

**TRANSPORT CHALLENGES FOR THE NEW  
LEISURE CLASS**

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**ABSTRACT**

In recent years we have seen a significant increase in discretionary travel. In the 1993-94 Victorian Activity & Travel Survey (VATS), approximately half the trips were for this type of travel, compared to only 30% in the late 1970's. The major reason for this growth has been the changes in society which have increased the amount of time available for recreational activities.

Traditionally, emphasis has been placed in transport planning on mandatory travel such as travel to work or school. Most of the transport systems have been geared to cope with the morning and afternoon peaks created by this type of travel. Discretionary travel, on the other hand, has no set hours and thus more complex movements.

Two main groups of discretionary travel are associated with shopping and recreation. Study of these activities shows that the travel patterns of those at leisure are vastly different to those of workers. In this paper, results will be presented from investigations on Melbourne's shopping trips and for spectator trips to Australian Rules Football (AFL) - two prime sources of travel for discretionary activities.

The challenge for transport planners is to recognise the diverse travel patterns that are emerging in the discretionary travel market and apply the correct survey, analysis and planning techniques to these distinct groups. The results from these analyses should accurately reflect travel patterns and thus enable the transport planner to be more proficient in the study, understanding and prediction of the future travel needs of the community.

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## **Introduction**

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Two main groups of discretionary travel are associated with shopping and recreation. Study of these activities shows that the travel patterns of those at leisure are vastly different to those of workers. In this paper, results will be presented from investigations on Melbourne's shopping trips and for spectator trips to Australian Rules Football (AFL) - two prime sources of travel for discretionary activities.

The challenge for transport planners is to recognise the diverse travel patterns that are emerging. Even within the discretionary travel group different characteristics have developed. The shopping trip is epitomised by the frequency with which it is linked to other activities whereas spectator trips to the football display varying spatial characteristics depending on the teams playing and the ground at which the game is being played.

## **Data Sources**

The two sources of data used for the analyses described in this paper are the Victorian Activity & Travel Survey (VATS) being conducted by the Transport Research Centre and a series of surveys on travel to Australian Football League (AFL) games in Melbourne.

The section in this paper on shopping trips utilises data from the Victorian Activity & Travel Survey (VATS). The VATS survey uses a mail-out/mail-back self-completion questionnaire method which has been developed over many years by members of TRC staff. The survey method is based on a design which originated in West Germany in the early 1970s. The VATS mail-out/mail-back survey method has three stages and these are the initial contact letter, the main mailing of the household, person and trip forms and finally up to four postal reminders.

The VATS survey provides information on "all travel by all modes by all people in responding households in the survey sample" (TRC, 1993, pg. 9). The survey requires respondents to record all their travel for one day. The survey begins at 4 a.m. on the allocated travel day and finishes at 4 a.m. on the next day. All modes are included, even the non-motorised modes of walking and bicycling, and people of all ages, from babies to the elderly, are asked to respond.

Each household records their travel for only one day. However, surveys are sent to households on every day of the year, including weekends and holidays, so that a continuous database is obtained. The advantage of this continuous database is that variations over seasons, days of the week and times of the day can be investigated. Also, with the survey running continuously over five years, a longitudinal database is acquired and thus one can observe the changes in behaviour that occur over time.

The survey began in 1993, with data on activity and travel patterns being collected from households in the Melbourne Statistical Division (MSD). Increasing coverage of other urban centres in Victoria is proposed with the survey scheduled to run over five years. VATS has collected information from about 5000 responding households in each of the 1993-94, 1994-95 and 1995-96 financial years. The data used in this paper comes from the 1993-94 financial year.

The VATS survey collects information on household characteristics, demographic characteristics of household members and their activity/travel patterns. This information from the survey falls into seven major categories (database files):

- household information
- person information
- stop (trip-stage) information
- trip (all stages on a single purpose trip) information
- vehicle information
- trip chain information
- route information

The surveys used for the research on travel to AFL games have been conducted as part of an ongoing investigation into travel patterns to AFL games. The data reported in this paper has come from surveys performed in the first week of the 1996 AFL season. Approximately 300 patrons were interviewed at each of three games played at the Melbourne Cricket Ground over that weekend. A response rate of 98% was obtained for these surveys. The interviewer asked about the patron's support for either team playing on the day, about where they had come from before the game, where they were going after the game, and about the methods of travel used to get to and from the game. In addition, the interviewer recorded some demographic characteristics of the patron.

