

SOCIAL/RECREATIONAL TRAVEL AND ITS INFLUENCE ON TRANSPORT'S GREENHOUSE GAS EMISSIONS

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ABSTRACT

This paper discusses how a quite different trip type should be the focus of efforts to reduce greenhouse gas emissions from transport. For many years, travel management has focussed on the "to work" travel trip so as to maximise the efficiency of the transport network during this peak travel period. This "to work" focus has transferred to greenhouse gas emission reduction strategies, as shown by work travel plans and the like.

This paper discusses how social/recreational trips should be the major focus for reducing greenhouse gas emissions; not just because social/recreational travel is at least an equivalent contributor to total vehicle kilometres travelled compared to the "to work" trip, but also because of very strong linkages between social/recreational travel and other key transport behaviours. It appears that the impetus to make social/recreational trips has always been strong; that social/recreational trips were the dominant factor in the uptake of private vehicles and these trips have a strong influence on the size of vehicle purchased. A recent study confirms that social/recreational trips that are infrequent but require a larger-than-regular vehicle, such as holiday trips, strongly influence the type of vehicle purchased.

Social/recreational travel has a symbiotic relationship with urban form; with vehicle uptake often initially being for social/recreational travel then allowing settlement growth to be achieved with low density urban forms. But now that this urban form exists, extended social/recreational travel is necessary to enable families and friends to reconnect throughout these dispersed settlements.

1. INTRODUCTION

Central Laboratories has recently completed a long term research programme that targeted reducing the greenhouse gas emissions that arise from household travel. This research programme was not targeted at any specific intervention but rather at understanding the motivations that underlie current transport behaviours which appear highly dependent on private vehicle-based travel. We also sought to understand the motivations and behaviours that underpin vehicle ownership and vehicle choice. A parallel research programme examined the contribution that urban form might make to sustainable cities and this research examined the relation between transport and urban form and also urban form and liveability. What we observed is the dynamic relationship between form and dominant transport mode, and that the availability of private cars has made our cities more spread out so that much behaviour is now locked in by this form. For the metropolitan centres living by using only public transport or walking is difficult and for those living this way usually only a much smaller part of the metropolitan city can be practically accessed unless they too become passengers in the cars of others. However before cars were the

dominant mode, New Zealand cities enjoyed very good to excellent public transport systems. Major tram or bus routes ran in excess of 100 services per day over about 17 hours, from 6:00 am to midnight. Auckland ferry services had a similar frequency, then an hourly service from midnight to 6:00 am. For most urban areas a car was not a necessity. We believe that there is quite strong evidence that until the late 1950's urban residents purchased cars primarily for recreational travel purposes. Once owned these cars were then used for the "to work" journey, then as cities changed in response to car use, cars became important for social travel and shopping as well. A lifestyle and urban form has therefore evolved where for most people car use is now a necessity and car use for social and recreational travel is still central to this lifestyle and urban form. Attempts at greenhouse gas emission reduction which attempt modal shift away from cars for the "to work" and "to education" journeys will therefore have only minimal impact unless social and recreational travel is also addressed.

2. THE SCALE OF SOCIAL/RECREATIONAL TRAVEL

The New Zealand Household Travel Survey collects data including travel purpose. This travel is grouped under major categories. Social travel includes visiting friends and family, entertainment, cultural and religious meetings, going on holiday and hobby-related pastimes. Recreational travel includes travel to sporting events as well as going for a walk, ride, or drive.

Social travel and recreational travel were grouped together in the 1976 and 1989 and 1997 surveys but are reported separately in the 2003 to 2009 surveys.

