Transport of the Disabled in the ACT

Occasional Paper

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Subject
Series
Date
A to Z
Search
Results
Print
Exit
GO BACK

Transport of the Disabled in the ACT

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FOREWORD

The International Year of Disabled Persons (IYDP) program in 1981 drew attention to barriers which people with disabilities face in achieving a productive, fulfilling and enjoyable lifestyle. As part of this more general process, transport planners and operators recognised that much of the disadvantage experienced by disabled people was due to a lack of mobility and therefore an inability to gain access to services, facilities and social contacts. However, efforts to improve the mobility of disabled people through adjustments to transport systems have been limited by a lack of appreciation of the nature and extent of mobility handicap.

This study takes a step towards rectifying such deficiencies in the information base. It represents a contribution to the reappraisal of transport arrangements stimulated by IYDP.

Many organisations associated with disabled people in Canberra assisted the study. They are too numerous to acknowledge individually, however, we should draw particular attention to the assistance provided by the Australian Capital Territory IYDP Advisory Committee, staff of the Woden Valley Rehabilitation Centre and the Aerial Taxi Cabs Co-operative Society Limited of Canberra.

The work for this study was carried out in the Special Studies Branch of the BTE by Dr H.W. Faulkner and Mr S. French. Ms A. McKnight conducted the household surveys and assistance in analysis was provided by Ms R. Nelson and Mr D. Bulbeck.

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CONTENTS

TABLES

FIGURES

CHAPTER 1—INTRODUCTION

STUDY AIMS

Access to community facilities and opportunities for social interaction are largely determined by personal mobility. In an affluent society where high levels of car ownership have become the norm, the level of mobility necessary to enjoy the full benefits of modern urban life has become increasingly dependent upon the availability and use of a private car. Under these circumstances, anyone who lacks private transport is disadvantaged and any such person who also has difficulty using alternative forms of transport is doubly disadvantaged.

The International Year of the Disabled Person (IYDP) program in 1981 has drawn attention to a substantial minority of people who have disabilities which restrict the range of transport services they can use, and which consequently further limit their opportunity to live the sort of life most able-bodied people take for granted. This increased awareness has added impetus to innovations in urban transport aimed at accommodating disabled people. It has also been instrumental in the formation of special consultative bodies responsible for advising authorities on the transport needs of disabled people (Department of Transport Australia 1981). However, to appraise the effectiveness of these developments and to identify those deficiencies that undoubtedly remain, it is necessary to develop a clearer understanding of the travel behaviour of disabled persons, the problems they encounter and appropriate modifications to urban transport systems required to overcome these problems. It has been suggested that the absence of such information in the USA has led to inefficient and costly services (Revis, J. 1978). To date examination of these issues in Australia has been limited.

The main aim of this paper is to take a step towards filling the gap in the information available on the transport needs of the disabled. In particular, the travel behaviour and preferences of disabled people in Canberra are explored with a view to producing insights into the effectiveness and limitations of existing and recently introduced transport services specifically designed for this group. Financial and organisational constraints affecting the operation of such services are also considered.

The study is confined to Canberra partly because time and resource constraints did not permit a more widespread comparative analysis. Also this city—and its transport system—presents a manageable scale for a city-wide study. More importantly, however, current thinking (BTE 1981) on transport for the disabled in Australia favours a range of public transport options intermediate between the fixed route systems and the motor car—ie paratransit. Systems based on this approach had been recently established in Canberra at the time the study was conceived. By examining responses of disabled persons to existing services insights can be provided into the strengths and deficiencies of these services and therefore into possible improvements or extensions.

Compared with other major Australian cities, Canberra is atypical in many respects. For instance, the 1976 Census of Population and Housing revealed that Canberra's population was generally more affluent and with a higher car ownership level than that of any other major Australian city. Furthermore, detailed planning has resulted in most residential suburbs having good access to a comprehensive range of community facilities (Lansdown 1971). Clearly conclusions drawn from an examination of the Canberra experience will not necessarily be directly or fully applicable elsewhere. In

view of the apparently advantaged circumstances of Canberra and its population, it would appear that any disadvantage experienced by disabled people would be minor compared with that experienced by similar people elsewhere. On the other hand, it might also be possible that in the midst of such relative affluence, disadvantaged minorities become less visible and their handicaps magnified.

METHODOLOGICAL ORIENTATION AND STUDY STRUCTURE

The methodological stance adopted in this study is based on the premise that assessment of the transport needs of the disabled should follow from a detailed analysis of present travel, the level of satisfaction achieved, and any preferred alternative arrangements. Since such information can only be obtained directly from the people concerned, the approach hinges upon a survey of disabled people. The survey uses a game-simulation interview technique which is designed to simplify the description of travel behaviour and the choice of transport options, and yet ensure that relevant constraints are also considered realistically. This method is similar to the activity-based approach that has been recently developed overseas (Jones 1979; Brög and Erl 1980) and in Australia (Faulkner 1978, 1981). In the present study, the strength of such an approach lies in the way it allows the analysis of travel patterns to be integrated with information on the socio-economic circumstances and activity patterns of the individuals involved.

Chapter 2 begins by examining the general relationship between impairment, disability and handicap. A conceptual framework for classifying the impact of various disabilities upon transport usage is then presented. The incidence of disability within Canberra's population is estimated in Chapter 3 to allow statements to be made regarding the likely magnitude of related transport problems. This step also enables the sample drawn in the study to be placed in perspective.

Chapter 4 provides an overview of developments in the provision of transport services to the disabled. Steps taken in Canberra are related to schemes elsewhere. Thus, the nature and level of services available to the surveyed population can be compared with those available overseas and in Australia as a whole.

Chapter 5 describes and explains the sampling and interview techniques used in this survey and interprets the information produced. Conclusions drawn from the study are presented in Chapter 6.

CHAPTER 2—IMPAIRMENT, DISABILITY AND TRANSPORT DISADVANTAGE: CONCEPTUAL CONSIDERATIONS

IMPAIRMENT, DISABILITY AND HANDICAP DEFINED

Four concepts are central to the philosophy underlying this study:

- impairment;
- disability;
- handicap; and
- mobility disadvantage.

These concepts are linked in that a handicap (and its severity) is largely a function of some impairment. A mobility disadvantage, in this context, is partly a direct function of handicap, but is also potentially compounded by other consequences of handicap (such as financial hardship, psychological effects and special travel needs for treatment).

The World Health Organisation (WHO) draws a useful distinction between disability and handicap. Disability is defined as:

> reflecting the consequences of impairment in terms of functional performance and activity of the individual: disabilities thus represent disturbances at the level of the person. (WHO 1980, p14)

Handicap is defined as:

> disadvantages experienced by the individual as a result of impairments and disabilities; handicaps thus reflect interaction with and adaptation to the individual's surroundings. (WHO 1980, p14)

In both these definitions, the disabilities and handicaps referred to are restricted to those arising from impairment; that is, some loss of or abnormality in the anatomical, physiological or psychological functions of the individual (WHO 1980, p27). This source of handicap is distinct from solely economic factors which are nevertheless often associated with, and compound the effects of, impairment (Australian Government Commission of Inquiry into Poverty 1977). The link between impairment and economic status is examined in Chapter 3 of this report.

In terms of this framework, the extent to which a disability results in handicap or disadvantage depends partly upon the individual's adjustment to it and also upon the degree to which it is accommodated or compensated by society. In other words, *disability* is a product of the individual's adaptation to an impairment, whereas *handicap* is a product of the combined effect of this 'intrinsic response' and an 'extrinsic response' inherent in the social environment (Wright 1960, p19). Indeed, Smith takes this interpretation a step further by arguing that, apart from exacerbating a disadvantage arising from a disability by failing to make allowances for it, society may react to a disability in a way which actually *creates* handicap:

> Society by its perceptions and conceptions of people with physical disabilities, can effectively create more handicaps for the individual than the disability itself. These perceptions and conceptions when translated into specific social philosophies, can give rise to social policies which seek to exclude opportunities for the disabled to function as people. (Smith 1980, p17).

This study focuses on the way one facet of urban society, its transport system, causes individuals with disabilities to be disadvantaged by excluding them, and thereby

restricting their mobility. In essence, we are concerned with mobility handicaps produced by discordant relationships between disabilities and the characteristics of urban transport systems.

Fundamentally, the dual notions of disability and handicap are relative concepts. With regard to disabilities, it should be recognised that we all have disabilities of one sort or another. What is important is the *severity* of these disabilities and how they affect our performance relative to others. Thus, an individual is regarded as being disabled when there is a 'restriction or lack of ability to perform an activity...*in a manner or* within a range considered normal for a human being' (WHO 1980, p28). Transport facilities often appear to be designed as if the usual abilities of physically and intellectually unimpaired people were the lowest level to be accommodated. In as much as little or no allowance is made for those who are in someway impaired, disabled people are inhibited in their use of many forms of transport.

Handicap is also relative in the sense that it implies some degree of disadvantage, which in turn can only be defined by referring to some norm. In the context of the present study, it may be sufficient to describe this norm in terms of the mobility achieved by non-disabled people. However, a precise description of such a criterion is confounded by other constraints which impinge upon mobility. There are also considerable variations in the propensity to travel associated with characteristics such as age, sex and socio-economic status.

Given the general definitions of impairment, disability and handicap described above, progress towards a more explicit statement of the transport ramifications requires some framework to:

- identify various types of disability; and
- describe how each type of disability impedes the use of transport facilities.

Such a framework is described in the following section.

IMPAIRMENTS, DISABILITY AND THEIR TRANSPORT IMPLICATIONS

As a basis for exploring the relationship between disabilities and transport usage, the full World Health Organisation (WHO 1980) classification is rather too detailed and extensive—it has 88 categories of impairment and 68 categories of disability. For the purpose of this exercise, it is sufficient to identify basic categories of impairment broadly in terms of the implied effect on ability to use transport. Thus, in Table 2.1, impairments affecting the *sensory communicative* functions of individuals are distinguished from those affecting *motor* functions. The former group includes conditions, such as mental retardation, which diminish capacity to comprehend instructions and/or carry out the transactions required to use transport facilities. This group may also include impairments, such as blindness, which render individuals incapable of responding to standard cues to users of particular systems (route headboards, bus stop signs, timetables). The motor disability group encompasses any condition which directly impedes movement capabilities, and thereby reduces capacity to control movements and/or negotiate physical obstacles encountered in using transport. Examples in this group include paraplegia, hemiplegia and dwarfism.

The distinction between the two groups of disability is not as clear as implied in Table 2.1. For instance, although blind people are essentially disabled in terms of sensory functions, there may be secondary motor disabilities where blindness leads to problems in avoiding obstacles. However, this disability is not *directly* attributable to restricted motor functions. On the other hand, some conditions have multiple effects that directly impinge upon both sensory-communicative and motor functions. For example, stroke and cerebral palsy victims often have both speech and skeletal impairments.

One major category of impairment recognised in the WHO classification has been excluded from Table 2.1. Disfiguring impairments which affect appearance (eg deformities of the limbs or face; skin disorders) are not included even though they may

TABLE 2.1—CLASSIFICATION OF IMPAIRMENT AND TRANSPORT DISABILITY

Impairment group[a]	*Examples*	*Disability affecting transport usage*
Skeletal (body structure)	Paraplegia, Quadraplegia Spina bifida Muscular distrophy Dwarfism/giantism	Motor
Visceral (organ functions)	Cardiovascular	
Ocular (vision)	Blindness and varying degrees of visual impairment	
Aural (hearing)	Deafness or reduced hearing capacity Vertigo	
Language	Mutism Stuttering	Sensory communicative
Psychological	Anxiety/phobias Epilepsy	
Intellectual	Mental retardation	

a. Based on the World Health Organisation classification of impairment, WHO 1980.

impede the use of transport. The effect that such impairments may have in this context highlights Smith's point in the previous section. That is, the impairment in itself is not the disabling factor but rather it is the expected or actual response of other users of the transport system and, in turn, the psychological barrier created through self-consciousness (Falcocchio and Cantilli 1974). Again, where they also cause disfigurements, the disabling effects of some sensory-communicative and motor impairments may be compounded by social reactions.

A range of barriers to the use of public transport by disabled people has been recognised both in Australia (eg Metropolitan (Perth) Passenger Transport Trust 1981) and overseas (eg Abt Associates 1969). Specific types of barriers are listed in Table 2.2. Those at the top of the list are more relevant to motor disabilities while those further down tend to effect people with sensory-communicative disabilities more severely.

The characteristics presented in Table 2.2 emphasise the *nature* of barriers confronting disabled users of public transport rather than the degree to which they inhibit use. Daunt (1980) provides an alternative scheme, presented in Table 2.3, which identifies different *degrees* of transport disability.

The development of transport services and policies which effectively enhance the mobility of disabled people relies upon a precise statement of the nature, degree and incidence of disabilities affecting transport use. Without such information, there would be no basis for determining the resource allocation necessary to remedy mobility problems experienced by disabled people. Moreover, quantitative evidence on the extent of the problem is necessary before resource allocations can be justified. Required information on the size and distribution of the population with varying disabilities which affect their use of transport might eventually be translated into a graphical format similar to Figure 2.1. There is seldom a clear cut and consistent relationship between a particular impairment and how it manifests itself with regard to the nature and degree of transport related disabilities. Thus, specific impairments may be reflected in a range of disabilities, in terms of both the nature and degree of their effect. Different impairment groups are therefore plotted in the matrix so that a proportion of each group in specific categories described by the two axes can be indicated.

TABLE 2.2—BARRIERS CONFRONTING DISABLED PEOPLE USING PUBLIC TRANSPORT

Relevant disability	*Barrier*
Motor	• Physical obstacles within vehicles and at terminals or interchanges, for example, steps, narrow aisles, inaccessible seating • Lack of, or inconveniently positioned aids, such as hand rails, in vehicles and terminals • Long walking distances to, or within, terminals • Motion characteristics of vehicles which have the potential to cause discomfort or injury from abrupt or unexpected acceleration, deceleration or directional changes • Movement and density of crowds, both in vehicles and at terminals (have the dual effect of complicating the disabled person's movement and making them conscious of causing inconvenience to other users) • Time pressures to meet imposed service schedules are accentuated when movements are impeded by disabilities
Sensory-communicative	• The layout of vehicles and terminal buildings, and instructions or service information do not usually allow for users with sensory limitations

NOTE: Arrows show direction of reducing relevance.
Source: Adapted from Abt Associates (1969, pp114-119).

TABLE 2.3—DEGREES OF TRANSPORT DISABILITY

Degree of disability	*Description*
Independent	Those who, without much difficulty, can use conventional transport systems
Restricted in use of public transport	Those who, with assistance, can use conventional public transport systems but with such difficulty that their trip making is restricted
Restricted to specialised services	Those who are unable to use conventional transport systems but can use specialised transport
Unable to use specialised services	Those who are so severely disabled or ill that they are never or rarely able to travel

Source: Adapted from Daunt (1980).

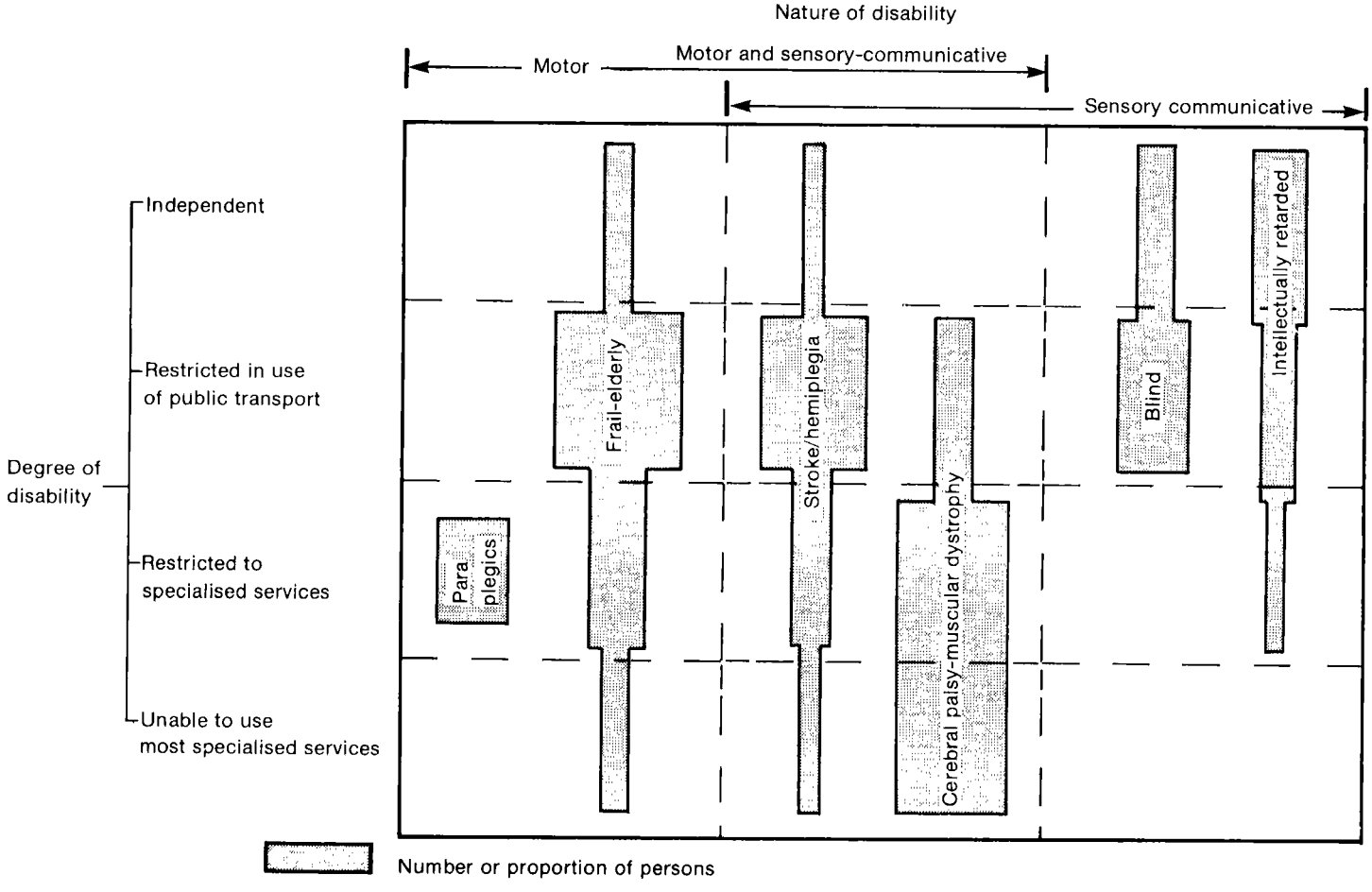


Figure 2.1 A graphical scheme for representing the nature, degree and incidence of transport related disabilities

CHAPTER 3—CHARACTERISTICS OF THE DISABLED POPULATION OF THE ACT

This study is principally concerned with the nature and range of transport difficulties experienced by disabled people. However, such information will have little value without at least an approximation of the numbers of people affected. Since transport difficulties arising from an impairment may be exacerbated or mitigated by the financial situations of those concerned, it is also relevant to consider the incomes of the disabled population. This chapter seeks to establish the number, age distribution and income characteristics of those people in the ACT with a mobility handicap. This information also enables the representativeness of, and possible bias in, the survey sample drawn from the Canberra population to be appreciated.

Any estimate of the number of disabled people, either in Australia or in the ACT, is necessarily imprecise. The disabled do not form a homogeneous group. Different impairments cause different disabilities and handicaps. Any one impairment can vary in its consequences, depending on its severity and on the psychological outlook and financial, housing, employment and family situation of the person affected. Australian Bureau of Statistics (ABS) census and survey data relating to disability and handicap are not always of the quality or detail required to give an accurate picture of the situation in the ACT. Census data is especially limited in reliability by the element of self-reporting where questions deal with qualitative characteristics, such as disability. The usefulness of more specific ABS surveys (ABS 1976b, 1980, 1981a) in describing the incidence of disability is restricted by the small size of the sample drawn from the ACT. Approximately 1200 ACT households were surveyed in the 1981 survey of handicapped persons (ABS 1981a) and some of the more detailed information consequently lacks statistical significance and has not been released. The final bulletin of the 1981 survey is not due to be released until August 1982. Inference from data applying to Australia as a whole is possible so long as the particular socio-economic and demographic characteristics of Canberra are taken into account, but such inference can only yield approximate estimates. The figures presented in this chapter should be treated with caution. The picture of the consequences of disabilities they provide should be regarded only as indicative.

THE MAGNITUDE OF THE DISABLED POPULATION IN THE ACT

As Table 3.1 shows, the 1976 Census of Population and Housing recorded 5324 people in the ACT who were stated to be handicapped, 1125 of whom were handicapped in their ability to get about alone. When the number of handicapped people is expressed as a percentage of all persons in the respective age group, the increased incidence of handicap amongst older people is clearly evident. However, the post-enumeration survey following the 1976 Census showed that questions dealing with handicap had different meanings for different people and the resulting data was of poor quality (ABS 1981a). Other ABS surveys suggest that the Census figures significantly understate the incidence of handicap in Australia. The 1974 survey, Chronic Illnesses, Injuries and Impediments (ABS 1976b) estimated that 10 800 non-institutionalised people in the ACT were suffering from chronic limiting illnesses.

The most recent relevant survey, undertaken in 1981, cites a figure of 13 800 for the total ACT handicapped population (ABS 1981a); this figure represents approximately 6.2 per cent of the total population of the ACT, compared with an equivalent figure of 8.6 per cent for Australia as a whole.