## **Shopping Travel**

The main feature of shopping trips is their relative complexity, compared to many other types of trip. The complexity of shopping trips is due to the fact that the shopping activity is often linked to other out-of-home activities. To view each shopping trip in isolation and ignore the sequence of preceding and succeeding activities would provide results that inaccurately describe the travel patterns for shopping. Thus, the method of analysis to be utilised is trip chaining as this technique allows the travel pattern to be viewed in its entirety.

It is important at the outset to define the terminology which will be used in this paper. A trip is a one-way movement from an origin to a destination for a single purpose. A trip may have more than one stop, when more than one mode of transport has been required to reach the destination. A chain is defined as a sequence of travel consisting of two or more trips, and a home-based chain has the additional restriction of beginning and ending at an individual's home.

The home-based chain can be separated into two major categories (Figure 1). The first category is the simple chain which has only two trips and one purpose excluding 'going home'. The second category is the complex chain, also known as a multi-trip chain, where there are more than two trips and one or more purposes excluding 'going home'.

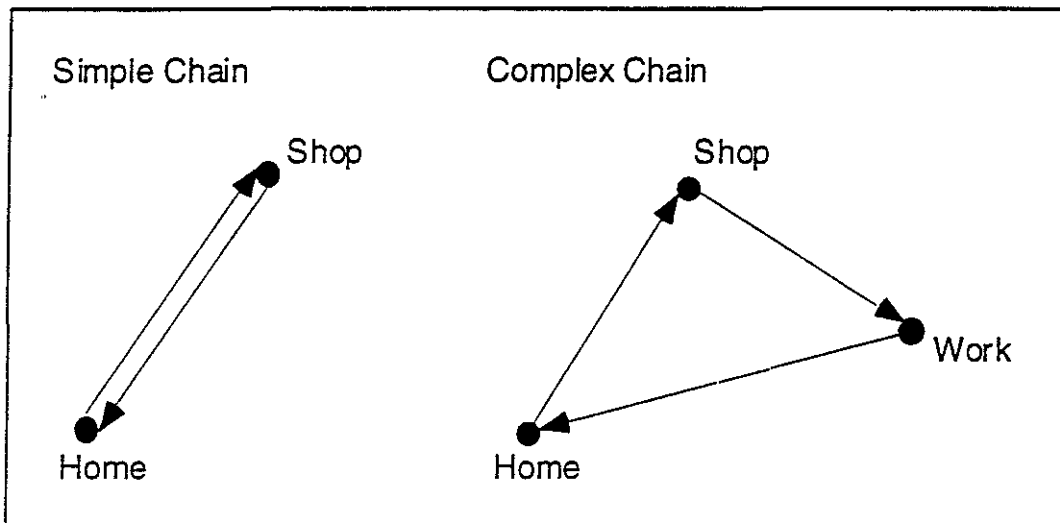


Figure 1 Simple and Complex Chain Types

Trip chaining occurs when an individual tries to fulfil an activity schedule within the time and space constraints imposed upon them. The constraints most commonly encountered are store opening hours, the speed of the mode available, the duration of the activity and the time available. In some instances an individual will decide upon a trade-off such as going to a shop that is closer but has less variety in order to use their resources, such as time, more efficiently.

### Complexity of Shopping Chains

Of the 15,338 chains in the first year of the VATS data, 13,907 are home-based chains. The other 1,431 are either chains that did not begin at home, end at home or both. This could be due to a variety of reasons, the major ones being people starting or ending their travel day at work or at someone else's home.

The percentage breakdown of the home-based chains into four main types is shown in Table 1. The first group consists of simple shopping chains, defined by a home-shop-home trip pattern. The second group are complex shopping chains where these chains have many different activities within the chain but at least one of the activities must be for shopping. The third group are simple non-shopping chains encompassing all the simple

chains of other activities. Finally, the complex non-shopping chains are all those complex chains that do not contain a shopping trip within them.

**Table 1** Types of Home-Based Chain

Group	Type of Chain	Frequency	Percentage
1	Simple Shop	1596	11%
2	Complex Shop	2513	17%
3	Simple Non-Shop	6828	50%
4	Complex Non-Shop	2970	22%
	Total	13907	100%

From this table, it can be seen that 39% of all the home-based chains are complex and 28% of all home-based chains contain at least one shopping trip. Considering only the shopping chains, approximately 60% of these chains are complex. For chains not containing a shopping activity, 30% of these chains are complex. Thus home-based shopping chains are twice as likely to be complex as chains which do not contain a shopping activity.

Investigating further, it was found that a home-based shopping chain has, on average, 3.5 trips in a chain. A home-based non-shopping chain has an average of 2.6 trips in a chain and this lower value is due to the high proportion of simple chains for the home-based non-shopping category.

