability to lead one's everyday life, keep up social relations, take part in every kind of activity outside one's own four walls, and seek out places subjectively significant or objectively central to meeting daily material needs and guaranteeing access to health care. Mobility in general and the use of the transport system, whether by foot or with private or public means of transportation, are therefore major components in maintaining the quality of life. The automobile, in particular, has become a key to mobility. Despite a growing awareness of the problem posed by motorized traffic, it has lost little of its allure and symbolises more than ever the modern values of freedom, competence, and flexibility.

As a person ages, mobility is increasingly jeopardised. The process of aging is accom-

panied by waning strength and the increased risk of declining sensory abilities, and hence restriction of physical mobility. Because public transport facilities are difficult to access and use or are absent altogether, the significance of a private means of transportation increases if the elderly person is to continue dealing with daily demands and being part of society. Having a car of one's own enhances the scope of what one can do. As mentioned earlier, however, possession of a driver's license and a motor vehicle in today's generation of elderly people in Europe is still mostly a function of age, gender, and country of residence.

Against this background, findings from the comparative European research project 'MOBILATE - Enhancing Outdoor Mobility in Later Life: Personal Coping, Environmental Resources, and Technical Support', funded by the European Commission, are presented. The goal of this study is the description and explanation of how men and women in later adulthood manage their daily commutes and which conditions they feel promote or hinder their ability to get around, paying special consideration to the cultural, geographic, and structural differences in various European regions. The effect of specific environmental resources on mobility in urban and rural contexts is of primary importance.

A country's organisation of traffic is the result of different factors such as geographical conditions, institutional arrangements, level of modernisation and mechanization, population density and land use, types of settlements and, not least, cultural traditions, habits, and attitudes of the population. This makes international comparison difficult. Therefore, the comparative presentation of findings from several European regions does not aim foremost at comparing these regions. Instead, the focus is on the role of driving compared with other travel modes in different regional conditions and the consequences resulting with respect to the satis-

faction of older adults with their possibilities to get where they want or need to go.

METHODS

To achieve the objectives of the MOBILATE project, patterns of mobility and activity as well as the respective personal and environmental conditions were examined in a survey conducted in the year 2000 in six urban and non-urban regions, representing five European countries (Finland, eastern and western Germany, Hungary, Italy, and the Netherlands) varying by geographical and climate conditions as well as cultural traditions and thus indicating European diversity. The sample included 3941 men and women in middle and late adulthood (55 years of age or older) and was disproportionately stratified according to gender and age (55 to 74 years and 75 years or older, with approximately equal numbers of men and women in each group). The respondents were chosen at random, using municipality registration registers, or where this was not possible (i.e., in the rural areas of western and eastern Germany), by a random route procedure. Standardised questionnaires and a mobility diary were used to assess various forms of

mobility (e.g., walking, using private or public modes of transportation) and the essential features of the community (e.g., access to shops, services, and stations). Demographic aspects, personality measures (e.g., control beliefs, subjective well being, positive / negative mood) and sensory ability or disability (e.g., visual acuity, physical mobility) were assessed as well. Besides the general face-to-face interview, MOBILATE also took advantage of a diary-based assessment quite close to the everyday life of older people. These diaries provide especially detailed information on the everyday travel behaviour of the respondents. Each person kept the diary of all the journeys he or she made over two days (the last day before and the first day after the interview). It includes comprehensive information on each journey (from leaving home until coming back home): the departure time from home and the arrival time back home, the trips and trip motives (the trip is a part of the journey, e.g. the trip from one's home to the bakery or from the bakery to the doctor), the travel mode(s) used, and the characteristics of the journeys. If the respondent did not travel on either day, this information was also recorded on the diary forms.

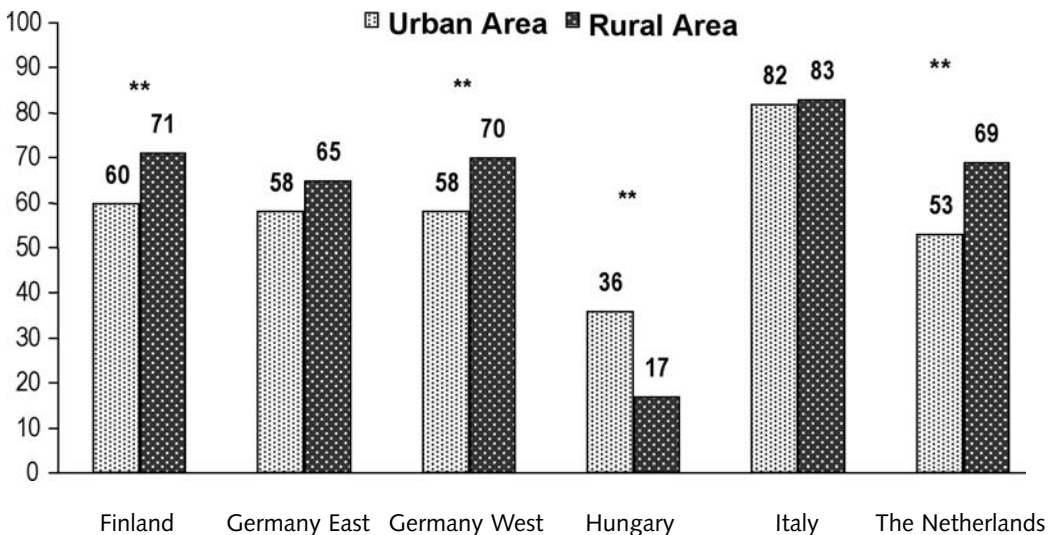


Figure 1. Availability of private cars in senior households (by area; percentages; ** $p < .01$)

In terms of analysing the very large data set resulting from the broad scope of assessed variables relevant for outdoor mobility X five countries (and six regions), we decided to test all mean differences for statistical significance, but limit the presentation and interpretation of the results to circumscribed

areas of particular importance for the theme of the present work. In order to control for multiple comparisons, we set the level of significance to $p < .01$ and $p < .001$.