TABLE 3.1—PERSONS IN THE ACT STATED TO BE HANDICAPPED BY SERIOUS LONG-TERM ILLNESS OR PHYSICAL OR MENTAL CONDITION, AND PERSONS STATED TO BE HANDICAPPED IN GETTING ABOUT ALONE

	Handicapped persons		*Handicapped in getting about alone*	
Age group	*Number*	*Percentage of population in age group*	*Number*	*Percentage of population in age group*
0- 4	151	0.7	36	0.2
5- 9	317	1.5	65	0.3
10-14	234	1.2	50	0.3
15-19	297	1.6	59	0.3
20-24	375	2.0	47	0.3
25-29	361	1.6	43	0.2
30-34	351	2.0	48	0.3
35-39	285	2.1	28	0.2
40-44	298	2.8	28	0.3
45-49	280	2.8	39	0.4
50-54	507	5.7	56	0.6
55-59	455	7.8	75	1.3
60-64	339	8.3	48	1.2
65-69	256	10.4	75	3.0
70+	818	22.1	428	11.2
Total	5 324	2.7	1 125	0.6

Source: ABS 1976a.

This latest ABS survey provided figures by age for the total Australian population suffering mobility handicap, defined as involving 'difficulties in using public transport, moving around a person's own home, moving around unfamiliar places, walking 200 metres, walking up and down stairs' (ABS 1981a, p2). By calculating the incidence of handicap in each age group and matching it to the ACT population age structure, an estimate of the size of the ACT population with a mobility handicap can be derived and its likely age distribution determined. The estimates shown in Table 3.2 indicate that about 8520 people with a mobility handicap were resident in the ACT in June 1979.

TABLE 3.2—ESTIMATED POPULATION OF ACT WITH MOBILITY HANDICAP AND RESIDENT IN HOUSEHOLDS, JUNE 1979

Age group	*Number*	*Percentage of population in age group*
5-14	651	11.5
15-24	615	1.5
25-34	1 061	2.3
35-44	1 191	4.1
45-54	1 474	7.4
55-64	1 728	14.0
65-74	1 041	19.4
75+	759	31.3
Total	8 520	3.8

NOTE: Figures derived from ABS Survey of Handicapped Persons, Australia February-May 1981 (Preliminary), Table 5 and ABS Australian Capital Territory Statistical Summary 1981, Table 4. Incidence of handicap in Australian population in each age group is calculated and figures derived according to the proportion of Australian population in each age group resident in ACT in June 1979, obtained from ABS Australian Capital Territory Statistical Summary 1981 and ABS Australian Demographic Statistics Quarterly December 1979 and March 1980.

In the two years to June 1981 the total population of Canberra is estimated to have increased by about 3.2 per cent (Department of the Capital Territory 1981), so the figure of 8520 may be a slight understatement of the present number. Like the Census data given in Table 3.1, the figures in Table 3.2 show a higher incidence of mobility handicap among the elderly. However, this feature of the age distribution of the handicapped population is less marked in these estimates than in the 1976 Census data. One possible reason for this discrepancy is that Table 3.1 includes, where Table 3.2 excludes, residents of institutions. No information on the age distribution of the latter is available, but it is likely that a high proportion are elderly. A small but detailed study of the accommodation needs of handicapped people in Sydney suggests that current accommodation arrangements are a function of opportunity and finance rather than of individual preference (Horn *et al* 1980). Thus it is possible that improved transport facilities could enable some residents of institutions to live independently in private households. However, when estimating the extent of the transport problems of the disabled it is convenient to exclude residents of institutions since they may be supposed currently to have limited transport needs.

The estimates shown in Table 3.2 suggest that 21 per cent (1800 out of 8520) of those in the ACT with a mobility handicap are over 65 years in age; this compares with a figure of 39 per cent for Australia as a whole. This difference can be explained by the age structure of the ACT which has a significantly younger population than Australia; only 3.5 per cent of the ACT's population was over 65 in June 1979 compared with 9.4 per cent of the total Australian population. Three ways in which the incidence of handicap relates to age may be identified:

- old people are more susceptible to disorders than the young;
- most impairments worsen with age; and
- younger people are generally better able to cope with an impairment and are less likely to be handicapped by it than the old.

Given the high incidence of handicap among the elderly, the handicapped population of the ACT is likely to increase significantly as the age structure changes. Applying the method used to derive Table 3.2 to the National Capital Development Commission's population projections (NCDC 1980), estimates of the size and age structure of the likely ACT population with a mobility handicap and resident in households in 1990 and 1995 were obtained. These figures are shown in Table 3.3. Such estimates are, of course, somewhat speculative. They assume no change in the pattern of institutionalisation of disabled people and the same incidence of handicap in each age group for the ACT in 1990 and 1995 as for Australia in 1981. The impact of advances in medicine cannot easily be predicted; they may act to reduce the incidence of handicap by facilitating the rehabilitation of the disabled, or they may increase the incidence of handicap by prolonging life. Furthermore, these estimates are based on projections which themselves are only broad estimates and, in view of the recent deceleration in Canberra's expansion, possibly overstate likely population growth[1]. Nevertheless Table 3.3 does point to a considerable increase over the next 15 years in both the absolute size of the ACT mobility handicapped population, and the incidence of handicap.

INCOME IMPLICATIONS OF DISABILITY

Whether or not a disability leads to a mobility handicap depends in part upon individual circumstances, particularly financial. It is therefore relevant to examine the income characteristics of the disabled population. The Henderson report on poverty in Australia established that the invalid, the sick, and the elderly are, in general, poorer than the rest of the community:

- twenty-five per cent of 'non-aged adult income units' classified as suffering

1. These projections assume an average growth rate of over 2 per cent. This compares with growth rates to years ending 30 June of 1.3 per cent (estimated) for 1981, 1.9 per cent for 1980, 3.0 per cent for 1979 and 3.7 per cent for 1978 (Department of the Capital Territory 1981).

sickness, accident or permanent handicap were 'very poor';

- seventy-one per cent of families headed by a 'sickness beneficiary' were below the poverty line; and
- twenty-four per cent of 'aged income units' living outside institutions were deemed to be 'very poor', although the higher rate of home ownership amongst the elderly means that when housing costs were considered, the number of 'very poor' elderly people was significantly reduced.

TABLE 3.3—ESTIMATED POPULATION OF ACT WITH A MOBILITY HANDICAP RESIDENT IN HOUSEHOLDS; 1979, 1990 AND 1995

	1979[a]	*1990*[b]	*1995*[b]
Estimated population of mobility handicapped resident in ACT households	8 520	13 119	16 104
Mobility handicapped as percentage of total ACT population	3.8	4.7	4.9
Percentage of mobility handicapped over 65 years	21	26	28
Percentage increase in population of mobility handicapped since 1979	—	54	89
Percentage increase in total ACT population since 1979	—	27	48

a. Figures derived as in Table 3.2.
b. Figures derived as in Table 3.2 from NCDC (1980).

(Australian Government Commission of Inquiry into Poverty 1975, pp235, 284-285.)

Disabilities have a compounding effect on the economic well-being, and therefore the mobility, of individuals and households. Not only do disabled people often have restricted income earning capacity, but they also face additional financial burdens. A supplementary study of the Henderson inquiry considered the relationship between poverty and disability in Australia (Australian Government Commission of Inquiry into Poverty 1977). This study pointed to substantial expenses borne by disabled people but not faced by the able-bodied; for instance additional costs for aids, housing modifications and medical services. The study also noted the extra expenses incurred by people who rely on expensive specialised transport services because of their inability to use cheaper forms of transport. The ramifications of such expenses, both for the individual and his or her immediate family, were also recognised.

> The handicapped frequently cannot manage to use public transport and so have to resort to more expensive forms such as taxis, hire-cars, or their own vehicle especially fitted. Because of the prohibitive costs, social activities are often curtailed and social isolation and impoverishment, every bit as serious and destructive as financial poverty, follows ... The parents of handicapped children can sustain heavy expenses taking their child for treatment, or visiting him if institutionalised. Geographical remoteness of some institutions ... can make these expenses especially high. (Australian Government Commission of Inquiry into Poverty 1977, p47).

From the data available, it is difficult to establish precisely what proportion of disabled people in Canberra are actually caught in a 'squeeze' between limited income and additional demands for transport and other services. In order to establish the extent of financial disadvantage amongst the disabled, some comparison between the income distribution of the disabled and that of the whole population is necessary. The information available does not permit a rigorous comparison to be made. However, ABS and Department of Social Security statistics do provide some information on the income characteristics of the disabled.

As information on income distribution from the 1981 ABS survey of handicapped persons was still in preparation at the time of writing, the only ABS data currently

available giving any indication of the income characteristics of the disabled are contained in the 1974 survey of chronic illness (ABS 1976b). This information is compared with unpublished data from the 1973-74 ABS survey of income distribution in Table 3.4. In May 1974 41.7 per cent of the people in the ACT with a chronic limiting illness earned less than $32 per week, or $1560 pa. In 1973-74 35.7 per cent of all people in the ACT earned less than $1600 pa. The corresponding figures for Australia as a whole were 59.6 per cent and 42.5 per cent.

TABLE 3.4—INCOME COMPARISON BETWEEN PEOPLE WITH CHRONIC LIMITING ILLNESS AND THE TOTAL POPULATION

	ACT	*Australia*
Percentage of people with chronic limiting illness with annual income under $1560 pa[a]	41.7	59.6
Percentage of all people with income under $1600 pa[b]	35.7	42.5

a. Source: ABS 1976b. Non-institutionalised persons aged 15 years and over, excluding those with own business or firm. Figures converted from weekly income estimated for May 1974 by multiplying by 52.
b. Source: Unpublished data from 1973-74 ABS survey of income distribution. Non-institutionalised persons aged 15 years and over.

Table 3.5 shows more recent Department of Social Security figures relating to the non-pension income of age and invalid pensioners in New South Wales and the ACT combined. Non-pension income is derived from sources such as part-time employment, rents, interest, dividends and royalties. Assuming that ACT and New South Wales pensioners have similar financial characteristics, it is possible to estimate the approximate number of ACT pensioners in each non-pension income group in 1979; these estimates are shown in Table 3.6. Although almost certainly overstating the number of financially disadvantaged ACT pensioners—because of the differences between the ACT and New South Wales populations—these estimates do indicate the existence of a substantial group of people, notably the estimated 3882 pensioners with non-pension incomes of under $312 per annum, whose personal difficulties are likely to be compounded by low income. While not all pensioners are necessarily restricted in their mobility, the fact that many receive only low incomes should be borne in mind when considering the transport alternatives available.

A comparison between average income and the income of disabled people dependent on pensions further highlights the degree to which the latter are economically disadvantaged. Pensions are currently increased in May and November each year. In October 1981, when most of the interviews for this study were undertaken, a single person with no non-pension income received a pension payment of $66.65 per week. A single person with a non-pension income of $312 per annum received a total weekly income of $72.65. Married pensioners with no non-pension income received pension payments of $55.55 each. Pensioners living in rental accommodation were entitled to a supplement of $5 per week. Single pensioners with a non-pension income of less than $40 per week, and pensioner couples with a combined income of under $68 per week, were eligible for a number of additional benefits. These details on the income received by pensioners may be put in perspective by comparison with average weekly earnings in Australia. In the June 1981 quarter average (seasonally adjusted) weekly earnings per employed male unit were $295 in Australia and $348.60 in the ACT (ABS 1981b).

No figures are available showing the number of mobility handicapped ACT residents in the workforce. In the absence of more reliable data, the approximation in Table 3.7 seems reasonable. Estimates presented in Table 3.2 suggested that there were about 6069 people aged 15-64 and with a mobility handicap resident in ACT households in June 1979. From this it is estimated that there are not more than 4450 mobility handicapped people in the workforce. The actual number is likely to be rather fewer since this estimate does not account for those handicapped people, of indeterminate number, who are neither in the workforce, nor pensioners, children or students. The 1974 ABS survey of chronic illness (ABS 1976b) presents figures for the number of non-

TABLE 3.5—PERCENTAGE DISTRIBUTION OF AGE AND INVALID PENSIONERS BY NON-PENSION INCOME GROUPINGS; NSW AND ACT, JUNE 1979

Annual non-pension income ($)	*Age pensioners*	*Invalid pensioners*
Nil	15.1	46.4
1-312	31.1	26.7
313-897 married persons 313-1040 single persons	23.1	12.1
Over 897 married persons Over 1040 single persons	21.2	14.8
Not stated	9.5	—
TOTAL	100.0	100.0

Source: Department of Social Security 1980a.

TABLE 3.6—ESTIMATED NUMBER OF ACT AGE AND INVALID PENSIONERS BY INCOME GROUP, JUNE 1979

Annual non-pension income ($)	*Age pensioners*	*Invalid pensioners*	*All pensioners*
Nil	1 034	456	1 490
1-312	2 130	262	2 392
313-897 married persons 313-1040 single persons	1 582	119	1 701
Over 897 married persons Over 1040 single persons	1 452	145	1 597
Not stated	651	—	651
TOTAL[a]	6 848	983	7 831

a. Totals differ from column sum due to rounding of estimates to whole numbers.

Source: Estimates derived from figures in Department of Social Security 1980a and 1980b.

institutionalised people with a chronic limiting illness outside the workforce in Australia as a whole. These show that 65 per cent of all chronically ill people over 15 were either 'not in the labour force' or 'looking for first job'. This compares with our estimate (from Table 3.7) of about 43 per cent of all mobility handicapped people aged over 15 in the ACT being outside the workforce. In view of the significantly larger number of elderly people in Australia compared with the ACT, these two proportions are not inconsistent.

TABLE 3.7—ESTIMATION OF NUMBER OF ACT MOBILITY HANDICAPPED PEOPLE IN THE WORKFORCE, JUNE 1979

Estimated mobility handicapped population of ACT[a]	8 520
Less children under 15[a]	651
Less people over 65[a]	1 800
Less women aged 60-64 (assumed to number one quarter of all people aged 55-64[a])	432
Less students (assumed to number one third of all people aged 15-24[a])	205
Less invalid pensioners[b]	983
	4 449

a. See Table 3.2 for derivation of figures.
b. Taken from Department of Social Security 1980a.

SUMMARY

While it is not possible to describe the size and nature of the mobility handicapped population of the ACT with accuracy, its likely characteristics are as follows. In June 1979, 8520 people in the ACT, or 3.8 per cent of the total population, are estimated to have had a mobility handicap and been resident in private households. Of these, 1800 (21 per cent) were over 65 and 651 (8 per cent) were children aged five to fourteen. Thirty-one per cent of all people over 75 had some mobility handicap, as had 19 per cent of people aged 65-74. The Henderson inquiry into poverty in Australia established that, in general, the elderly, the invalid and the sick are poorer than the population as a whole. Assuming that ACT and New South Wales pensioners have the same income characteristics, we estimated that in October 1981, when most of the interviews with disabled people were undertaken for this study, 3164 age pensioners and 718 invalid pensioners had total weekly incomes of $72.65 or less if single, or $61.55 or less if married. About 4450 people with a mobility handicap, or 57 per cent of all ACT people over 15 with a mobility handicap, are thought to be in the workforce.

These figures indicate the number and characteristics of people in the ACT who might be expected to have transport problems as a result of a mobility handicap. Such information, however, says nothing in itself about the *nature and extent* of individual problems. Subsequent chapters of this report discuss transport means currently available to the disabled in the ACT and examine how a sample of disabled people manage to travel in Canberra.

CHAPTER 4—PROVISION OF TRANSPORT FOR THE DISABLED: IN CANBERRA, IN AUSTRALIA AND OVERSEAS

Recent initiatives in the provision of specialised transport services for the disabled in the ACT may be viewed as part of a more general trend, both in Australia and overseas, to reconsider the needs of disabled people and provide them with greater mobility. No standard solutions to the mobility problems of the disabled have yet been established. Indeed perhaps no standard solutions could ever be established, given the diversity of difficulties encountered by the disabled and variations in social, urban and institutional structure and resource availability. Yet a brief description of developments elsewhere may provide a basis for further initiatives and is relevant if the position in the ACT is to be understood fully. This chapter outlines a range of possible approaches to combating the transport difficulties faced by the disabled, and describes innovations in the rest of Australia. The transport facilities available to elderly and disabled people in the ACT are then discussed and the advantages, problems and costs associated with different modes are considered.

APPROACHES TO EASING THE TRANSPORT DIFFICULTIES OF THE DISABLED

Figure 4.1 indicates that the provision of more accessible transport services is not the only possible approach to easing mobility problems of the disabled. Transport is not an end in itself, and the mobility problems of the disabled may be reduced by minimising the need for transport as well as by increasing its accessibility (O'Flaherty 1978). To this end, Hopkin, Robson and Town (1978) have advocated the provision of housing for elderly and disabled people close to urban centres. Efforts have been made in Belgium to develop mobile shops and provide a subsidised telephone service for the use of people with mobility difficulties (Harboort 1978). Since the transport difficulties of the disabled are commonly compounded by low income, these difficulties can sometimes be eased by financial assistance. This may either be of a general nature, through the provision of pensions and benefits, or be specifically related to transport, through fare concessions, subsidies toward the purchase of a vehicle, or mobility allowances such as those paid to disabled people in Britain (Morris 1978). Although such approaches to the mobility problems of the disabled may be important they may not be regarded properly as complete solutions without increased availability of *accessible* transport.

There are two general approaches to providing a more accessible transport system for the disabled: increasing the accessibility of conventional facilities, and providing specialised services. The most far-reaching attempt to make conventional transport universally accessible has been undertaken in the United States (Daunt 1980; Johnson 1981). This resulted largely from organisations for the disabled exerting pressure based on the constitutional guarantee of equal rights and equal protection under law. Using as precedents court decisions relating to racial segregation, in which 'separate but equal' provisions were found to be unconstitutional, these organisations claimed that all public facilities, including transport, must be fully accessible to disabled people (Ashford 1978). Section 16 of the US Urban Mass Transportation Act, amended in 1970, states that it is 'the national policy that elderly and handicapped persons have the same right as other persons to utilise mass transportation facilities' (quoted by Bell 1978). This principle was reinforced in 1973 by Section 504 of the US Rehabilitation Act which stated that 'no otherwise qualified handicapped individual can be denied the benefits of, or excluded from participation in, any program or activity receiving federal assistance' (quoted by Revis, J. 1978). The effect of these statutes is that the US

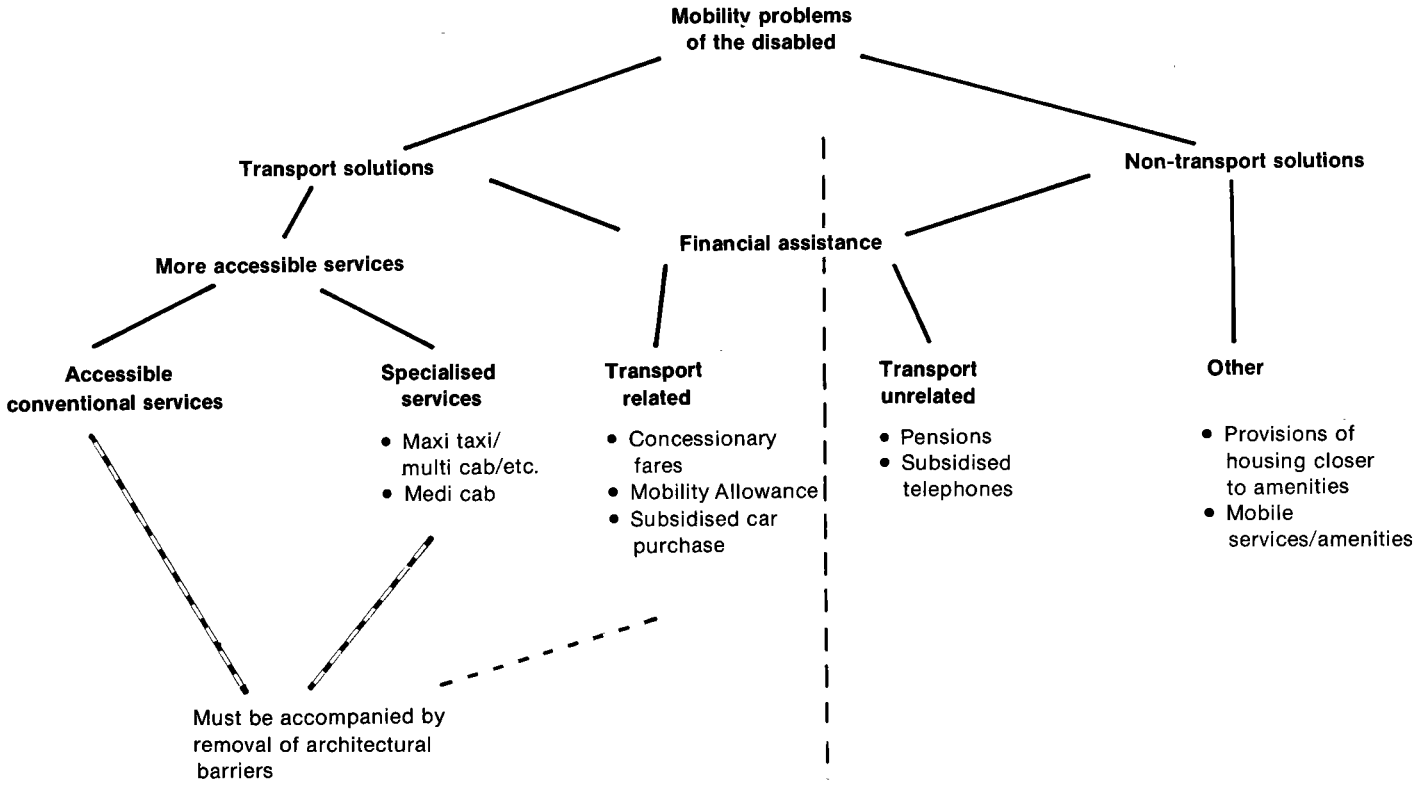


Figure 4.1 Schematic representation of approaches to easing the mobility problems of the disabled.

