THE EMERGING NEEDS OF THE MAJORITY- WOMEN, YOUNG AND OLD

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ABSTRACT

The marked social and demographic changes that have occurred in Australasian society over the past few decades have ushered in a new set of transport needs. Undoubtedly, the most salient feature has been the increased participation in the workforce by women, especially those with children. As women's role in society has changed so, too, have their travel patterns - and those of their children, who both influence and are influenced by their parents' travel. At the same time, longer life expectancies and smaller families have led to an aging of society. This paper examines the emerging transport needs of the majority of the population - women, young and old.

Utilising information from a variety of sources, travel patterns for these three groups are analysed to identify a snapshot view of travel behaviour in urban Australia. Based on these findings, it is possible to speculate on the extent of future changes in travel behaviour and to assess the social impact of alternative transport planning and pricing strategies.

The findings indicate two opposing trends in travel patterns. On the one hand, increased participation in the workforce by women, particularly those with children, has given rise to more complex travel patterns and increased dependence upon the car. Conversely, an aging society implies an expanded market for public transport, albeit not as large a market as might have been expected in years gone by, because of the increased licence holding of the elderly, particularly elderly women. In addition, a reduction in the proportion of young people in the Australian population implies a reduction in this traditional market of young travellers for public transport. Clearly policies which aim at reducing car travel and improving public transport must not only look at the needs of their traditional and potential markets but also at the demographic context in which transport decisions are made.

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Introduction

The marked social and demographic changes that have occurred in Australasian society over the past few decades have ushered in a new set of transport needs. Undoubtedly, the most salient feature has been the increased participation in the workforce by women, especially those with children. Although many women have embraced paid work, their daily activity schedules continue to be strongly influenced by the needs of their families. This is because of the gender role that women continue to perform in relation to raising children and keeping house. In some respects, the demands on women's time imposed by other family members have increased rather than decreased. For example, increasing concerns over safety and personal security in our society have lead to increasing restrictions upon the independent mobility of children and the elderly. This in turn has added to the responsibilities of women, as the principal carers in our society. Moreover, longer life expectancies and smaller families have led to an ageing of society, with the elderly now representing a numerically significant population group. The need for help increases with advancing age and much of this eldercare is provided by women. Significantly, the current generation of women of working age is sometimes referred to as the "sandwich generation" because they may have joint responsibilities to their children and their parents arising at the same time (Rosenbloom, 1994). This situation has occurred because many women have postponed childbearing in the pursuit of a career, whilst their older parents are living longer.

Taken together, these three groups - women, young and old - constitute a majority of the population. While each of these groups is in themselves quite diverse, one thing that their activity and travel patterns have in common is a high level of interdependence with other people, whether from the same or different households. This paper explores the emerging needs of the majority in contemporary urban Australia, and attempts to identify the key issues to be confronted in designing transport services and policies to meet these needs.

Utilising data from a variety of cross sectional surveys, the travel patterns of these three groups are analysed to provide a snapshot view for metropolitan Melbourne. Where possible comparisons are made with other Australian cities. Based on these findings, it is possible to speculate on the extent of future changes in travel patterns and to suggest appropriate planning and transport strategies to accommodate these trends. Whilst improvements to public transport would clearly benefit all three groups, some of the most tangible benefits may well be achieved through improvements in safety and accessibility at the local level, thereby providing for increasing levels of independent travel. More fundamentally, consideration needs to be given to the definition and measurement of "transport disadvantage", in ways which can provide a basis for policy development and measurement of performance.

Information for this paper is drawn from a variety of sources including the population censuses undertaken by the Australian Bureau of Statistics, and several special purpose travel and activity surveys. In particular, extensive use is made of the Victorian Activity and Travel Survey (VATS), which is currently being undertaken for metropolitan Melbourne VATS is an ongoing survey using a mail-out/mail-back self-completion

questionnaire technique which has been developed and used over many years in Australia and overseas by members of the Transport Research Centre (Richardson and Ampt, 1995). The survey records all travel by all modes by all people in the responding households in the survey sample. Each household is asked to provide this information for a specified travel day. The survey is continuous, covering all 365 days of the year, thereby enabling temporal variations in activity patterns to be observed. It is intended to continue the VATS survey for at least five years, generating an expected total response of about 30,000 households. The VATS survey began in December 1993 and collected information from about 5000 responding households in both the 1993-94 and 1994-95 financial years. The information being used in this paper is from the first year of the VATS survey covering the period December 1993 through June 1994. The paper also uses information collected as part of the 1992 Australian Living Standards Study, and the Federal Office of Road Safety 1985 Survey of Day-to-Day Travel in Australia.

The paper looks first at women's travel patterns, then at those of children and those of the elderly. As already outlined, women continue to have an important role in assisting the mobility of these other groups, although dependence is clearly more prevalent among children than for most elderly folk. When it occurs for elderly persons, however, the levels of dependence can be extreme.

Women's Travel Patterns

As women's roles in society have changed, so too have their travel patterns. Traditionally, women as a group have been considered to be transport disadvantaged, reflecting their lower levels of licence holding, reduced car availability and lower personal incomes. But there are already signs that this is changing, at least for some segments of women. While licence holding among older women is still low, the uptake of driver's licences among young women in contemporary urban Australia is almost as great as it is for young men (Figure 1).
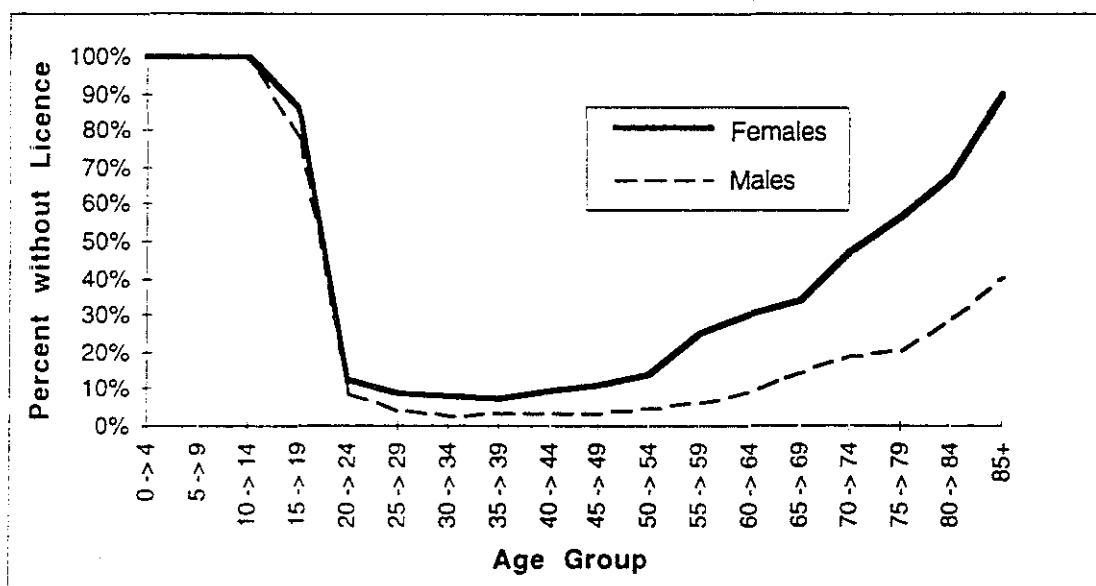

Figure 1   Licence Holding by Age and Gender
Source: VATS 1993-94

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The number of households in Melbourne owning two or more cars now outstrips the number of households with only one car, although significantly some 12% of Melbourne households have no car (Figure 2).
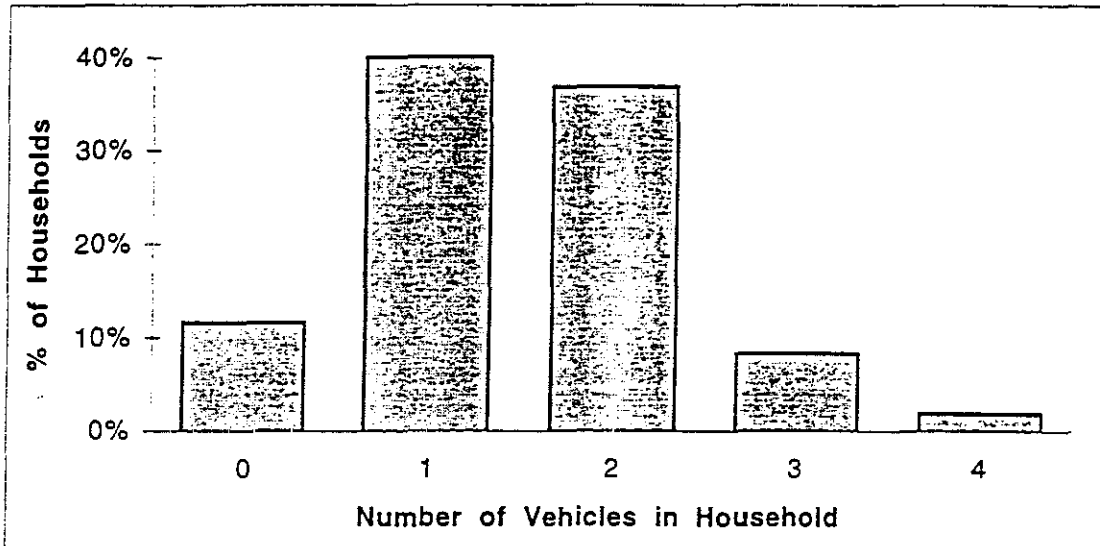