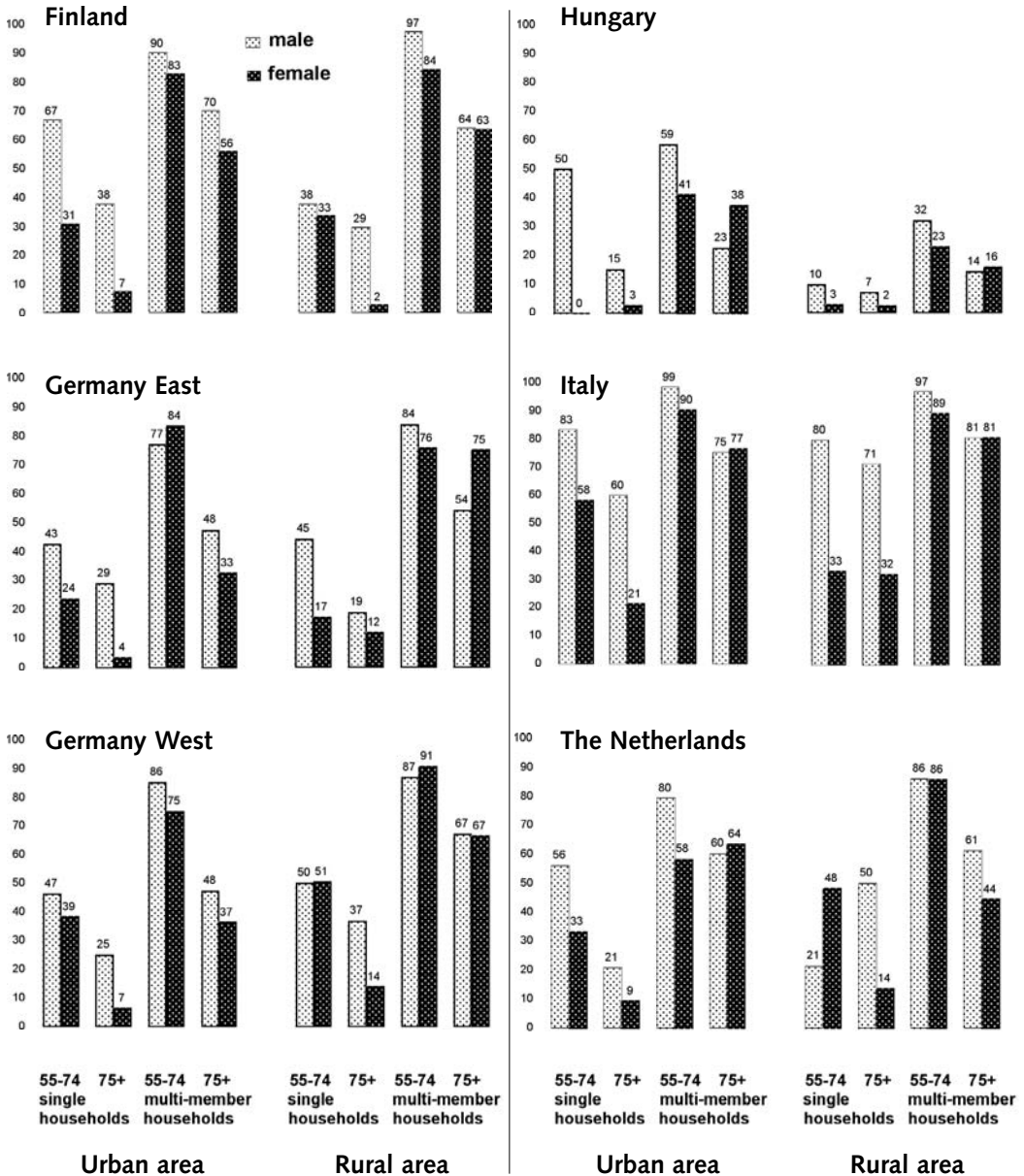


Figure 2. Availability of private cars in senior households (percentages)

RESULTS

The availability of automobiles in senior households

In order to understand the role of driving in older adults' outdoor mobility, one must first

examine to what extent automobiles are available to elders. On average, the households of the respondents in both the urban and rural areas of Italy most frequently have a car available, followed by the older adults in Finland, Eastern and Western Germany,

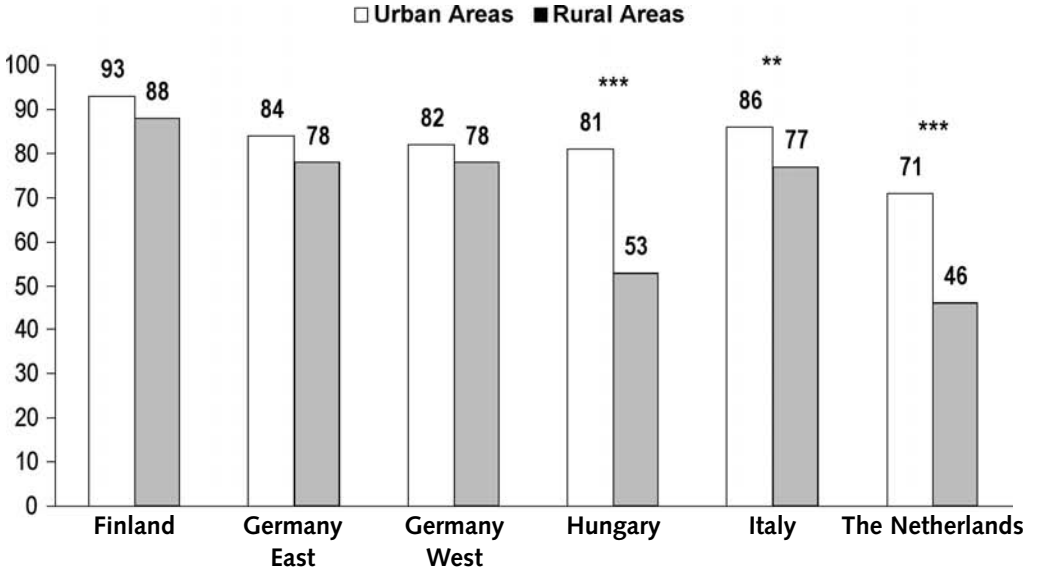


Figure 3a. People making at least one trip during two days (by area; percentages; based on diaries; ** $p < .01$; *** $p < .001$)