The 1997/1998 New Zealand Household Travel Survey provides, in tables TR2 and TR3, national estimates of number of trips and kilometres travelled for nine trip purposes and seven travel modes. Walking is not included in TR3 as "time walking" is not translated into distance. TR22 of the Household Travel Survey showed the total number of walking trips is 1098.8×10^6 and time is 191.7×10^6 hours, translating as 11.2 minutes per trip on average. Giving walking speed as anywhere in the range of 60 to 90 metres per minute, the average walking trip is about 700 metres to 1 kilometre. The total distance walked is therefore about 8 to 11×10^8 kilometres, which is insignificant against the distance travelled in cars which is 437.8×10^8 kilometres. Similarly the total distance travelled by modes other than car are small, 39×10^8 kilometres out of a total 476×10^8 kilometres)

Looking in particular at trips made and distance travelled by drivers and passengers in cars allows the relative number of passengers in each trip purpose, average vehicle occupancy, and the proportion of vehicle kilometres travelled for each trip purpose to be calculated. These calculations for car based travel are shown in table 1 below.

Table 1 Characteristics of travel by car for different purposes, from 1997/1998 data

Travel purpose	From distance travelled, TR3: Average vehicle occupancy	Percentage of the person kilometres travelled by car for each purpose	Percentage of car vehicle kilometres travelled for each purpose
Home	1.62	29.1	31.2
To work – main job	1.13	10.2	16.1
To work – other job	1.33	0.4	0.1
Employer's business	1.10	6.1	9.9
Education	2.76	1.7	1.3
Shopping	1.64	7.7	8.4
Personal business	1.45	4.0	4.9
Social recreational	2.09	23.1	19.6
Accompanying someone	1.81	7.7	7.6

In Table 1, column 1 lists the journey purpose. Column 2 is average vehicle occupancy. This is calculated from TR3 by dividing the combined distance travelled by the driver and the passenger, by the distance travelled by the car. The distance travelled by the driver is equated to also be the distance travelled by the car. Column 3 is the total person kilometres travelled by car and is the combined distance travelled by drivers and passengers.

Table 1 shows that for vehicle distances travelled, car travel "To work" is 16.2 percent of household vehicle kilometres travelled while social-recreational travel is 19.6 percent. "Education" is notable at only 1.3 percent of household car vehicle kilometres travelled, indicating that the "walking school bus" is not a short term solution for greenhouse gas emissions reduction and merits of the "walking school bus" need to lie in congestion-relief, health improvement, and perhaps longer term walking habits.

Travel for "Employer's business" is not really part of the household's travel as the household has little control over how much or the mode by which this travel is done.

All trips "home" are included in one category, which is now normal practice in the current survey. This practice does understate the true distance travelled for each purpose since our return journey home is caused by our outward journey. Table 2 spreads the 31.2 percent of travel by vehicle for the "home" trip purpose over the other trip purposes on a pro-rata basis. This ignores trip-chaining but it is likely that with the range of chains possible, things balance out. Also given the preponderance of social/recreational travel on weekends, and as is shown later multiple peaks across the day for return home, the likelihood is that these weekend trips are often out and return for the one trip purpose. "Employer's business" may finish with a trip home or it may terminate at the employer's premises. Table 2 assumes that all have a journey home. Table 2 shows the data for all four travel surveys, which have been adapted in the same way as described above for the 1997/1998 survey.

Table 2 Characteristics of travel for different purposes, with "home" travel merged with associated other travel purpose

Travel purpose	Percentage of car-vehicle kilometres driven for each purpose, return journey included			
	1976	1989	1998	2003-2006
To work – main job	25.9	20.0	23.4	33.6
To work – other job	n/a	1.0	0.2	
Employer's business	12.5	18.0	14.4	6.3
Education	1.2	1.0	1.9	1.4
Shopping	21.5	10.0	12.6	14.9
Personal business		8.0	7.1	9.7
Social recreational	31.9	30.0	28.5	25.1
Accompanying someone	n/a	12.0	11.0	8.1

The 1976 Driver Exposure Study¹ reports mainly only on vehicle drivers but for this group reports similar data on trip purpose and distances travelled. "Home" is not a trip type in this survey.

Allowing for there being no category for "accompanying someone", these percentages for 1976 are reasonably compatible with those assessed for 1989, and 1997/1998.