Department of Transportation is able to specify a required level of accessibility for transport systems which are eligible for federal funding. As a result of this policy, the BART and METRO rapid transit systems in San Francisco and Washington had to be modified while under construction to allow access to disabled passengers. Department of Transportation regulations issued in 1978 included requirements that all new buses and rapid transit carriages should be accessible to wheelchair users from October 1979, and other deadlines were set for the conversion of existing fleets and installations (Young 1981). The costs of complying with these regulations would have been enormous; about $10 000 for equipping each new bus with a lift, and an aggregate capital cost estimated at between $1700 million and $3200 million for the conversion of urban rail systems. The outcry against the new regulations was vociferous, especially in eastern and midwestern cities with extensive rail networks. In 1979 the regulations were relaxed and while *new* buses and carriages were still required to be accessible, only 'key stations' needed to be 'retrofitted' (Young 1981). The Reagan administration has proposed a further relaxation in requirements for transport accessibility. If put into effect this would allow local authorities greater scope to determine the appropriate level of accessibility for their transport system (*Passenger Transport* May 15, 1981).

The merits of a fully accessible conventional public transport system, such as that envisaged by the US Department of Transportation regulations of 1977, have been keenly argued (Ashford 1978; Peterson 1979; Kleger 1979; Johnson 1981). The case is supported by constitutional considerations in the United States, and by other more general arguments based on equity, to the effect that disabled people have the 'right' to use the same transport services as the able-bodied (Peterson 1979; Manly-Warringah IYDP Committee (undated); Lane 1981). Moreover, greater accessibility can benefit transport users other than the disabled, especially people with young children (Peterson 1979; Adam 1980).

The main disadvantage of fully accessible public transport is its expense, particularly when changes to existing equipment and installations are involved. This was the main reason for the relaxation of the US Department of Transportation's regulations on transport accessibility. Cost is not, however, the only problem faced by a policy of providing fully-accessible public transport. There is evidence to suggest that use of public transport by disabled people is restricted by the difficulties faced in getting to and from bus stops and stations as well as by the inaccessibility of transport facilities themselves (Feeney, Ashford, Morris and Gazely 1979; Department of Social Security 1977). Thus, accessible public transport may not be sufficient to enhance the mobility of the disabled. A further difficulty, mentioned in a resolution adopted by the International Commission on Transport Economics (1980) is that in some respects the needs of disabled people conflict with the requirements of other users of public transport. For the latter minimum journey time is desirable, but the concomitant rapid acceleration, sharp braking and strict timetables may cause discomfort and inconvenience to the former. Modifying transport services to cater for the disabled could therefore arguably lead to a decline in total patronage.

An alternative to making conventional public transport fully accessible to disabled people is the provision of specialised services. Such services operate in a number of countries, including the United States (Revis, J. 1978; Sahaj 1978; Daunt 1980), Canada (Garner 1974; Dunwoodie 1978; Daunt 1980), Sweden (Brattgard 1978), France (Bolze 1978) and Britain (Garden 1974). Sizes and types of vehicle vary, but typically vans with a seating capacity of 10 to 15 are used. These have commonly been modified to facilitate access by wheelchair users. Operating arrangements also vary (demand-responsive; prebooking 24 hours in advance; fixed route), as do funding procedures (user pays; direct subsidy to users; operator subsidy) and the extent of assistance provided by drivers and attendants (door-to-door; curb-to-curb). This variability and flexibility in the nature of specialised services is one of their advantages as they can be adapted to meet the differing needs of the people and communities they serve. A further advantage lies in the personalised nature of these services (South Australian

Department of Transport 1981). Elderly users in particular may find personal contact with drivers and attendants reassuring.

It is unnecessary and misleading to consider specialised services and fully accessible public transport as representing a clear dichotomy. Even vigorous proponents of the public transport option accept that this does not eliminate, and must be complemented by, specialised services for the severely disabled (Kleger 1979). Many modifications to conventional public transport may increase accessibility at low cost and may also be to the benefit, rather than the detriment, of other passengers (Adam 1980; Metropolitan (Perth) Passenger Transport Trust 1981). The mobility problems of the elderly and the disabled are likely to be eased most effectively by a judicious combination of approaches, involving both specialised services and conventional public transport, both financial assistance and technical innovations, and initiatives both related and unrelated directly to transport.

DEVELOPMENTS IN AUSTRALIA

In view of the problems arising from the American determination to make conventional public transport fully accessible, and because of the enormous capital outlay that such a strategy would require, Australian initiatives in the provision of transport for the disabled have concentrated on low-capital improvements in access to conventional transport and the provision of specialised demand-responsive services. The early extent and impact of both approaches has been only modest (Adam 1980; Daunt 1980).

Attempts have been made in Australia to identify ways in which regular public transport could be made more accessible to the disabled, recent examples being described in Adam (1980) and Metropolitan (Perth) Passenger Transport Trust (1981). However, the benefits of this concern for the problems of the disabled have been manifested mainly in the design of new equipment and buildings rather than in a commitment to improve the accessibility of existing facilities. This has the consequence that most regular transport services still make little provision for users other than the able-bodied (Daunt 1980).

The development of specialised demand-responsive services for the disabled is in its infancy in Australia. The first service of this kind is believed to be that established by a private operator in Adelaide in 1979. It consisted of two minibuses equipped with wheelchair lifts and two-way radios. In 1980 the South Australian Department of Transport assisted with the expansion of the service by making funds available for the training of a new driver (South Australian Department of Transport 1981). In 1980 *Medi Cabs*, ordinary taxis with swivel front seats, and *Maxi Taxis*, minibuses with wheelchair lifts, were introduced in Canberra. The *Maxi Taxis* were later replaced by the similar *Multi Cab* service. A more detailed description of these initiatives is given in the next section. Tasmania has recently been experimenting with the *Maxi Taxi* service, which moved to Hobart after ceasing operation in the ACT in December 1980. Nine taxis in Brisbane have been modified in the manner of the Canberra *Medi Cabs*, and these commenced service in October 1981 (*Courier Mail*, 7 October 1981).

A more ambitious scheme started operation in New South Wales in November 1981 (NSW Minister for Transport, News Release, 4 September 1981). Eventually up to 80 special taxis driven by 240 specially trained drivers are expected to be available to disabled passengers in major towns and cities, 24 hours a day. The vehicles used are currently minibuses equipped with wheelchair lifts, but these will progressively be replaced by sedan-type taxis modified to carry wheelchairs. Disabled people permanently unable to use buses, trains and ferries pay only half the metered taxi fare, with a government subsidy making up the balance. It is intended that ultimately such taxi fares will be reduced to the level of regular public transport fares. Bookings are made as for standard taxis, and the cabs are permitted to carry able-bodied passengers at normal fares when not required by the disabled. The annual cost of the service to the New South Wales Government is estimated to be $2.5 million by 1983-84 (Urban Transit

TABLE 4.1—SPECIALISED DEMAND-RESPONSIVE TRANSPORT SERVICES FOR THE DISABLED IN CANBERRA

Service	*Operator*	*Number of vehicles*	*Character of vehicles*	*Commencement date*	*Termination date*
Medi Cab	Aerial Taxis	4	Conventional taxi with swivel front seat	June 1980	—
Maxi Taxi	Murray's Coaches	2	Toyota Hiace minibus with wheelchair lift	June 1980	December 1980
Multi Cab	Aerial Taxis	1	Nissan Urvan minibus with wheelchair lift	February 1981	—

Authority of NSW, undated leaflet). Officers in other States have indicated that the effectiveness of the scheme will be closely watched and similar services may be introduced if it proves successful.

Since specialised services for the disabled in Australia are of such recent inception there is little information on their viability and effectiveness at this stage. There are indications that the Adelaide and Hobart services are extending the mobility of disabled people in those cities and are financially viable (Daunt 1980; Transport Economics Centre, University of Tasmania 1981). Specialised services in Canberra are relatively extensive and long established compared with those in other cities. Thus an examination of these services is relevant to the discussion of the needs and problems of the disabled elsewhere in Australia.

TRANSPORT FOR THE DISABLED IN CANBERRA

This section describes the various transport modes available to the disabled in Canberra and examines the costs, utilisation and convenience of each. Particular attention is paid to the introduction and operation of the *Medi Cab, Maxi Taxi* and *Multi Cab* demand-responsive services. Whenever fares and costs are mentioned these refer to those current during the period in which the survey was conducted, ie September to November 1981.

Specialised services for the disabled

Prior to 1980 there were no public transport services in the ACT specifically designed for the disabled. In June of that year two new services, the *Medi Cab* and the *Maxi Taxi*, were introduced providing transport for the disabled at conventional taxi rates.[1] A summary of the characteristics of these services, and that provided by the *Multi Cab* is presented in Table 4.1. Table 4.2 compares the cost to the user of these services with costs relating to bus transport and use of a private car.

TABLE 4.2—COST OF SINGLE JOURNEY FROM NORTH BELCONNEN[a] TO OTHER LOCATIONS IN CANBERRA BY VARIOUS TRANSPORT MODES[b]

Destination	*Distance (kms)*	*Mode*			
		Bus with concession	*Bus without concession*	*Taxi/Medi Cab/ Multi Cab*	*Private car*
			$		
South Belconnen	4.5	0.15	0.40	2.58	1.03
East Belconnen	8.0	0.30	0.80	3.80	1.83
North Canberra	15.0	0.30	0.80	6.25	3.42
Civic Centre	20.0	0.30	0.80	8.00	4.57
Weston Creek	22.0	0.60	1.60	8.70	5.02
Woden	24.0	0.45	1.20	9.40	5.48
Tuggeranong Central	31.0	0.60	1.60	11.85	7.08

a. North Belconnen was selected as a representative outer suburb and to allow comparison of costs among a wide range of different trip distances.
b. Figures for bus fares assume pre-payment through purchase of ticket booklet. Taxi and bus fares current in October 1981. Car costs are average costs derived from *Royalauto* April 1981.

The *Medi Cab* service was initiated by Aerial Taxi Cabs Co-operative Society Ltd. Four taxis out of the total fleet of 104 were fitted with a swivel front seat, allowing easier access for physically disabled passengers. The conversion costs of $600 per taxi were borne by the co-operative as a whole. The co-operative also compensates *Medi Cab* drivers when long journeys to passenger pick-up points need to be made. This compensation totalled $427 in 1980-81 but declined to only $20 in the first five months

1. In October 1981 rates were 75 cents flag fall, 25 cents booking fee and 35 cents per km, Monday-Friday, 7 am-7pm, and 40 cents per km at other times.

TABLE 4.3—PERCENTAGE OF DWELLINGS WITH GIVEN NUMBER OF VEHICLES 'PARKED OUTSIDE': SELECTED AUSTRALIAN CITIES[a]

Number of vehicles	*Canberra*	*Sydney*	*Melbourne*	*Brisbane*	*Adelaide*	*Perth*	*Hobart*	*Newcastle*	*Wollongong*	*Geelong*	*Australia*
None	6.5	20.5	17.3	16.3	14.9	13.4	16.7	18.0	16.0	14.1	15.7
One	49.8	47.3	45.5	45.2	48.1	44.8	46.2	49.7	51.4	48.4	46.7
Two	33.3	22.0	26.3	26.8	27.3	30.1	26.3	23.5	23.8	28.1	26.0
Three or more	8.0	5.6	6.6	7.7	7.3	9.2	7.9	6.1	6.2	6.7	7.9
Not stated	2.3	4.6	4.3	4.0	2.4	2.5	2.9	2.8	2.6	2.7	3.6
Total[b]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a. Capital city figures are for relevant Statistical Divisions, figures for other cities are for Statistical Districts.
b. Totals differ from column sums due to rounding.

Source: ABS 1976a.

of 1981-82. The management of Aerial Taxis was unaware of the reason for this sharp reduction, but suggested to the BTE that *Medi Cab* drivers may now claim compensation less frequently than previously. In effect, Aerial Taxis' assistance to the *Medi Cabs* involves some cross-subsidisation by other taxi users. In other respects the *Medi Cabs* operate as ordinary taxis.

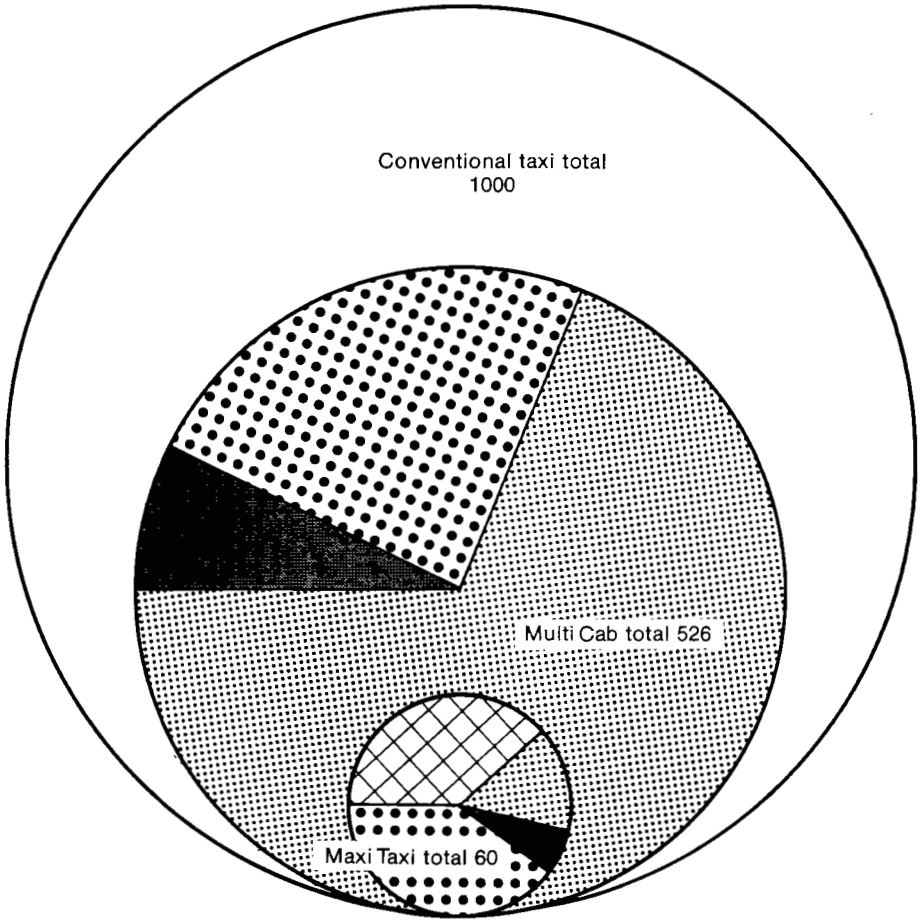
Detailed information on *Medi Cab* patronage is not collected, but Aerial Taxis have suggested that many disabled users are elderly or arthritic people who still have limited mobility and would be able to use conventional taxis if necessary. It is therefore likely that though the *Medi Cabs* provide a more comfortable and accessible form of transport for many people, they do not greatly increase the mobility of the disabled population.

One problem with the *Medi Cab* mentioned by Aerial Taxis and by the Department of the Capital Territory (DCT 1981) has been that some people, both disabled and able-bodied, are apparently reluctant to travel in a vehicle that caters for the disabled, and prefer using conventional taxis. A similar phenomenon has been observed with the *Maxi Taxi* service in Hobart (Transport Economics Centre, University of Tasmania 1981).

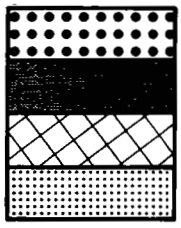
The second innovation of June 1980 was the *Maxi Taxi* This service was introduced by Murray's Coaches (a division of Murray's Charter Coaches and Travel Services Pty Ltd, a local coach operator), with the intention of providing transport for people confined to wheelchairs. The two vehicles used as *Maxi Taxis* were Toyota Hiace minibuses fitted with hydraulic lifts which provided access for people in wheelchairs. In most respects the *Maxi Taxis* were permitted to operate as conventional taxis, but were not permitted to ply for hire from ranks. Although licensed as omnibuses for administrative reasons, conditions of licence were such that they could be put to a broad range of uses, including the transport of groups too large for conventional taxis or with excess luggage, and the operation of a parcel and goods delivery service. Without such a broad licence the *Maxi Taxis* were not expected to be financially viable. An additional intended advantage of the *Maxi Taxis* multi-purpose character was that the possibility of disabled people feeling embarrassed about travelling in a vehicle specifically designed for their benefit might be reduced (DCT 1981).

It was originally intended that access to alternative business would be ensured through integration with Aerial Taxis' radio network. However, this intention was never fulfilled. The Department of the Capital Territory has suggested that this was due to difficulties which existed between Aerial Taxis and Murray's over the operation of the *Maxi Taxi* service (DCT 1981). Without integration with Aerial Taxis' radio network, the *Maxi Taxis* had insufficient access to alternative business to permit financial viability. Murray's subsequently entered into an agreement with a local hire car firm for the use of radio and booking facilities, but this did not generate sufficient business to permit continued operation, and the service was discontinued in December 1980 and moved to Hobart.

The under-utilisation of the *Maxi Taxis* is indicated in Figure 4.2. Information provided by the Department of the Capital Territory shows that ACT taxis make an average of just over 1000 trips per vehicle per month, compared with a combined total number of trips for the two *Maxi Taxis* of 163 in July, 64 in August and 134 in September 1980. An ACT taxi's average gross revenue was $3340 per month, compared with $1628 for the two *Maxi Taxis* together in July, and $569.80 in August. A significant proportion of the *Maxi Taxis'* business was provided under contract to the ACT Schools Authority for the transport of school children. This business was unavailable during the school holidays in August and September. Otherwise, as Figure 4.2 shows, the *Maxi Taxis* failed to procure any significant alternative business. Patronage by wheelchair passengers did increase significantly during the *Maxi Taxis'* period of operation and records suggest that once people had used the service they tended to use it again (DCT 1981). More complete information on the *Maxi Taxis'* operation is given in Appendix I.



Trip categories



Wheelchair and disabled

Parcels and luggage

Schools

Other

Source: Daily running sheets provided by the Department of the Capital Territory.

Figure 4.2 Comparison of average number of monthly trips made by a Maxi Taxi, the Multi Cab and a conventional taxi.

In February 1981 Aerial Taxis started operation of the *Multi Cab* offering a service similar to that previously provided by the *Maxi Taxis* which had ceased operation in the ACT in December 1980. The *Multi Cab* is a 14 seater Nissan Urvan minibus modified by the removal of the rear seats, allowing space for a wheelchair, and by the fitting of a hydraulic lift. The vehicle has seating for eight passengers in addition to a wheelchair user. Like the *Maxi Taxis* the *Multi Cab* is licensed to operate services other than the transport of disabled people, but is not permitted to ply for hire from ranks. Unlike the *Maxi Taxis,* however, the *Multi Cab* uses Aerial Taxis' radio network and since April 1981 has been competing with taxis for radio hirings. It is therefore able to operate more effectively as a conventional taxi than were the *Maxi Taxis.* Aerial Taxis estimates the total cost of the *Multi Cab* (including lift, two-way radio, taxi-meter, clamps and harness for wheelchairs, and other accessories) to have been $14 000.

As is evident from Figure 4.2, while the *Multi Cab* has been much more successful than the *Maxi Taxis* in procuring business and particularly business in the 'other' trip category (mainly conventional taxi hirings), it has still been making significantly fewer trips than have conventional taxis in the ACT. *Multi Cab* trips are on average longer than those of conventional taxis, but additional revenue per trip does not fully compensate for the fewer trips made. Average monthly *Multi Cab* revenue between March and October 1981 (the last complete month before an increase in fares) was $2543 compared with an average of $3340 for an ACT taxi.

Daily running sheets for the *Multi Cab* provided by the Department of the Capital Territory show that in the last five months of 1981 between 79 and 88 wheelchair users and other disabled people made trips by *Multi Cab.* These passengers made in total an average of 110 trips per month. The latter figure represents about 13 trips per month per 1000 of the 8520 people with a mobility handicap estimated to be resident in ACT households. This compares with 483 conventional taxi trips per month per 1000 of the total ACT population. The *Multi Cab's* current contribution to the mobility of the disabled has therefore been limited, notwithstanding the service it has provided to its relatively few users.

There are four plausible explanations for this low usage by the disabled.

- Few potential disabled users. By no means all the estimated 8520 mobility handicapped people in the ACT are potential *Multi Cab* users. The *Multi Cab* principally caters for disabled people unable to drive themselves or to use buses, taxis or *Medi Cabs* and yet who are not so severely disabled that they are unable to go out at all. The number of people in this group is not known.
- Lack of awareness of *Multi Cab,* despite publicity at its inception in February 1981, including advertising in *The Canberra Times* and liaison with the various groups in Canberra representing and supporting the disabled.
- Reluctance on the part of disabled people to being exposed to the stigma that may be perceived as accompanying use of a special service.
- The *Multi Cab's* expense. Those disabled people receiving low incomes are likely to be deterred from using the *Multi Cab* by its expense. Between February and October 1981 the average fare for a wheelchair user was $7.68. In this period 246 trips were made carrying a boy between Queanbeyan and Kaleen at a one-way fare of $12.50. If these trips are considered exceptional and excluded in order to give a more representative indication of the cost of the *Multi Cab* to other users, the average single trip *Multi Cab* fare for a wheelchair user was $5.09. For a large proportion of disabled people on low incomes an average return fare of over $10 imposes a severe limit to the number of outings that can be made.

On the basis of information on costs, trip numbers and revenue made available by Aerial Taxis and from the daily running sheets provided by the Department of the Capital Territory, it is estimated that in the year March 1981 to February 1982 the *Multi Cab* service would have lost $2800. This figure includes a component for the residual value of the *Multi Cab* once the loan for the purchase of the vehicle has been repaid. In

terms of cash flow therefore, the loss is likely to be greater than $2800[1]. In future years the loss could be expected to increase as maintenance costs rise with the vehicle's age. For the *Multi Cab* operation to break even, it would need to have made about 7300 trips in the year to February 1982, 15.8 per cent more trips than the 6300 we estimate it made to that date. Alternatively the operation would break even if fares for the estimated actual number of trips throughout the year had been on average 11.4 per cent higher than they were. A more complete presentation of the assumptions and information on which these estimates are based is provided in Appendix II, and other operating details are shown in Appendix III.