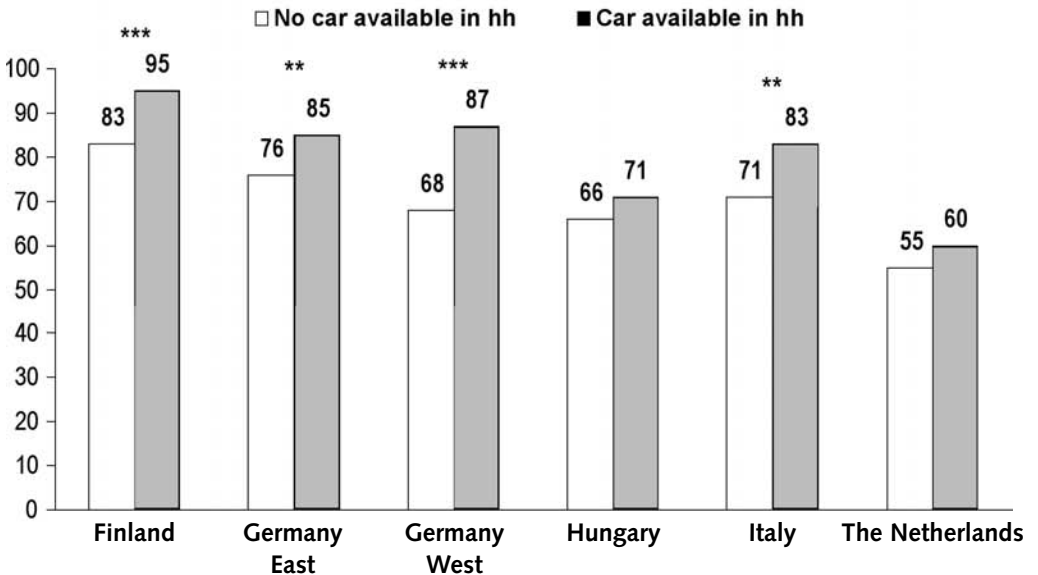


Figure 3b. People making at least one trip during two days (by availability of a car in the household; percentages; based on diaries; ** $p < .01$; *** $p < .001$)

and the Netherlands (Figure 1). The latter countries show statistically identical patterns with respect to overall equipment with cars, showing consistently higher car availability in rural compared to urban regions. A far lower share of the Hungarian elders own a car compared to their western European contemporaries. Moreover, the pattern found for urban versus rural differences in most of the other countries does not hold for Hungary, for in the rural areas access to a car is even lower than in the urban area of this country. To gain further understanding about possible opportunities and constraints with respect to access to a car, logistic regression analyses were conducted with household size, age, gender, and area as predictors of car availability. Controlling for these variables, urban-rural differences remained significant only in western Germany and Hungary, although as noted above, the direction of these differences varied. With regard to age, gender, and household size, however, similar structural patterns can be observed in all countries participating in the study - albeit on different levels and again except for Hungary: Households of the younger age groups (aged 55-74 years) more often have access to cars than households of the older groups (aged 75 or older) and multi-member households are by far better equipped than single households throughout all countries participating in the study. Gender, when seen together with the remaining predictors, proved to be a significant predictor only in Finland, Hungary and the Netherlands.

Nevertheless, a closer look at single households shows that single men are much more likely to own a car than single women. This is especially true for persons over 75 years of age, whilst the gender gap appears to be less striking for the younger participants (Figure 2). We assume that access to an automobile also depends on further conditions, particularly on disposable household income³⁴. As income, however, is very difficult to compare between countries, we unfortunately could not investigate this issue. The question is now how those unequal preconditions for outdoor mobility affect the older adults' going out. Information on trips and journeys based on diary entries over two days is available from 3934 respondents. Among them, 1020 persons made no trip on either day (26%). As can be seen from Figure 3a, the share of people who made at least one trip during one of the two interview days was higher among people living in urban areas than among those in the countryside. These urban-rural differences were found for all countries under study and reach statistical significance for Hungary, the Netherlands, and Italy. People having a car available in their households are, in general, apt to be more often on the go than those who don't own such a means of transportation. Only for the Hungarian and Dutch regions no dependency on car availability could be found (Figure 3b).

The Finnish urban elders, followed by their rural contemporaries and the Italian urbanites, obviously are most active in terms of

Table 1. Mean number of journeys (*** $p < .001$)

Variable (M)	Country											
	Finland		Germany East		Germany West		Hungary		Italy		Netherlands	
	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural
Total	1.4	1.2***	0.9	0.9	0.9	1.0	0.9	0.6***	1.2	1.1	0.8	0.5***
No car	1.1	0.9	0.8	0.8	0.7	0.7	0.9	0.6	0.8	0.8	0.7	0.3
Car	1.3	1.1	1.0	0.6	0.8	0.9	0.7	0.6	0.8	0.8	0.7	0.7
passenger												
Car driver	1.7	1.5	1.0	1.1	1.1	1.2	1.0	0.6	1.5	1.5	0.9	0.6

journeys undertaken (Table 1). The older people in the non-urban areas of the Netherlands and of rural Hungary, by contrast, are the least often on the go. Besides the obvious differences in the descriptive numbers, statistically significant urban-rural differences in mobility exist in Finland, Hungary, and the Netherlands. In general, people are more often out and about in the cities than in the non-urban and rural regions. Only in western Germany are people more active outdoors in rural than in urban areas. This difference does not approach significance, though.