The Ministry of Transport's 2008 document "Comparing Travel Modes"² used data collected between March 2003 and June 2006 to prepare similar information. This survey differs from the previous surveys in that it samples a smaller number of households (2,000) but on an annual basis.

The 1976, the 1989, and the 1998 surveys were reasonably even in the distribution of distance travelled per travel purpose allowing for some classification differences. Throughout this more than twenty year period, social/recreational travel has been the dominant travel purpose. The 2003 to 2006 data appears to show a significant shift with the most vehicle kilometres travelled being associated with work, but social recreational travel still being very significant. Noticeable in comparison to the three previous surveys is the marked decrease in travel for "Employer's business", which almost matches the growth in "To work" travel. Note that across all surveys, "To work" and "Employer's business" have a stable total of approximately 40 percent. Given the pronounced fluctuations in the reported totals for work related travel it may be that there has been variable coding of the "employers business" and of the "To work" categories.

Also noticeable is an increase in "Shopping", possibly a shift of recreational activity to an afternoon at the mall, and a decline in "Accompanying someone" possibly because it is no longer as necessary with the increase in car ownership.

¹ White, W. 1978. *Survey of Driver Exposure to Risk of Accident: An Overview of the Findings*. Ministry of Transport: Wellington, New Zealand

² Ministry of Transport. 2008. *Comparing Travel Modes: Household Travel Survey*. <http://www.transport.govt.nz/research/Documents/Comparing-travel-modesv1.4.pdf>

3. EARLIER DATA

It appears that the 1976 household travel survey was the first national detailed survey that included details of travel purpose, as is currently practised.

A 1972 Travel Survey³ found that (with "to home" trips excluded): 40 percent of personal car travel occurs at weekends and public holidays; 50 percent of personal travel is for social/recreational purposes (includes holidays). Also, urban travel (travel within boundaries of settlement of 1,000 or more) and non-urban travel are of equal magnitude. As 83 percent of the population were urban, urban people undertake a substantial part of their travel in non-urban areas. Two thirds of social/recreational trips are on the weekend.

There are also regional studies such as the individual Auckland, Wellington, Christchurch, and Dunedin studies undertaken in the early 1960s. However because the focus of these studies was network capacity, travel surveys concentrated on weekdays and the 6:30 am to 6:30 pm period. Although social and recreational travel show significantly in the data, the restrictions around time exclude a significant portion of social and recreational trip-making.

Household survey data from Auckland regional studies shows that in 1963 17 percent of all trips were for social/recreational purposes. A 1966 study of the Wellington region discussed the unusual possibility of having to expand the capacity of the main north-western highway to accommodate weekend rather than weekday travel.

The 1946 Royal Commission investigating the need for the Auckland Harbour Bridge also considered its potential role to satisfy social and recreational travel demand. Evidence presented included desires for the main Auckland population to access the spacious beaches of the North Shore and of the frustrations of attempting to get space on the ferries so as to be able to drive to more distant beaches than were serviced by the North Shore buses. The number of Sunday ferry services appears to be more than on weekdays. For example, about 35 ferry services over the Sunday evening period of about 4:00 pm to 10:00 pm were provided to move the returning travellers and cars on the Devonport back to Auckland route alone.

³ Wilbur Smith and Associates. 1973. *New Zealand Transport Policy Study*. Ministry of Transport: Wellington, New Zealand