Figure 2   Distribution of Household Car Ownership
Source: VATS 1993-94

The number of vehicles per household shows a strong positive relationship with the number of workers per household (see Figure 3). Moreover, the marked growth of female participation in the workforce is reflected in significantly increased personal incomes for women (Richardson et al, 1996).
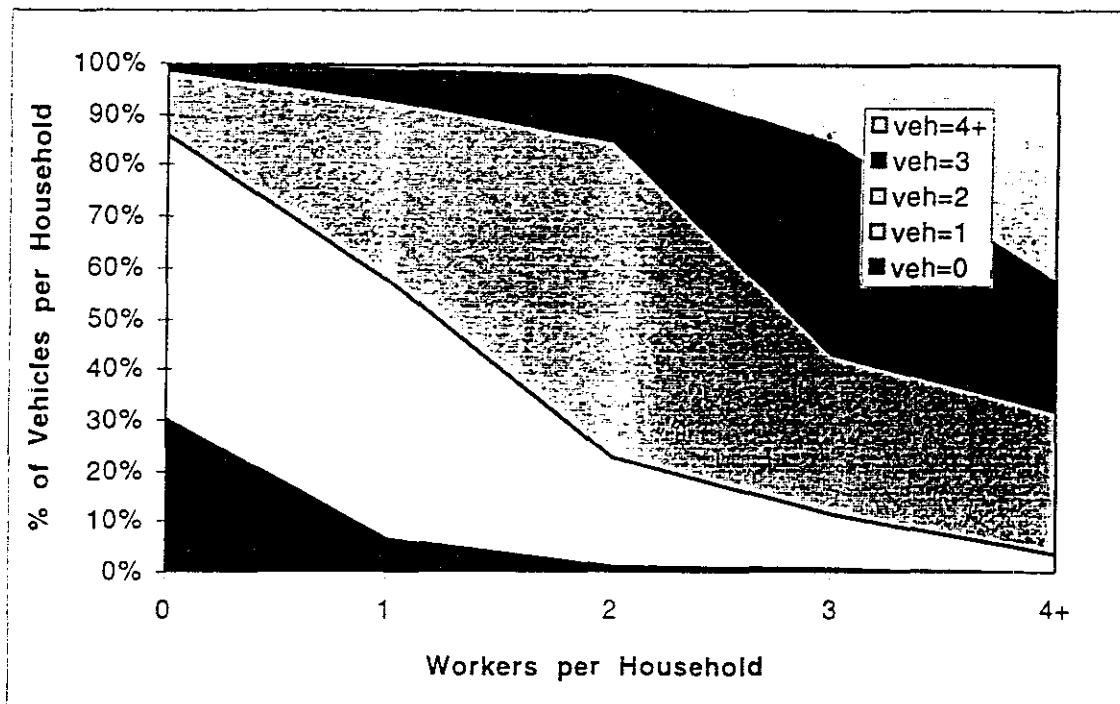

Figure 3   Car Ownership as a function of Workers per Household
Source: VATS 1993-94

It has been found in earlier work based on the Melbourne data (Morris and Richardson, 1995) that when variations in employment status are taken into account, there is presently very little difference between men and women in their overall levels of mobility. However, it was also shown that the overall pattern masks important differences between the genders, and a true picture of travel patterns can only be obtained by more detailed analysis.

There are still significant differences between men's and women's travel patterns when other factors such as the mode, purpose, timing, and complexity of travel are considered. For example, women of working age undertake a significantly greater proportion of their total travel as car passengers. This is so, even among younger women in the working age bracket (defined here as 20 to 65 years). This applies especially on weekends (Figure 4), but it is also apparent on weekdays (Figure 5).
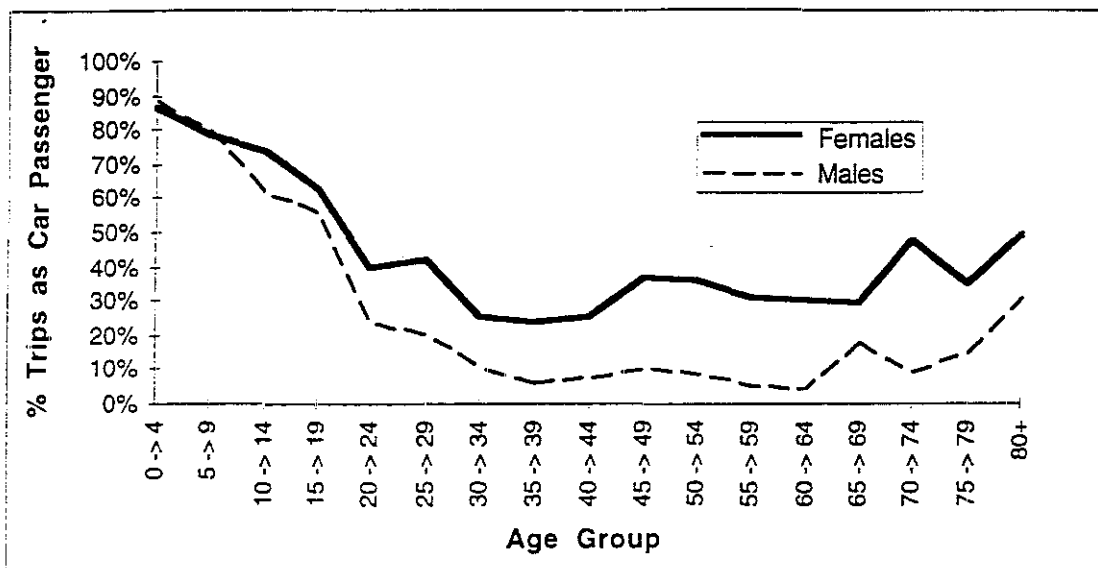

Figure 4   Car Passenger Trips by Age and Gender (weekends)
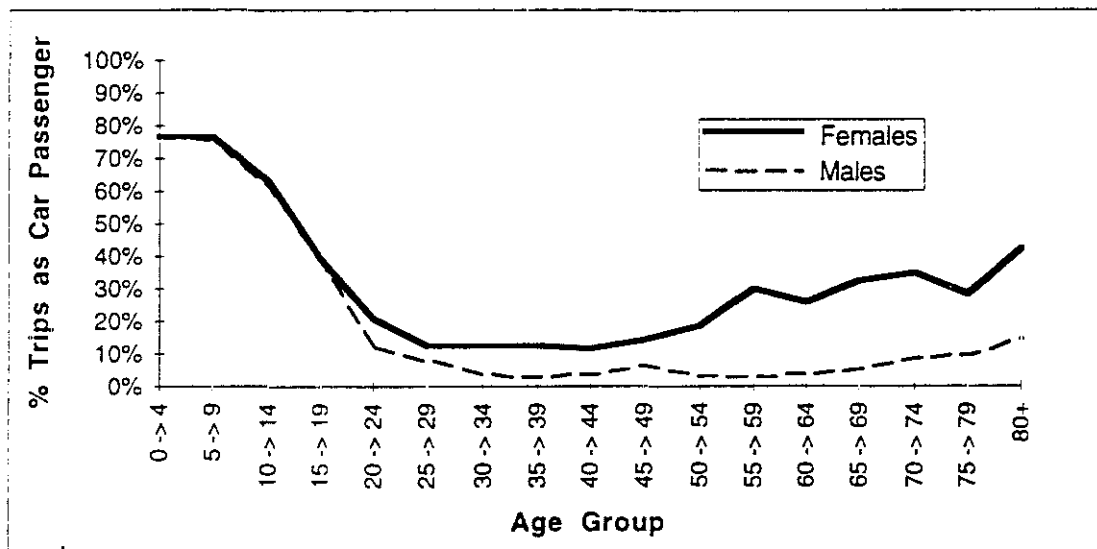Source: VATS 1993-94

Figure 5   Car Passenger Trips by Age and Gender (weekdays)
Source: VATS 1993-94

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Moreover, this trend is consistent regardless of employment status and, seemingly, also trip purpose. Information from the Australian Bureau of Statistics (1991) regarding work travel alone shows that women are over-represented as car passengers without exception across all regions of Melbourne (Table 1).