Previous studies on mobility, based on the collection and analysis of statistical data, show that mobility (e.g., the number of trips a person takes or/and mileages driven) definitely declines with age^{26,31,37,42}. However, the relatively small number of car owners in the older age group is often not taken into account. If this factor is explicitly included in the analyses, one finds considerable increases in mobility in the higher age groups as a result of increased motorization³¹. The availability of an automobile clearly influences the mean number of the MOBILATE respondents' journeys, too: With the exception of Hungary, the persons who have a private car in their households are more often on the go

than those who do not have such a means of transportation at their disposal. This mobility pattern also turned out to be most common when urban and rural areas were analysed separately. In almost all regions, car owners leave their homes for significantly more journeys per day than people who don't own a car. Only in the urban areas of eastern Germany, Hungary, and the Netherlands having a car in one's household did not substantially affect the number of journeys undertaken (Table 1). Slight differences exist between those who drive and those who have a car available but use it only as passengers. In general, people who have no car available reported less journeys per day than those who at least may use a car as a passenger. However, these differences did not reach statistical significance in any region under study except for the non-urban parts of the Netherlands. Among those who actively drive a car, the mean number of journeys was noticeably higher and differed in a statistically sound manner from those given by persons without cars or by passengers. Only in the urban part of western Germany and in the non-urban parts of the Netherlands no significant differences in the number of journeys taken by passengers and drivers could be found.

Table 2. Use of transport modes in five European countries (%)

Travel Mode	Country							Total
	Finland	Germany East	Germany West	Hungary	Italy	Netherlands		
Bus	2.5	3.9	1.4	16.2	4.3	8.4	5.0	
Special service	2.8	2.0	0.8	0.2	2.3	1.9	1.8	
Taxi	1.0	0	0	0	0	0	0.2	
Train	0.1	0	0	0	0	0	0	
Tram	-	1.7	2.4	-	-	-	0.8	
Car driver	30.9	22.3	30.3	6.2	42.0	29.9	28.4	
Car passenger	13.8	12.2	7.2	4.1	14.7	13.3	11.3	
Bicycle	14.6	11.3	7.8	16.8	0.5	15.3	10.3	
On foot	38.4	49.9	53.5	67	39.9	31.5	46	
Total number of trips	3,353	2,963	3,117	1,750	2,974	1,666	15,824	

Whether or not one owns a car clearly affects the older adults' choices of transport modes: Summarizing the use of various

means of transportation over the days documented in the diaries, walking is clearly the most common travel mode of older adults in

Table 3. Use of transport mode by country (%)

Transport mode	Urban area				Rural area			
	55 to 74 years male	female	75 years or over male	female	55 to 74 years male	female	75 years or over male	female
Finland								
Bicycle	7	19	8	1	12	25	13	14
Public transport ^{a)}	3	6	9	6	8	8	13	6
Car driver	55	13	38	2	57	15	33	3
Car passenger	4	18	13	18	7	23	9	27
On foot	34	48	40	77	21	33	37	56
Germany East								
Bicycle	3	4	3	2	22	17	27	19
Public transport ^{a)}	7	14	12	19	4	1	3	4
Car driver	40	12	26	0	36	15	20	7
Car passenger	5	19	3	14	3	18	7	35
On foot	51	60	58	65	36	50	43	36
Germany West								
Bicycle	13	11	9	9	6	3	4	6
Public transport ^{a)}	4	8	9	22	2	1	1	0
Car driver	46	18	17	4	47	27	31	3
Car passenger	2	11	4	6	3	11	5	19
On foot	36	60	70	75	43	60	58	73
Hungary								
Bicycle	1	0	0	0	44	43	49	16
Public transport ^{a)}	24	28	27	28	1	0	9	2
Car driver	19	2	2	0	10	0	6	0
Car passenger	4	6	6	5	2	3	1	2
On foot	63	77	88	85	42	54	38	82
Italy								
Bicycle	1	0	0	0	1	0	1	0
Public transport ^{a)}	4	11	8	16	6	2	12	1
Car driver	61	28	20	10	69	18	36	10
Car passenger	6	23	2	21	4	37	8	25
On foot	34	45	76	61	21	44	44	64
The Netherlands								
Bicycle	21	17	22	1	14	15	7	0
Public transport ^{a)}	6	19	10	29	3	2	9	15
Car driver	38	14	32	9	55	30	44	2
Car passenger	5	17	10	18	4	27	4	21
On foot	30	34	27	43	24	26	36	63