4. AVERAGE WEEKLY TIMING OF SOCIAL/RECREATIONAL TRAVEL

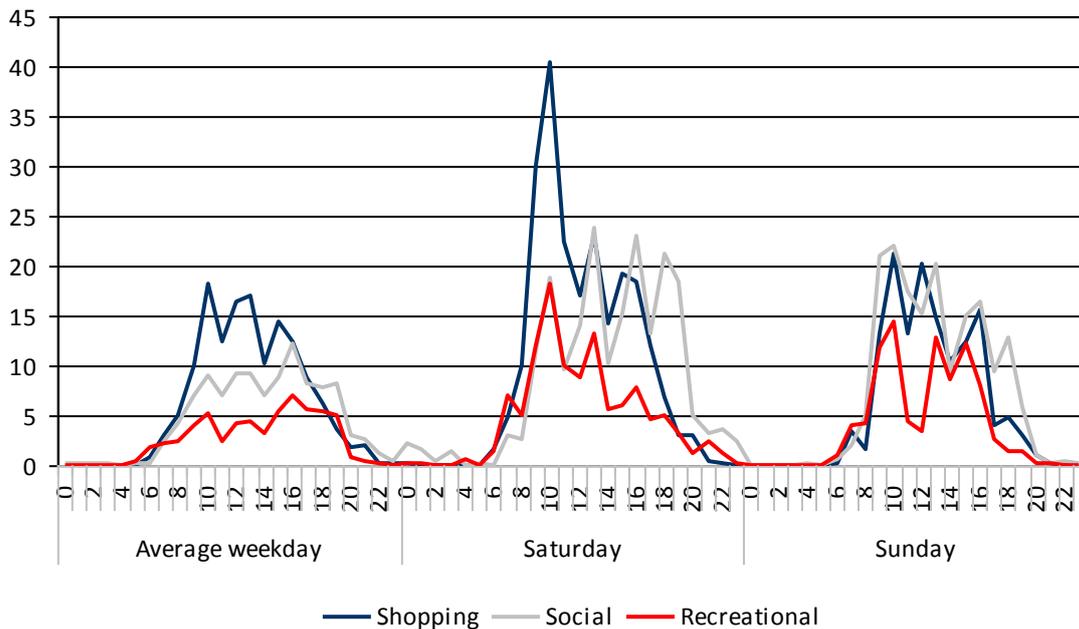


Figure 1 Time of travel for shopping, social, and recreational purposes (in annual million trips), from 2004 data

Figure 1 indicates the time of day over which three key travel purposes, shopping and social and recreational, occur. The figure illustrates that while shopping and social and recreational travel occur throughout the week, there are marked differences over the days of the week. In weekdays, all three purposes occur to moderate levels and are spread throughout the day, mainly 8:00 am to 8:00 pm. Saturday shows the dominance of Saturday morning as the main shopping period for households. (Note that total weekday will be five times the average.) Social travel is strong throughout the day but especially from about mid-day to mid-evening. Recreational travel is strongest in the first part of Saturday, in line with either sport or starting out on the weekend away. On Sundays, travel for all three purposes occurs throughout the day from 8:00 am to 8:00 pm and at about the same times. The strong morning peak for social travel would reflect attendance at religious services or cultural activities on Sunday morning.

Not only does the majority of social and recreational travel occur on the weekends, but much will occur across town, rather than between strong nodes well served by public transport. In addition, currently most New Zealand public transport systems operate at about only 50 to 75 percent of weekday frequency on the weekend and for a number of routes weekend services do not operate at all.

5. INFLUENCE ON VEHICLE CHOICE

Data from the 1976 Driver Exposure Survey supports the hypothesis that social/recreational travel is a strong influence on initial vehicle uptake and choice. (as shown by engine size). This survey also highlights that much of the social/recreational distances are performed outside urban areas.

Table 3 shows for each car size the percentage of the total vehicle kilometres that were classified as rural (that is, on roads with a speed limit greater than 70kmph) and the percentage of rural travel by each car size for each trip purpose. Trips for "employer's business" reasons are excluded as the choice of car is not made by the private individual. Education is also excluded as the contribution is very small. Table 3 shows that most of the rural vehicle kilometres travelled was driven in social and recreational trips.

