

Can Improved Mobility Raise the Elderly's Sense of Fulfillment?

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Introduction

Discussions on transport in an aging society naturally focus on negative issues; how to prevent accidents among elderly drivers who are slowly losing their ability, or how to make public transport more accessible for the physically disabled and the elderly, or what type of escalators and other mobility aids are best for elderly people who are physically infirm. Of course, these questions are all important, but more positive issues regarding the elderly have gained importance over the last few years. For example, discussions should also focus on the growing number of elderly people who have drivers' licences and possess their own cars, and retirees who, after years of living in the city, now have plenty of time and energy to enjoy leisure activities. Obviously, studies of transport in an aging society must look at a wide variety of issues, both positive and negative.

This article summarizes the results of a study on the relationship between the elderly and transport, and examines the following points:

- To what extent does the condition of public and private transport—whether good, bad, or indifferent—affect the activity level of the elderly outside their homes?
- To what extent does the frequency with which elderly people spend time outside their homes affect their sense of fulfillment?
- Can improved mobility raise the elderly's sense of fulfillment?

Basic Approach

Figure 1 shows the framework we developed to determine the extent to which mobility and other factors implicit in the living environment affect why and how often individuals go outside their homes,

and to analyze how the living environment affects various people's sense of fulfillment. 'Sense of fulfillment' primarily means people's belief in the value of their lives, and their level of vitality. Our data uses numerical values derived from the results of questionnaires, statistical materials, and other sources.

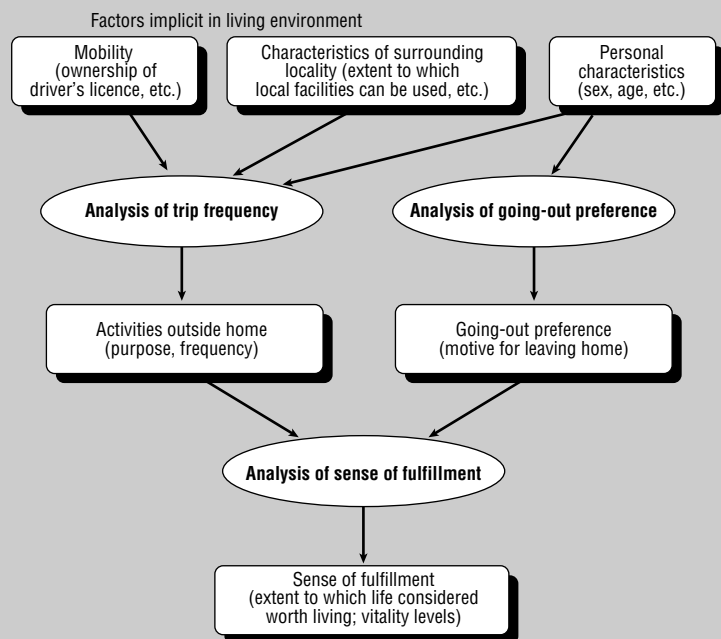
Areas Covered by this Survey

We participated in a research project¹ conducted by the International Association of Traffic and Safety Services (IATSS) in October 1995, using questionnaires to examine the mobility and transport safety of middle-aged and elderly people (aged 55 and over). We chose three urban areas for this research, each offering a different level of transport services, and each of different size: (1) Tokyo's Kita Ward,

typical of a densely populated metropolitan area; (2) Kumagaya, typical of a medium-size city servicing a surrounding area of limited extent; and (3) Tatebayashi, typical of a smaller regional town in Japan. We obtained responses from 900 people. Our fact-oriented questions regarding mobility and the purpose and frequency of activities outside the home are listed in Table 1.

Figure 2 gives part of the results for one sample question posed in the above-mentioned survey, regarding the number of times people left their homes for leisure activities or pleasure travel. The results are tabulated in two ways: by age group, and by driving potential (whether respondents had a driver's licence or not). The figure indicates that, no matter what the age group, approximately the same percentage of people leave the home fairly frequently (i.e., at least several times a month). However, the percentage of

Figure 1 Analysis Framework



people never going out rises sharply with age. The percentage of people without a driver's licence who never leave the home is more than double that of licence holders.