^{a)} Including bus, tram, train, taxi, and special services

Maintaining Mobility

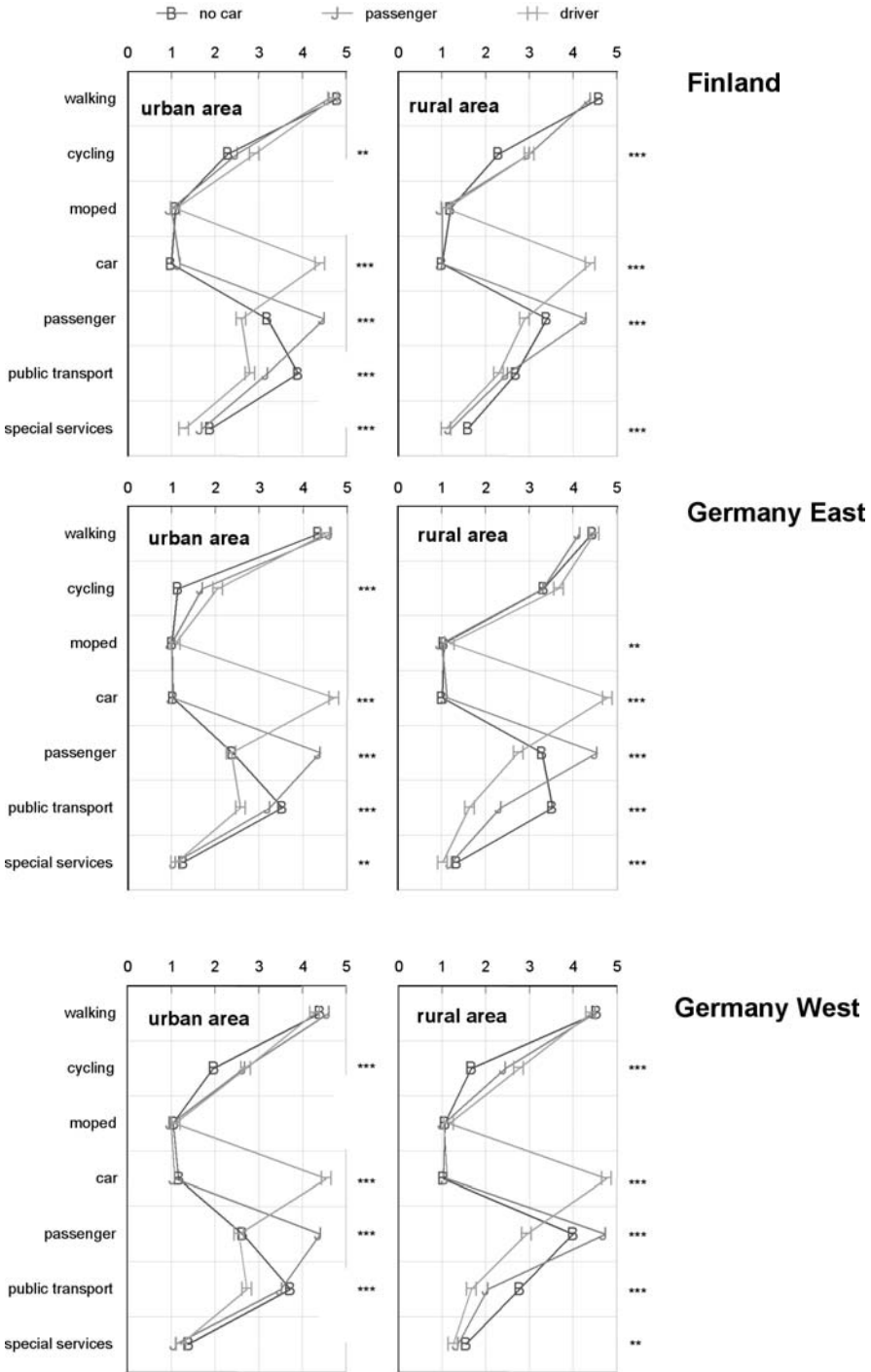
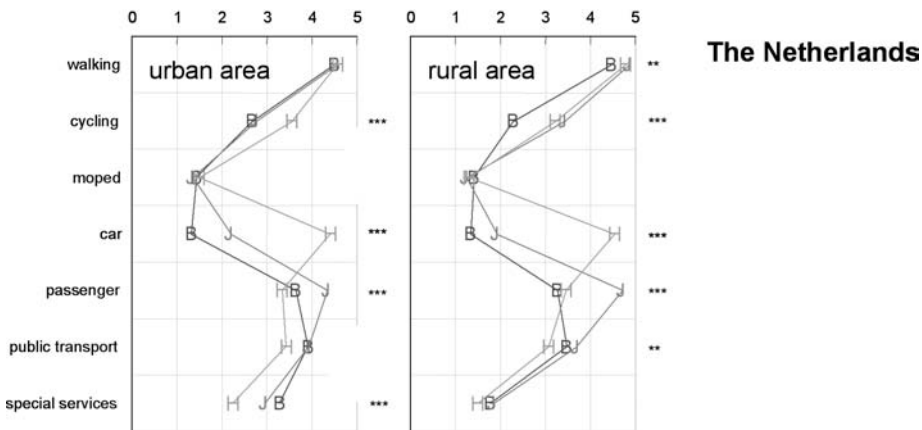
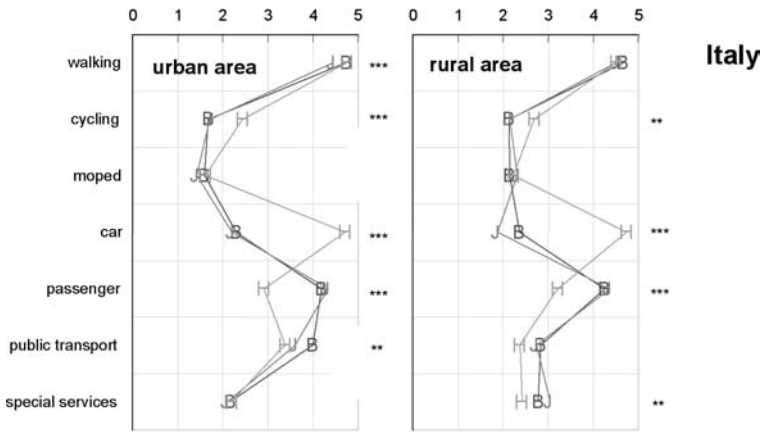
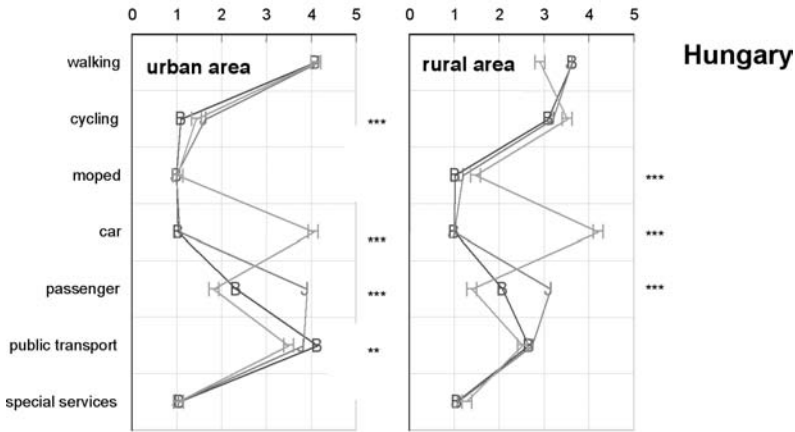


Figure 4. Importance of different means of transportation by country (means; ** $p < .01$; *** $p < .001$)

Maintaining Mobility



Europe. Almost half of all trips made by the people who participated in the study were on foot (46%). The car, used as driver (28.4%) or as a passenger (11.3%), was the second most important mode with altogether 39.7%; public transport including all modes (bus, tram, train, taxi, or special transport) was used in 7.8% and the bicycle in 10.3% of the trips (Table 2).