One reason for the *Multi Cab's* financial position is that the cost of transporting disabled people by such a service is likely to be higher than that of transporting able-bodied passengers. There are three reasons for this.

- The capital cost of a vehicle such as the *Multi Cab* is higher than that of a conventional taxi because of the need to make it accessible to wheelchair users (this only includes costs of vehicles and not any market value of taxi plates).
- The time taken by disabled passengers and wheelchair users in getting into and out of the vehicle is greater than that taken by able-bodied passengers, restricting the number of trips that can be made in a given period.
- Since there are fewer disabled people than there are able-bodied, a taxi service catering for the disabled is likely to have a higher proportion of 'dead' miles to total miles than a conventional service. The extent of this problem would of course be reduced if more taxis were equipped to carry disabled passengers.

The difference in cost between transporting disabled and able-bodied people is not reflected in the fares charged by the *Multi Cab*. In consequence travel by disabled passengers is currently cross-subsidised by other *Multi Cab* users.

Aerial Taxis is appraising the future of the *Multi Cab*. The cessation of the service or the introduction of a second vehicle in an attempt to reduce the proportion of 'dead' miles run by the present *Multi Cab* are both being considered.

Bus services

The cheapest regular transport service available in Canberra is that provided by the Australian Capital Territory Integrated Omnibus Network (ACTION). In October 1981 pensioners with non-pension incomes of less than $40 per week were entitled to concessionary cash fares of 25 cents for one-section trips, or 15 cents when the fare was pre-paid. For those pensioners with low incomes, therefore, the cost of most round trips by bus was only about 30-50 cents.

Although bus travel may be cheap, organisations in the ACT representing the disabled have suggested to the BTE that it is unsuitable for many disabled people. The following difficulties were mentioned:

- distances to bus stops are too far for many disabled people to walk[2];
- boarding and disembarking;
- acceleration, braking and jolting;
- absence of benches and shelters at many bus stops[3];
- small type on bus timetables;
- indirect routes to health facilities, often requiring changes of bus;
- infrequent services, meaning that bus users attending medical appointments at fixed times may have to leave home well in advance of appointments and 'kill time' at their destination[4]; and

1. The *Multi Cab* was involved in a collision in August 1981. The vehicle was insured for damage, but revenue was lost during the short break in service and extra costs were incurred in hiring a temporary replacement. These costs and loss of revenue have not been taken into account.
2. ACTION services are planned so that 95 per cent of Canberra residents are within 400 metres of a bus route on weekdays, and within 600 metres at weekends (ACTION 1981).
3. ACTION sources indicate that 310 of the 3000 Canberra bus stops have shelters.
4. Services commonly operate at an off-peak frequency of twice-hourly on weekdays and hourly at weekends.

- in comparison with taxis, *Medi Cabs, Multi Cabs* and community services, bus services lack personal contact between driver and passenger.

These and other problems associated with disabled people's use of buses have been well documented elsewhere, for instance Abt Associates (1969), Brooks, Ruffell-Smith and Ward (undated) and Metropolitan (Perth) Passenger Transport Trust 1981.

In 1980-81 ACTION received a government contribution of $11.761 million, equal to 61 per cent of its expenditure and equivalent to an average subsidy of 59 cents for each of the 19.8 million passenger journeys made in that year (Department of the Capital Territory 1981). This subsidy is not duplicated in support of services which are provided for those unable, by reason of their disability, to use buses.

Access to cars

In 1976 of all major Australian cities Canberra had the highest proportion of households with the use of a private car (see Table 4.3). The implications of this for the transport difficulties of the disabled are not clear. The high level of car availability might suggest that disabled people unable to drive are relatively more disadvantaged compared with those in the States. But given the relatively comprehensive and convenient bus service in Canberra (ACTION 1981), and the urban planning that has ensured the availability of basic amenities within reasonable distance of most households (Lansdown 1971), the high ratio of cars to households may have more to do with the relative affluence and particular age structure of the ACT than with any 'dependence' on the private car. If this is so, the high level of car availability in Canberra does not necessarily imply a special disadvantage for disabled people unable to own or drive a car. It could in some circumstances be seen to ease transport difficulties for some of the disabled by increasing the possibility that people who are themselves unable to drive might have someone prepared to meet their transport needs. But Canberra's rapid expansion has possibly not yet been accompanied by the social integration which is a prerequisite of such informal transport arrangements (Saha 1975).

Use of cars by disabled drivers is restricted not only by the technical difficulties of training drivers and of adapting vehicles (Gazeley and Haslegrave 1978), but also by the financial disadvantage that many of the disabled suffer (Department of Social Security 1980c). Although cars bought by disabled people are sales tax-exempt when necessary to provide transport to and from 'gainful' employment, the basic purchase price is often increased by the need for automatic transmissions and auxiliary hand controls (installation of the latter costing about $320). A recent RACV analysis (*Royalauto* April 1981, p4) suggests that the average cost of owning and running a typical new car (a 2.0 litre, four-cylinder, five-speed manual Mitsubishi Sigma GL) is $65.95 per week, or 22.83 cents per km. For the many disabled people on low incomes, such costs are likely to prohibit car ownership.

Enquiries to the car rental companies Avis, Budget and Hertz revealed that none has hand-controlled cars for rental in the ACT, or has plans to acquire any.

No figure is available for the number of people in the ACT with a mobility handicap who are able to drive themselves. However, it is possible to estimate the likely number (see Table 4.4).

In the absence of any better basis for estimation, a minimum figure for the number of non-drivers may be derived by assuming that all elderly people with a mobility handicap and invalid pensioners are unable to afford the cost of owning and running a car. This assumption is unsatisfactory since it fails to take into account capital that may have been saved by or settled upon age and invalid pensioners and which undoubtedly allows some people on low incomes to own and drive cars. But this failure is likely to be more than compensated by the assumption's disregard of non-drivers among people aged 15-65 with a mobility handicap who are not invalid pensioners. Adding the number of elderly people and children with a mobility handicap to the number of invalid

TABLE 4.4—ESTIMATED NUMBER OF MOBILITY HANDICAPPED DRIVERS AND NON-DRIVERS IN THE ACT

(i)	Minimum figure for mobility handicapped non-drivers[a]	
	Invalid pension recipients[b]	983
	Estimated mobility handicapped under 15[c]	651
	Estimated mobility handicapped over 65[c]	1 800
	Approximate total	3 430
(ii)	Maximum figure for mobility handicapped non-drivers	
	Estimated population of mobility handicapped in ACT[c]	8 520
	Less (iii) below	500
	Total	8 020
(iii)	Minimum figure for mobility handicapped drivers	
	Estimate of parking permits issued in 1981[d]	500
	Total	500
(iv)	Maximum figure for mobility handicapped drivers	
	Estimated population of mobility handicapped in ACT[c]	8 520
	Less (i) above	3 430
	Total	5 090

a. See text for qualifications.
b. Department of Social Security 1980a.
c. See Table 3.2 for derivation of figures.
d. See text for source.

pensioners, a minimum figure of about 3430 is obtained for the number of people in the ACT with a mobility handicap who are likely to be legally or physically incapable of driving or who lack the financial means to own and run a car. The number of disabled driver's parking permits issued in the ACT provides a minimum figure for the number of drivers with a mobility handicap. Up to 14 October, 1981, 454 permits were issued, suggesting a figure for the year of just over 500. Subtracting this figure from the estimate of 8520 for the total population with a mobility handicap who are resident in ACT households, a maximum figure of about 8020 for the number of non-drivers with a mobility handicap is obtained. Given the quality of the information available, the estimated ranges for the numbers of mobility handicapped drivers (500-5090) and non-drivers (3430-8020) are necessarily extremely broad.

Voluntary services

Several voluntary organisations in the ACT provide free transport services to people in need. The organisations known to the BTE, and which provided information, are:

- Australian Red Cross Society;
- Blind Society of the ACT;
- Belconnen Community Service;
- Tuggeranong Community; and
- Woden Community Service.

About 100 volunteer drivers work with these organisations, and they make a total of between 150 and 200 trips per month. Since many of these are return trips, these services provide the equivalent of approximately 300 taxi trips per month—a significant contribution when compared with a maximum monthly total of 140 *Multi Cab* trips carrying wheelchair and other disabled passengers. Although the majority of those transported are reported by the organisations to be elderly, a wide range of people with difficulties are helped; the Tuggeranong service received the bulk of its calls for

assistance from families without access to cars. Most journeys are made in connection with medical appointments, but some are trips to shops. None of these organisations is able to meet every demand made on it, and it was mentioned that this situation is exacerbated when bus services are interrupted at times of industrial disputes. Those organisations which are hardest pressed to meet demand for their services claim to observe strict criteria when assessing the means and physical difficulties of those seeking assistance. One organisation also suggested that only those in real need would be referred to it for assistance anyway. Each organisation mentioned the difficulty faced in maintaining its number of volunteer drivers and the frequency with which volunteers are prepared to help. Some drivers receive a mileage allowance, but this is paid at the expense of other services provided by the organisations. Problems are encountered in transporting disabled people who have difficulties in getting into and out of cars. This is particularly so with wheelchair users who have to be lifted and for whose wheelchairs space must be found. It was claimed that some calls for assistance from people in 'real need' have had to be turned down because of these difficulties.

Paramedical services

The remaining relevant transport services are the paramedical services operated by the Capital Territory Health Commission (CTHC) and the Handicapped Citizens Association. These provide routine transport for disabled people from their homes to schools, day care and therapy centres, and sheltered workshops. The CTHC runs 16 services, handled by 20 buses equipped to carry wheelchairs. Three hundred and fifty moderately and severely disabled children are taken to school each day and about 100 disabled adults are carried to day care and therapy centres and to the rehabilitation centre at Woden Valley Hospital. The ACT Schools Authority has made arrangements with private bus companies for the transport of less severely disabled children to school. Given the nature of CTHC services, periods of peak activity are experienced in the early morning and late afternoon. For the rest of the day the buses have a range of functions including distribution of linen and meals, transport of disabled people on excursions and to a variety of therapeutic activity centres, and transport of school children to dental services. The Handicapped Citizens Association operates five buses, one of which can carry wheelchairs. Three buses are used to carry people to a sheltered workshop in Fyshwick, one is used in taking people on outings and the fifth is held in reserve. (Four of these buses were bought by the Association itself, and one was donated by a charity organisation.) While these services are important to their users and in fulfilling their specific functions, at present they have no wider role and make no contribution to more general mobility needs of the disabled.

CONCLUSION

In line with the trend elsewhere in Australia, Canberra has sought to extend the mobility of its disabled population by the provision of demand-responsive specialised services. In making an appraisal of the effectiveness of these services, and in assessing the availability and limitations of more conventional modes, the aspirations, difficulties and current travel behaviour of disabled people need to be considered. Chapter 5 examines the experiences of a sample of disabled people in dealing with the options provided and the contraints imposed by the transport services available to the disabled in Canberra.

CHAPTER 5—TRAVEL PATTERNS AND PROBLEMS OF THE DISABLED IN CANBERRA

INTRODUCTION

Consideration of the effectiveness of transport services in Canberra, from the disabled person's point of view, requires an examination of:

- how disabled people presently cope with their travel needs;
- to what extent has their mobility been enhanced by recent innovations and what problems persist; and
- what modifications to the existing systems are seen as being necessary for disabled people to achieve a level of mobility more closely comparable to that enjoyed by the remainder of the community.

Since these questions can only be answered by directly consulting those concerned, a survey approach was essential. This chapter examines the results of such a survey, the main feature of which involves the use of game-simulation technique to elicit responses to variations in the level of constraint operating on travel behaviour. Analysis of these responses produces a typology of travellers which enables varying relationships between transport systems and disabled people in Canberra to be distinguished.

The chapter is organised in four sections. First, the sampling procedure adopted and general characteristics of the resultant sample are described. The survey technique is dealt with in the next section, but only to the extent necessary to allow understanding of the analysis of the data. More detailed methodological information appears in the Appendices. In the third section, attention is turned to current trip patterns and relationships between travel behaviour and individual attributes. Finally, insights into travel constraints and preferences produced by responses to the game are described and analysed.

THE SAMPLE: DERIVATION AND PROFILE

The problems of determining the extent of disability within a population are manifold. These problems also obstruct the process of deriving a representative sample of disabled people, and the subsequent task of surveying this sample. In the absence of a central registry of disabled people in Canberra, records maintained by various organisations providing services to this sector of the population were used. The comprehensiveness of the sample thus compiled is limited in several respects:

- the members of a particular organisation, or the users of a particular service, do not necessarily represent all those in the community with similar disabilities, as registration is voluntary;
- there may be disability groups without relevant support organisations; and
- some organisations were concerned about members confidentiality and declined to participate.

Organisations which responded, and the numbers of registrants on their lists, are recorded in Table 5.1. A small number of double entries were eliminated and the remaining individuals were classified according to the nature of their disability (see Table 5.2). The total number in the final list was 1980, representing about 14 per cent of

the ACT's handicapped population and 23 per cent of those estimated as having mobility handicaps in the 1979 ABS Survey (see Table 3.2). A random sample of 60 stratified by disability, was taken from the final list for inclusion in the survey.

TABLE 5.1—ORGANISATIONS PROVIDING LISTS OF CLIENTS OR MEMBERS

Organisation	*Number of registrants*[a]
Woden Valley Hospital Rehabilitation Centre[b]	1 890
Hartley Street Centre	71
Paraplegic Association of the ACT	12
Multiple Sclerosis Association	51
TOTAL	2 024

a. Figures from original list, unadjusted for double entries.
b. Woden Valley Hospital Rehabilitation Centre serves all of Canberra. Clients have restricted mobility stemming from causes such as old age, Multiple Sclerosis, Cerebral Palsey, Strokes, heart disease, and accident victims sustaining limb, spinal or intellectual damage.

TABLE 5.2—NUMBERS OF REGISTRANTS IN DIFFERENT DISABILITY GROUPS

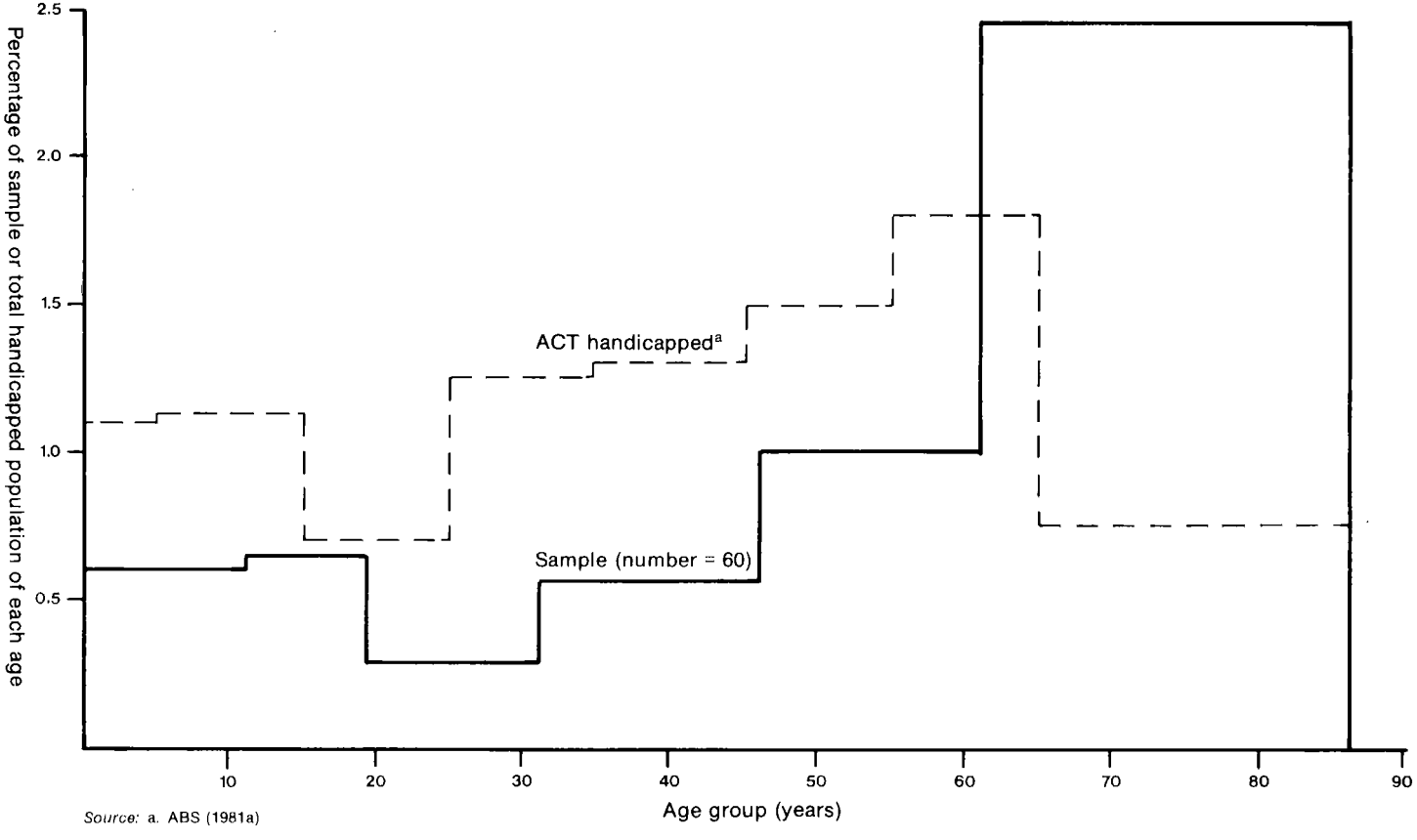
Disability group	*Number of registrants*	
	Original	*Adjusted*[a]
Motor		
Legs and/or spinal injuries	232	221
Calipers and amputees	204	204
Multiple sclerosis, cerebral palsy, muscular dystrophy and other like degenerative diseases	94	90
Frail, arthritic or elderly	729	709
Heart, cancer and stroke victims	170	165
Sensory-communicative		
Intellectual handicaps	186	183
Miscellaneous disabilities	79	78
Other	330	330
TOTAL	2 024	1 980

a. Adjusted for double entries.

It was not possible to check the representativeness of the 60 sampled people against the total disabled population in the ACT. An ABS survey of the disabled which would allow this to be done has yet to be published. However, where possible, comparisons have been made with information from estimates of the disabled population derived in Chapter 3.

Figures 5.1 and 5.2 illustrate the age and disability distributions of the sample population. The high proportion of the over 60s age group (61.7 per cent) and the frail and elderly categories of disability (36.7 per cent) reflect the dominance of aged people in the survey population. Indeed, a comparison with figures contained in Table 3.1 indicates that aged people are overrepresented in the sample. A quarter of the ACT disabled population is over 60 (according to ABS estimates), compared with nearly 62 per cent in the sample.

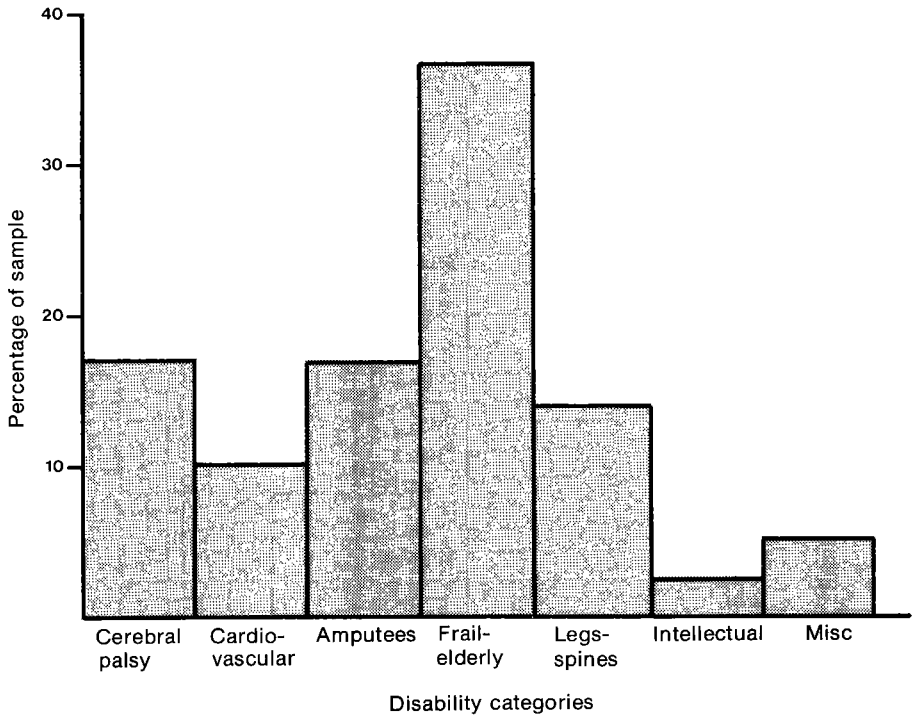
The distribution of household income within the sample is shown in Figure 5.3. With two thirds (67 per cent) of the households being concentrated in the under $10 000 per annum income bracket, this tendency is consistent with the earlier observation that



Source: a. ABS (1981a)

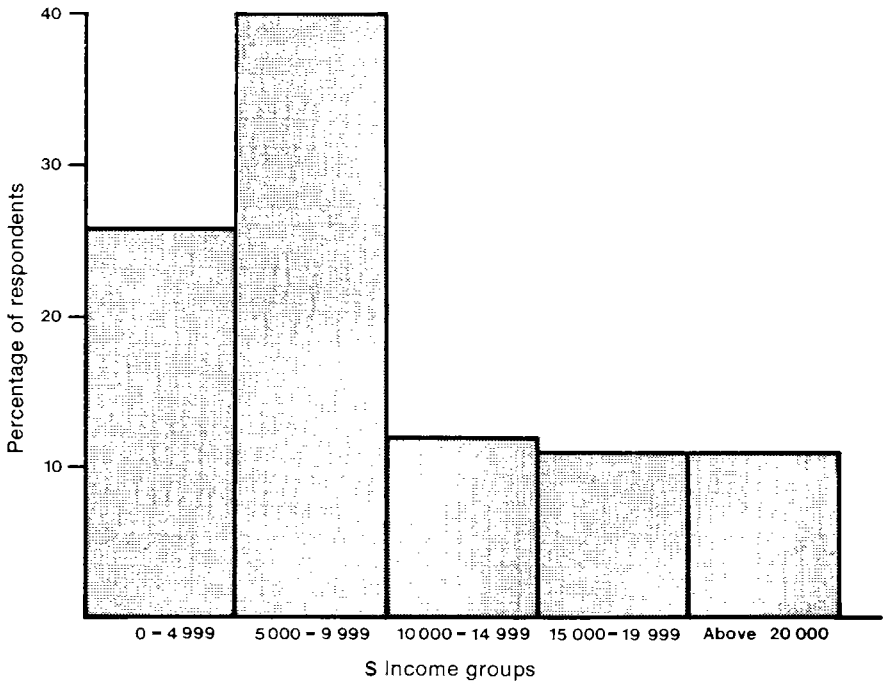
NOTE: Age groups in the basic data do not coincide to allow comparison; numbers in each age group were assumed to be evenly spread within that group.