Indices Expressing Sense of Fulfillment

Our analysis included an examination of the elderly's sense of fulfillment. We wanted to measure this sense of fulfillment with indices that indicate the vitality of elderly people. Vitality is understood to be the keenness one feels about one's daily life, or the extent to which one feels life is worth living. Four questions regarding the sense of fulfillment were prepared, and the answers to these questions were rated by the values shown in Table 2 in order to express the sense of fulfillment of respondents.

We also developed indices to indicate going-out preference, which is the extent to which elderly people generally go out on their own volition, or conversely the extent to which they generally leave the home only because they are urged to do so by others.

Our survey of a person's preference to go out was based on the assumption that even if people leave their homes at approximately the same level of frequency, their sense of fulfillment may differ, depending on whether they like or dislike leaving the home. One of the reasons for this idea is that people who frequently leave the home do not necessarily have a greater sense of fulfillment—indeed, we can assume that people who dislike leaving their home but must do so often will feel that their lives are not fulfilled.

Table 3 gives the results of answers to six questions regarding respondents' preference for going out, with numerical values worth 0, 1 or 2 points given to each answer. Our study used the index values obtained through calculations based on the formula in Table 3. The coefficients shown were

Table 1 Survey Questions

Focus	Questions
Personal characteristics	Age, sex Family Has/does not have walking disability Previous/current occupation, etc.
Extent of mobility	Ownership of driver's license Frequency of automobile use Number of cars owned Frequency of bicycle use Number of bicycles owned
Activity outside home (by trip purpose*)	Trip frequency Transportation mode Travel time (one-way) Personal characteristics of companion traveller

* Possible trip purposes listed as follows:

- Trips motivated by need (to secure necessities for daily living)
 - To buy daily items
 - Other shopping
 - Personal needs
 - Dropping off or picking up family members
 - Hospital visits
- Departures not motivated by need (to enjoy leisure)
 - Sports, to pursue interests, to meet friends
 - Other leisure activities, pleasure travel
 - To visit children and/or grandchildren
 - Neighbourhood community activities

obtained using statistical component analysis. As you can see, any personal preference to go out is given a coefficient with a positive value.

We separated responses into five categories based on indices expressing sense of fulfillment and preference to go out: from 'very low' to 'very high'.

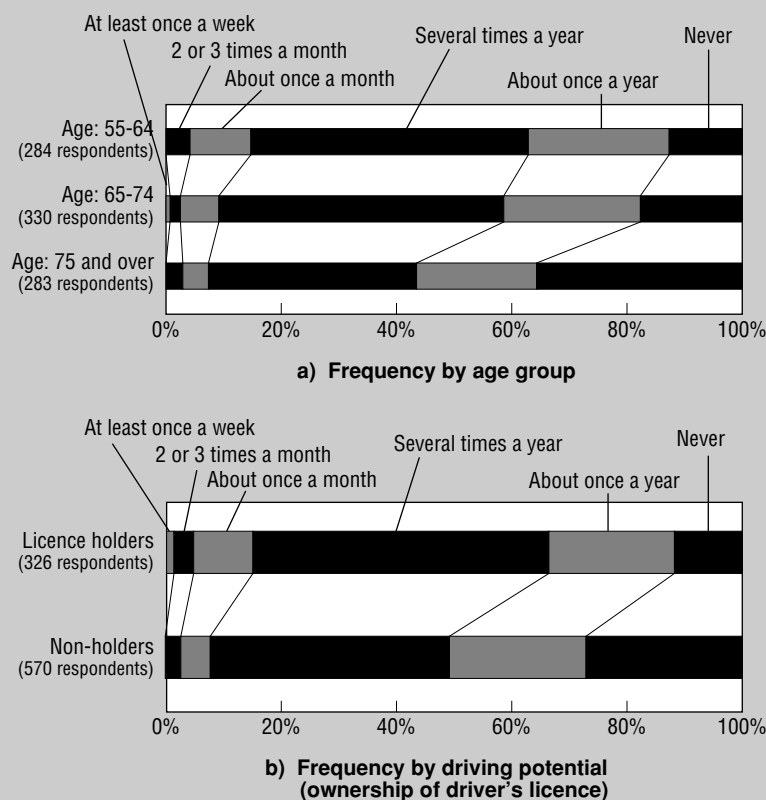
Analysis of trip frequency

Our study also examined what factors influence trip frequency, for each of the nine purposes given for going out. Here we will look at one set of purposes—leisure and pleasure travel. We based our analysis on a statistical method called Hayashi's type-II quantification from which we can estimate relevant formulae that are most apt for explaining specific trip frequency patterns.