However, there were large differences between countries. In the Hungarian regions, for instance, where cars are not nearly as prevalent as in the other countries, two thirds of all trips were on foot - in the Netherlands, the percentage of trips taken on foot barely amounted to one third. At the same time, the proportion of trips undertaken by bike was nearly the same, and public transport was also used relatively often in both countries. The main difference consists in using the car as a driver or as a passenger. In Italy, driving is also very common - even more so than walking. In comparison with this, the bicycle as a means of transport, does not seem to be a true alternative in the Italian regions under study. The bicycle was used most often in regions with favourable geographical or topographical conditions (Hungary, the Netherlands, and Finland). In Finland, the car was used for almost the

same proportion of trips (45%) as in the Netherlands. In the eastern and western German regions, cars were used for only 36% and 38% of all trips, respectively; whereas the use of non-motorised modes (bicycle, foot) was more frequent. Other modes of transportation, such as taxi, train, or special transport services, were not commonly used in any of the countries. The national differences become even more obvious when one differentiates according to the availability of a car, urban vs. non-urban regions, and socio-structural variables such as age and gender (Table 3; because of the low number of cases, bus, tram, taxi, train, and special services have been subsumed under 'public transport' in this table). Driving a car was the main travel mode of younger men (55-74 years) in both urban and rural regions, especially in Italy. Two exceptions to this rule appear to be Hungary and East Germany. Only younger women from the non-urban regions of the Netherlands drive just as much as they walk; all other subgroups of the study use the car much less often for their daily trips. The trips of women - of women aged 75 years or older, in particular -, and of older men are by far more often undertaken by foot or made as car passengers. This is often the case in rural areas, which are characterized by a lack of public

Table 4. Importance of different transportation modes (means; ** $p < .01$; *** $p < .001$)

Variable (M)	Country											
	Finland		Germany East		Germany West		Hungary		Italy		Netherlands	
	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural
Walking	4.7	4.6	4.5	4.4	4.4	4.4	4.1	3.6***	4.7	4.5	4.5	4.7
Cycling	2.6	2.8	1.6	3.5***	2.4	2.4	1.3	3.2***	2.1	2.4	3.1	3.0
Moped	1.1	1.1	1.0	1.1	1.1	1.1	1.0	1.1	1.6	2.2***	1.4	1.3
Car driver	2.6	2.7	2.5	2.6	2.7	3.0	1.7	1.3***	3.5	3.2**	3.0	3.5***
Car passenger	3.1	3.3	2.7	3.4***	2.8	3.6***	2.4	2.1**	3.6	3.9**	3.6	3.6
Public transport	3.3	2.5***	3.1	2.5***	3.2	2.1***	3.9	2.7***	3.6	2.6***	3.7	3.3***
Special	1.6	1.3**	1.2	1.2	1.3	1.4	1.1	1.1	2.2	2.7***	2.8	1.6***

transport services. Usually, the availability and accessibility of public transport, as well as the abundance of shops and other facilities, is better in urban than in non-urban and

rural regions. Thus, it is not surprising that in urban areas, people travel more by public transport and by foot. Buses and trams (where available) are used mostly by older

Table 5: Satisfaction with mobility (means). Mobility ranged from 0 (not satisfied at all) to 10 (very satisfied)

Variable	Country											
	Finland		Germany East		Germany West		Hungary		Italy		Netherlands	
	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural
Total	8.5	8.1	7.6	7.7	7.8	7.6	7.9	6.0	8.1	7.0	7.5	7.8
Use of car												
No car	8.3	7.6	6.6	6.8	7.1	6.7	7.8	5.8	6.8	5.4	6.9	6.8
Car passenger	7.9	7.7	8.1	7.5	7.9	7.6	8.1	6.0	7.1	6.7	7.5	7.8
Car driver	8.9	8.6	8.4	8.5	8.5	8.1	8.2	7.0	9.1	8.1	8.3	8.4
Use of public transport												
Never	8.4	7.8	6.4	7.9	6.7	7.7	6.4	4.4	6.8	7.0	7.7	7.8
Occasionally	8.7	8.6	8.1	7.5	8.0	7.3	8.0	6.8	8.6	7.2	7.6	7.9
Regularly	8.3	8.2	8.0	6.9	8.5	6.5	8.3	7.1	8.3	8.0	7.5	7.8
Household size												
Single	8.2	7.6	6.7	7.1	7.1	7.2	7.5	5.5	7.6	6.4	7.4	6.8
Multi member	8.7	8.3	8.0	7.8	8.3	7.8	8.1	6.2	8.2	7.1	7.7	8.2
Age												
55 to 74 years	8.8	8.3	8.1	7.8	8.2	7.8	8.1	6.2	8.7	7.4	7.7	7.9
75 and over	7.7	7.5	6.0	7.1	6.9	7.0	7.4	5.2	6.9	6.1	7.0	7.3
Sex												
Male	8.9	8.3	7.7	7.8	8.1	7.7	8.0	6.4	8.7	7.8	7.8	7.9
Female	8.3	8.0	7.5	7.5	7.6	7.5	7.9	5.7	7.7	6.4	7.3	7.7
Physical mobility												
(Very) Poor	6.7	5.9	5.1	6.3	5.8	6.9	7.3	4.6	4.7	4.6	5.7	5.0
Fair	8.3	8.2	7.3	7.9	7.8	7.6	8.1	6.2	7.5	6.7	6.8	7.4
(Very) Good	9.2	9.0	8.7	8.0	8.3	7.8	8.3	7.4	9.1	7.9	8.1	8.2

people, and within each age group, women use this mode more often than men. In the Hungarian city, public transportation is the most important mode of travel for both sexes except walking, whereas in the other cities, public transport is most frequently used by older women. The geographical situation also makes a difference: the bicycle appears to be a frequently chosen mode of travel for both women and men in the flat rural regions of Hungary and eastern Germany, as well as among younger Finnish and Dutch elders.