Table 1   Travel to Work Mode by Home Region and Sex

Home Region within Melbourne	Public Transport Male %	Public Transport Female %	Car Driver Male %	Car Driver Female %	Car Passenger Male %	Car Passenger Female %	Walked Male %	Walked Female %	Bicycle Male %	Bicycle Female %
Outer Western	11.5	19.9	70.2	55.5	7.0	14.5	2.5	3.1	1.3	0.3
North Western	13.3	21.3	67.8	53.2	6.6	14.0	2.9	4.2	1.6	0.6
Inner	24.2	29.0	51.3	42.8	4.1	8.1	10.3	12.1	3.3	1.7
North Eastern	13.1	18.6	69.8	58.7	6.0	12.6	2.5	3.1	1.3	0.4
Inner Eastern	14.5	18.3	71.8	66.0	4.7	10.9	1.9	3.1	1.0	0.3
Southern	15.2	15.9	68.8	59.0	4.7	10.8	2.8	4.2	2.0	0.6
Outer Eastern	12.1	13.7	72.5	67.4	6.0	10.3	2.0	2.5	0.9	0.2
South Eastern	7.9	11.3	74.2	64.4	7.2	14.8	2.1	2.9	1.0	0.2
Mornington Peninsula	7.8	8.9	72.9	68.5	7.2	11.7	3.5	3.7	1.4	0.5

Source: ABS 1991

The extent to which older women are passengers, rather than drivers, is presumably directly related to the lower levels of licence holding among older women. But the persistence of the trend among younger women of working age raises important questions about the allocation of transport resources within households. It also raises the important question of how we define "transport disadvantage". Is the pattern of car use a reflection of underlying male dominance, entrenched acceptance of gender roles, or simply differences between the sexes in personal preferences towards driving? Furthermore, do the levels and methods of transport used represent valid indicators of "transport disadvantage", or are other measures based on access to activities, or indeed missed participation in activities, more appropriate? Clearly these questions can only be answered conclusively by more qualitative survey methods. However, the fact remains that women are consistently over-represented as car passengers.

Concern over personal security and safety has been assumed to be a factor which is of particular importance to women, especially in so far as it affects their use of public transport at night. In reality, very few persons (of either sex) in Melbourne use public transport at night, when the car is the predominant mode of travel (Figure 6).

There is some evidence, however, to suggest that fear is nonetheless an important determinant of travel behaviour, especially for women. Qualitative information collected in a series of discussion groups with Melbourne women found that a commonly held feeling was one of being vulnerable to attack (Perrott Lyon Mathieson Pty Ltd and Greg Tucker and Associates Pty Ltd, 1995). This perception of vulnerability was felt to

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underlie women's unwillingness to travel on public transport at night as well as an expressed nervousness by some women about driving alone at night.
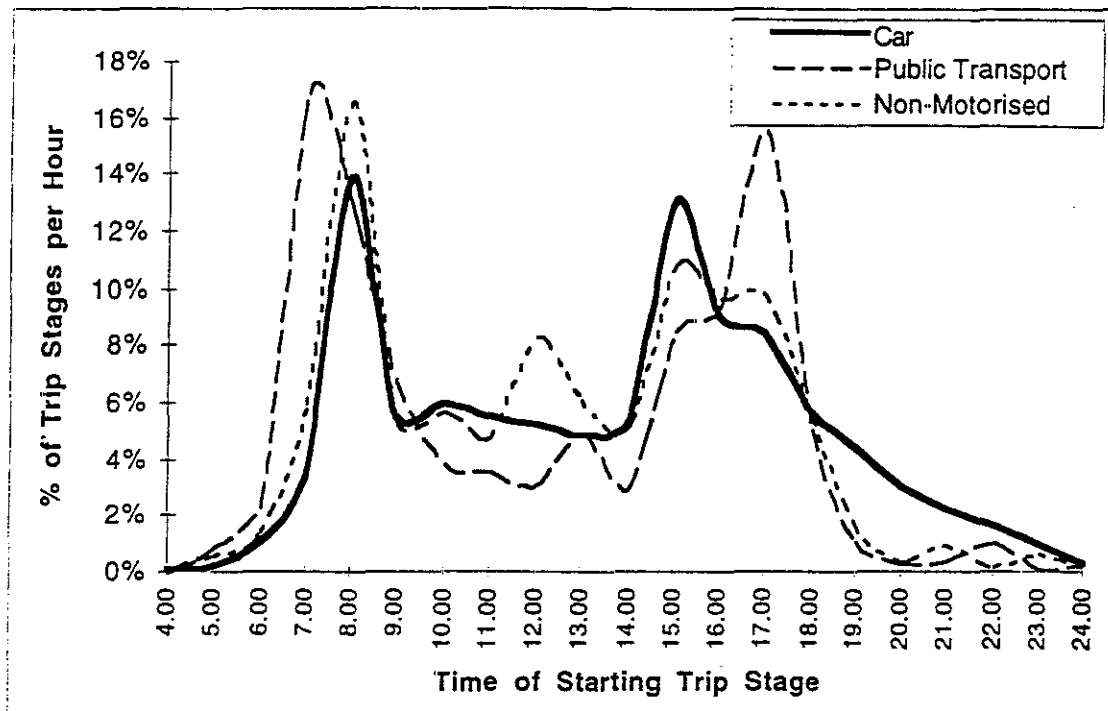

Figure 6   Mode Use by Time of Day
Source: VATS 1993-94

It would certainly appear that there is a tendency for women to concentrate their travel into the daylight hours. Figure 7 shows the proportion of various types of trips made at different times of day by women. The top left diagram shows the percentage of all trips at various times of day made by women, while the remaining diagrams show the same information for a range of trip categories. Women's travel is clearly more concentrated in the daytime hours between 8 a.m. and 4 p.m., with more than half of all trips at this time being made by women. After 5 p.m., less than half of the travellers are women. During the morning peak, nearly 60% of all travellers are women, with a similar figure in the early afternoon peak between 4 p.m. and 5 p.m. This concentration of travel by women into daylight hours may be related only partly to a fear of travelling alone at night.