### Analysis of Complex Shopping Chains

The previous section has revealed how home-based shopping chains are twice as likely to be complex compared to those chains without a shopping activity. Further analyses of the complex shopping trip chains are required to determine which segments of the demographic and travel variables are more likely to be associated with complex chains.

#### *Age*

Figure 2 shows the proportion of home-based shopping chains that are complex within each age group. Also shown is the average proportion of chains that are complex across all age-groups, and the total number of chains within each age-group (at the foot of the graph).

It can be seen from this graph that those aged over 50 are less likely to be involved in complex shopping chains than the younger age groups. The graph exhibits a peak of nearly 70% for the 20-29 age group whilst the 60+ age group make the least number of complex chains at just under 50%. Overall it can be seen that the old have different shopping trip chain patterns to the rest of the population, preferring to make relatively simple shopping trips.

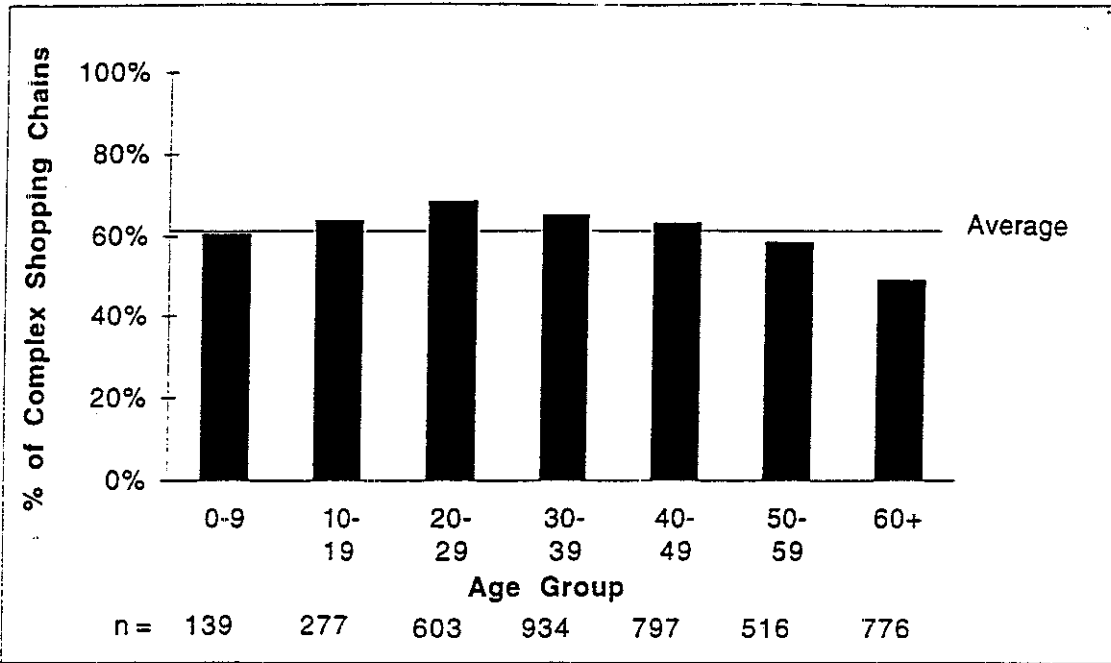


Figure 2 Type of Shopping Chain by Age Group

*Employment Status & Gender*

Figure 3 shows the percentage of home-based shopping chains that are complex for various employment groups of each gender. Females who are in full-time employment or not in employment are seen to make more complex shopping chains than their male counterparts. However, there appear to be no gender differences for people in part-time employment. With more females entering the workforce and still retaining the responsibility for shopping, the linking of shopping trips to other activities during the day has become necessary for many women.