The availability of a car seems to be decisive for the choice of the travel mode. When people cannot use an automobile because they are too old or unsure of themselves, because they lack a driving license or because it is too expensive, they look for alternatives in public transport. The bicycle can be an alternative where no public transport is available, as long as geographical or topographical circumstances are favourable. As could be seen from Table 1 'Journeys', however, elderly people without access to a private car by and large make fewer journeys outside their homes than people who have a car at their disposal. In the following, we analyse whether the various options for outdoor mobility find expression in the subjective evaluation of the different travel modes. The participants of the study were asked to rate the importance of each means of transportation on a scale from 1 (not important at all) to 5 (very important).

The importance of driving among other modes of transport and its impact on general satisfaction with mobility

At first glance and on average, walking is the most important travel mode in the opinion of older adults in the urban as well as the non-urban and rural areas of all countries under study (Table 4). The substantial differences between rural and urban areas found in all countries with respect to the importance of public transportation can be interpreted as typically diverging structural mobility opportunities of urban and rural elders.

However, when distinguishing between people who don't have a car in their households on the one hand, and those who own and use a car as drivers or as passengers on the other, this picture changes (Figure 4). Walking may still be seen as the most important travel mode, but available opportunities such as the use of a car (i.e. to travel as a passenger or actively drive a car) tend to close the gap in importance ratings. In general, car drivers view the importance of driving a car nearly as high as the importance of walking in all regions under study. Passengers consider travelling as a passenger likewise as important as going on foot. However, the importance of walking as a travel mode does not vary according to the availability of a car (except for the non-urban Dutch area).

The importance of actively driving and of using a car as a passenger, in comparison, varies between the three subgroups. In the rural areas of Germany, Italy, and Hungary, the people who *actively drive* a car themselves judged driving to be significantly more important to them than walking. The same is true for the car drivers in the eastern and western German cities. Among urban Hungarians who don't have a car, public transport was the most important mode of transport. Being able to ride in a car as a *passenger* was particularly important for people who don't own a car or who are not able to drive themselves. Riding as a passenger ranked second after walking among the persons who have access to a car but do not actually drive themselves in every region that was surveyed, and on no occasion exceeded walking in importance. *Cycling* got high ratings ($M \geq 3$) only in regions where it was a relatively frequent mode of transportation, that is in the rural areas of Hungary, East Germany, Finland, and the Netherlands. Surprisingly, car passengers and drivers tend to ascribe more importance to bicycles than people without a car. By contrast, the evaluation of *public transportation* shows a more obvious pattern of results: Buses (and trams, where available) are mainly important in urban

Table 6. Predictors of general mobility satisfaction (regression analyses) for urban and rural areas. Only significant standardized beta-weights (** = $p < .01$ or *** = $p < .001$) and the according semi-partial squared correlations are shown for reasons of lucidity

Area and Mode of transport	Country											
	Finland		Germany East		Germany West		Hungary		Italy		Netherlands	
	stb	semi	stb	semi	stb	semi	stb	semi	stb	semi	stb	semi
		par		par		par		par		par		par
		tial		tial		tial		tial		tial		tial
		r ²		r ²		r ²		r ²		r ²		r ²
		%		%		%		%		%		%
URBAN AREAS												
Satisfaction with public transport	0.19	3.2	0.31	7.7	0.4	12.3	0.4	15.5			0.4	14.1
Physical mobility												
Fair (Very) Good	0.44	6.4	0.22	2.1					0.42	6.4		
	0.72	15.4	0.44	7.3	0.24	2.3			0.67	14.1	0.33	3.6
Use of public transportation												
Occasional					0.25	3.0	0.28	2.8				
Regular												
Car use												
Car passenger												
Car driver			0.22	2.2	0.29	4.6			0.33	3.5	0.3	6.1
R ² (%)		36		38		42		24		44		33
Adjusted R ² (%)		33		36		40		21		42		30
RURAL AREAS												
Satisfaction with public transport	0.17	2.6	0.41	16.3	0.22	4.4	0.33	9.4			0.15	1.8
Physical mobility												
Fair (Very) Good	0.52	10.7	0.26	3.5			0.22	3.1	0.29	4.6	0.53	5.9
	0.65	15.8	0.30	4.1			0.3	5.1	0.53	13.2	0.74	10.3
Use of public transportation												
Occasional			-0.16	1.3			0.26	3.9				
Regular							0.27	4.6				
Car use												
Car passenger									0.21	1.7		
Car driver			0.24	1.9	0.23	2.4			0.31	2.9	0.28	3.9
R ² (%)		29		32		12		36		35		37
Adjusted R ² (%)		26		30		10		33		32		34

areas, and they are significantly less important to drivers than to people who don't own a car or who ride in cars only as passengers (except in the Hungarian rural area). Overall we can conclude that people obviously appreciate most of all the means of transport they have at their disposal and which they are dependent on, whether this is a car, a bicycle, a form of public transport, or their own two feet. The question arising from these findings is how satisfied older adults are with their possibilities to get where they want or need to go and which personal, structural, or technical conditions play a role in this appraisal. Satisfaction was assessed by an eleven-point scale (0 = 'not satisfied at all' to 10 'very satisfied'). Table 5 shows the results, differentiated by aspects which were expected to impact on mobility satisfaction and/or which had proven to be important mobility predictors in previous research^{6,43-44}.

The findings confirm our hypothesis: people who rated their physical mobility as poor or very poor were significantly less satisfied with their mobility in general than people with good or excellent physical mobility. Even in Finland, where satisfaction is generally relatively high in all life domains, people of poor physical mobility showed the lowest satisfaction compared with all other Finnish respondents ($M=6.7$ in urban and $M=5.9$ in rural regions). Men and women aged 75 years or older also expressed lower satisfaction with their possibilities to be mobile than younger elders (55-74 years old), but these differences were less strong. Differences between men and women were rather modest and did not reach statistical significance. The size of household plays a role again in East Germany, but also in West Germany and Finland (in both urban and rural areas), in urban Hungary and in the non-urban region of the Netherlands. The reason for this difference may be that older single living persons are less likely to have a car available than multi-member households and thus are more restricted in their mobility. Another significant difference in mobility satisfaction exists bet-

ween people who regularly or occasionally use public transportation and those who never use such means of transport. The low satisfaction of the never-users is particularly striking in Hungary, in the eastern and western German cities and the urban area of Italy. In the German rural areas under study, it is just the opposite: there, the people who use (or have to use) public transportation regularly are the least satisfied with their possibilities to get where they want or have to go compared with the people who never or just occasionally travel by this transport mode.