A more significant factor would seem to be the predominant role that women continue to perform in household management and looking after children. Indeed, the distribution of travel over the day shows a clear tendency for women to make more trips during the peak periods. Proportionately more shopping trips and, more particularly, chauffeuring trips are made by women during the daytime. The weekday pattern of serve-passenger trips indicates that approximately 70% of these are made by women during the day, compared with only about 40% at night. Social and recreational travel is the only trip category in which men and women participate equally throughout the day (Morris and Richardson, 1995). Hence women may undertake relatively less travel at night simply because they have more need to go out during the day and less need to go out at night.
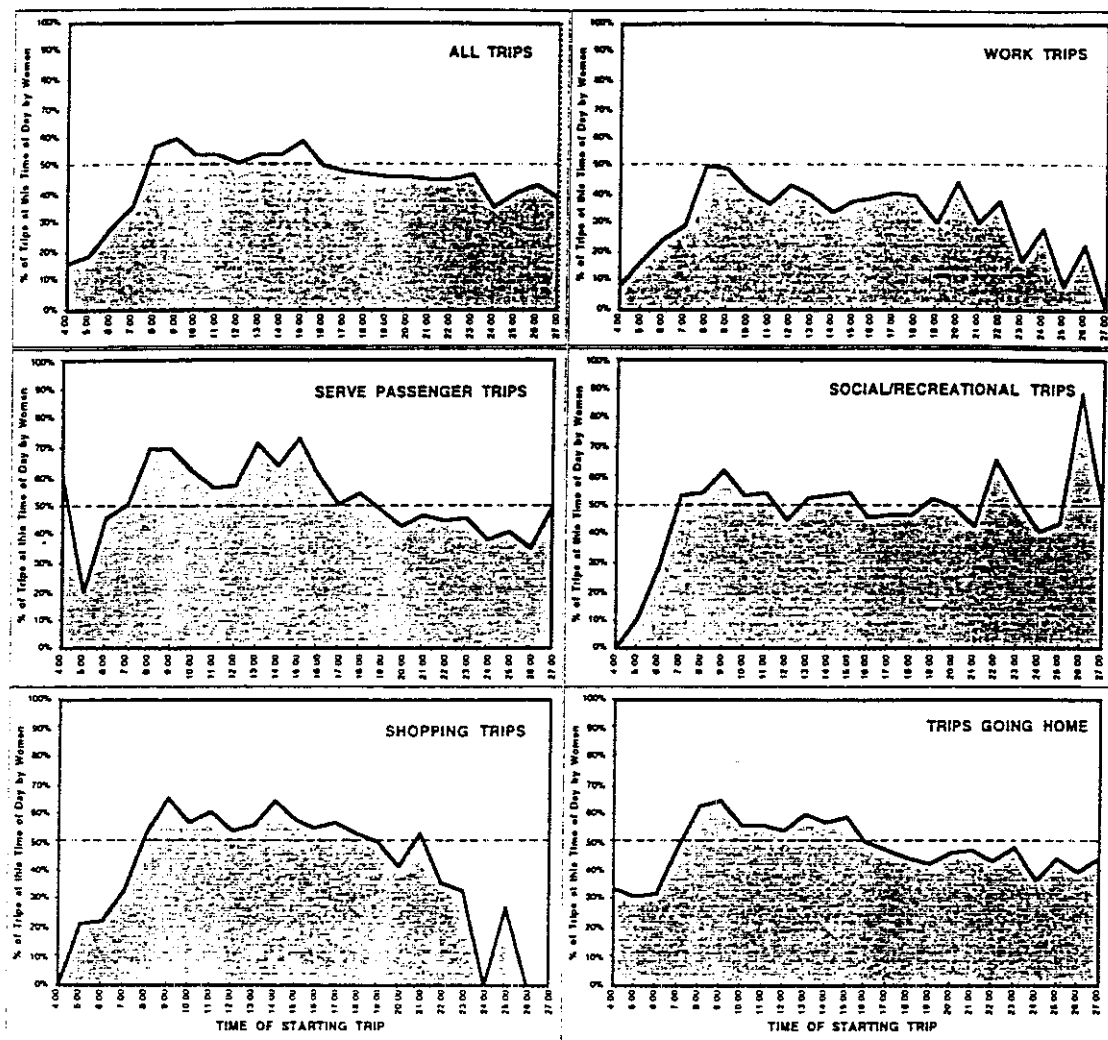
Figure 7   Percent of Trips made by Women at Various Times of Day
Source: VATS 1993-94

Analysis of trip purpose also shows clear differences between the genders. Women do more shopping trips and more chauffeuring, while men make more work trips. The differences are particularly evident for those working part-time and those not in the workforce. This pattern is remarkably stable across Australia's major cities based on the findings of the Federal Office of Road Safety's Survey of Day-to-Day Travel in Australia undertaken in 1985-86 (Richardson et al., 1996). The same general trends have also been found to prevail in Melbourne in 1993-94 (Morris and Richardson, 1995). Interestingly, it has also been found that these gender-based variations are broadly consistent across the socio-economic spectrum. Irrespective of their field of employment, women who work part-time perform proportionately more chauffeuring trips and, indeed, make more trips overall than their male counterparts (Richardson et al., 1996). A similar situation applies for those not in the workforce. These findings are significant, and reflect the increased family responsibilities that are associated with having children. In fact, more than three-quarters of the women in the VATS survey who work part-time or are not employed have children.

One important question which needs to be answered, however, is whether the extra tripmaking undertaken by women who are either at home or in part-time work is perceived by the women themselves to be a benefit or a disbenefit. This has important implications for the way in which we define "transport disadvantage". If, in fact, many of these extra trips are perceived to be a burden, very high levels of tripmaking could well be taken to be a sign of "distress". Since very low levels of tripmaking may also indicate unmet needs, trip rates by themselves are not necessarily unambiguous measures of "transport disadvantage".

Further evidence of the importance of children in shaping the travel patterns of their parents can be found in the constraints imposed by very young children. Young children exert an important influence on the timing and modes of travel, and the level of independent trip making by parents (Chen, 1994).

Children's Travel Patterns

In their early years, children have few independent travel needs. However, by virtue of being too young to be left at home alone, very young children still undertake a considerable amount of travel in the company of other people. The majority of these journeys are made as car passengers (see Figure 8), with the remainder being on foot.
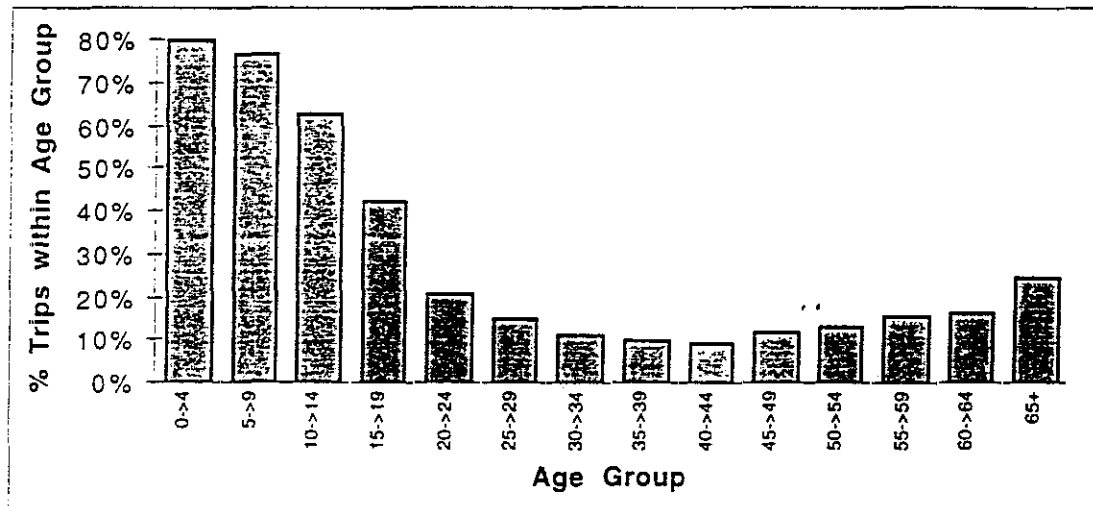

Figure 8   Car Passenger Travel by Age of Traveller
Source: VATS 1993-94

Once children go to school their horizons widen and their travel needs increase significantly. Children change from being predominantly passive participants in travel-related activities to being decidedly more active participants. In their younger years, children at primary school are usually accompanied by their parents on most journeys, whilst students in secondary school and beyond exhibit a greater degree of independence in their mobility. To cite one example, Chen (1994) found that fewer than 10% of all trips made by children of primary school age were independent of other household members, whereas some 25% of trips made by children older than primary school age were made independently.

Some signs of increasing freedom in mobility with increasing age of the child can be seen in the patterns of mode usage uncovered by the VATS data. This is reflected, for example, in the increased number of trips made by teenagers using bicycle (Figure 9). The use of bicycles, however, is gender-specific, suggesting that girls and boys may have different attitudes to the on-road use of bicycles, or that restrictions imposed on cycling by parents are more stringent for their daughters than for their sons.
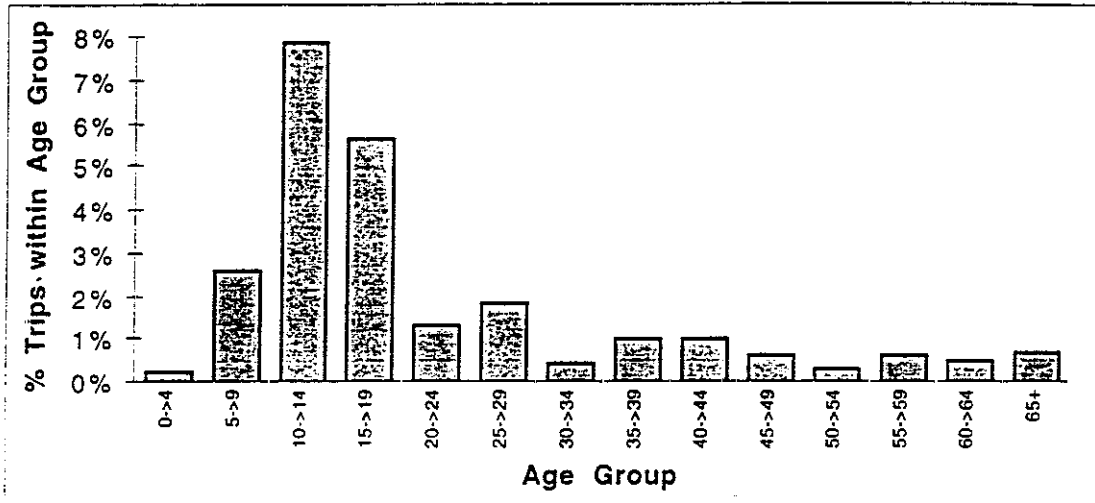

Figure 9   Bicycle Use by Age of Traveller
Source: VATS 1993-94

This increasing independence is also reflected in greater public transport use (see Figure 10). Among the various public transport modes, buses tend to be used more readily by the younger age groups, with trains and trams coming into use in the late teenage years.