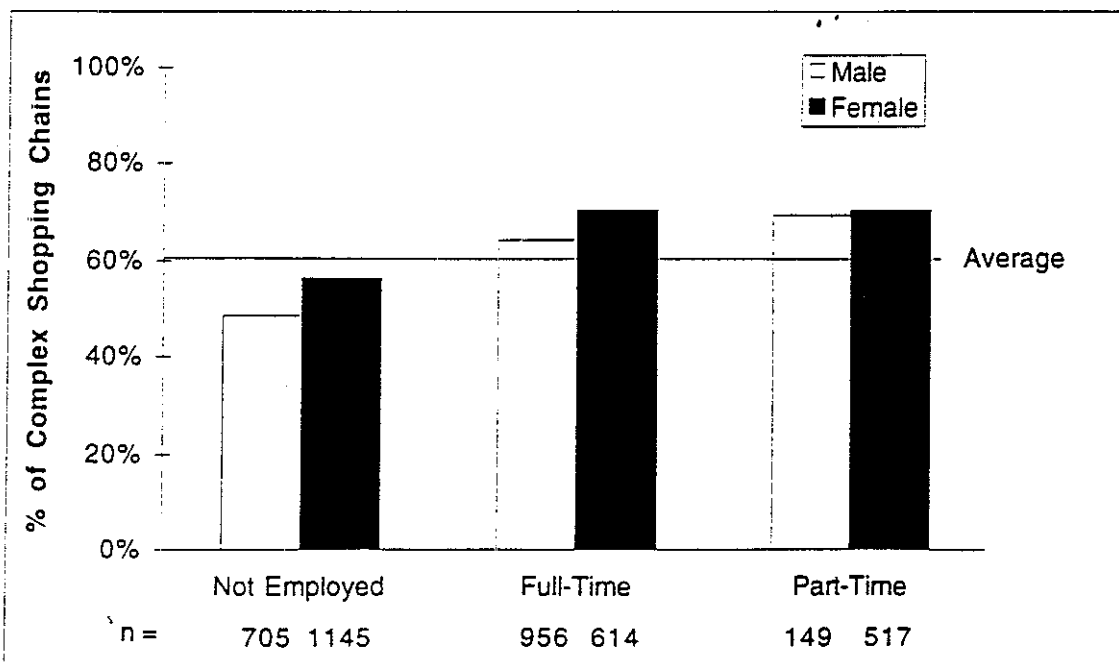


Figure 3 Complex Shopping Chains by Employment Status and Gender

More interestingly, though, is the fact that those employed make far more complex shopping chains than those who are not employed. This implies that those who are not employed have less time and space constraints and thus less need to chain their trips. This figure also confirms that the work activity, which is perceived as 'rigid' in time and space, can easily be used as a base to perform other activities and hence promote the linking of trips.

### *Mode*

The priority mode of the chain is found from a ranking of the modes used within the chain. The modes from highest to lowest priority are train, tram, bus, car-driver, car-passenger, bicycle and walk. Figure 4 shows the priority mode used in each chain. The principal mode for complex shopping chains is the car with over 80% of these chains being car-driver or car-passenger. Public transport modes and non-motorised modes are relatively insignificant, when compared to the car, as each category has only an 8% share in the number of complex chains. This agrees with the literature which suggests that the car is the principal mode used for trip chaining due to its flexibility and speed (Strathman & Dueker, 1995).