Figure 3 shows mobility factors that may influence the frequency of trips for leisure activities and pleasure travel, and the extent to which these factors do indeed affect mobility. For example, the effect of

one mobility factor—ownership of a driver's licence—is indicated by positive values for licence holders, and negative values for non-licence holders. The values show that licence holders are relatively more likely to go out than non-holders. Overall, ownership of a driver's licence and the number of cars owned by a household are very important factors influencing use of personal forms of transport. Similarly, the quality of service provided by railways and bus companies is an important factor influencing use of public transport. In other words, the degree of mobility greatly influences trip frequency. This is especially relevant in the case of the number of cars owned by a household—the length of the bars in the graph clearly shows that the more cars a household has, the more likely people in the household are to use one of the cars for personal use. Obviously, the extent to which elderly people are free to use their own car is an important factor determining the frequency of their outings.

Figure 2 Trip Frequency for Leisure or Tourism



Our analysis of other purposes for going out was conducted in the same way. An outline of our results is presented in Table 4. Only seven purposes for outings are presented in the table, because we were unable to obtain meaningful results for two of the reasons: hospital visits, and dropping off or picking up family members. The study of trip frequency patterns leads to the following conclusions:

- (1) Elderly people who have lost some of their agility through age, or who have difficulty in walking, face limitations on all their activities outside the home;
- (2) Performance or non-performance of household chores greatly affects the frequency of trips for shopping, personal needs and other necessary activities outside the home. Similarly, ownership of a driver's licence greatly affects the frequency of trips to pursue personal interests, to travel for pleasure, and to participate in other leisure activities outside the home;
- (3) The quality of public transport services (trains and buses) affects frequency of trips, especially in the case of leisure outings and pleasure travel;
- (4) The number of times people leave their homes to purchase daily items and conduct personal business tends to vary according to region, with the greatest frequency seen in densely populated urban areas (in this case, Tokyo's Kita Ward);
- (5) Elderly people who were company employees before retirement tend to go on outings more than people who held any other type of work, regardless of the purpose of the outing.

Analysis of going-out preference

Using the same process that we took to hypothesize departure frequency patterns, we drew up hypothetical trip motivation patterns, examining what personal characteristics influence a person's desire to leave the home. The inferred results are given in Figure 4.

Table 2 Questions and Rating on Sense of Fulfillment

[Responses to Question 33]

Question	Answer	Agree	Partly agree	Hardly agree	Do not agree
(1) My life has worsened progressively with age.		-2 points	-1 point	1 point	2 points
(2) I cannot help others as much as I could before I became elderly.		-2 points	-1 point	1 point	2 points
(3) I feel as healthy as last year, or even healthier.		2 points	1 point	-1 point	-2 points
(4) Growing old is better than I imagined when I was young.		2 points	1 point	-1 point	-2 points

Sense of fulfillment index = (1) + (2) + (3) + (4)

Table 3 Questions and Ratings for Going-out Preference

[Responses to Question 34]

Question	Answer	Often	Sometimes	Never
(1) I go out because it is boring to stay home all day.		2	1	0
(2) I go out to stay healthy and keep physically fit.		2	1	0
(3) I go out to keep abreast of developments in the city.		2	1	0
(4) I go out to meet friends and acquaintances.		2	1	0
(5) I go out for a change of atmosphere, even if I have nothing special to do.		2	1	0

[Responses to Question 35]

(1) I like to go out even if I have no reason for doing so.	2
(2) I don't mind going out if I have a reason to do so, but otherwise I would rather stay home.	1
(3) I would rather stay home, even if there is a reason for going out.	0