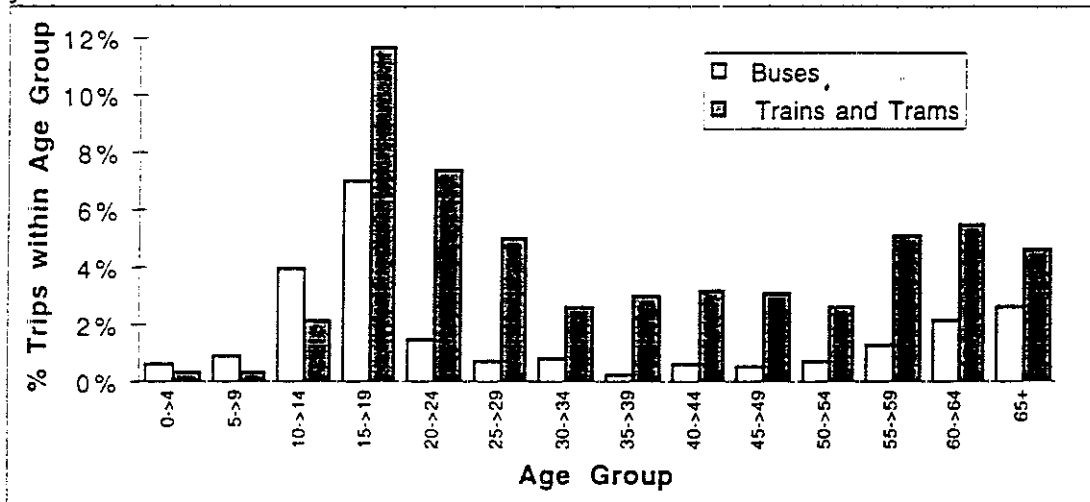Figure 10   Public Transport Use by Age of Traveller
Source: VATS 1993-94

Nevertheless the most important mode of travel for children of all ages is as a car passenger. More than 60% of all trips by 10 - 14 year olds are made as a car passenger, with the corresponding figure for 15 -19 year olds being just over 40% (see Figure 8). Some of the latter trips may be made with newly licensed friends as the driver, but most

of the chauffeuring burden undoubtedly falls on parents, especially on mothers (at least during the working week). The study by Chen (1994) found that mothers are much more likely than fathers to be involved in dropping off or picking up their children (see Figure 11). Indeed there is mounting evidence to support the claim made some time ago that "the modern mother has been freed from the stove to be chained to the wheel" (Schaeffer and Sclar, 1975). On weekends, however, it would appear that the chauffeuring task is more evenly shared between the sexes (Morris and Richardson, 1995).
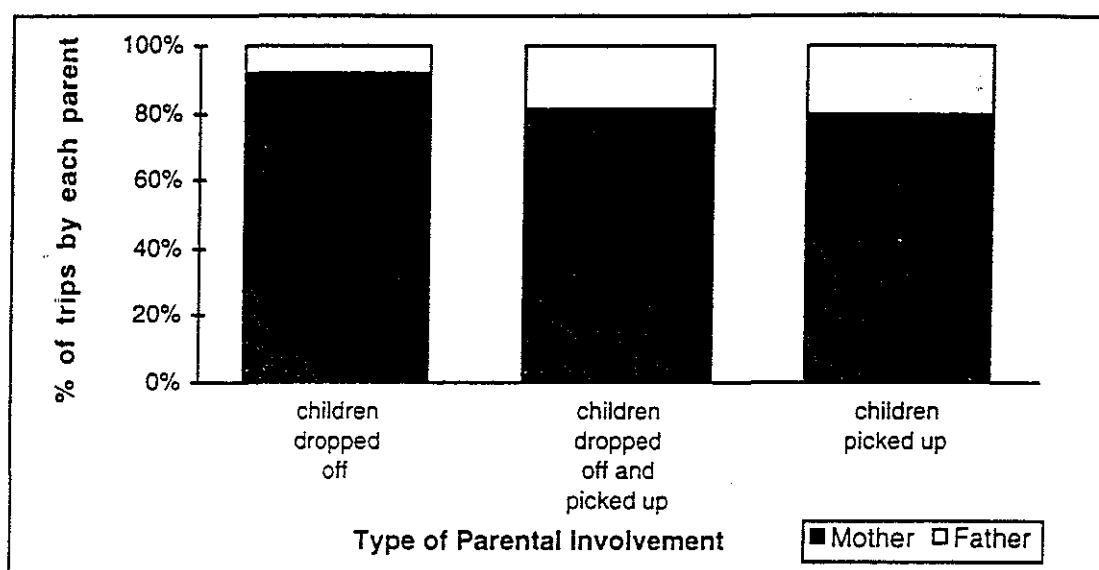
Figure 11 **Who Delivers and Collects the Kids?**
Source: Chen (1994)

Insofar as travel to school is concerned, the same general trends can be seen - with increasing independence in travel occurring with increasing age of the child. Chen (1994) found that the assistance of parents or older siblings for journeys to school was more prevalent among children of primary school age than for older students. In Chen's (1994) study, the mean age at which children started to make more independent than dependent trips was 13.7 years

Children in primary school are most likely to walk to school or to be taken by car. Public transport is rarely used, reflecting the more dense network of primary schools and the relatively short distances travelled. However, there is considerable variation throughout Melbourne in the relative importance of the different modes used. Table 2 presents some results from the Australian Living Standards Study (ALSS) undertaken in 1992-93 amongst families in four study areas in Melbourne (Transport Research Centre, 1994). The tables illustrate the modes being used "always" or "often" by primary school children when travelling to school, as reported in the different areas. (Note that because multiple responses were possible the sample size varies and columns do not sum to 100%.) The major difference is the markedly higher level of walking in inner Melbourne than in any of the other areas (Box Hill is a middle suburb, while Werribee and Berwick are outer suburbs). There is a correspondingly greater use of car travel in the outer areas. Also notable is the relatively low use of public transport for journeys to primary school.

Table 2   Mode Use by Children Travelling to Primary School

Mode of Travel	Berwick	Box Hill	Inner Melbourne	Werribee	Total
Walk	34%	32%	59%	29%	36%
Bicycle	4%	6%	0%	6%	4%
Car	47%	51%	33%	57%	48%
Train	11%	7%	5%	3%	7%
Tram	2%	1%	3%	2%	2%
Bus	4%	1%	0%	6%	3%
Other	1%	1%	1%	1%	1%
Sample Size	329	309	211	357	1207

Source: ALSS 1992-93

By contrast, secondary school children make much greater use of public transport for their journeys to school (Table 3). Most secondary school students travel to school by bus (or tram, in inner Melbourne) or on foot. Once again, students in inner Melbourne walk to school more often, and travel by car less often than their suburban counterparts. Differences in the pattern of usage of public transport to some extent reflects differences in the availability of the various modes in the study areas. Interestingly, children travel to secondary school by bicycle much more frequently in Werribee than in the other areas. This may possibility reflect the larger number of students attending local schools in Werribee, which is relatively isolated from surrounding suburbs, and hence more self-contained. It probably also has something to do with a suburban street layout which is either more conducive to or, at the very least, perceived to be safer for, cycling.