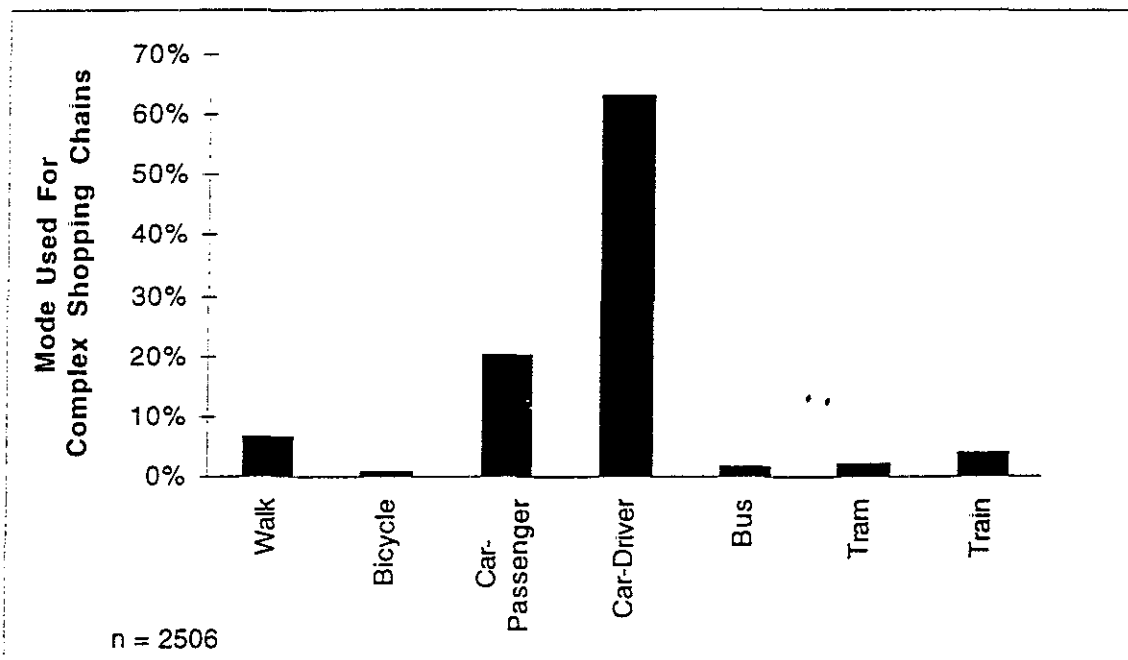


Figure 4 Complex Shopping Chains by Priority Mode

### *Time of Day*

The time of day that the shopping chain is performed is examined by considering the start and end time of each chain. The time of day is split into four time periods which are am peak (<9am), interpeak (9am-4pm), pm peak (4pm-6pm) and evening (>6pm). Chains that straddle two or more time periods, eg. starting a chain at 10am and finishing the chain at 6pm, will constitute a mix of peak and off-peak travel. Thus there are three categories of travel:

- completely in peak periods
- completely in off-peak periods
- a mixture of peak and off-peak periods

The distribution of home-based shopping chains between these time periods is shown in Table 2, while the degree of complexity of shopping chains in these time periods is shown in Figure 5.

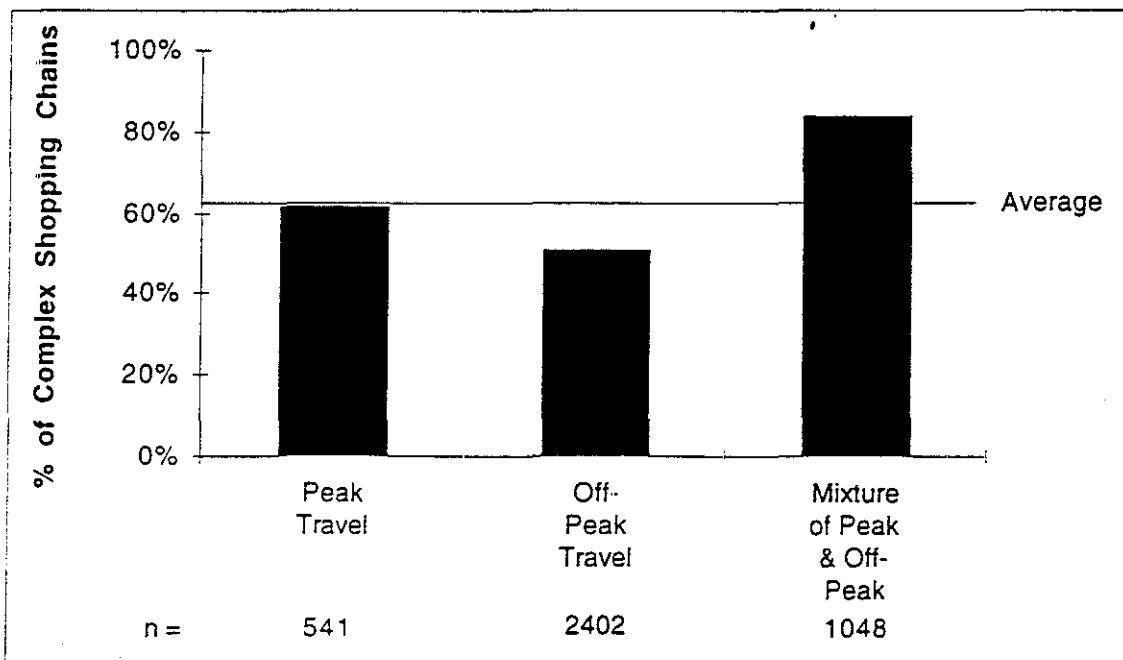
**Table 2 Time Period of Travel for Home-Based Shopping Chains**

Time Period of Travel	Percentage
Peak Travel	14%
Off-Peak Travel	60%
Mixture of Peak and Off-Peak Travel	26%

n=3991

Figure 5 indicates that chains performed in the peak travel period have the average percentage of complex chains, off-peak travel is less likely to have complex shopping chains and the most complex chains occur in the mixture of peak and off-peak travel.

Intuitively one would expect a mixture of peak and off-peak travel to be more complex as these chains are possibly several hours long considering that they cross over from one period to another. If one considers that shopping activities are usually of a short duration then it is assumed that other activities are linked to the chain. Peak travel would also be complex as this usually has a more dominant purpose associated with it such as work or education.