Index expressing going-out preference
 $= 0.505 \cdot Q34(1) - 0.804 \cdot Q34(2) - 0.308 \cdot Q34(3) + 0.420 \cdot Q34(4) + 0.121 \cdot Q34(5) - 0.017 \cdot Q35$

People who live alone have far less preference for going out. Responses to the questionnaire and a study of the above-mentioned trip frequency showed that people living alone tend to go out relatively more frequently for necessary purposes (i.e., to secure necessities for daily living). Even so, they often have little desire to go out—these people generally leave the home only because they have to. Indeed, it would appear that the necessity imposed on them to go out on errands tends to reduce their motivation to enjoy leisure activities outside the home. Their responses seem similar to that of an overworked employee who wants to spend his or her Sundays sleeping at home. Figure 4 also shows how elderly people who look after a family member tend to have much less desire to go on outings. (This is similar to the case of people who live alone.) The work involved in looking after someone tends to greatly reduce the room for enjoying life outside the home.

Analysis of sense of fulfillment

Using the same process we used to analyze trip frequency, we examined how trip frequency by purpose and going-out preference (or lack thereof) affect sense of fulfillment. The inferred results are given in Figure 5.

Sense of fulfillment has some relationship to trips on errands of varying degrees of necessity. Sense of fulfillment grows considerably when frequent outings are taken to enjoy leisure activities, pleasure travel and sports, to pursue interests, and to meet friends. Such activities contribute considerably to an elderly person's sense of fulfillment. Conversely, frequent visits to the hospital exert a strong negative effect on sense of fulfillment.

Our analysis also shows that going-out preference is closely linked to sense of fulfillment—the stronger someone wants to take outings, the greater is his or her sense of fulfillment.

Application to Improved Bus Services

We used the above-mentioned three analyses to determine the quantitative relationship among living conditions, outings and sense of fulfillment. Our results suggest that improved mobility may increase trip frequency and raise sense of fulfillment. We examined one hypothetical situation to verify it.

Figure 6 gives the results of calculations made to determine how much elderly people's sense of fulfillment would rise if their outings increased in number. The case illustrated in the figure posited a hypothetical situation in Tatebayashi town, involving one bus route that currently has only seven return runs per day. The question was, 'How would sense of fulfillment change if the bus service frequency was increased to 50 per day?' (About this many buses did run on the route at one time.)

Figure 6 shows two interesting points: one third of people whose sense of fulfillment was categorized as 'average' would have a higher level of fulfillment if bus services were improved; and 40.0% of all respondents would enjoy a high or very high sense of fulfillment, compared to 27.1% now.

Thus, from our calculations we were able to infer the extent to which improved mobility would raise people's sense of fulfillment in this case. After considering the results of the three analyses (i.e., the extent of their influence), we see that improved conditions for automobile travel—such as cars and roads designed with the needs of the elderly in mind—would raise vitality levels further.

Future Transport Policies for Aging Society

Our research leads to suggestions on how our aging society can offer better mobility, as follows:

- (1) It is important to recognize that there

are many different types of elderly people.

It is common to label all people who have reached the age of 65 as 'elderly,' and to place them all in the same category when administering government measures for the elderly. Yet the actual conditions experienced by older adults depend on a variety of different factors. Two important factors are age and sex, but there are many others, including personal mobility (e.g., ownership of car and driver's licence), and household situation (e.g., income and individual family circumstances). In other words, each elderly person experiences a different set of circumstances. One typical manifestation of these circumstances is activities outside the home, whether involving everyday errands or leisure. Any discussion of

the elderly must taking into account the fact that their circumstances vary greatly.

- (2) The elderly are a generational extension of the mass of ordinary, able-bodied people.

Notwithstanding point (1) above, outings tend to gradually diminish in frequency as each person becomes older. We can assume that this is mainly due to a decrease in physical stamina and agility, manifested, for example, by deteriorating eyesight. But these physical limitations are certainly not limited to people who are labelled elderly because they have reached the age of 65—physical deterioration may begin even in the prime of life, and grows worse with time.