Table 3   Mode Use by Children Travelling to Secondary School

Mode of Travel	Berwick	Box Hill	Inner Melbourne	Werribee	Total
Walk	25%	16%	35%	23%	24%
Bicycle	4%	8%	2%	13%	7%
Car	29%	18%	9%	15%	18%
Train	12%	25%	15%	8%	15%
Tram	1%	15%	31%	1%	13%
Bus	39%	23%	10%	40%	28%
Other	0%	2%	1%	2%	1%
Sample Size	188	245	183	236	853

Source: ALSS 1992-93

There is correspondingly more variation between the patterns of travel to and from school for secondary school students than there was for primary school students. In particular, secondary school students make greater use of the car for their journeys to school than they do on the return journeys. This shortfall in car travel is balanced by a greater usage of public transport (especially buses) and, to a lesser extent, walking on the way home from school. This is probably due to a closer correspondence between starting times for school and work in the morning than exists for their finishing times in the afternoon and evening. Consequently, children are more likely to be able to get a lift to school in the morning than to get a lift home in the evening. It may also reflect the greater temporal flexibility that surrounds the time of arrival at home, at least for secondary school students, compared to the fixed nature of school starting times. An additional factor may be that parents who work are more prepared to let children in secondary school make their

own way home or to after-school activities, whilst working parents of younger children are more likely either to adjust their working hours to fit in with school hours or to invoke a variety of other child care arrangements.

Considerations of traffic safety and personal security are both relevant to parents' decisions regarding the modes of travel to be used by their children. The ALSS study asked parents to identify which of several problems with safety they feared in the case of secondary school students travelling to and from school. Fear of attack on the street was mentioned consistently by parents, with between 60% and 75% citing this problem in the four study areas. However, this was overshadowed by the fear of crossing roads in inner Melbourne, where 80% of all parents noted this problem. Violence on public transport was the least frequently mentioned of the four main problems, although it was mentioned by between 25% (Berwick) and 40% (Werribee) of parents.

The ALSS study also showed that children's perceptions about the safety of travelling on public transport do not necessarily correspond closely with those of their parents. Table 4 contrasts the differing perceptions of children and their parents concerning the difficulties experienced by secondary school students in travelling to entertainment. Both parents and students alike perceived safety of coming home at night to be a major problem, whereas parents expressed significantly greater concern than their children about safety on public transport itself. Although the students still considered safety on public transport to be important to themselves, they were slightly more concerned about levels of service.

Table 4   Perception of Problems by Parents and Children

Perception of Transport Problems for Travel to Entertainment	Parents	Children
Safety coming home at night	83%	75%
Safety on public transport	76%	53%
Frequency of trains and buses	62%	56%
Driving and alcohol	30%	35%
Cost of transport	20%	36%
Other	16%	9%
Average Sample Size	716	660

Source: ALSS 1992-93

Significantly, secondary school students in the study areas demonstrated quite high levels of public transport usage to reach places of entertainment, especially from the outer suburbs (see Table 5). This could have important implications for the marketing of public transport services. Quite possibly the risks of travelling on public transport are more apparent than real - in which case the focus would need to be on changing perceptions about safety. It would seem to be particularly important to direct advertising campaigns towards parents, who are often non-users of public transport, especially at night (Transport Research Centre, 1994).

Table 5   Modes for Travel to Entertainment by Secondary Students.

Mode of Travel	Berwick	Box Hill	Inner Melbourne	Werribee
Public Transport	90%	31%	60%	91%
Car	70%	15%	37%	71%
Walking	25%	19%	28%	25%
Bicycle	15%	13%	15%	20%
Other	2%	3%	4%	0%
Sample Size	188	245	183	236

Source: ALSS 1992-93

Some observers view the restrictions on the independent mobility of children as a cause for concern. Hillman et al. (1990) suggest that "the increase in the personal freedom and choice arising from widening car ownership has been gained at the cost of freedom and choice for children". Their comparative study of the UK and Germany indicated that the apparent reduction in children's involvement in accidents over time is due largely to significant reductions in independent travel by them. This in turn limits their capability for independent movement. The challenge is clearly to design urban environments and transport services which not only cater for independent mobility but which also provide safeguards governing personal security.

Travel by the Elderly

The elderly (over 65) presently constitute around 12% of the Australian population. As a group, the population of retirement age (65 years and over) is growing rapidly, and this is especially so for the very old. It is expected that by the year 2021, this group will constitute about 17% of the Australian population, increasing to 22% by the year 2041 (ABS, 1996).

Unlike women of working age, the majority of elderly persons have relatively few constraints on their time, being comparatively free of work and family responsibilities. At some stage, however, a significant number of elderly persons may be required to take on a caring role for loved ones whose health begins to fail. In such circumstances, the constraints faced by elderly carers are not unlike those faced by mothers of young children. Such constraints may range from being tied almost entirely to the house, to being required to provide assistance with mobility and other tasks, depending on the levels of disability of the person for whom care is provided.

While elderly persons in general have a considerable amount of freedom in the scheduling of their daily activities, they face a number of constraints of a different nature. Many elderly are faced with declining financial resources. This is due primarily to their reduced incomes upon retirement. But legislative changes imposed by recent Australian governments have also had the effect of restricting the levels of investment that are permitted by beneficiaries of government benefits. In addition, many elderly persons have been hit by higher user charges resulting from increases in indirect taxation and from the increasing privatisation of community services that has been occurring in Australia in recent years. The net effect of these changes is to reduce the amount of money available for discretionary spending by the elderly. As such, the costs of owning and running a car

by elderly households, and, indeed the cost of transport in general, may impose severe financial burdens.

For some elderly persons, especially women, access to private transport is restricted simply because they never learnt to drive. As seen earlier in Figure 1, a large proportion of the elderly, especially elderly women, do not have a driver's licence. However, this proportion is declining steadily as younger age groups progressively reach retirement age. Changes in licence-holding over time may be examined by comparing the VATS results with data obtained from a Survey of Day-to-Day Travel undertaken for the Federal Office of Road Safety (FORS) in 1985-86. This survey is similar in design to VATS, being a self-completion, mail-back questionnaire, covering details of all trips made by members (over 9 years of age) of the sampled households during a randomly chosen day in the year-long survey period. The survey information was collected from a total of 18,000 households throughout Australia, selected on the basis of a geographically stratified, random sample (SOCIALDATA Australia, 1987). By comparing the licence-holding in 1985-86 from the FORS study with that in 1993-94 from the VATS survey, it can be seen that the proportion of elderly at any given age without a licence has dropped significantly over that eight-year period (Figure 12). This is particularly the case for elderly women, where the curve has essentially shifted eight years to the right. This trend is likely to continue as the current cohort of middle-aged people reaches retirement age over the next 10 to 20 years.
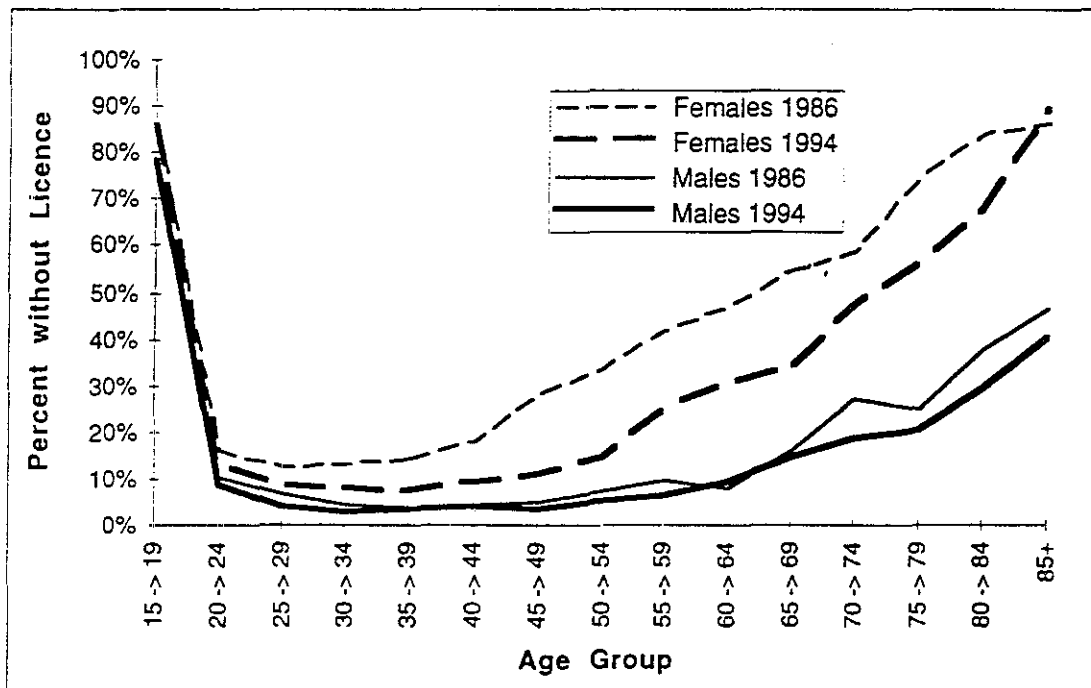