**Figure 5 Type of Shopping Chain by Time Period of Travel**



## AFL Spectator Travel

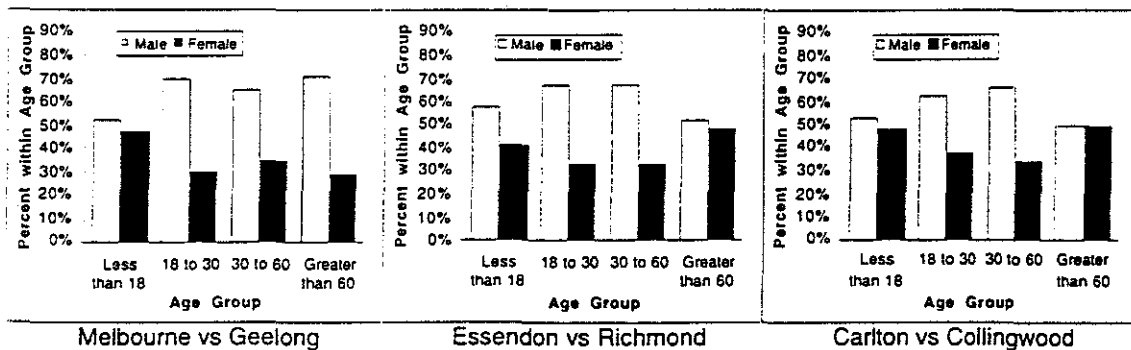
A very different type of leisure travel is associated with attendance at major sporting events. Whereas shopping travel is diffuse and interwoven with many other travel activities, travel to major sporting events is concentrated in time and space and may pose particular difficulties for traffic management and public transport operators. Major games at the Melbourne Cricket Ground generate more trips than is often associated with journey-to-work in most Australian cities. The magnitude and special features of football travel make it worthy of closer examination.

The data for the analysis of AFL football travel patterns was obtained from surveys performed in the first week of the 1996 AFL season. Approximately 300 patrons were interviewed at each of three games played at the Melbourne Cricket Ground over that weekend, as shown in Table 3. Patrons were interviewed inside the ground before the start of the main game and during the quarter-time and half-time breaks.

**Table 3 Sample Sizes and Response Rates for AFL Surveys**

Survey	Time of Game	Attendance	Sample Size	Response Rate
Melbourne vs Geelong	Friday Night	45,946	312	98%
Essendon vs Richmond	Saturday Afternoon	52,743	308	99%
Carlton vs Collingwood	Sunday Afternoon	67,533	313	97%

The analysis reported in this paper concentrates on four main characteristics: the demographic profile of patrons, the modes used to access the game, the car availability for travel to the game, and the areas from which patrons came before the game. In terms of the demographic characteristics of patrons, it can be seen from Figure 6 that AFL patrons tend to be male, but not to the exclusion of females. Approximately 35% of spectators at these games were female, with females under 18 years of age almost as numerous as males under 18. Female support tends to decrease in the middle-age years, but returns in older age groups. Interestingly, older women were under-represented as spectators at the Friday night game between Melbourne and Geelong.



**Figure 6 Demographic Characteristics of AFL Patrons**

As shown in Figure 7, travel to the MCG is dominated by three major modes of travel ; car driver, car passenger and train. The MCG is well serviced by train, having two

stations close by the ground (Richmond and Jolimont) and also being within a 10-minute walk of the main stations in the CBD. As a result, approximately 30% of patrons use the train for access to the MCG. While not shown here, the percentage of patrons going home by train on Friday night is higher than this figure, since many people have arrived at the ground by another mode and then gone home by train. This is particularly the case for patrons who go to the game directly from work in the CBD, using either tram or walk to access the ground. Overall nearly 50% of patrons use some form of public transport to get to the MCG. In times of decreasing demand for public transport in other areas, this would appear to be a niche market worth protecting and cultivating.