Figure 5.1 Age structure: Sample compared with estimated ACT handicapped population



NOTE: Number of cases = 60

Figure 5.2 The incidence of different disability categories in the sample



NOTE: Number of cases = 57

Figure 5.3 Gross household income distribution of sample

disabled persons generally receive low incomes (see Chapter 3). The bias towards low incomes reflects the large number of pensioners in the sample. Seventy-three per cent of the sample (44 people) were pensioners with most of these being aged pensioners (55 per cent or 33 people) and, to a lesser extent invalid pensioners (15 per cent or 9 people).

METHODOLOGY

The exploratory nature of the study made a large scale structured survey inappropriate partly because such an approach is too restrictive in terms of scope and depth of the discussion it generates, and also because it is insufficient as a framework for discussing the complexities of individual travel behaviour at an appropriate level of detail. A game-simulation approach was adopted because it combines the flexibility of open-ended discussion with a structured format which facilitates the systematic collection and organisation of data on actual and preferred travel arrangements. Other advantages of this technique are more readily explained in the light of a brief description of the interview procedure.

Interviews were divided into three parts. An introductory conversation gathered information on the respondent's disability and its affect on mobility. A gaming board (comprising a map of Canberra) was then set up and used to record all destinations of trips undertaken by the respondent. Information on mode, frequency and difficulties encountered was collected at this stage. Finally, respondents were asked to consider the changes they would make to their travel arrangements under three sets of conditions:

- a reduction of 30 per cent in current travel expenditure;
- the provision of a mobility 'allowance' equivalent to about $12 per week; and
- free travel.

A more detailed explanation of the game-simulation approach appears in Appendix IV.

The game part of the interview had two functions. First, by simulating aspects of the environment that require trade-offs between options, it offered a flexible framework for determining priorities in travel. Secondly, it encouraged the consideration of alternative travel arrangements in the light of their potential implications.

The survey was intended more as an initial step towards understanding and conceptualising the travel behaviour and transport disadvantages of the disabled, rather than to produce a statistical analysis of these problems. However, while the size of the sample and the quality of much of the data did not allow the statistical significance of all relationships between variables to be tested, an attempt was made to establish the relative importance of such factors as disability, car availability and income in determining travel activity.

Two types of information were produced by the survey:

- data on the existing travel behaviour of different disability groups were obtained from the first two stages; and
- the game section of the interview yielded information on the level of satisfaction with existing travel patterns, preferred travel arrangements, and why these arrangements are presently unattainable.

The following sections deal with each of these two sets of information in turn.

EXISTING TRAVEL BEHAVIOUR

General trip rates

Chapter 2 indicated the relative nature of transport handicap. This implies that the existence of transport handicap among a particular target group (in this case, disabled people in Canberra) will be reflected in a level of trip making which is lower than that achieved by the remainder of the community. To measure the extent to which disabled

people included in the survey are transport handicapped requires a comparison between this group and the Canberra population as a whole. This survey only collected data relevant to disabled residents of Canberra, so a general travel survey conducted in 1975 (NCDC 1977a) was used for comparative purposes. The NCDC study revealed that the average weekly trip rate per capita for Canberra residents was about 15.9[1], while this study showed that the corresponding figure for disabled people was only 6.3. Hence, trip making among the population in general may be as much as double that among disabled people. Even though it is hazardous to draw upon two sources which are neither contemporaneous nor methodologically consistent, the difference revealed in this instance is sufficiently large to suggest that disabled people in Canberra may be severely restricted in their use of transport.

Information gathered on mode and purpose of trips of the disabled is summarised in Table 5.3. Major features evident in the Table include:

- shops were the most frequent destination of trips (40 per cent of all trips), while trips undertaken for social purposes were the second most frequent (21 per cent);
- over half of all trips (53 per cent) involved a private car, with most of these being fairly evenly divided between self driven (22 per cent) and as a passenger in a car driven by another household member (24 per cent);
- a relatively high proportion of work trips (67 per cent) were self driven, reflecting the higher income and less restrictive disability of people in employment;
- social and recreational trips were predominantly made by private car—71 and 84 per cent respectively, compared with 53 per cent for all trips; and
- conversely, a disproportionate number of less discretionary trips (such as those

TABLE 5.3—CURRENT TRIP PATTERNS

Mode of transport	*Trip purpose*						
	Shopping	*Social*	*Health care*	*Recreation*	*Work*	*Study*	*All trips*
				(per cent)[a]			
Self driven	23	26	18	22	67	3	22
Driven by household member	23	30	12	56	13	16	24
Driven by non household member	4	15	14	6	0	0	7
Taxi/medi cab/ multi cab	7	3	2	0	7	0	4
Walk	22	17	24	0	0	0	16
ACTION bus	20	6	0	11	13	0	11
CTHC bus	0	2	29	6	0	81	16
TOTAL[b]	100	100	100	100	100	100	100
Percentage of all trips made for each trip purpose	40	21	14	8	3	14	100

a. Per cent of trips made by each mode.
b. Columns may not add to 100 per cent due to rounding.

1. The actual survey only measured week day trips. However, by taking into account the ratio of weekday to weekend trips as reflected by traffic counts (1.6:1), it is possible to adjust weekday trip figures to give a weekly count.

$$\text{Weekly trip rate} = 5\,(\text{weekday trips per person}) + 2\,\frac{(\text{trips per person per week day})}{1.6}$$

involving shopping, health care and study) were made by modes other than the private car—notably walking and ACTION bus for shopping, walking and CTHC bus for health care and CTHC bus for study.

Trip making and car availability

There is a tendency for discretionary trips to be based on private car use, while other trips (including shopping, health care and study) more often involve other forms of transport. This implies that people whose access to a car is limited may be more restricted in the number of discretionary trips they can make. Social and recreational trip destinations are often more dispersed and, therefore, less accessible by public transport. More evidence of possible disadvantage among those with limited access to a car is obtained from Table 5.4, where weekly trip rates for different purposes are compared among groups with different levels of car availability. Numbers recorded in each column refer to the number of cases registering the specified weekly trip rate.

In Table 5.4, car availability is measured in terms of the times cars are available for use, with distinctions being drawn between those who have a car available all the time, sometimes and never. When the percentage of each car availability group in each trip rate category is calculated, three key observations can be drawn from this table:

- irrespective of trip purpose, the same proportion of those with no access to a car at any time (67 per cent) are concentrated in the lowest trip rate category, while much lower proportions (8 to 27 per cent) of those with access all the time appear in the same category;
- trip making for social and recreational purposes is low among all three car availability groups, with nearly half (47 per cent) of all cases appearing in the lowest trip rate category. This compares with 28 and 35 per cent for 'other' and 'all' trips respectively; and
- those with no car available at any time appear to make only marginally fewer trips in the social-recreational trip category than those with a car available sometimes. There is no statistically significant difference (0.05 level) between these two groups in terms of social-recreational trips, whereas there is when they are each compared with those who have a car available at all times (see Figure 5.4).

In summary, these observations suggest that the overall number of trips and social-recreational trips in particular are lower among those whose use of a car is in any way restricted. While this implies that these groups are disadvantaged in a transport sense, we cannot be sure that this is so because the trip patterns observed may equally reflect differences in trip making propensity associated with the general adaption of individuals to their disability. This point is considered in more detail in the conclusion of this chapter.

Trip making and transport disability

The extent to which a disabled person is handicapped with respect to transport use depends not only upon the availability of transport but also on the effect of the disability on the capability to use different forms of transport. Levels of transport disability (the inverse of capability) can be distinguished by referring to degrees of competence in the use of private, conventional public and specialised transport. Five categories of transport disability, corresponding with successively lower levels of mobility, are identified:

- independent private transport users, people capable of using private transport independently, although in some cases only after adjustments have been made to controls and seats;
- independent public transport users, people who are unable to drive a car but capable of using conventional public transport (buses and taxis) without assistance;
- dependent (private and public) transport users, people who are only able to travel in private transport as passengers and in public transport when they receive assistance from others;

TABLE 5.4—TRIP MAKING PATTERNS AND CAR AVAILABILITY

Car availability	*Number in car availability group*	*Number of people in trip rate categories (trips per week)*			*Mean trip rate*	*Standard deviation of trip rate*
		<1	1–1.9	⩾2		
		Social and recreational trips				
Never	15	10	4	1	0.42	0.65
Sometimes	19	11	6	2	0.61	0.72
Always	26	7	8	11	1.58	1.54
Total	60	28	18	14	0.98	1.24
		Other trips				
Never	15	10	1	4	0.80	1.33
Sometimes	19	5	5	9	2.32	1.93
Always	26	2	3	21	4.03	2.76
Total	60	17	9	34	2.68	2.55
		All trips				
		<2	2-3.9	⩾4		
Never	15	10	4	1	1.22	1.54
Sometimes	19	8	4	7	2.92	1.97
Always	26	3	7	16	5.61	3.11
Total	60	21	15	24	3.66	3.04

NOTE: Trips are round trips.

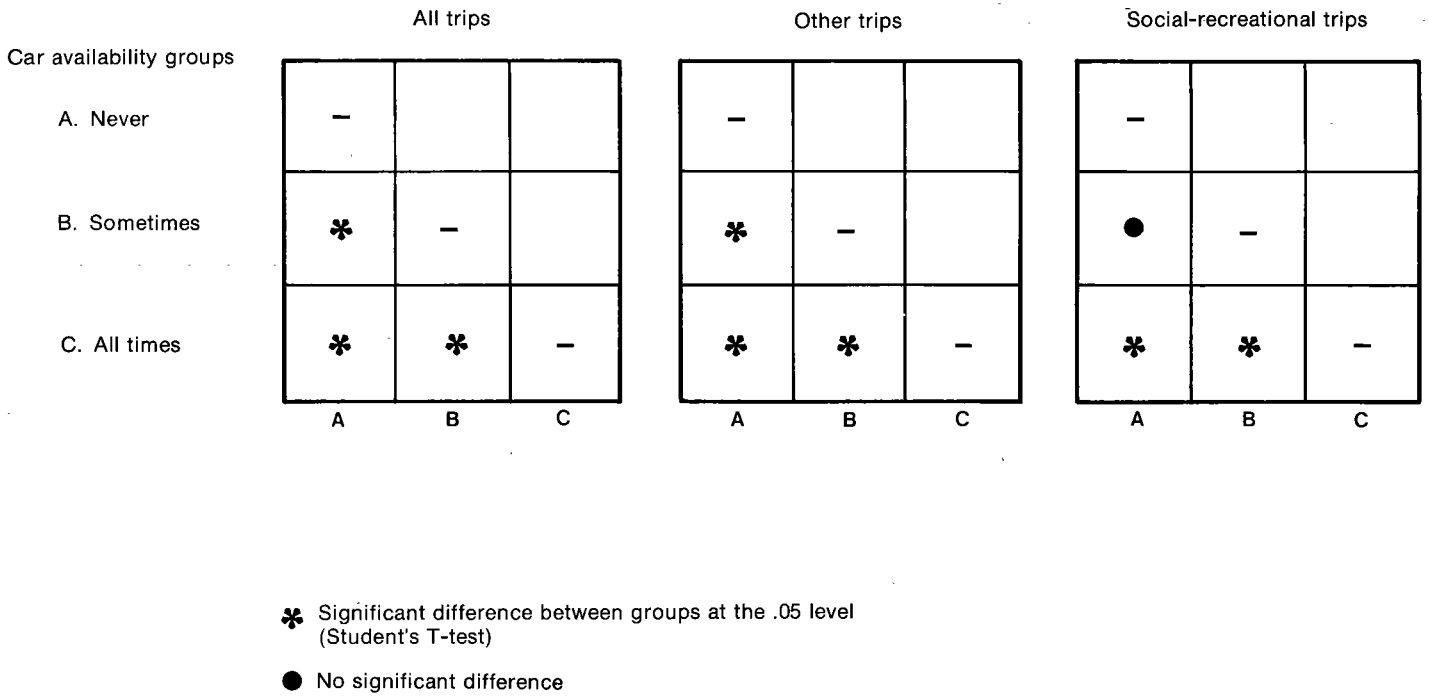


Figure 5.4 Statistical comparisons of trip-making among different car availability groups

- restricted transport users, people who can only use specialised transport services (with modified seating and access facilities) in a dependent capacity—notable examples in the Canberra setting include *Multi Cab* and CTHC bus users; and
- totally restricted travel, people who are unable to use transport under normal circumstances, apart from highly specialised services such as ambulances.

This classification goes a step further than that of Daunt (1980), referred to in Chapter 2, because it takes into account the capability of using private as well as public transport.

The distribution of survey respondents among the five transport disability categories is indicated in Table 5.5. There are two qualifications to this table. First, individuals were classified according to the upper limit of their capability. Generally, this means that someone who, for instance, is classed as a dependent transport user, is also able to use specialised transport services but cannot use private or public transport independently. However, while this rule is generally applicable there are exceptions. For example, a person who can drive a car—but only after extensive modifications to the vehicle—will often be unable to use public transport independently.

The second qualification relates to the specific characteristics of cases classified as 'dependent transport users'. All respondents belonging to this group actually travelled exclusively in private cars as passengers; no one requiring assistance to use conventional public transport actually did so. In other words, those who would require assistance to use public transport avoid this option.

TABLE 5.5—THE INCIDENCE OF DIFFERENT TRANSPORT DISABILITY LEVELS IN THE SAMPLE

Transport disability group	*Cases in the sample*	
	(number)	*(per cent)*
Independent private transport users	12	20.0
Independent public transport users	14	23.3
Dependent transport users	26	43.3
Restricted to specialised transport	6	10.0
Totally restricted	2	3.3
TOTAL	60	100.0

Table 5.6 compares trip rates for different transport disability groups. The two 'totally restricted' transport users have been combined with the 'restricted' transport users for the purpose of this analysis. The outcome of a statistical analysis of differences in the trip rates between groups is recorded in Figure 5.5. Two distinctive patterns are evident.

- For all trips and for trips other than those undertaken for social and recreational purposes, a distinction appears between independent and other transport users. At least half of the two independent groups appear in the highest travel frequency categories, whereas there is a greater tendency for the dependent and restricted groups to have lower travel rates. However, statistically, only the restricted group has trip rates in the 'all' and 'others' trip purpose categories which differ from those of the independent groups at a significant level (see Figure 5.5).
- When social and recreational trips are considered the main distinction is between independent private transport users and the rest. Independent public transport users, like the dependent and restricted groups, are concentrated in the lower trip frequency categories. As expected, differences between these three groups in their rates of social and recreational trip making are not statistically significant.

Summary

So far we have discovered that the level of trip making in general, and for social-recreational trips in particular, appears to be influenced by car availability and by the

TABLE 5.6—TRIP MAKING PATTERNS AND TRANSPORT DISABILITY

Transport disability	*Number in disability group*	*Number of people in trip rate categories (trips per week)*			*Mean trip rate*	*Standard deviation of trip rate*
		<1	*1-1.9*	*⩾2*		
		Social and recreational trips				
Independent private transport users	12	3	3	6	1.54	1.14
Independent public transport users	14	8	5	1	0.68	0.92
Dependent transport users	26	10	9	7	1.14	1.47
Partially or totally restricted	8	7	1	—	0.13	0.35
Total	60	28	18	14	0.98	1.24
		Other trips				
Independent private transport users	12	1	2	9	3.65	2.48
Independent public transport users	14	2	2	10	3.73	2.89
Dependent transport users	26	8	5	13	2.33	2.33
Partially or totally restricted[a]	8	6	—	2	0.53	0.99
Total	60	17	9	34	2.68	2.55
		All trips				
		<2	*2-3.9*	*⩾4*		
Independent private transport users	12	—	3	9	5.19	2.22
Independent public transport users	14	3	4	7	4.41	2.80
Dependent transport users	26	11	6	9	3.47	3.28
Partially or totally restricted[a]	8	6	2	—	0.66	1.26
Total	60	20	15	25	3.66	3.04

a. Combining those previously classified as 'restricted to specialised transport' and 'totally restricted'.

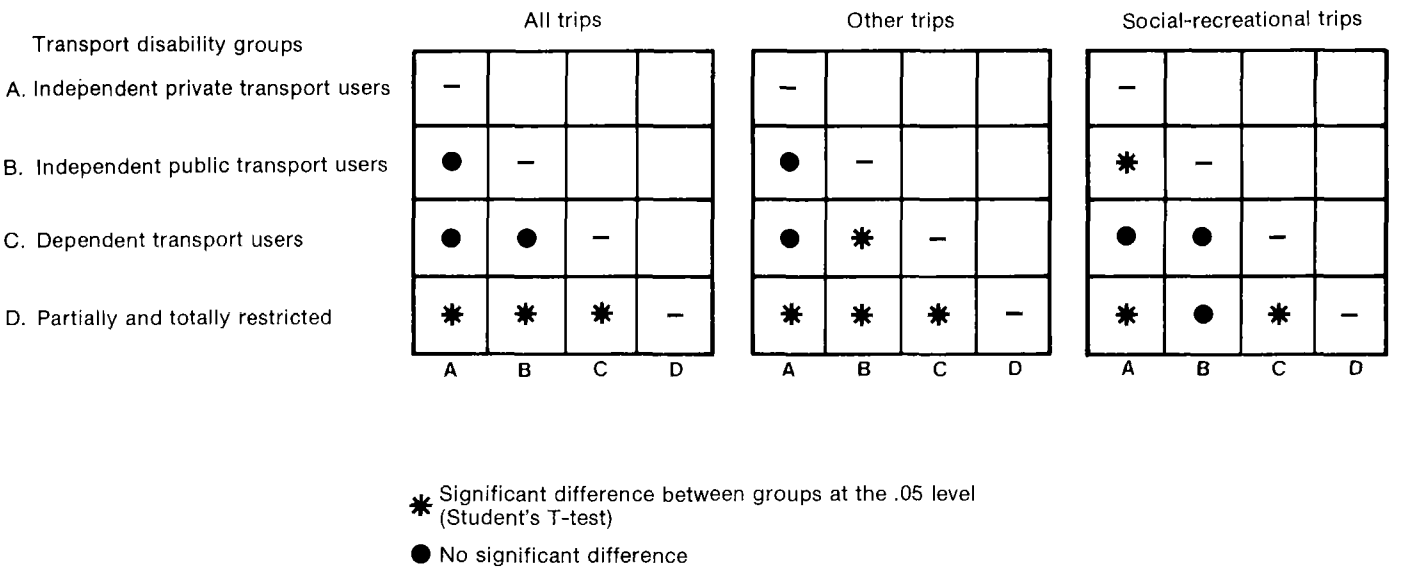


Figure 5.5 Statistical comparisons of trip-making among different transport disability groups

range of transport modes individuals are capable of using. More specifically, travel seems to be especially limited among those disabled persons:

- for whom access to a car is either restricted to a few days a week or is non-existent; and
- who cannot use private transport independently.

If car availability and transport disability have these impacts on trip making separately, then in combination they should act in a manner consistent with the expectation represented in Part A of Figure 5.6. That is, independent private transport users who have access to a car at all times should register the highest trip making rate. Independent public and dependent transport users with unlimited access to a car should be the next highest in the order of trip makers, followed by those with access to a car sometimes and then the remainder. The mean trip rates for each car availability-transport disability group in Part B of Figure 5.6 reveals that this is a reasonable approximation of the actual pattern.

TRAVEL CONSTRAINTS AND PREFERENCES

The previous section looked at the relationship between the travel behaviour of individuals included in the sample and certain broadly defined constraints on this behaviour. This section draws upon responses to the game to gain a more detailed insight into levels of satisfaction with existing travel arrangements, constraints experienced and changes in travel behaviour which might occur if some of these contraints were removed. A typology of respondents based on current levels of travel activity and responses to the game is adopted as a framework for examining these issues.

Responses to the game section of the interview enabled the four categories of travel behaviour represented in Figure 5.7 to be identified. The number of cases in each category is indicated in brackets. At one level, distinctions are drawn between respondents according to whether or not they are satisfied with their present travel arrangements; while at another level, the amount of travel behaviour and the nature of constraints inhibiting travel are the criteria for grouping cases.

Satisfied respondents

Those in the 'satisfied' groups responded to the 'mobility allowance' and free travel phases of the game with, at the most, a marginal increase in their level of travel activity, expressing their satisfaction with current travel arrangements. As 34 of the 60 cases in the sample responded in this way, it seems that a majority cope reasonably well within the existing transport system. This is not to say that restraints were not apparent but rather that, where these occurred, the respondent had adjusted to the situation or may have compensated in other areas to reduce the motivation or need to travel. Indeed, actual levels of travel activity varied widely within this group, suggesting a distinction between:

- satisfied travellers, who travelled regularly and frequently as part of their weekly routine; and
- satisfied non-travellers, who travelled infrequently or not at all (but apparently did not mind).