Our study shows that although trip frequencies are obviously affected by

aging, they tend to be affected even more by mobility, which depends on many different factors, such as ownership of a car and driver's licence. In other words, the current tendency of elderly people to take few outings outside the home is due not only to their advancing age but also to their low level of mobility. From the above, it is clear that we should regard the elderly not as a separate group but as a natural generational extension of the ordinary population of able-bodied people.

- (3) Improving mobility will raise the vitality of elderly people.

The basic aim of all welfare-promotion measures is maintaining and improving people's vitality, thereby ensuring their sense of fulfillment. Human vitality is affected by many factors, including financial well-being, living environment,

Figure 3 Factors Contributing to Trip Frequency (Leisure and Pleasure Travel)

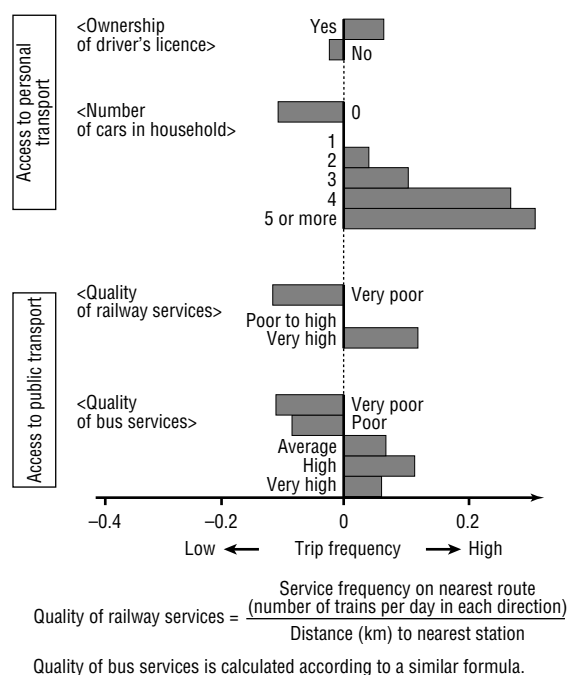


Figure 4 Factors Contributing to Going-Out Preference

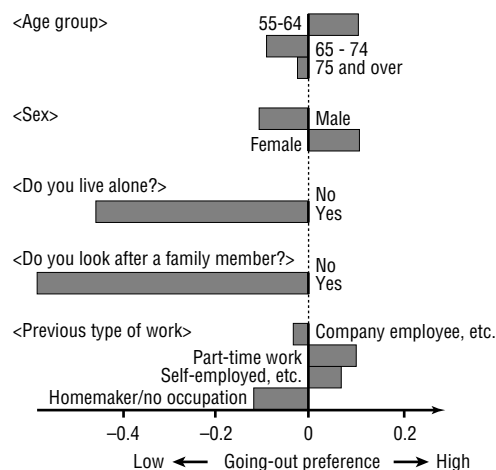


Table 4 Factors Influencing Trip Frequency Patterns

Factors influencing trip frequency		Purposes							
		Shopping for daily goods	Shopping for presents, etc.	Personal business at bank, etc.	Sports, to pursue interests, to meet friends	Leisure activities, pleasure travel	To visit children and/or grandchildren	Neighbourhood community activities	
Factors determined by personal characteristics	Advanced age	-	--	-	-	--		+	
	Walking disability	--	-	--	--	--	-	-	
	Has lived in present house for many years	-					+		
	Lives alone	+							
	Lives with children						-		
	Has job	-				+		+	
	Previous occupation	Company employee, etc.	+	+	+	+	+		+
		Part-time work	+	-	-	+	-		-
		Self-employed	-	-		-			
		No occupation/housewife		-	-		+		+
	Does housekeeping	++	++	++				+	
Factors determined by extent of mobility	Has driver's license			+	+	+	+		
	Household has several cars					++		+	
	Household has several bicycles							+	
	Good rail services					++			
	Good bus services					++			
	Long way to nearest station				--				
	Long way to nearest bus stop						-		
	Lives in metropolitan area (Tokyo's Kita Ward)	++		+					

Note: The '+' and '-' symbols indicate the relative extent to which each factor promotes or prohibits going out.