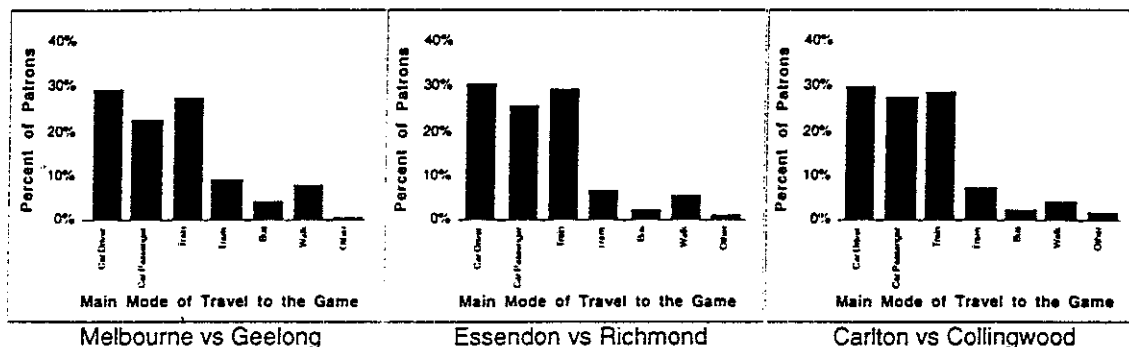


Figure 7 Mode Usage to MCG Games

An important aspect of this public transport market is that many of the users of public transport to the MCG appear to be choice travellers, rather than public transport 'captives'. Each user of public transport was asked to nominate whether they had a private vehicle available for use to travel to the MCG on the day of the survey. As shown in Figure 8, a majority of public transport users indicated that they did have such a vehicle available, especially for the weekend games. This finding is a double-edged sword. On the one hand, it shows that public transport is providing a competitive offering which is able to attract people away from their cars for the trip to the MCG. On the other hand, it is clear many public transport users do have an alternative mode available, and that if the level of service on public transport slips, or if the access by car is improved, then many people will be able to switch to private transport.

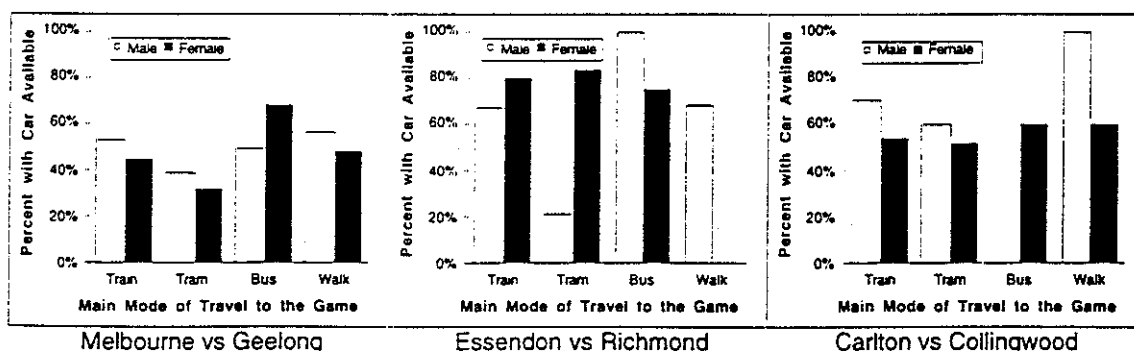


Figure 8 Car Availability for AFL Patrons

The final factor to be considered in this paper are the catchment areas for spectators attending the games. It can be seen from Figure 9 that the catchment areas can change dramatically for each game, depending on the teams involved in the game. This is

particularly evident for the Carlton vs Collingwood game, where 55% of all patrons come from that part of the Eastern Suburbs not served by the Burnley group of rail-lines, compared to 40% for the other two games. Even more dramatically, over 70% of rail patrons come from this area, especially from the north-eastern suburbs of Melbourne which are traditional supporter bases for both the Carlton and Collingwood teams. Such dramatic changes in catchment areas make servicing AFL games at the MCG very different from providing commuter services to the CBD, where the catchment areas are predictably the same from day to day. Providing public transport for AFL games needs to be much more flexible and responsive, especially when the overall levels of demand can also change on a week to week basis depending on the ladder position of the teams involved in the games and on such mundane issues as the weather.

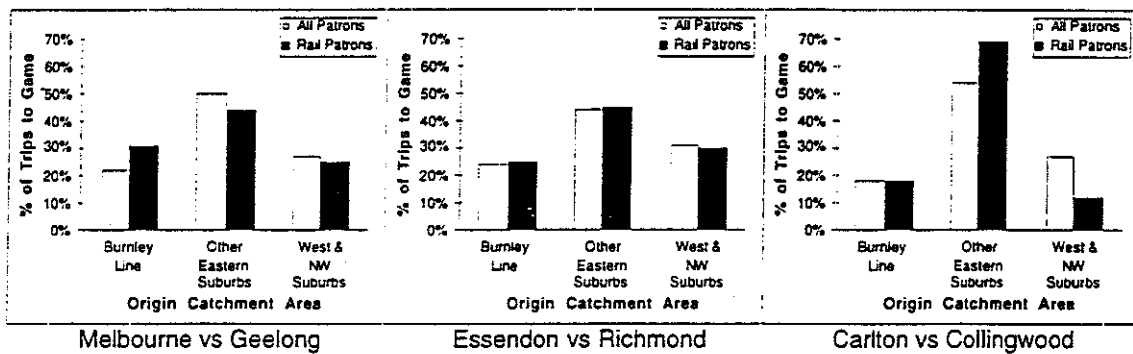


Figure 9 Catchment Areas for AFL Patrons

## Implications for Transport Planning

The above analyses of travel for different leisure markets has highlighted the fact that travel for shopping and for attendance at major sporting events is not as simple or as predictable as travel to work.