Table 3 Percentage of rural vehicle kilometres travelled by engine size and trip purpose, from 1976 data

Engine capacity, cc	Percentage of rural vehicle kilometres travelled, for trip purpose			Percentage of total travel that is rural
	Work commute	Services and shops	Social and recreation	
Up to 1,000	25.0	16.1	54.0	40.2
1,000 to 1,350	18.6	22.1	54.0	51.9
1,351 to 2,000	22.4	17.7	52.0	54.6
2,001 to 3,500	16.9	29.8	42.0	58.6
Over 3,500	21.3	20.0	49.0	69.0

Table 4 shows average trip distance for the three main purposes of commuting to work, services and shopping, and social and recreational trips. For each trip purpose the urban trips are essentially a constant length independent of car engine size. Compared to "work commute" trips, urban "services and shops" trips are slightly shorter (0.5 to 1.0 kilometres) and urban "social and recreational" trips are slightly longer (about 0.5 kilometres). For the rural trips there is a distinct trend of larger cars for longer trips evident, but which occurs across all rural trip types. Compared to rural "work commute" trips, rural "services and shops" trips are about 50 percent longer, and rural "social and recreational" trips are about two to three times longer. The strong implication is for the longer trips, especially social and recreational travel, to determine the vehicle choice with this vehicle then being used for all other trips.

Table 4 Average trip distance, from 1976 data

Engine capacity, cc	Average trip distance, kilometres					
	Work commute		Services and shops		Social and recreation	
	Rural	Urban	Rural	Urban	Rural	Urban
Up to 1,000	7.4	4.5	10.1	4.5	19.2	5.3
1,000 to 1,350	10.0	5.4	16.3	4.2	29.6	5.8
1,351 to 2,000	14.9	5.2	14.4	4.7	28.2	5.7
2,001 to 3,500	10.5	6.4	18.6	3.9	21.1	6.5
Over 3,500	17.2	5.2	21.2	4.2	39.9	6.1

This apparent trend is further supported by a 2007 study by Walton. Walton surveyed 505 participants, first questioning about the suitability of their current vehicle for their purposes, the next questioning them on how a vehicle smaller than their current vehicle or alternatively how a vehicle larger than their current vehicle would either reduce or enhance their ability to do the things that they were using the vehicle for. The finding is that for many the infrequent event where a larger vehicle would be

more suitable dominates the vehicle choice and even if the purchaser finds the extra capability unnecessary, they are reluctant to reduce to a smaller vehicle. A large vehicle for holiday use is typical of an infrequent need.

6. INFLUENCE ON UPTAKE OF VEHICLES

Coupling the strength of the social/recreational travel with vehicle uptake gives a strong indication of motivation for vehicle purchases.