For the purposes of this distinction, 'non-travellers' were defined as those travelling on average twice a week or less, while 'travellers' regularly make more than two trips per week. This level was chosen because it coincided with a 'trough' between groups of individuals appearing on a bi-modal frequency distribution of trip rates.

The distribution of satisfied travellers and non-travellers on the car availability-transport disability matrix is represented in Figure 5.8. As expected, travellers are concentrated in the top left hand corner of the matrix, signifying high levels of car availability and independence. Conversely, non-travellers tend to be distributed more towards the lower right hand corner where lower levels of car availabilty and user independence are found. These differences are quantified in Table 5.7 where the

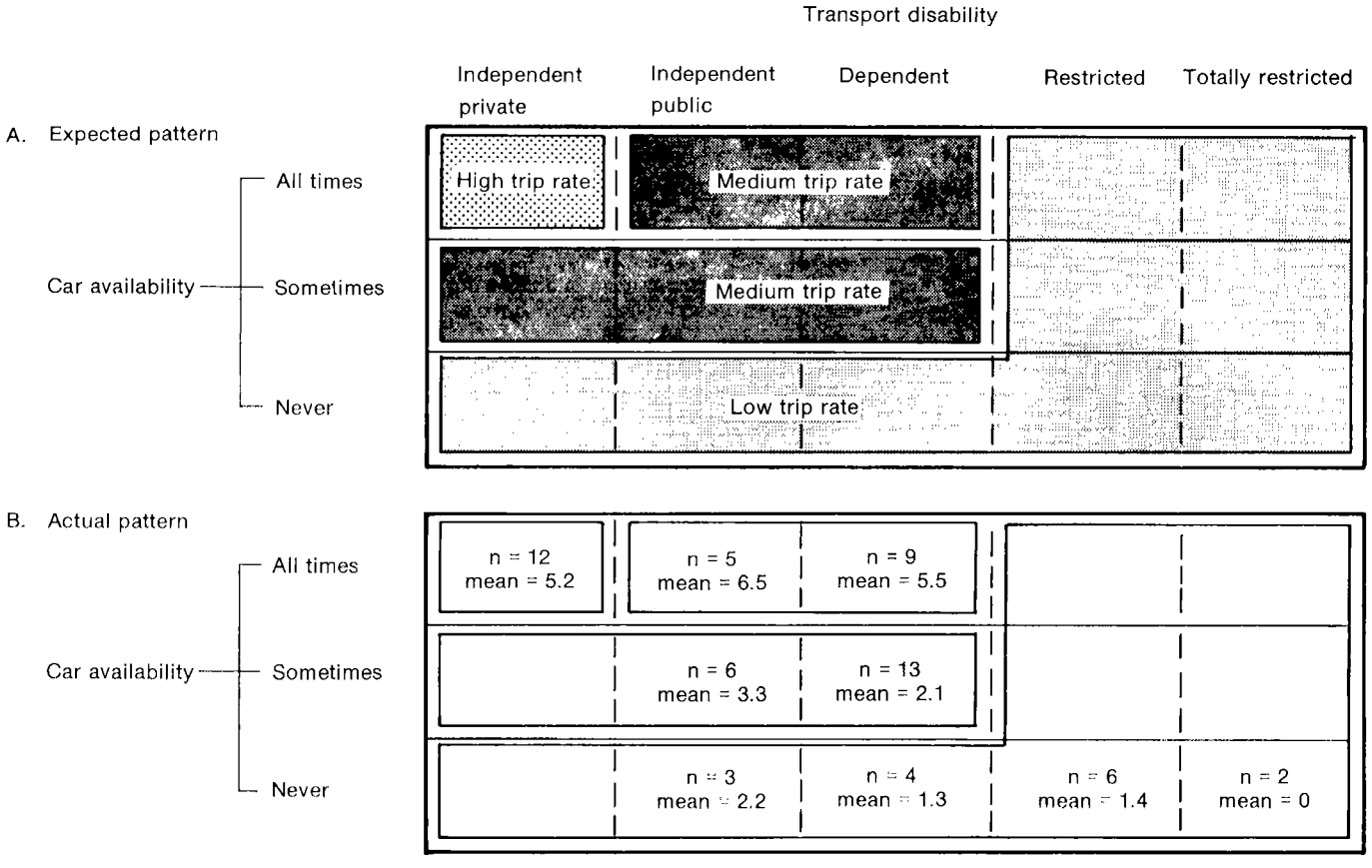
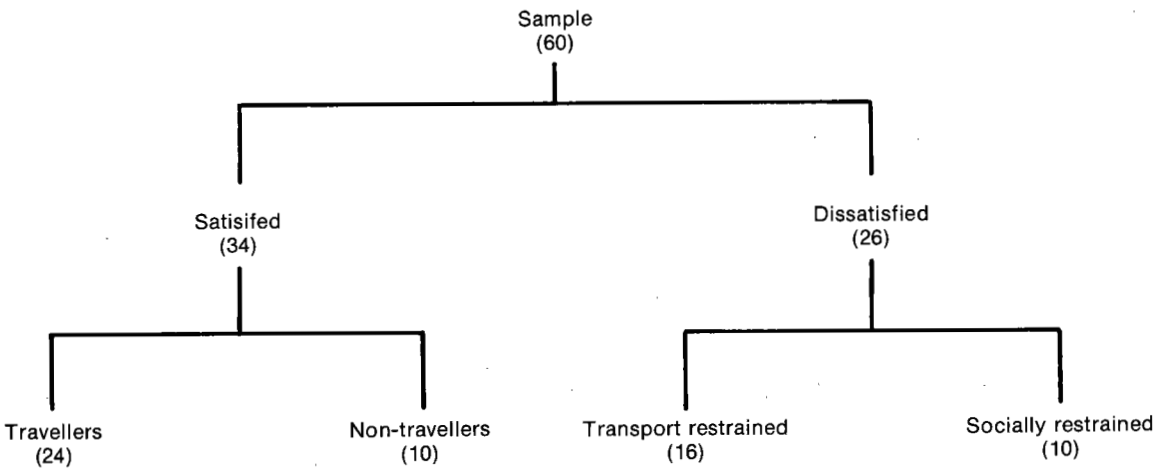


Figure 5.6 Expected and actual trip rates for different car availability/ transport disability groups



NOTE: (n) = number of cases from the sample in each group

Figure 5.7 Classification of respondents

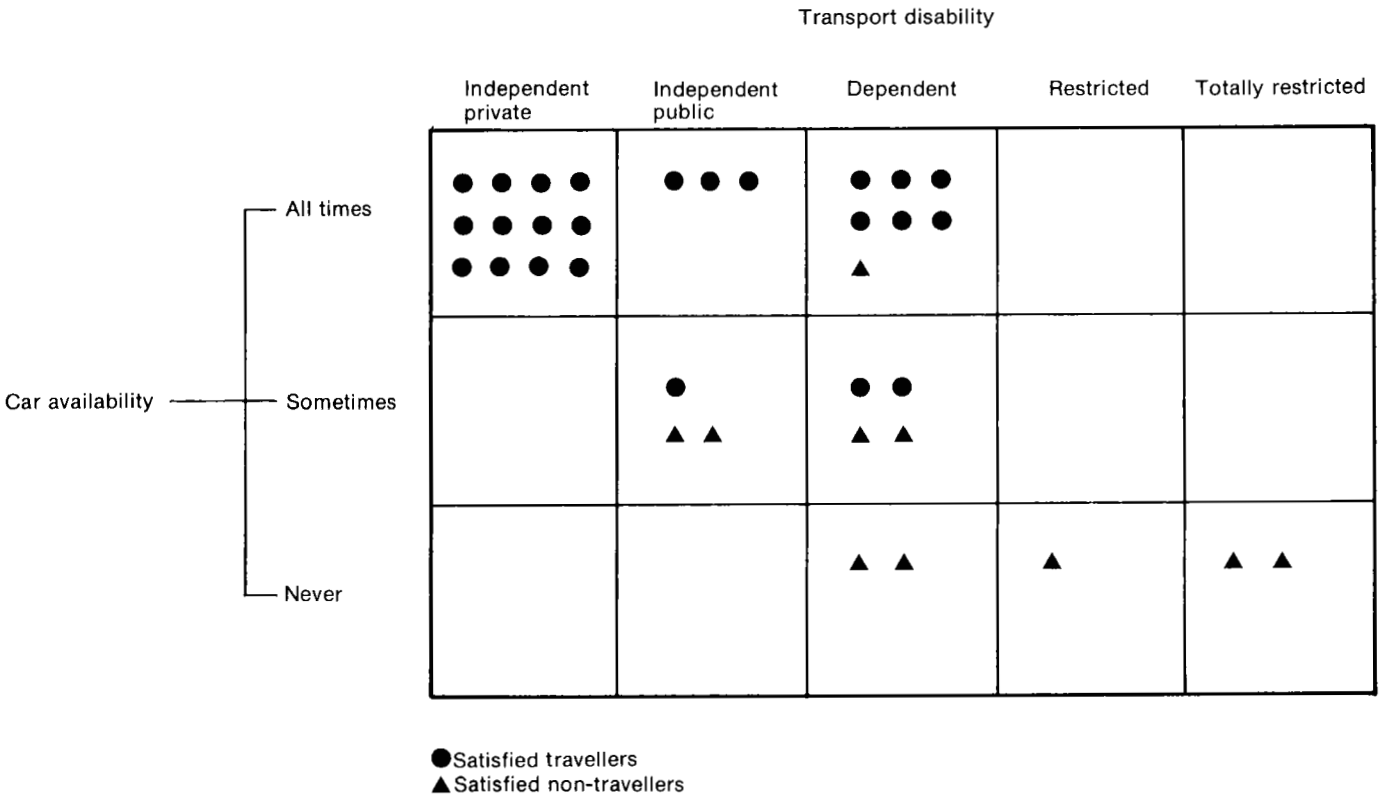


Figure 5.8 The distribution of satisfied respondents on the car availability/transport disability matrix

percentages of each group at different car availability-transport disability levels are compared. While 90 per cent of non-travellers are in the lower car availability category, 88 per cent of travellers are in the higher category. Similarly, 80 per cent of the non-travellers are in the dependent or restricted transport disability category, compared with only 33 per cent of travellers.

TABLE 5.7—TRANSPORT DISABILITY AND CAR AVAILABILITY CHARACTERISTICS OF SATISFIED RESPONDENTS

Characteristics	*Per cent of cases*	
	Travellers (n = 24)	*Non-travellers (n = 10)*
Car availability		
At all times	88	10
Never or sometimes	12	90
	100	100
Transport disability		
Independent	67	20
Dependent and restricted	33	80
	100	100

Dissatisfied respondents

Those respondents who were dissatisfied with their present travel arrangements registered their sense of travel deficiency by enthusiastically engaging in the travel game or otherwise indicating that they would undertake many extra trips if circumstances permitted. Members of this group might therefore be referred to as 'latent travellers'. Within this group, a distinction can be drawn between:

- transport restrained latent travellers, whose travel is restricted by conditions directly associated with their use of transport facilities; and
- socially restrained latent travellers, whose travel is restricted not so much because of transport factors, but because of other mainly psycho-social factors which affect their propensity to travel.

The distinction between these two groups was manifest in responses to the travel game in that, whereas most of the problems experienced by the former could be resolved to some degree within the game framework, those of the latter could not. Transport restrained latent travellers made full use of the travel allowance and free travel opportunities in the game when these were introduced. Socially restrained latent travellers could not so readily find solutions to their problems in the course of the game because their ability to travel was reduced mainly by social and psychological adjustment problems which could not be remedied by simply manipulating the transport system. However, there were some cases defined as socially restrained (notably those confined to or requiring a wheelchair) who indicated that modifications to the transport system would be a necessary (but not a sufficient) condition for improving their mobility.

Table 5.8 lists the barriers to travel cited by transport and socially restrained latent travellers respectively. For the purposes of comparing these two groups, the barriers are categorised as financial, physical and psycho-social. The number of cases in respect of which each barrier is relevant is recorded in the incidence column. Summations in this column may exceed the number of cases in groups because individual cases are often multiply affected.

One point of clarification needs to be made before this table is examined in more detail. The 'barriers' referred to by the two sub-groups sometimes appear to be similar, but are subtly different in terms of their effect. For instance, while both groups indicate that they would like to have someone accompany them on trips, they do so for different

TABLE 5.8—BARRIERS TO TRAVEL CITED BY LATENT TRAVELLERS

Category of barrier	*Transport restrained latent travellers*		*Socially restrained latent travellers*	
	Description of barrier	*Incidence (No of cases)*	*Description of barrier*	*Incidence (No of cases)*
Financial	—Taxi/Medi Cab fares too high for frequent use	16		
	—petrol costs too high for longer trips	3		
	—bus fares too high for frequent use	2		
		21		
Physical	—assistance required embarking and disembarking from public transport	5	—ramp for wheelchair from house required and difficulties encountered with access to places at destination	6
	—bus stops too far from home and/or destinations	4	—wheelchair, or an electric rather than a manual wheelchair, required	5
	—unable to cope with sudden movements (stopping, acceleration, turning) of buses	2	—modifications to household car required for wheelchair access	2
	—insufficient time allowed for changing buses at interchanges	1		13
	—services inadequate outside peak periods	1		
		13		
Psycho-social	—ignorance of relevant specialised services	3	—lack of companionship for travel	5
	—nervousness, lack of confidence and/or inability to communicate	2	—reluctance to encounter unfamiliar people in public places	5
	—negative reactions of drivers and other passengers	1	—lack of knowledge of Canberra and sparsity of social links in the area	3
		6	—unable to cope with group situations owing to communicative/sensory impairment	2
			—fear of: being a nuisance	1
			cars	1
			dogs	1
				18

reasons. On one hand, those who are transport restrained require company in travel mainly because they need *physical* assistance when getting into and out of transport facilities. The problems these people experience could therefore be partially offset by opting for *Medi Cab* or taxi services in the travel game. On the other hand, the reasons socially restrained latent travellers required company were not so much because they required physical support but because they needed *moral* support. They depend upon the company of someone with whom they have emotional affinity in order to overcome feelings of loneliness, insecurity, confusion or fear which they may otherwise have when travelling alone. While a few cases (three) which were classified as transport restrained believed that these feelings could be moderated by opting for taxi services, most of the socially restrained group did not.

Three major observations can be based on Table 5.8:

- all cases in the transport restrained group refer to financial circumstances as a major inhibitor of travel, while this factor is not so explicitly referred to by those in the socially restrained group;
- physical barriers are equally relevant to both groups, although those referred to by the socially restrained latent travellers specifically involved wheelchair-related problems which could not be resolved within the context of the game (implicitly, these problems might be regarded as financial to the extent that they could be solved by financial assistance); and
- as a product of the way the two groups have been defined, psycho-social problems stand out as the most important category of barriers affecting socially restrained latent travellers, whereas this category is least important within the other group.

The game technique was particularly valuable in distinguishing between those whose travel is restricted primarily by financial circumstances and those who are inhibited mainly by psycho-social problems (recalling, however, that both conditions are here associated with disablement). In the process, the relative importance of these two types of barriers has been revealed.

The transport and socially restrained groups are compared on the car availability-transport disability matrix in Figure 5.9. Each group has a similar distribution in the matrix, with both exhibiting a slight bias towards the lower car availability and more dependent transport disability categories. Indeed, in terms of the criteria represented in the matrix, these two groups bear a close resemblance to the satisfied non-travellers referred to earlier in the chapter. This impression is confirmed in Table 5.9 where groups are compared in terms of the proportion of cases in different car availability and transport disability categories. The information contained in this table is represented graphically in Figure 5.10 where, as expected, satisfied travellers stand out from the others by having substantially higher proportions capable of travelling independently and with a car available at all times.

TABLE 5.9—TRANSPORT DISABILITY AND CAR AVAILABILITY CHARACTERISTICS AMONG CASES IN DIFFERENT TRAVEL CATEGORIES

Characteristic	*Per cent of cases*			
	Satisfied respondents		*Dissatisfied respondents*	
	Travellers	*Non-travellers*	*Transport restrained*	*Socially restrained*
Car availability				
At all times	88	10	19	10
Never or sometimes	12	90	81	90
TOTAL	100	100	100	100
Transport disability				
Independent	67	20	38	20
Dependent or restricted	33	80	62	80
TOTAL	100	100	100	100
(Number of cases	*24*	*10*	*16*	*10)*

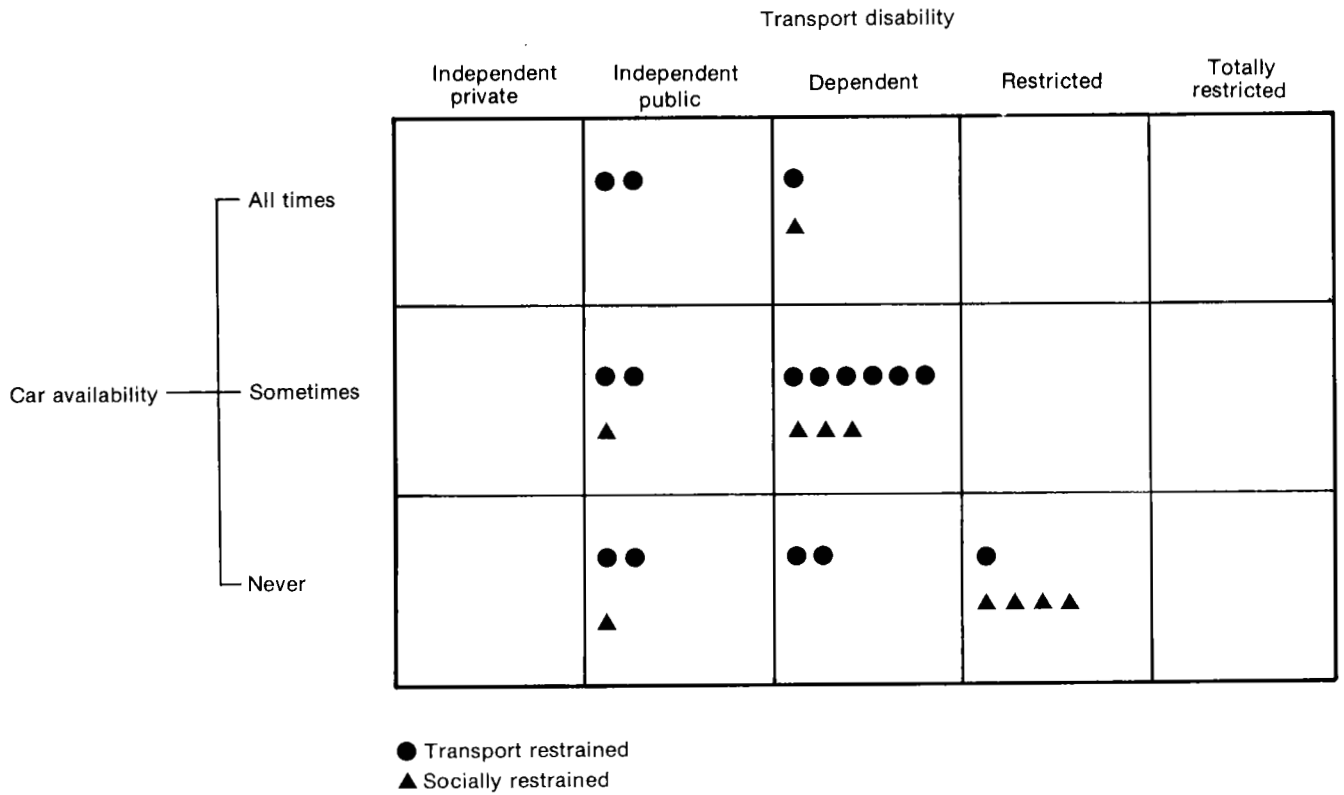


Figure 5.9 The distribution of latent travellers on the car availability/ transport disability matrix

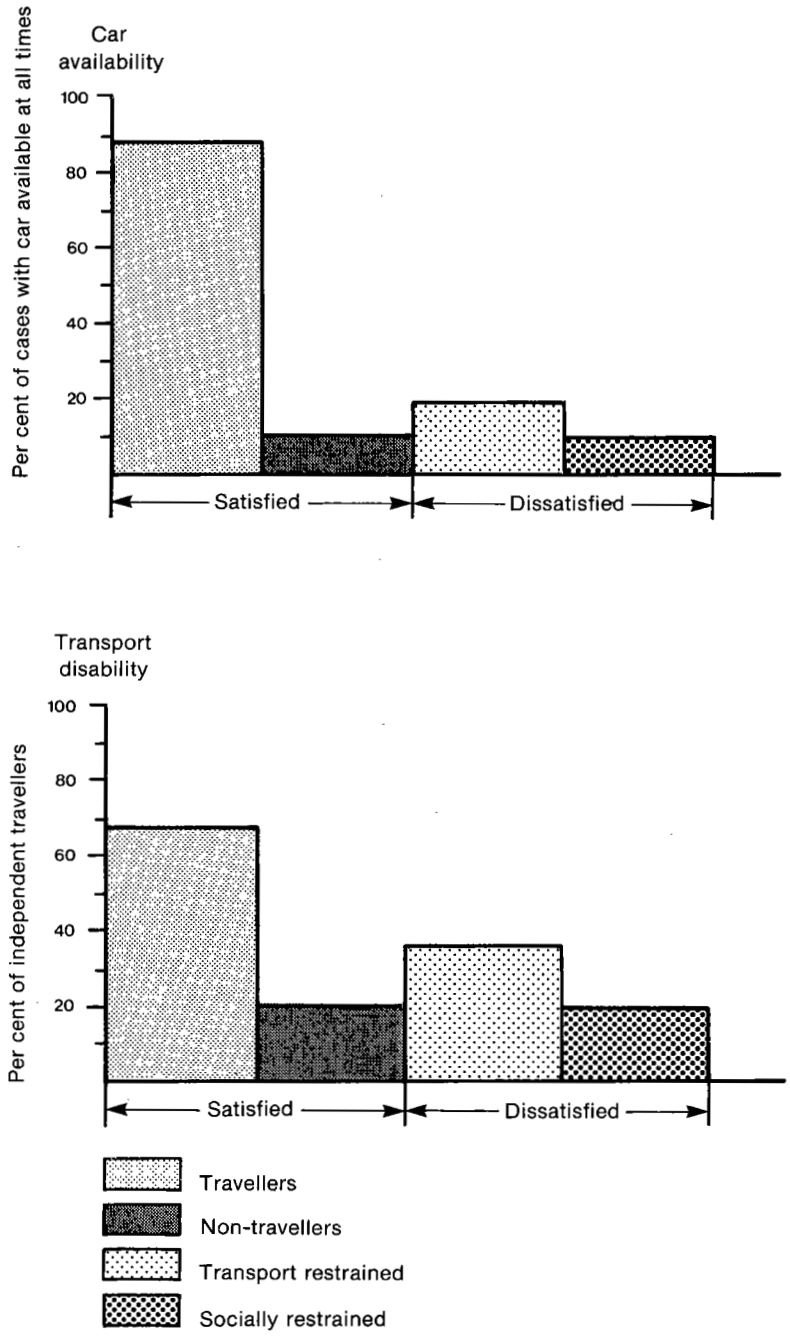


Figure 5.10 Car availability and transport disability characteristics of different travel groups.