and an appreciation of the value of one's job. Another important factor is the enjoyment of activities outside the home, regardless of whether these activities are merely everyday errands or for the purpose of leisure and enjoyment. Elderly people, who have probably already retired from the workforce, may find that their vitality levels rise when they are active outside the home. Their vitality rises to an extent relatively greater than it would in the case of people in the prime of life seeking activity outside the home. In other words, there is every reason to believe that improving mobility will improve the vitality of elderly people by increasing the frequency of their outings. When we consider that Japan's

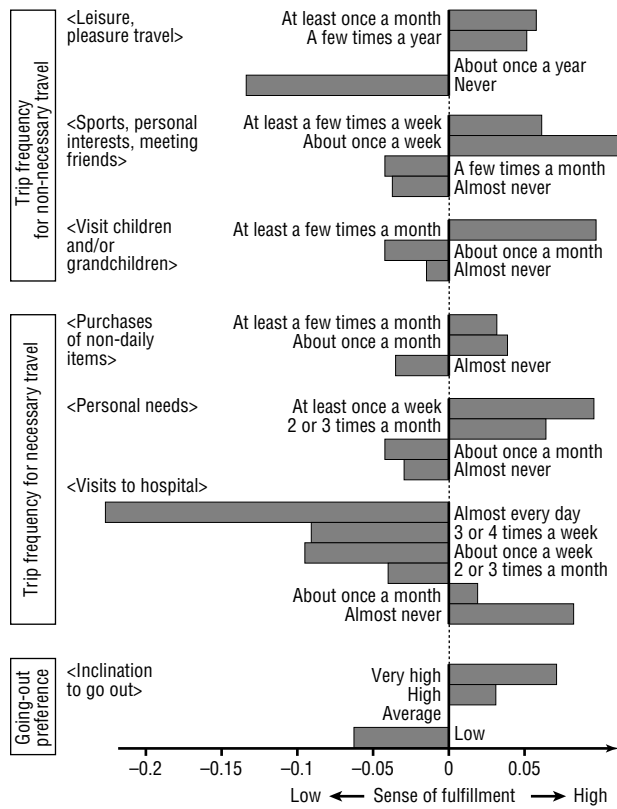
society will soon age to levels never seen before, with more than 25% of the population being 65 or older, it is obvious that if the elderly can find more opportunities to experience the joys of living they will benefit both themselves and society as a whole.

- (4) Transport policies for the elderly should aim at maintaining and raising the vitality of society as a whole. Japan is aging at an unprecedented rate. To maintain and raise the vitality levels of the entire population, society should implement a wide variety of policies and measures aimed at improving the welfare and mobility of elderly people. Previous measures to improve transport for the elderly have focused on ensuring that they obtain

at least a minimum standard of services. These measures have succeeded to some extent, because today's seniors without a driver's licence or motor vehicle are generally able to ride buses to shop for everyday items and to visit hospitals, seniors' clubs and other places they want to frequent. However, the current public policy of ensuring a minimum level of mobility should be promoted further by developing transport policies that improve the vitality of all people in society. Such a shift in emphasis would greatly change the approach of current policies for seniors.

- (5) We should look favorably on use of cars by the elderly. The car offers excellent comfort and

Figure 5 Factors Contributing to Sense of Fulfillment



convenience, and is ideal for the elderly because it allows them to travel door-to-door. The current generation of car owners are well accustomed from youth to using their vehicles to travel and enjoy outdoor activities and will,

one day, form the core of the senior generation. Consequently, we can assume that Japan will experience a rapid rise in the number of elderly who continue to use cars for leisure purposes. As they spend more time outside the

home, their sense of fulfillment will probably grow considerably. It has doubtlessly been assumed that, in every case, transport for the elderly means public transport, but we should think of seniors' use of their own cars not as something that is simply inevitable but as a new trend that offers a number of advantages.