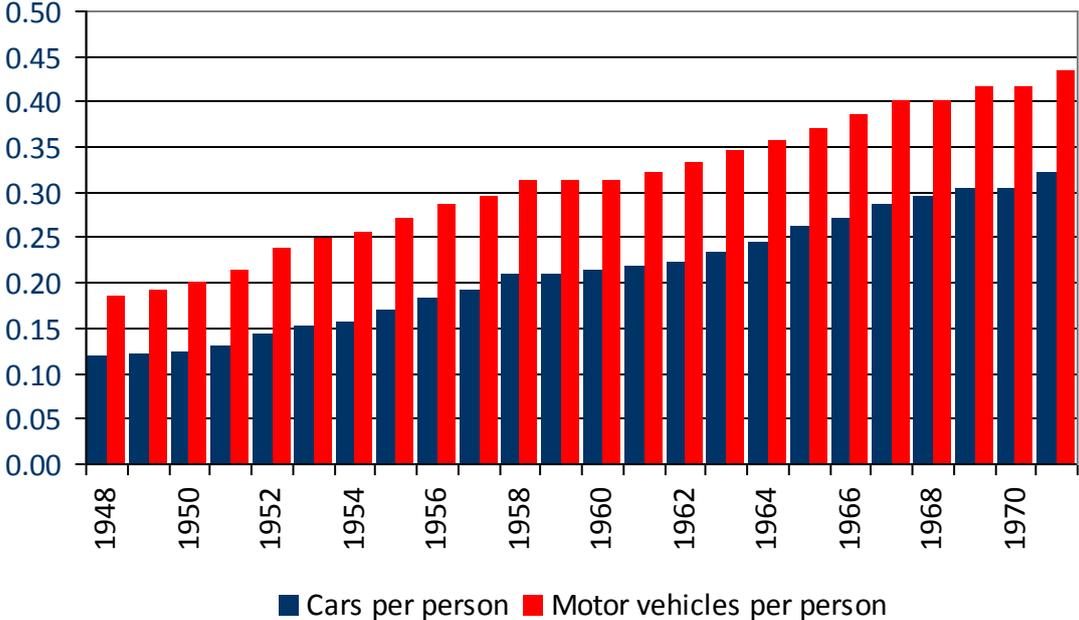


Figure 2 Rates of vehicle ownership

Figure 2 shows the uptake of cars over the period 1948 to 1971 expressed as cars per person and motor vehicles per person. Over this period the number of occupants per household decreased from 3.60 to 3.35. Household car ownership therefore changed from 0.4 cars per household to 1.1 cars per household in this twenty year period.

Surveys in 1963 in Auckland and Dunedin noted the number of cars per dwelling in those cities. The inner suburbs was where public transport is at its best and work and retail destinations would be easily accessible by public transport or walking yet they already have a substantial ratio of cars to households, as shown in Table 5.

Table 5 Household access to cars in Auckland and Dunedin, from 1963 data

	Cars per household		
	Auckland	Dunedin	Christchurch
Inner suburbs	0.71	0.66	0.75
Outer suburbs	0.85	0.84	0.95

Census information on mode of travel to work shows that even as late as 1971 only 55 percent of the population (45 percent as drivers) used a car as the main mode to work which has only increased to 64 percent by 2001.

Given the quite high rate of vehicle access even for the inner city suburbs and the modest rate of car usage to access work, then having a car appears to have been to satisfy another important household trip and our conclusion is this is the social/recreational trip. Accessing beaches, forest, lakes, rivers, and mountains has for many years been regarded as a key part of the New Zealand lifestyle and the car would deliver this access to a greater range of destinations than public transport.

We have not been able to fully determine the nature of social and recreational travel in the eras before significant car use, but clearly it would have been of a different nature. Prior to the tram era the sizes of our cities were only what was walkable but they had been laid out to include either park areas or were adjacent green belts for recreation. Friends and family were always nearby and within the monoculture, religious and cultural centres would also be close.

Although cities expanded in the tram era, they were still reasonably compact (about 5 kilometre radius). Friends and family and cultural centres may have been further apart, but still would have been readily accessible via the tram network. Leisure activities however would still have been confined to what was accessible via the public transport system, and what would be then walked to from this system. Photographs of the period show inner beaches much more crowded than they are today and crowded trams of beachgoers. More distant trips could be made outside the area by train, but thereafter destinations again had to be what was walkable from the station.

Photographs of the period also show cars surrounding beaches that would be not accessible by public transport and our view is seeing the expansive lifestyle of car owners would be a strong incentive for non-car owners to uptake car ownership.

The economics supports this conclusion. Vehicle assembly started in the mid 1920s in New Zealand and halved car prices. However it was not until the 1930s that larger assembly plants were made, but in addition to recovery from the 1930s depression and wartime restrictions, vehicle production capacity from 1939 to 1945 was totally redirected to the war effort. Normality only returned in the late 1940s as restrictions on tyres and fuel eased, which then coincided with a period of wealth in New Zealand so that widespread car uptake was possible.



Figure 3 Beaches near Wellington during the 1920s. The left photograph shows Titahi Bay with cars on the beach. The right photograph shows the tram at Lyall Bay.

7. SOCIAL/RECREATIONAL TRAVEL AND URBAN FORM

With the uptake of cars in the 1950s and 1960s the form of our cities altered to accommodate growing population. New housing was built on the urban periphery. In the late 1970s and 1980s a combination of factors such as neighbourhood renewal areas and the Oil Shocks concentrated development around infill housing and renewal of the older suburbs. Since the 1990s the development patterns combines inner city living, infill housing, and periphery development. Peri-urban development has occurred in part because real transport costs have fallen and as part of new economies forming. Patterns emerge such as young people leaving suburban houses moving to inner city living then back to suburban living when starting families. Property values have a key role in determining the location of new household formation, and so young family members on leaving home may be distant from where their parents live, and depending on their life stage, may also be living distant from their friends who now have families. Mixed in with this is strong immigration over the last twenty years and the development of more multicultural societies.