Responses to the third (game) stage of the interview in particular provided insights into the *nature* of trips that would be undertaken if certain barriers (especially financial constraints) were removed. Figure 5.11 summarises the aggregate responses of each of the four travel groups identified above by indicating the average number of trips per month and the proportion of trips undertaken for specific purposes. For each group, three separate histograms representing three stages of the game are included: one representing trips actually undertaken; the second representing potential responses to a contraction of funds; and the third representing responses to the relaxation of constraints permitted by a mobility allowance.

As may be expected, given the criteria adopted to distinguish groups, the satisfied groups show little change either in the number of trips or trip purpose profile at successive stages of the game. Of the remaining two groups, the transport restrained group exhibits the biggest increase in trip making at the final stage of the game and, notably, social and recreational trips were the main trip categories where increases occurred. This pattern is consistent with earlier observations concerning the link between car availability and the ability to undertake social and recreational trips. While the socially restrained group could only manage a marginal increase in their trip making within the constraints of the game, they also concentrated on increasing social and recreational trips more than any other trip purpose.

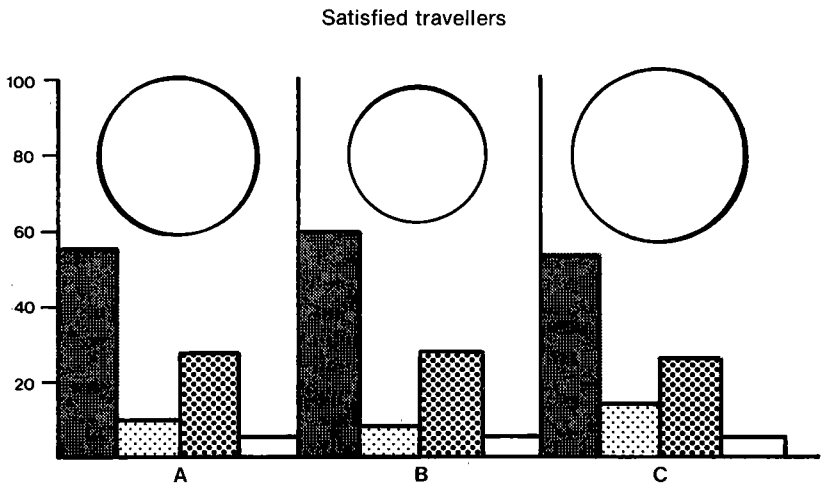
CONCLUSION

The analysis of responses to the travel game drew attention to variations in trip making among survey respondents, levels of satisfaction with travel arrangements, and the nature of constraints affecting such arrangements. These three aspects of travel were used to develop a typology which defined four different situational groups—ie transport restrained latent travellers, socially restrained latent travellers, satisfied travellers and non-travellers. Another perspective on this typology is provided in Figure 5.12, where satisfied travellers are distinguished from the rest. Satisfied travellers, comprising 24 cases (40 per cent of the sample), have ready access to a private car or are able to use some transport mode independently. Being relatively unrestricted in their use of transport, this group travelled frequently and were satisfied with their present travel arrangements. The remainder of the sample, consisting of 36 cases (or 60 per cent of the sample) generally tended to have limited access to a car and were unable to use any form of transport independently. Lower trip rates were consequently recorded by this group, but the precise reasons for this varied.

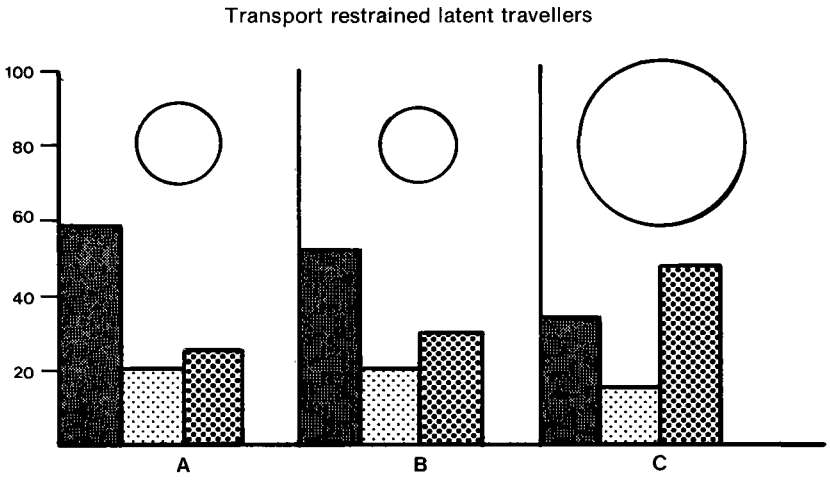
Among those in the latter group who indicated that they were dissatisfied with their limited travel, a distinction was drawn between transport restrained and socially restrained groups according to the relative importance, respectively, of extrinsic and intrinsic restrictions on travel. In general, the term 'extrinsic barriers' may be used to refer to inhibiting environmental conditions, while 'intrinsic barriers' refers to dysfunctional tendencies inherent in the individuals' responses to their disabilities. In the context of the present study, therefore, extrinsic barriers incorporate specific conditions of the transport system which inhibit use and include such factors as high fare levels and physical obstacles to access. Intrinsic barriers refer to deficiencies in the psychological and social adaptation of individuals to their disability. These deficiencies in turn impede the use of transport.

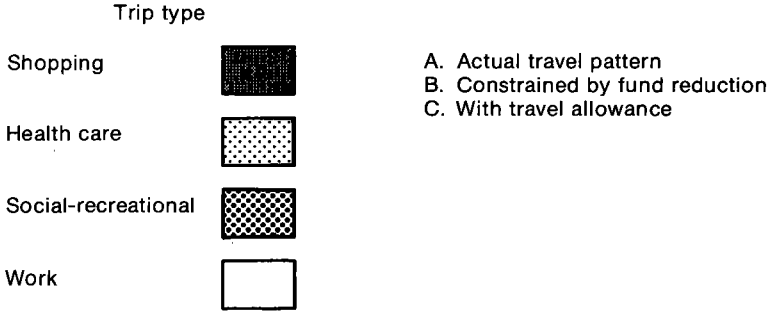
The effect of these two types of barriers on travel behaviour may be more complex than the above definitions imply. For instance, reduced trip rates may occur in cases where people are affected by intrinsic constraints not simply because mobility is restricted. Feelings of self-consciousness, inadequacy or inferiority may also discourage such people from travelling and, in some cases, produce an ambivalence towards engaging in social interaction. Conversely, those who have adapted to their disability sufficiently to allow independent use of transport tend to have this reflected in higher trip rates not simply because of enhanced mobility but also because they are more inclined to interact with the community outside the home. Any distinction between intrinsic and

1.

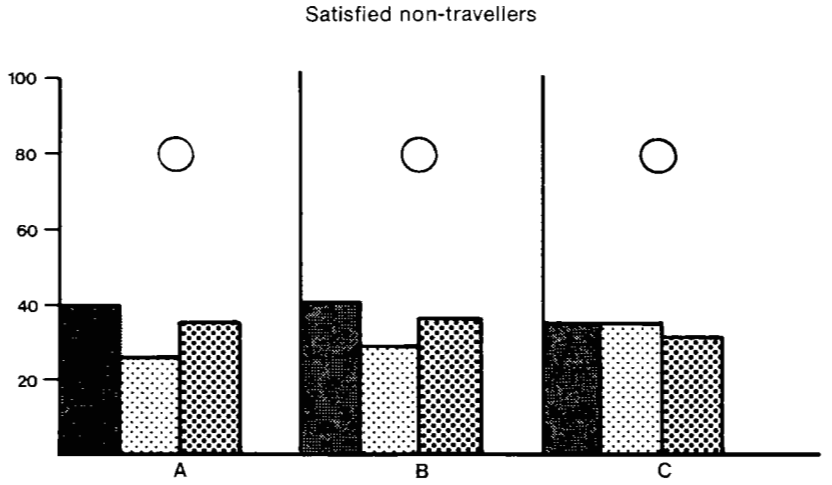

Satisfied travellers
100
80
60
40
20
A
B
C

2.


Transport restrained latent travellers
100
80
60
40
20
A
B
C


Trip type
Shopping
Health care
Social-recreational
Work
A. Actual travel pattern
B. Constrained by fund reduction
C. With travel allowance

3.



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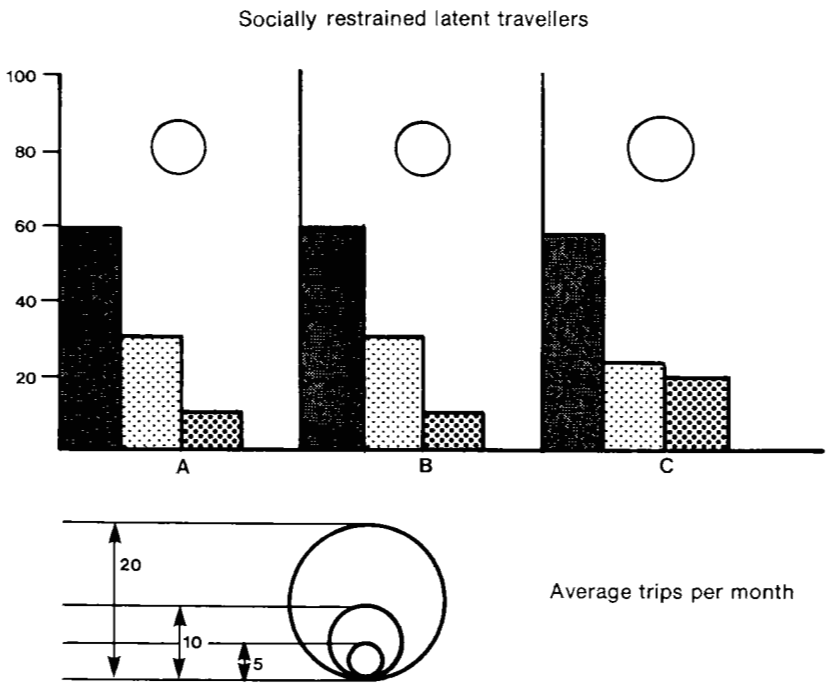
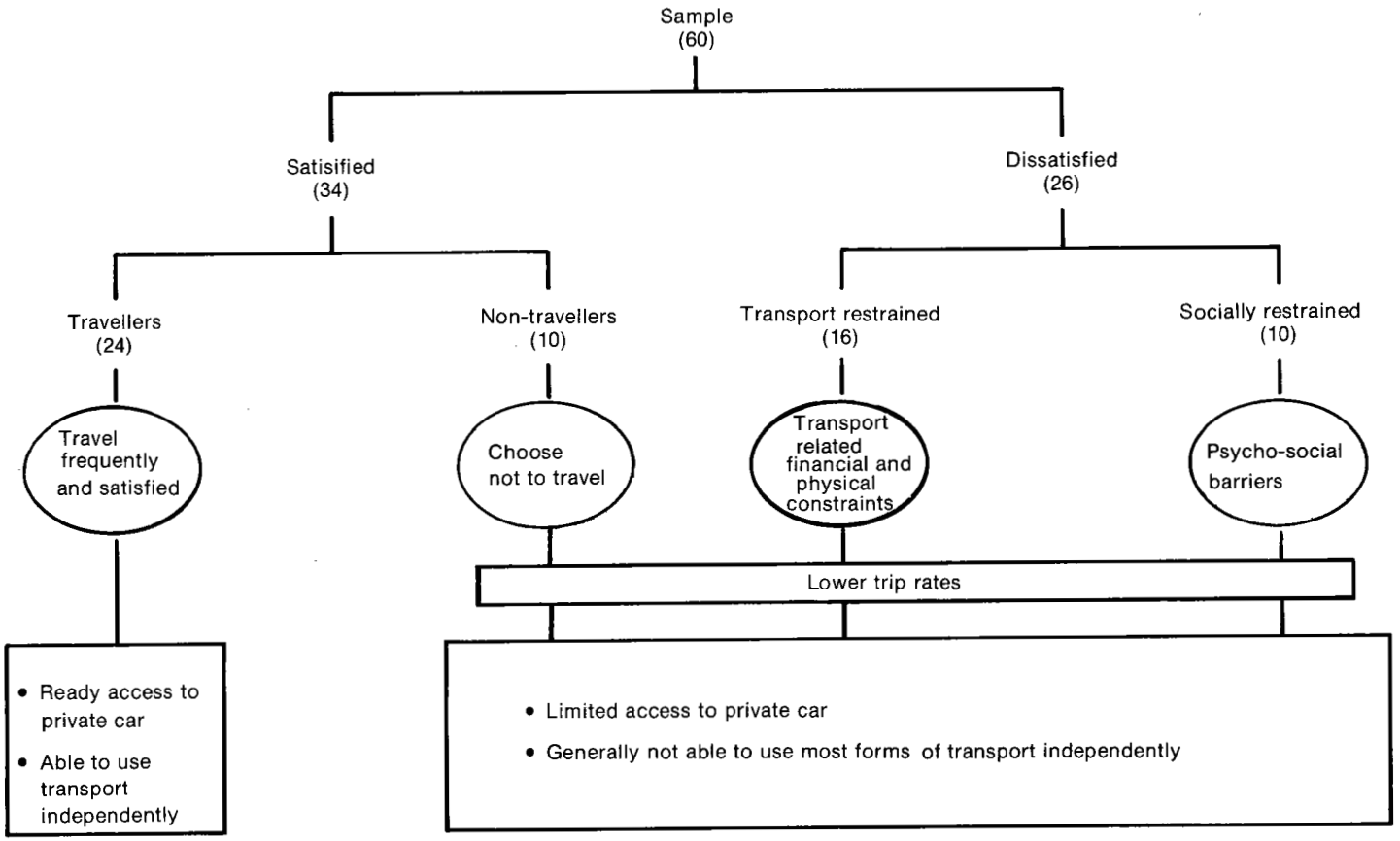


Figure 5.11 Summary of responses to successive stages of the game



NOTE: (n) = number of cases from the sample in each group

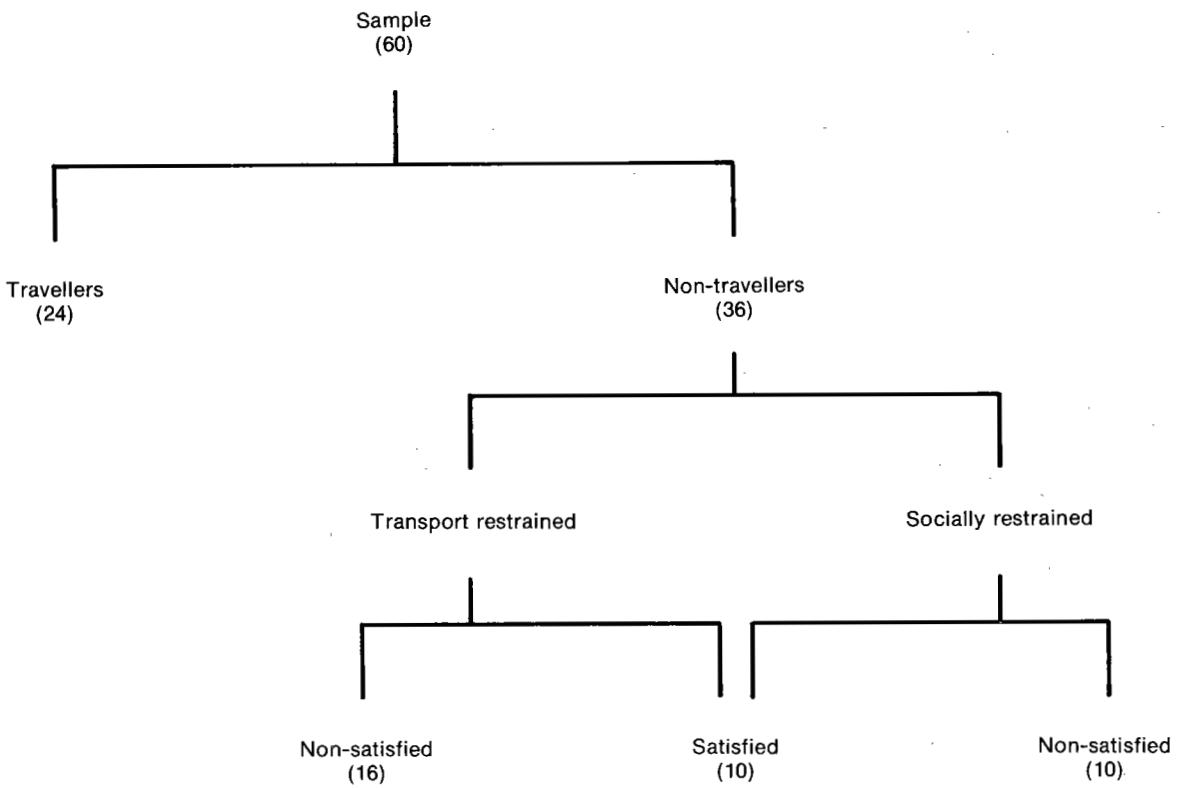
Figure 5.12 A typology emphasising the distinctiveness of satisfied travellers

extrinsic barriers is further clouded by the possibility that they may interact in the sense that an individual's psychological (ie intrinsic) disinclination to use public transport may arise from a combination of extrinsic and intrinsic conditions. For example, cases were encountered in the survey in which the negative reactions of drivers and fellow passengers to any slight inconvenience they may experience as a result of a disabled person's need of assistance discouraged the latter from using the services available.

While the notion of intrinsic and extrinsic barriers helps to unravel some of the subtleties in the distinction drawn between transport and socially restrained groups, there also might be an equally subtle distinction between these two groups and the so-called satisfied travellers. Indeed, it seems possible that some non-travellers claiming to be satisfied may be so mainly because their aspirations (and therefore, their motivation to travel) have been adjusted downward to what they see as being attainable in the context of the intrinsic and extrinsic constraints they experience. Such cases might be better referred to as 'discouraged' rather than truly satisfied. The possible affinity between satisfied non-travellers and the two dissatisfied groups is taken into account in the alternative typology presented in Figure 5.13. Thus, the main distinction is drawn between travellers and non-travellers, while satisfied non-travellers are shown as being potentially affected by intrinsic and extrinsic barriers in a similar way to the socially restrained and transport restrained groups respectively.

The suggestion that some satisfied non-travellers may in fact be discouraged does not exclude the possibility of others being genuinely satisfied with low trip rates for other reasons. In particular, there may be people who are satisfied not so much because of lowered aspirations, but because they have been able to adapt by substituting some of those activities which would otherwise require travel by home-based activities. However, because the methodology of this study did not encompass total activity systems (including in-home activities) no assessment could be made of this latter form of adjustment.

Notwithstanding this limitation, the distinction between intrinsic and extrinsic barriers to travel may help to define specific target groups in terms of the type of assistance they would require to overcome their mobility handicap. Thus 16 of the 26 cases who were dissatisfied with their present travel arrangements were affected by extrinsic barriers, and could therefore be assisted by modifications to the transport system. Furthermore, it appears to be the cost of using existing services (rather than the lack of suitable services) which is the main barrier confronting this group. Since at least 10 of the remaining cases are restricted mainly by intrinsic barriers, they need more fundamental social support mechanisms, perhaps in addition to adjustments in the transport system.



NOTE: (n) = number of cases from the sample in each group.

Figure 5.13 An alternative typology emphasising the possible affinity between satisfied non-travellers and dissatisfied groups

CHAPTER 6—CONCLUSIONS

This study was concerned with the relationship between disability and the social environment, and the effect of this on access to community facilities and opportunities for social interaction. In particular, it considered the extent to which the nature and availability of transport in Canberra mitigates or exacerbates accessibility problems experienced by disabled people. The study has involved three basic steps: an estimation of the demographic and socio-economic characteristics of Canberra's disabled population; an assessment of the transport services available to this population; and, finally, an examination of the travel behaviour, problems and aspirations of a sample of disabled people. While Canberra is by no means typical of urban centres in Australia, some findings of this study may be relevant, if not directly applicable, beyond their immediate context.

The quality and extent of available information did not allow precise statements to be made on the characteristics of the disabled population in Canberra. However it is clear that disabled people on average are older, have lower incomes, and are increasing in number faster than the population as a whole. A more accurate picture of Canberra's disabled population is likely to emerge from an ABS survey of handicapped people which, at the time of writing, was soon to be published.