Figure 12   Changes in Licence Holding over Time
Source: FORS 1985-86 & VATS 1993-94

Nevertheless, the amount of driving by elderly males is considerably greater than by their female counterparts throughout all Australian cities (see Figure 13). Conversely, elderly females undertake many more journeys as car passengers (see Figure 14). As a consequence the mobility of elderly women who do not drive is likely to be affected greatly by the death of their husbands, who statistically have a shorter life expectancy.
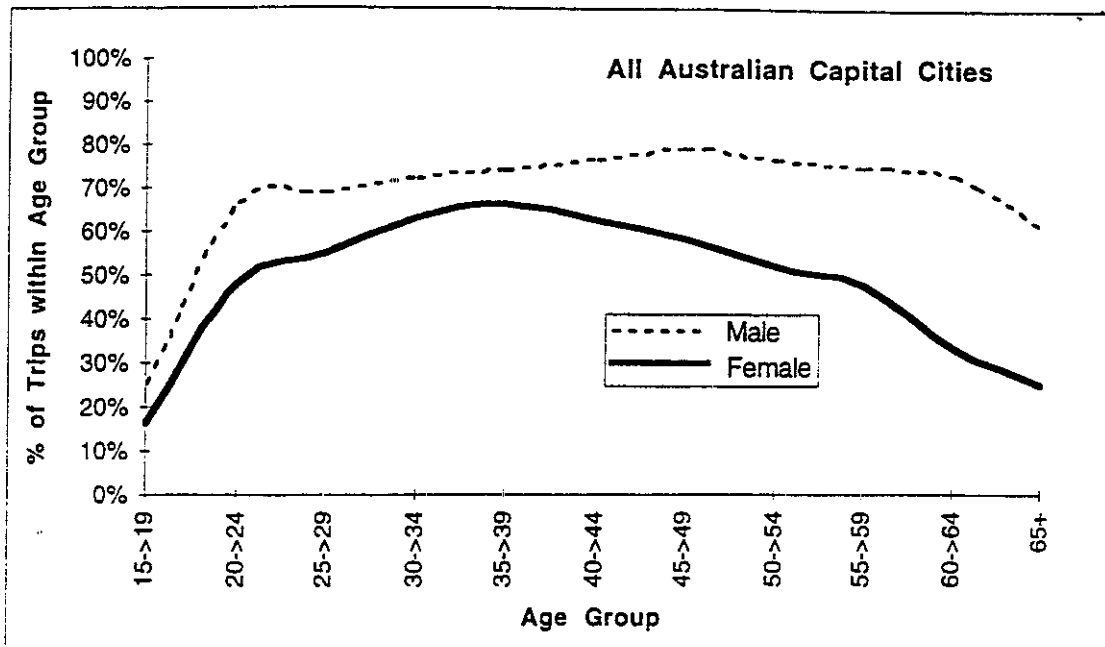
Figure 13   Car Driver Trips as a Function of Age and Sex
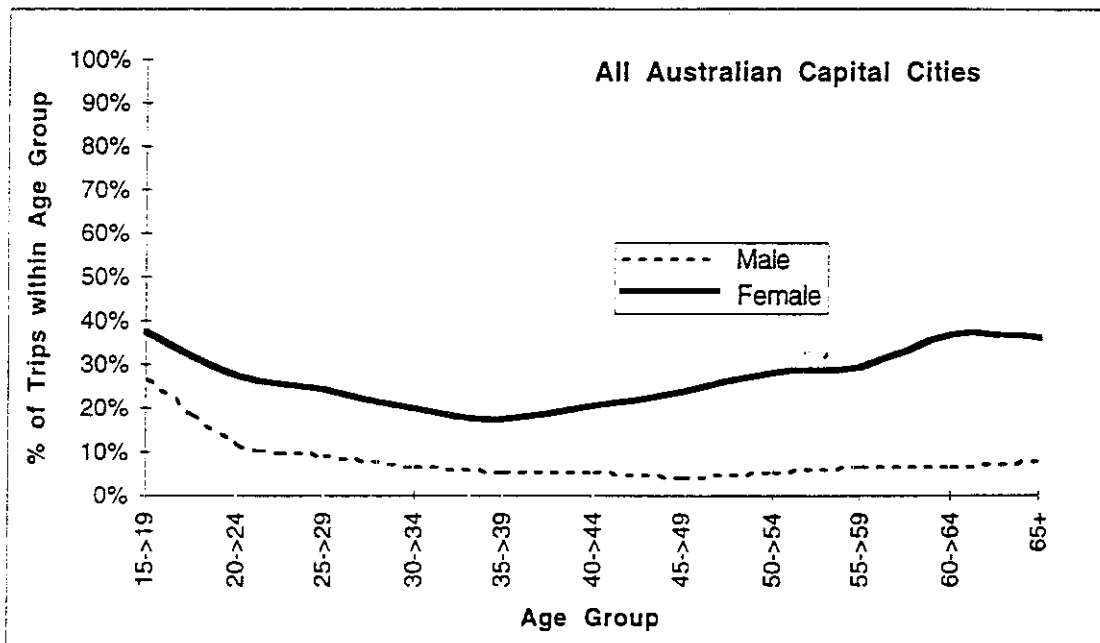Source: FORS 1985-86

Figure 14   Car Passenger Trips as a Function of Age and Sex
Source: FORS 1985-86

While the extent of car driving by the elderly can be expected to increase in the future, as more and more females with driving experience enter into retirement age, there are nonetheless clear limits. Ageing has an effect on driving ability, due to declining physical capabilities. At some stage in their lives many elderly drivers give up their driving licences (Hopkin et al, 1978). Furthermore, some elderly persons retain their licences largely for status reasons or for identification (Gillan and Wachs, 1976), while many others are in a "transitional stage", restricting their driving to daylight hours and less congested periods (Planek and Overend, 1973).

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Other mobility problems encountered by the elderly also stem from declining physical capabilities. There is no magic age at which restrictions upon mobility set in, and the elderly constitute a very diverse group. In general, however, the incidence of disability and handicap increases with age. The mobility implications of declining physical capabilities with increasing age are indicated by the most recent survey undertaken by the Australian Bureau of Statistics on Disability, Ageing and Carers (ABS, 1993). On the basis of the survey results, it was estimated that 18% of the Australian population had a disability and some 14% had a handicap in relation to certain aspects of daily living (namely, self-care, mobility, verbal communication, schooling or employment). Of those with a handicap, the most frequently reported area of difficulty was mobility, with some 73% reporting mobility limitations. Many of those reporting mobility limitations were living in institutions. Among the reduced number of 1,478,900 persons with a disability living in households, the most frequently reported activity requiring help was in the area of home maintenance. Even so, as Figure 15 shows, the importance of illness as a reason for not travelling increases strongly with age within the elderly population group (Transport Research Centre, 1996).
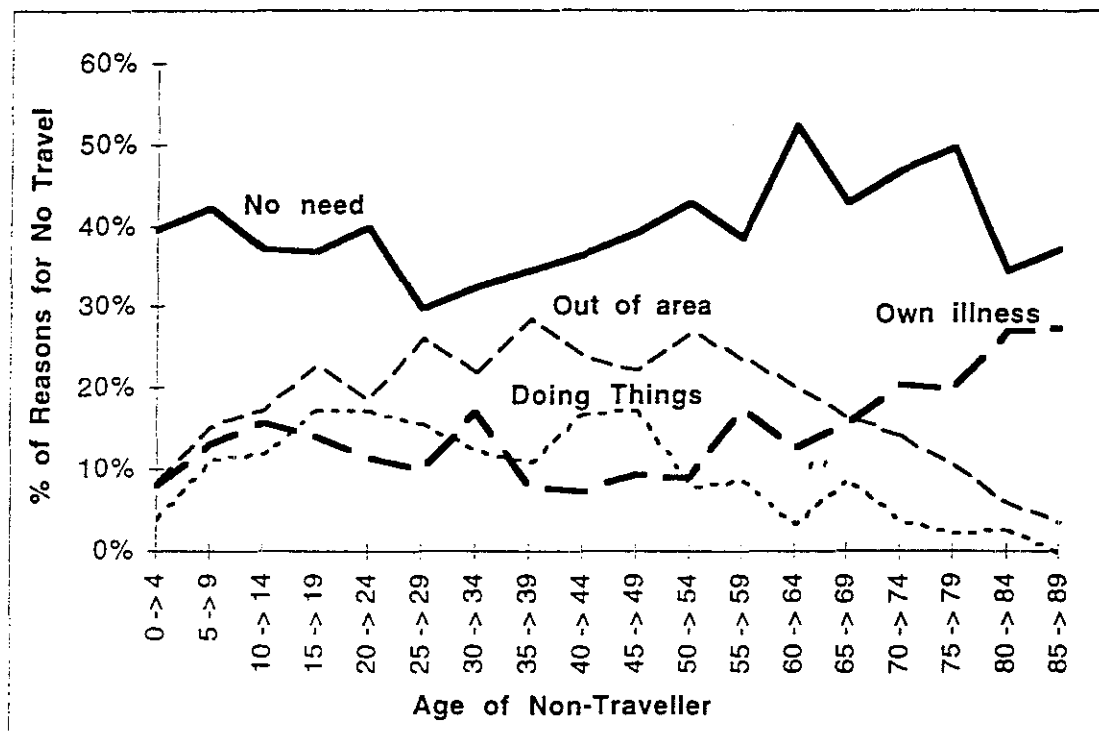