The findings on mobility and satisfaction among elders are of particular interest to this paper and correspond largely to our assumptions: Without exception, the older adults who are able to drive and actually use a private automobile are by far more satisfied with their general mobility than those who don't have such a means of transportation available in their households or who use it as passengers only (see again Table 5). In the eastern and western German, Italian, and Dutch urban and non-urban regions, these differences are highly significant. In Hungary and Finland, too, there is a gap of satisfaction between the three groups, but these differences fail to reach statistical significance.

In order to determine the best predictors of variance in mobility satisfaction, we carried out regression analyses separately for each region. In addition to the variables taken into account already in the descriptive overview shown in Table 5, we included satisfaction with public transportation as a potential further predictor in the analyses because the use of this transport mode per se had shown contradictory results regarding mobility satisfaction. With regards to the use of a car, we distinguished once again between persons who don't have a car in their household, the persons who have a car available but use it as passengers only, and those who own a car and actively drive.

Altogether, the variables included in the analysis explain between 10% (western Germany, rural

area) and 42% (Italy, urban area) of variance in older adults' satisfaction with their possibilities to get where they need or want to go (Table 6).

Examining the impact of individual predictor variables of mobility satisfaction, we found that satisfaction with public transport, fair and/or good physical mobility, and the ability to drive (and not just to have a car available) were the most important variables in almost all regions studied. Only in the two regions with the lowest total of explained variance (western Germany, rural area, and Hungary, urban area), the self-assessed ability to move about did not contribute to this explanation. Neither satisfaction with public transport nor the use of this travel mode played a role in the urban area of Italy where more than 80% of older households have access to a car. Here, as well as in the rural areas studied in this country, driving obviously was more important for older adults than public transportation. In the rural area, being able to use a car as a passenger was almost equally important. In addition to the Italian and western German regions already mentioned, the variable 'driver' was significantly important for mobility satisfaction in the rural regions of eastern Germany, in the East and West German cities, and in the Netherlands. Only in Hungary and Finland, the availability and use of an automobile had no impact on satisfaction with mobility at all.

Gender and the size of one's household did not impinge on satisfaction, although there were clear differences between men and women and between single living persons and multi-member households in some countries when these variables were analysed separately (Table 5). Age also did not contribute to explaining satisfaction with general mobility, most possibly due to its shared implications with the ability to move about.

All in all, these results confirm that biological age alone is not the critical factor determining the extent of satisfaction with one's mobility options. By contrast, being physical-

ly able to move about, being satisfied with the public transport system, and being able to drive a car (which can be used to bridge long distances or to compensate for advanced age and associated mobility losses) are more decisive variables.

CONCLUSIONS

The depiction drawn by the findings of the MOBILATE study confirms the assumption that the opportunity and ability to be mobile and active even in old age is a major component of an older person's quality of life. The low level of satisfaction with mobility of people whose mobility is hampered by limitations to their physical ability to move about or by lack of private or public transport clearly shows that the decline of outdoor mobility in old age is not an entirely voluntary retreat from the world. On the contrary, it means that elderly people are more or less being compelled to cope with health impairments and adverse external circumstances. Ensuring them the opportunity of venturing out despite physical handicaps and existing technological and spatial barriers would be a major contribution to their well-being.

To make it easier for elderly people to move about outdoors, it is necessary to improve the technical, physical, and organizational conditions of mobility as well as current patterns of social behaviour. Because elderly persons who do not drive feel hemmed in (as is suggested by their lower satisfaction with mobility options), whereas drivers are satisfied with their mobility even with increasing age and health impairments, priority should go to bettering the situation for pedestrians and the users of public transport. Such measures include reducing traffic chaos, enhancing traffic safety and facilitating socially and environmentally sustainable mobility.

However, elderly people with limited mobility still depend in many cases on the use of a private car to travel long distances or just to manage their daily routine in areas with little public transport service. Health-related constraints on mobility and adverse residential

and infrastructural conditions can be compensated to some extent by good local transport service. But in view of the alternatives currently available—or, to be precise, the current lack of alternatives—the practical possibilities of a car come closest to meeting the desires and needs of the older individual. Moreover, the number of ageing people who own and use an automobile is increasing. The elderly person's options for mobility may thereby increase, but the greater traffic density that results may immediately reduce them again. If important elements of the infrastructure, basic services, and recreation facilities keep revolving around users of private transport and continue to be concentrated either in city centres or in remote areas, elderly people who do not have the alternative of using a private car may come to suffer serious discrimination. It is already often the case that important services are difficult to come by in rural regions and urban suburbs. For that reason elderly people should be helped to improve their driving ability voluntarily through driver's training especially designed for their needs. Another measure would be to institute park-and-ride systems and reasonably priced group taxi transport on a broader basis so that people can more easily reach the denser downtown transport systems. These changes entail demands on car manufacturers as well. In addition to technical automotive improvements, which could not be explored in this article, it would be desirable to increase general traffic safety by socially responsible advertising; to counteract the flashy ads that hype the speed and power of the latest car model, drivers should be encouraged to develop a temperate and environmentally sound driving style, which includes the farsighted regulation of speed, avoidance of tailgating, and just plain consideration for other people on the road.

Thus, improvements must focus as much on traffic policy and socio-political measures as on appropriate urban development planning. It is becoming increasingly urgent for coordi-

nated city, social, and transport planning to: (a) create flexible, user-centred options for mobility that offer a genuine alternative to both the private automobile and traditional local public transport services, and (b) provide for neighbourhoods that also respond to the needs and wishes of an aging population. For elders, whose life space contracts with advancing age because of their inability to overcome environmental obstacles, it is crucial that the areas near their homes have readily accessible stores, medical services, appropriate public transport, and other facilities that will allow them to continue leading independent lives, maintain social contacts, and take advantage of recreational activities.

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