The introduction of *Medi Cabs* and, in particular, *Multi Cab* in Canberra has provided transport to disabled people who previously had no access to a suitable service. Although these specialised services may not have greatly increased the mobility of the disabled population as a whole, the *Medi Cabs* have provided more comfortable travel for disabled passengers, and the *Multi Cab* has contributed to increasing the mobility of a relatively small sub-group of the disabled population—wheelchair users. Given the high cost of the vehicles providing these services, and the greater number of 'dead' (unpaid) miles they travel, it is unlikely that the *Medi Cab* service or the *Multi Cab* could match the profitability of ordinary taxis while normal taxi fares are charged. It seems probable that the local taxi co-operative will continue to tolerate the *Medi Cab* service's limited profitability, but it is doubtful whether the *Multi Cab* service could continue to operate without some measure of direct subsidy. Responses to interview questions suggested that more use would be made of the *Multi Cab* by disabled people if it were to be further publicised and if they could more easily afford the fare. However, since transporting disabled people involves a greater number of 'dead' miles than other taxi business, even with increased patronage of the *Multi Cab* by wheelchair users the operation would be unlikely to approach financial viability.

The survey of travel behaviour revealed the following points.

- Disabled people in Canberra make considerably fewer trips than the population in general, who are estimated to make more than twice as many trips as the respondents to the survey.
- Nearly half of the sample (43 per cent) indicated that they required assistance to use any form of transport and, as a consequence, they all avoided using public transport.
- Modes of transport other than the private car were more heavily relied upon for less discretionary trips such as those to shops, health care and study.
- While just over half (53 per cent) of all trips involved private cars, cars were more frequently used for social and recreational trips (71 and 83 per cent respectively). Reliance on the private car for social and recreational trips probably reflects the tendency for these trips to be less feasible by alternative modes. The lower level of trip making for social and recreational purposes observed among those with limited

access to a car not only supported this interpretation but also highlighted the possible existence of unsatisfied travel wishes. (The population of Canberra as a whole make even more frequent use of cars for discretionary trips than do the disabled. A 1975 travel survey in Canberra found that 96.2 per cent of trips other than those to places of work and education were made by car (NCDC 1977b).)

Responses to the game section of interviews drew attention to variations in levels of satisfaction with present travel arrangements, constraints affecting these arrangements, and travel preferences. The following groups were identified:

- 24 cases (40 per cent of the sample) who had ready access to a private car or who were able to use public transport without difficulty—and who were satisfied with the relatively high level of travel activity they undertook;
- 10 cases (17 per cent) who were satisfied with limited travel;
- 16 cases (26 per cent) who wanted to travel more, especially for social and recreational purposes, but could not, mainly because of financial and physical constraints; and
- 10 cases (17 per cent) who were also dissatisfied with their current travel arrangements, but were restrained mainly by psycho-social barriers which could not be remedied by adjustments simulated in the game process.

Given the small sample size and the sampling methodology, conclusions drawn from the survey and applied to the disabled population as a whole should be treated with caution. However, if the sample were taken to be representative of the 13 800 handicapped people estimated to be resident in the ACT (ABS 1981a), the approximate size of each of these groups in the ACT is likely to be:

- 5520 unrestricted in their travel arrangements (3810-7231 at the 95 per cent confidence level);
- 2300 satisfied with limited travel (999-3602);
- 3680 restrained by financial and physical limitations (2136-5225); and
- 2300 restrained by psycho-social difficulties (999-3602).

This typology is based on the nature and extent of the transport difficulties of the disabled which are of use in assessing the effectiveness of possible attempts to enhance their mobility. In many cases, however, the difficulties faced by disabled people are compound in nature and likely to defy a single, simple solution. Four points illustrate this complexity and summarise the findings of this study.

- Since the introduction of the *Medi Cab* and the *Multi Cab* services, the transport difficulties of the disabled in Canberra have been associated less with the absence of a suitable transport mode than with inability, for various reasons, to use those services that are available.
- For some of the disabled, mobility is impeded by physical obstacles unrelated to the use of transport; in particular, problems of access to buildings and amenities at destinations, and even to homes, serve as deterrents to the mobility of disabled people.
- In many cases travel is limited by the difficulty many disabled people receiving low incomes (often as a consequence of their disability) have in affording the high cost of those transport modes which they are able to use.
- The least tractable problems faced by many of the disabled are of a social and psychological nature; lack of companionship, motivation and self-confidence inhibit the inclination to travel.

While provision of fully accessible transport is a necessary condition for maximising the travel opportunities of the disabled, it is by no means sufficient. Of the BTE's sample of disabled people in Canberra, about 43 per cent could benefit from enhanced mobility. Transport solutions alone could help about 62 per cent of these (about 26 per cent of the total) but the remaining 38 per cent (17 per cent of the total) would require additional assistance. Without attention to the mitigation of other restrictions on disabled people's travel behaviour, attempts to enhance mobility by the provision of specialised transport services are likely to be limited in effectiveness.

APPENDIX I—MAXI TAXI OPERATING DETAILS

TABLE I.1—MAXI TAXI TRIPS JULY-SEPTEMBER 1980

Trip category	*July*		*August*		*September*	
	Number	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*
Wheelchair[a]	34	21	22	35	90	67
Luggage	—	—	1	1	2	2
Parcels	5	3	6	9	8	6
Tours	—	—	1	1	—	—
Four passengers or fewer	36	22	1	1	3	2
More than four passengers	8	5	3	5	1	1
School run	80	49	26	42	30	22
Other	—	—	4	6	—	—
Total	163	100	64	100	134	100

a. Includes other disabled

TABLE I.2—MAXI TAXI REVENUE JULY-SEPTEMBER 1980

Trip category	*July*		*August*		*September*	
	$	*Per cent*	*$*	*Per cent*	*$*	*Per cent*
Wheelchair[a]	138	8	97	17	401	38
Luggage	—	—	3	—	9	1
Parcels	186	11	42	8	43	4
Tours	—	—	36	6	—	—
Four passengers or fewer	233	14	3	—	107	10
More than four passengers	110	7	8	3	5	1
School run	960	60	336	61	480	46
Other	—	—	32	6	—	—
Total[b]	1 628	100	560	100	1 046	100

a. Includes other disabled.
b. Totals differ from column sums due to rounding.
Source: Maxi Taxi Daily Running Sheets provided by the Department of the Capital Territory.

APPENDIX II—ESTIMATION OF THE BREAK-EVEN POINT OF THE MULTI CAB OPERATION

The information on which these estimates are based has been supplied by Aerial Taxis and derived from the *Multi Cab's* daily running sheets provided by the Department of the Capital Territory. The following costs have been taken into account:

Fixed costs
- Wages (including sick pay and holiday pay)
- Loan repayments
- Base fees
- Insurance
- Registration
- Audit fee

Fixed costs have been reduced to take into account the estimated residual value of the vehicle when the loan by means of which it was purchased has been fully repaid. The estimated residual market value has been apportioned over the three years of loan repayment and discounted to present value.

Variable costs
- Commission (paid to the *Multi Cab* driver for trips made outside normal working hours)
- Fuel
- Repairs and maintenance
- Sundries
- Tyres
- Repairs to meter
- Cleaning

The estimates are based on the following assumptions.

- The number of trips made in January and February 1982 is equal to the monthly average from March to December 1981.
- Revenue per trip is constant, except for a fare increase from mid-November 1981. Estimated revenue for trips in January and February 1982 is based on new fare levels.
- Variable costs per trip incurred from March to November 1981 apply from December 1981 to February 1982, except that the increase in commission at the time of the fare increase has been taken into account.
- The number of trips made by the driver working on a commission basis is a fixed proportion of the total number of trips.
- The number of trips of each type (wheelchair, luggage, etc) is a constant proportion of the total number of trips.
- Revenue loss and increased costs caused by the *Multi Cab* collision in August 1981 have been excluded from the analysis.

Figure II.1 shows the estimated number of trips that the *Multi Cab* must make at various given fare levels in order to break even. Table II.1 compares the *Multi Cab's* estimated current annual revenue and costs with likely revenue and costs were the *Multi Cab* to break even as a result either of increased patronage or of higher fares.

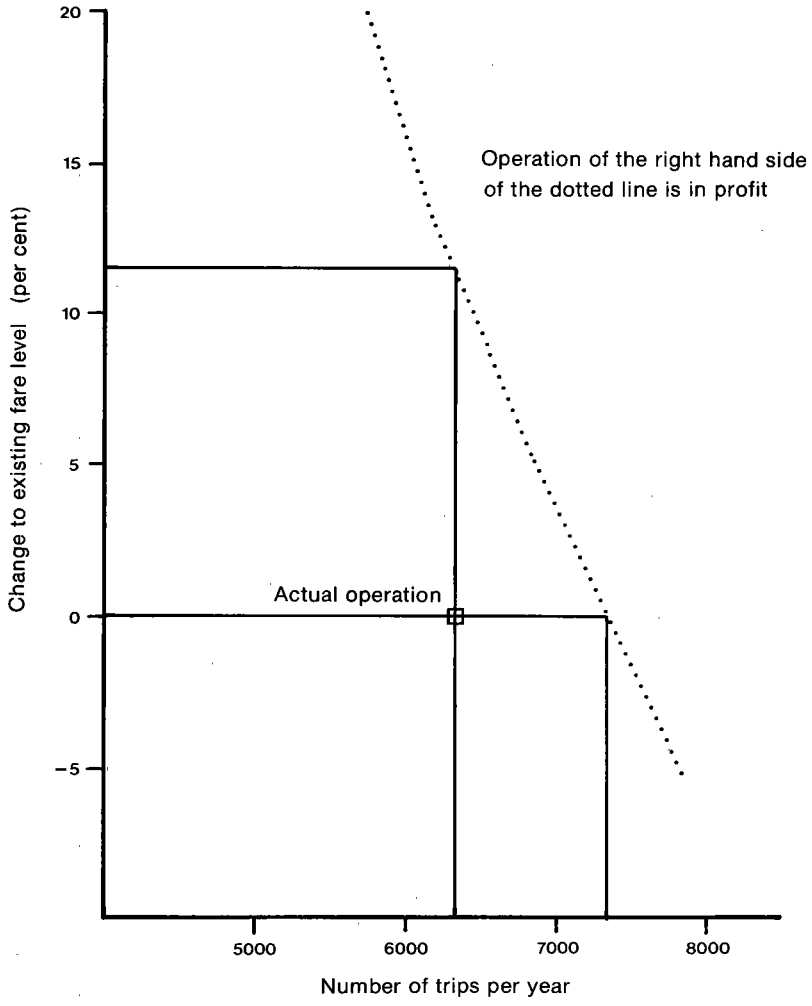


Figure II.1 Break even line for Multi Cab operation

TABLE II.1—ESTIMATED MULTI CAB ANNUAL COSTS AND REVENUE

		Break even requirements	
	Actual operation	*Increased patronage*	*Higher fares*
Trips made	6 307	7 304	6 307
Percentage increase in fares (in real terms)	—	—	11.4[a]
Fixed costs ($)			
Loan repayments	5 640	5 640	5 640
Labour	13 157	13 157	13 157
Base fees	1 908	1 908	1 908
Registration and insurance	673	673	673
Other	80	80	80
Total	21 458	21 458	21 458
Less component for residual value of vehicle	961	961	961
TOTAL FIXED COSTS	20 497	20 497	20 497
Variable costs ($)			
Commission	7 734	8 597	8 616
Fuel	3 501	4 054	3 501
Repairs and maintenance	1 656	1 918	1 656
Other	1 709	1 979	1 709
TOTAL VARIABLE COSTS	14 600	16 908	15 482
REVENUE ($)	32 300	37 407	35 982
TOTAL COSTS ($)	35 097	37 405	35 979
PROFIT (LOSS) ($)	(2 797)	2	3

a. Assumes demand is wholly inelastic to fares. To the extent that this is untrue then the fare rise required would be considerably more.

APPENDIX III—MULTI CAB OPERATING DETAILS

TABLE III.1—MULTI CAB TRIPS MARCH-DECEMBER 1981

Trip category	March		April		May		June		July		August		September		October		November		December	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Wheelchair[a]	123	39	68	21	72	12	74	13	73	11	55	10	138	28	100	17	140	26	115	18
Luggage	9	3	7	2	11	2	3	1	6	1	2	—	7	1	6	1	6	1	13	2
Parcels	5	2	7	2	20	3	14	2	30	4	11	2	35	7	40	7	39	7	18	3
Other[b]	181	57	238	74	495	83	477	84	567	84	478	88	317	64	430	75	350	65	476	77
TOTAL[c]	318	100	320	100	598	100	568	100	676	100	546	100	497	100	576	100	535	100	622	100

TABLE III.2—MULTI CAB REVENUE MARCH-DECEMBER 1981

Trip category	March		April		May		June		July		August		September		October		November		December	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Wheelchair[a]	889	50	599	37	376	15	640	23	639	20	450	18	1 068	39	735	24	1 035	34	740	23
Luggage	54	3	49	3	82	3	27	1	29	1	12	1	36	1	49	2	50	2	122	4
Parcels	30	2	28	2	118	5	113	4	128	4	63	3	298	11	427	14	412	14	116	4
Other[b]	819	46	960	59	2 019	78	1 989	72	2 440	75	1 966	79	1 323	49	1 871	61	1 509	50	2 175	69
TOTAL[c]	1 794	100	1 637	100	2 597	100	2 770	100	3 237	100	2 493	100	2 726	100	3 083	100	3 007	100	3 154	100

a. Includes other disabled.
b. Mainly conventional taxi hirings.
c. Totals differ from column sums due to rounding.

Source: *Multi Cab* Daily Running Sheets provided by Department of the Capital Territory.

APPENDIX IV—THE TRAVEL SIMULATION GAME

Games have been used as a framework for interviews in a variety of research fields generally related to behaviour and preferences in residential settings. They have also been used to investigate travel preferences and related decision-making processes (Hoinville and Berthoud 1969, Jones 1979, Phifer et al 1980), and transport problems experienced in outer suburban communities in Australia (Faulkner 1981, Faulkner and Rimmer 1982).

In most cases, the game has a relatively simple structure. Respondents are invited to express their preferences by manipulating a model representation of particular aspects of their residential environment. No unpredictable contingencies such as the effects of actions taken by other participants are included, nor is there scope for the inclusion of rewards since there is no way of ranking responses in order to apportion pay-offs. In short, games have generally been used mainly to simplify questions and to simulate aspects of the environment which require a trade-off between certain options, rather than to simulate the type of conflict in which game theorists are interested.

ADVANTAGES OF THE GAME-SIMULATION APPROACH

The game-simulation technique developed for the survey of disabled persons in Canberra is limited in the sense that it yields mainly qualitative information for a relatively small number of people. This type of information is not particularly amenable to quantitative analysis. However, this approach has several features which counteract certain limitations and disadvantages of conventional survey techniques and make it especially suitable for exploratory investigations. In summary, these features include flexibility, communicative advantages and an ability to simulate aspects of the real decision-making environment.

Flexibility

One of the main limitations of the conventional survey approach is that the interviewer's schedule of questions tends to become a restrictive recipe for interviews. Consequently, information which does not conform to prior expectations concerning what constitutes the relevant dimensions of the problem, is often 'screened out'. The technique used in the Canberra study overcame this problem to the extent that it is a compromise between the structured survey that yields mainly quantitative information and open-ended discussion which enables unexpected variations in responses to be explored in depth. This feature of the technique makes it especially applicable to the exploratory phases of research.

Communicative advantages

Perhaps the main advantage of the game technique is that it facilitates communication—not only between respondent and interviewer, but also among members of the household concerned (Brög and Erl 1980). This feature of the game is significant in the context of the Canberra study partly because disabled people are often dependent upon assistance from others and their transport problems frequently have an impact upon the mobility of other members of the household.

The physical model used in the game provides a tangible prop for discussion. Questions and answers can be clarified, by referring to the model; participants are able to visualise their travel patterns and remind themselves of omissions as they

cumulatively reconstruct their record of travel behaviour. Alternative transport systems being presented for consideration can be readily described. Furthermore, the novelty of the game and the model representation of the respondents' behaviour and environment sustains their interest, and avoids the tedious repetition that occurs when conventional survey techniques are used to obtain data on travel.

Simulation of aspects of the decision environment

The final advantage of the game is concerned with the way it simulates certain aspects of the environment. By imposing a budgetary constraint on the individual's choice, the game simulates the restrictions of choice in the real world. Thus, respondents are forced to assess their priorities and trade-off one alternative against another.

In his analysis of the advantages of the game technique, Jones (1980) emphasises how surveys frequently fail to predict responses to proposed changes. People respond differently to how they say they will before the event. This lack of correspondence between expressed intentions and eventual behaviour arises because people seldom fully understand the consequences of their choice. Preferences expressed in the survey interview are therefore suspect whenever respondents have no previous experience of a particular action and the adjustments which may be required to use them. In the Canberra study, the game technique aims to overcome this problem at least partially by presenting transport options in a manner which enables participants to explore some of the practical implications of enacting their preferences.

THE CANBERRA STUDY

The game-interview technique developed in the Canberra study involved three components.

Preliminary questions

Background information on the nature of the individual's disability and the effect it has on mobility was gathered by means of a conventional survey approach. Questions concerning family relationships, economic circumstances and residential history were considered later in the interview because they are often perceived by the respondent as being personal and not evidently relevant if dealt with at the outset.

Setting up the gaming board

Attention was then focused on a physical model (the gaming board) comprising a map of Canberra (Figure IV.1). A record of the respondent's existing travel pattern was compiled on this board by placing a flag at the destination of all trips undertaken on a monthly basis. As each destination was registered, information was sought on trip purpose, frequency, mode of travel, assistance required, difficulties encountered and other destinations incorporated in the same journey.

With the benefit of hindsight, the quality of the information collected could have been improved by having respondents compile an activity-travel diary over a period prior to the interview. This information could then have been used as a guide for setting up the gaming board.

Apart from the obvious purpose of enabling certain information about travel behaviour to be collected, the initial step provided an opportunity for participants to become familiar with the gaming board. It also provided a framework for them to consider their existing travel arrangements in a systematic fashion which reduced the possibility of omissions and encouraged respondents to consider difficulties experienced and possible alternative travel strategies.

Once all trip destinations had been plotted on the board, the scene was set for the game itself. Before progressing to the game stage, however, one more critical question was put to respondents. They were asked to indicate the destination of any trip they would like to include in their itinerary, but currently could not. If any such trips exist, the reasons why they presently cannot be undertaken were sought.

FIGURE IV.1 The gaming board used in the survey of disabled persons in Canberra

The game

The previous stage mainly served to draw attention to what respondents presently do. An opportunity was provided for the expression of preferences, but this was done without respondents being required to consider the consequences of enacting these preferences. Thus, the intention of the game itself was to create a situation which encouraged respondents to consider alternatives realistically in terms of their own economic and organisational constraints.

At the outset of the game alternative forms of transport were presented for respondents to consider. Their choice was constrained by the requirement that each trip be paid for by means of counters—the units of currency used in the game. The price structure of the transport options reflected their relative costs in the real world, with some concessions for the sake of simplicity (Table IV.1).

TABLE IV.1—COST STRUCTURE OF TRANSPORT ADOPTED IN THE GAME

Mode	*Units of currency (counters)*
ACTION bus	1 counter per section
Multi Cab	6 counters per 5 km
Taxi/Medi Cab	6 counters per 5 km
Car	40 counters (fixed cost) + 1 counter per 5 km

The scope of the respondent's transport choice was manipulated by altering the amount of 'currency' allocated. Initially, respondents' choices were restricted by being given fewer counters (30 per cent less) than they needed for them to adhere to their present travel pattern. This 'belt-tightening' procedure was designed to direct the participants into reassessing their travel priorities and considering alternative travel strategies. The options open to respondents were then expanded by the allocation of a 'mobility allowance' equivalent to an additional 30 counters (approximately $12 per week) above the current expenditure level.

In the final stage of the game the financial constraint was eliminated; all trips were free. This allowed the degree to which an individual's travel behaviour is restricted by economic factors to be indicated.

Table IV.2 summarises the stages of the game and interviews.

TABLE IV.2—STAGES OF THE TRAVEL GAME

Stages	*Description*
Preliminary	Background questions
1	Current travel behaviour
1A	Trips not currently taken, but considered desirable
2	Travel reduced by 30 per cent
3	Travel with 'mobility allowance'
4	Free travel

Two points concerning the rationale of the game warrant attention at this stage. First, although financial constraint is the explicit variable introduced to seek respondents' reactions, it is through observation of the process (as much as the product) of travel adjustments that insights into the real behavioural factors under study are gained. Thus, the financial constraint serves as much as a catalyst for discussion as it does as a proxy for policy changes.

Second, some consideration needs to be given to what is implied by the expression of travel preferences. As mentioned previously (Chapter 2), transport handicap is a relative concept in the sense that the degree to which someone is disadvantaged

depends upon comparison with 'normal' levels of travel behaviour. This suggests that a logical method for identifying mobility handicaps associated with disability would be to compare the travel patterns of disabled people with those of a control group comprising individuals with similar characteristics but who do not have disabilities (Brög et al 1981). However, since this approach requires a broader study of travel patterns among various socio-economic groups, it was not feasible in the present study. Instead, a simpler and perhaps less rigorous approach was adopted whereby the disparity between actual and preferred travel behaviour was taken as the disadvantage experienced in each case. This approach assumes that what a disabled person would 'like' to do in respect to travel approximates the norm for their able-bodied counterparts, and that disabled people are prevented from acting according to their preference primarily because of their disability.

There is a possibility that estimates of disadvantage based on this assumption will be exaggerated by unrealistic expression of preferences. However, there is some basis for believing that this danger was minimised by the way the interview technique was explicitly designed to encourage respondents to take relevant constraints into account when considering their preferences.

In summary, a game-simulation approach like that used in the Canberra study has considerable potential as a tool for examining the transport needs of disadvantaged groups in general as well as disabled people in particular. While the physical equipment that is used facilitates the description of travel arrangements, problems and alternatives, the game framework enables preferences to be expressed with due regard being given to constraints involved and the consequences of choosing particular options. In general, this technique has potential in research situations where a complex trade-off among conflicting options is necessary (and needs to be understood rather than merely measured) before preferences can be expressed, and/or where respondents need to be encouraged to consider the consequences of making certain choices.

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