Figure 15   Reasons for Not Travelling as a Function of Age
Source: VATS 1993-94

Transport Planning Implications

So, what does this mean for transport planning in circumstances where major reforms are occurring in the provision and funding of transport systems? There are two main conclusions which can be drawn from our work. The first is the need to devote more effort to establishing a clearer evaluative framework for transport planning. The second is the need to recognise that for the majority of the population, travel behaviour is not an

isolated event. Rather, travel decisions are strongly influenced by the needs, constraints and resources of other family members.

Clearly it is not enough to simply describe observed differences in travel behaviour. It is necessary to understand the underlying reasons and to interpret and translate these differences into measures that can be used to guide policy development and monitor performance. While tentative statements can be made about the needs of the three population groups analysed herein, we still do not have in place an adequate evaluative framework for interpreting observed differences in travel behaviour. For example, our analyses have shown that both high levels and low levels of trip-making for different groups in the population may be indicative of distress. Consequently, indicators of "transport disadvantage" based on levels of trip-making are not by themselves a reliable and unambiguous guide for planning purposes. Moreover, it is not always possible to deduce the relative importance of preferences and constraints from quantitative analyses of the survey data. There is a need to define "transport wellbeing" and "transport disadvantage" in ways which can provide an objective basis for assessing and monitoring performance. As already mentioned, the most promising course of action would seem to be to develop indicators of "transport disadvantage" based on access to activities - and, in particular, missed participation in activities - rather than focusing simply on the amount and type of travel per se. In the meantime, analyses of travel patterns will continue to provide a useful, though imperfect, basis for assisting policy development and evaluation.

The interdependencies that exist between peoples' travel and activity decisions have important implications for the design and marketing of transport services, and, indeed for urban planning generally. The challenge in designing transport and urban environments is to foster increased levels of independent mobility, for both non-motorised modes and motorised modes of travel. The key to achieving this would seem to be in providing adequate safeguards governing travel safety and personal security, although other considerations such as convenience and flexibility are also likely to be important. In designing and marketing public transport services, it is particularly important to understand the needs of non-users - particularly those who may be uninformed - and to develop methods of persuading this market segment to use either existing or upgraded services. As already shown, in the case of children's travel, it can be more important to direct marketing programs towards parents, because they are the ones who ultimately make the decisions concerning their children's travel choices. Furthermore, perceptions about the safety of travelling by alternative modes do not always accord with reality - in some cases, by simply changing people's perceptions about safety and personal security, it may be possible to bring about increases in patronage. In other cases, relatively small changes to the design of conventional public transport services can lift patronage levels.

Experimental changes to conventional bus services by the National Bus Company (NBC) in the north-eastern suburbs of Melbourne provide one example of the kind of changes to public transport that appear to be valued by the travelling public. On approximately one third of its suburban bus routes, NBC has replaced conventional buses with 26-seater minibuses, and redesigned the bus routes to allow the buses to pass through the residential streets, rather than skirting the residential areas along the main roads. The

minibuses pick up on a hail and ride basis and may even drop people off directly outside their homes. By getting closer to peoples' homes, the service is able to provide their customers with an enhanced sense of personal security. The service has proved to be popular across the board, but especially with women, children and the elderly. By making these relatively simple changes to its pattern of service delivery, the bus company has been able to lift patronage levels and increase customer satisfaction. The minibuses have also been used to replace conventional buses on other routes in the evenings and on weekends when patronage is low, thereby reducing operating costs for NBC as well.

It is important to recognise that measures which enhance independent mobility (of people who were previously dependent on others) have several important benefits. Most importantly, increased independence leads to an increased sense of personal well-being for the individuals concerned. However the benefits also extend to those who were previously relied upon for assistance, and quite possibly other family members who might otherwise have been compelled to make these journeys as well. These benefits are not simply in terms of the time and effort saved in making such serve-passenger trips, but also in the greater temporal flexibility that becomes available to other household members for undertaking their own activities, both inside and outside of the home. Sometimes the discrete amounts of time available will determine whether or not an activity can be undertaken at all. Also, in many instances, increases in the level of independent trip making will involve a shift from motorised modes to non-motorised modes, with consequent benefits to the environment.

The importance of providing public transport infrastructure in newly-developing areas cannot be underestimated. If public transport is to take on an expanded role in the longer term, the provision of transport services must be included in the planning for new subdivisions (Fleming and Pund, 1996). It is imperative that these services are in place or, at the very least, that the nucleus for such services exists, before decisions are taken by new residents to acquire a second or subsequent car. Inevitably, transport operators will not recover their costs in the early stages of operating services in these areas, and government incentives and subsidies will be needed to ensure that these services are provided at the outset. Such outlays should be considered to be investments in infrastructure which will hopefully not only generate economic returns in the future, but also have desirable social and environmental effects.

It is also clear that public transport servcies should attempt to emulate many of the characteristics of the car if they are able to provide a genuine alternative for travel in contemporary urban situations. This implies a need for new and more flexible transport services along the lines described by Hall (1992).

Perhaps most important of all is the need to pay attention to the interface between urban planning and transport. Given the local nature of many of the trips made by all three groups described above, some of the most tangible benefits may be achieved by improving levels of safety and accessibility at the local level. Not only would this assist higher levels of independent tripmaking by children and the elderly, it would also help to reduce the chauffeuring burden felt by many women.

Conclusion

Women, children and the elderly together represent a majority of the population. While each group on its own is quite diverse, the people making up these three groups share in common strong levels of interdependence with other people. This is clearly demonstrated in their daily activity and travel patterns. It appears likely that in some cases this interdependence is valued, and in others it may be a burden. The challenge for planners is to provide for greater levels of independence where it is needed, without eliminating the basis for personal contact which enriches daily existence.

In addition to this need for increased independence, another emerging need which appears to be shared by all three groups is the need for enhanced personal security and safety. Quite clearly it is the community's perception of risk which is important. While this is not simply a transport issue, it has important implications for the way in which we design and promote transport services, and the way in which we plan the urban environment. Improvements to public transport would benefit all three groups - whether directly or indirectly. However, considerable - and possibly even greater - gains can be made at the local level. These can be achieved through improvements to the pedestrian and the cycling environments, and by ensuring that good levels of accessibility are provided to a range of local services.

The findings in this paper indicate two opposing trends in travel patterns. On the one hand, increased participation in the workforce by women, particularly those with children, has given rise to more complex travel patterns and increased dependence upon the car. Conversely, an ageing society implies an expanded market for public transport, albeit not as large a market as might have been expected in years gone by, because of the increased licence holding of the elderly, particularly elderly women. In addition, a reduction in the proportion of young people in the Australian population implies a reduction in this traditional market of young travellers for public transport. Clearly, policies which aim at reducing car travel and improving public transport must not only look at the needs of their traditional and potential markets, but also at the demographic and social context within which transport decisions are made

This paper also raises many questions. One of the most important challenges is to devise workable definitions of "transport disadvantage" and "transport well-being" which can be used to guide the development of policy and measurement of performance. It is suggested that a measure encompassing access to activities holds the most promise. Because of the difficulty of disentangling preferences and constraints within patterns of observed behaviour, this work will ultimately entail qualitative survey methods.

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