Social travel therefore plays a critical role in reconnecting these households and groups in otherwise dispersed cities. For example, social travel can be a key activity of adult children supporting ageing parents and it can be difficult to undertake without a car. A study of Christchurch⁴ when "carless days" were operated in late 1979 and 1980 illustrates the importance of social travel. While regular routine trips such as "to work" could be replaced by other modes such as public transport or ride sharing, cycling or walking, when the "carless day" prevented car use one third of all social trips that would have been made on that day had to be postponed to another day. A major source of frustration over the "carless day" scheme and also the restrictions of weekend fuel purchases during that same period was the interference with the needs of social/recreational travel.

⁴ Elliot, J. Fletcher, I. Lauder, G. 1980. *The impact of the carless days scheme on the behavioural and attitudinal aspects of car usage in Christchurch*. Department of Geography, University of Canterbury: Christchurch, New Zealand

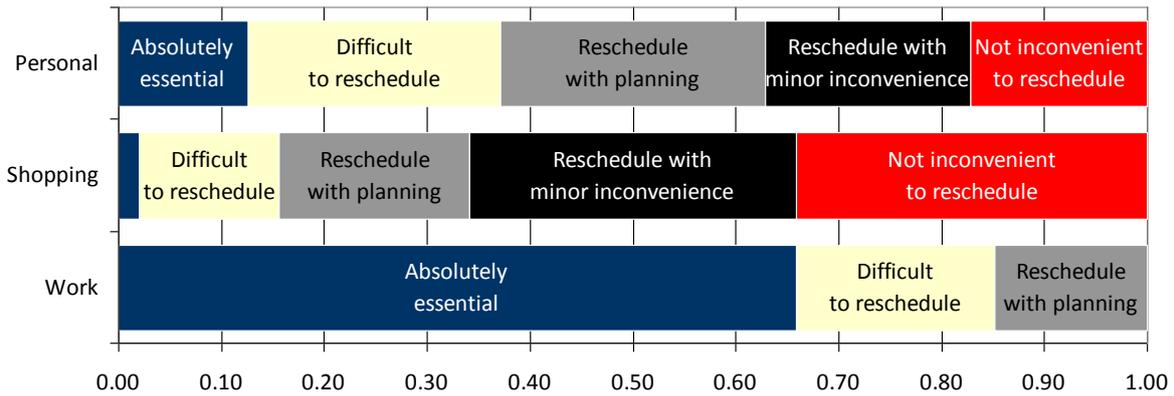


Figure 4 Perceived importance that travel is made on the selected day.

Figure 4 shows the four travel modes studied in the Christchurch "carless days" study. Social and recreational travel is a major part of personal travel. As the figure shows, half of this travel is either essential or involves significant inconvenience to reschedule. In contrast shopping could be easily rescheduled to another day when a car would be available.

8. CONCLUSIONS

Social/recreational travel is a major component of the travel undertaken in New Zealand and appears to have maintained this position over the last forty years, at least. This travel and the motivations behind it appear to have been a major factor influencing vehicle uptake and also appear to influence choices for large vehicle purchase. Much social/recreational travel occurs on the weekend and as it is often people connecting with people or people going to outdoor spaces, destinations may be served not well by public transport. The need for this travel by car especially is now a combination of our urban form and of lifestyle expectations. Our local street is not necessarily our community anymore. Our community is of friends and family separated in space but connected by transport, especially cars and telecommunication.

Our efforts to reduce greenhouse gas emissions from household travel will be frustrated by the importance to our lives of this social/recreational travel. The car that we judge as essential for this purpose is then used for most other travel even though alternate modes could be viable for these other travel purposes. We need to find ways to break the link between this travel purpose and car ownership and use, but it will be difficult.