The fact that over 60% of shopping chains are complex has quite significant implications for the way transport planners analyse and model this type of travel. Traditionally, planners have only been concerned with trip generation and trip distribution in an aggregate framework. The complexity of travel, in the form of linked trips, has been largely ignored. The models built to predict traffic flow were therefore fundamentally flawed as they were all based on the assumption of the trip being an isolated event. As shown above, however, shopping travel is rarely an isolated event and is generally linked to some other activity. Travel to sporting events may also be linked to other activities, particularly for night games where many people travel directly to the game from work.

To plan for the future in a comprehensive manner, trip chaining must be acknowledged and attempts made to address and include this type of travel in planning and analysis techniques. For example, the inclusion of all linkages forces the transport planner to re-think areas such as route assignment. The route and mode taken by an individual for a sequence of trips may well be different to the one a transport planner assumes as the most logical when only given the one trip in isolation (Graham & Ogden 1978).

The shopping analysis also showed that people who perform complex shopping chains prefer to use the automobile, with over 80% of chains being either car-driver or car-passenger. This is due to the cars flexibility in visiting several different locations, a faster travel speed, none of the waiting time usually associated with public transport and less physical exertion when purchasing large or heavy items compared to the other modes. Thus, it may not be possible for public transport operators to offer incentives such as discount off-peak fares which might entice people away from the automobile.

Other strategies such as car-pooling which aims to reduce congestion in the peak travel periods may not work as they do not take into account the complex nature of travel. The analysis of the timing of chains has shown 60% of peak travel is complex; that is, the shopping activity is linked to the work activity in either the morning or afternoon peak. An individual who car-pools is constrained by the other occupants of the car and may not be able to link the shopping activity to the work activity. Thus, car-pooling is not conducive to trip chaining and people who need to link trips prefer to drive alone.

With respect to travel to major sporting events, however, there appears to be a much greater potential for public transport usage. Many of the features favouring public transport use are present (e.g. concentrated destination, concentrated trip timing, constraints on parking) and the competitive position of public transport is demonstrated by a high level of 'choice users'. However, planning for public transport services is made more complex by the less predictable nature of demands for these services, depending as it does on the teams involved, their relative competitive positions, the day of the game and even the weather.

## Conclusion

This paper has examined the characteristics of two types of travel, shopping trips and trips to major sporting events, which are becoming more significant as people undertake a range of activities not related to the traditional journey to work.

The complexity of the shopping activity has been demonstrated with home-based shopping chains twice as likely to be complex as chains which do not contain a shopping activity. The demographic groups in the community most likely to perform complex shopping trip chains are those aged between 20-29, employed or female. These complex shopping chains usually occur in the mixture of peak and off-peak travel times with the principal mode being the car. Given the complexity of shopping trip chains, it is recommended that the analysis technique of trip chaining should be implemented, since the conventional use of the isolated trip as the focus of planning and analysis would inaccurately explain a sizeable proportion of travel patterns for shopping.

The defining feature of travel to major sporting events is the sheer number and concentration of such trips in time and space. While sometimes thought of as a male-dominated activity, surveys of patrons at AFL football games has shown that 35% of patrons are female, with females under 18 almost as numerous as males under 18 years of age. The results also show that about 50% of patrons used some form of public transport to get to the Melbourne Cricket Ground, even though a private car was available

for use by over half of these people. Finally, the catchment areas for patrons could vary quite dramatically on a game by game basis depending on the teams playing. This variability places added pressure on the public transport operator to ensure that adequate capacity was provided to take patrons to their desired destination after the end of the game, when the demands are the most concentrated.

The analyses of shopping chains and AFL spectator trips have highlighted the differences between these two activities, and their overall differences to such traditional travel markets as journey to work. This suggests that the discretionary travel market has distinct characteristics which require alternative analysis techniques.

## References

Graham, N.R., & Ogden, K.W. (1979). A Study Of Travel Linkages: Implications For Urban Transport Planning. Proceedings, 5th Australian Transport Research Forum, Sydney, pp. 441-457.

Strathman, J., & Dueker, K. (1995). Understanding Trip Chaining, 1990 NPTS: Nationwide Personal Transportation Survey: Special Reports on Trip and Vehicle Attributes. Washington, U.S.A.: United States Federal Highway Administration (FHWA).

Transport Research Centre (1993). The Victorian Integrated Travel, Activities and Land-Use toolkit (VITAL) (Transport Research Centre Working Paper VWP93/1): Transport Research Centre, RMIT University, Melbourne, Australia.