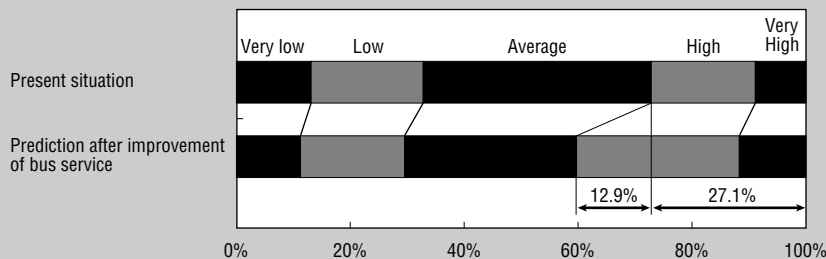
(6) Improvements in car design, roads and driver education are needed to make driving easier for the elderly.

However welcome may be the trend for seniors to use their own cars, we must realize that the current state of roads and the design of today's vehicles do not meet the requirements of the average elderly person with diminished agility. Roads and vehicles need improvements that can only be made after research, technical developments and considerable investments over the medium to long term. Roads, for example, should be constructed to permit greater sight distances, and the government should restrict billboards and other advertising that tends to obstruct views of traffic signs and signals. To make driving easier, cars should be computerized to a greater extent, they should have fewer blind spots, mirrors should offer better vision, and instrument panels should be made easier to see.

(7) The bicycle is an important means of transport, even for the elderly.

The bicycle is also becoming increasingly popular among the elderly. This article has not yet discussed this point, although our survey did find that a considerable number of elderly people ride bicycles when they travel outside the home. At present, many of these bicycle users do not have a car or driver's licence, and we can assume that bicycle use will continue to increase among the elderly, with many of them switching from cars to bicycles. The bicycle offers a high degree of flexibility and is an environmentally friendly way

Figure 6 Effect of Bus-Service Improvement on Self Fulfillment



to travel, especially in urban areas. It is also the best form of transport over short distances if topography, weather and road conditions are acceptable. Newly developed bicycles require less strenuous pedalling, while others can be folded up for easy transport. These and other innovations will make the bicycle a better form of transport for the elderly. Any government policies that promote the bicycle as a form of transport would be most welcome.

- (8) Further improvements are required for public transport systems in large urban centres, taking into consideration the needs of all people.

Trains and buses will remain the main form of transport in large cities, so further improvements should be made to public transport systems. Some needed improvements include: further installation of elevators and escalators in stations; renovations that make it possible to walk without stepping up or down; signs that are easy to read and understand and that maintain uniform standards, making recognition easy for people who transfer between different transport modes or different operators; information services that make transport systems easier to use; better rest areas within the transport system; and lowering of vehicle floors to platform levels.

Some of these improvements have already been implemented to provide better access for the elderly and physically disabled. However, any

effort to improve transport facilities must take into account the fact that physical disabilities vary from person to person—for example, some have impaired vision while others use wheelchairs.

Modifying transport facilities to satisfy the needs of one group may make transport less convenient for other passengers. Obviously, a public transport system that is highly accessible to less-agile elderly people must also offer comfort and convenience to the average passenger. Further study is required to draw up fiscal measures that will permit improvements to our transport systems so that all users and local communities benefit as a whole.

- (9) Basic services offered by regional public transport systems should be improved.

Cars and bicycles offer a very flexible form of personal transport, and provide greater mobility and independence for the elderly. Use of these modes should be promoted not only in areas where public transport is not readily available to the elderly, but also as a way to raise the vitality of everybody. Even so, public transport services should be maintained and improved, especially for elderly people who have lost much of their agility, and for others who have no other convenient means of travel. The planning of improvements to basic transport services should not be top-down, but should consider what users would find most convenient—for

example, more extensive networks and more frequent services to ensure greater accessibility for everybody. ■

Notes:

1. *Results of a Survey on Life Structures and Mobility in an Aging Society*, International Association of Traffic and Safety Services (IATSS) 1995, 1996.
2. Special Feature: Transportation in an Aging Society, Vol. 22, No. 2, p. 139, *IATSS Review*, IATSS.
3. *Transportation Policy for Small and Medium-Size Urban Regional Centers in Japan—Tatebayashi City*, Transportation Policy Research Association of Japan, 1994.
4. Koshiro Shimizu, Transportation Policy for the Elderly in a Car-Oriented Society, *Transportation and Economics*, Vol. 54, No. 6, p. 56, 1994.



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