

## MOBILITY MANAGEMENT FOR HIGH SCHOOL STUDENTS IN CHRISTCHURCH, NEW ZEALAND

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### ABSTRACT

This paper discusses general aspects of transport mode and travel patterns of school children in New Zealand by looking at legislative and cultural background and comparing it with overseas literature research. Six Christchurch high schools were monitored to look how the survey outcomes may be used to foster feasible changes and solutions to improving the current mobility management of students in New Zealand and ensuring environmental protection and higher efficiency.

**Key Words:** Mobility management, sustainable transport to school in New Zealand

### 1. THE PROBLEM

The everyday school-run by car contributes significantly to the rush-hour traffic congestion in developed countries, accounting for about 40% of all journeys. It causes traffic and parking congestion, pollution and raises safety concerns outside most school areas and annoyance for local residents due to car parking invading residential areas. There has been an increased trend for parents to drive their children to school and also for students to use their own cars.

### 2. OBJECTIVES

The objective of this New Zealand research was to find out about the transport mode and travel patterns of high school students to and from school, to investigate the reasons for school transport changes over the last 10 to 20 years and to assess if the current situation could be changed through improved transport management.

### 3. METHODOLOGY

As a first step, it was important to understand the New Zealand education system, way of life and relevant legislation. Some statistics gave an overview of the changing modal split over the last 25 years. An extensive international literature review was compiled that compared New Zealand and foreign experience. In a second step, a survey of approximately 1,200 students from six Christchurch high schools was conducted to identify issues such as their means of transportation, level of car or bike ownership, travel time, distance to school, and attitudes towards a potential shift to soft modes of transport. Finally, the analysis was concluded by a set of recommendations focussing on a large variety of organisations.

## 4. BACKGROUND

### GEOGRAPHY AND HISTORICAL TRENDS

The city of Christchurch was chosen to conduct this study. Christchurch is topographically a flat city, located on the eastern coast in the south island of New Zealand. It has a population of approx 325,000 that is predicted to increase by 2021 with a medium projection of 358,000 (CCC, 2000). Christchurch was a true cyclist city around 1930s as traffic statistics accounted bicycles to be 70% of all traffic movements in 1932 (CCC, 1979). Unfortunately, cycling has decreased markedly since the 70s. Public transport peaked in 1944 to fall at its low in the early nineties but since 1992 public transport patronage has been increasing steadily (ECAN, 2002). The number of private motor vehicles per capita has risen to nearly two, which is the second highest proportion of car ownership in the world after the USA (Redshaw et al., 1996). Traffic problems are still quite new to New Zealand, but Christchurch's traffic volume is predicted to rise by 43 per cent over the next 20 years (CCC, 2002). These trends will be discussed in relation to school trips in this paper. This type of study is important for schools, as the education system can assist to create a mobility conscience as perceptions are shaped here and this could influence the modal choice for further life.

### LEGAL ASPECTS

Under various New Zealand Acts, such as the Regional Land Transport Act 1988, the Transport Act 1962, the Local Government Act 1974, the Building Act 1991 and the Resource Management Act 1991, a local authority, the Christchurch City Council in this case, has legal obligations and opportunities to control and manage parking in the city (CCC, 2002a). Volume 3 of the Christchurch City Plan contains standards and rules for the provision of parking in developments, such as schools (CCC, 1999). It needs to be mentioned that there is a minimum requirement but not a maximum. So it is up to the specific school for example to decide upon the strategy they adopt. The Strategic Goals and Objectives of the 2003 Annual Plan of the Christchurch City Council include: “*Develop a network of roads, cycleways, footways and passenger transport to provide both for personal mobility and the needs of commerce and industry*” (CCC, 2002b). Regional authorities have set goals relating to their transport systems to promote a social environment which is safe and supportive, a transport system that is safe to use, consistent with a healthy, pleasant and pollution free environment, but also supports a thriving economy (ECAN, 2002a). Both, local and regional authorities in Canterbury are aimed at increasing the patronage of public transport and investing in infrastructure to attract more cyclists and pedestrians for commuter purposes. However, this is not a battle to be won quickly or easily, especially as the costs of running a private motor vehicle do not reflect the real environmental or social costs.

In order to better understand the situation, it is important to highlight further legislative aspects specific to New Zealand. Compared to many European countries, where the 18<sup>th</sup> birthday is the cutting age to acquire a driving licence, a learner driving licence can be obtained at the age of 15 in New Zealand (LTSA, 2002). NZ children attend primary school at the age of five which is earlier than many other countries. Cycle helmet wearing became mandatory in January 1994 and is most likely related to a decrease in cycling in New Zealand. Most primary, intermediate and secondary schools require compulsory school uniforms for their students. School days are Monday to Friday, starting at 9am and finishing at 3.30pm.

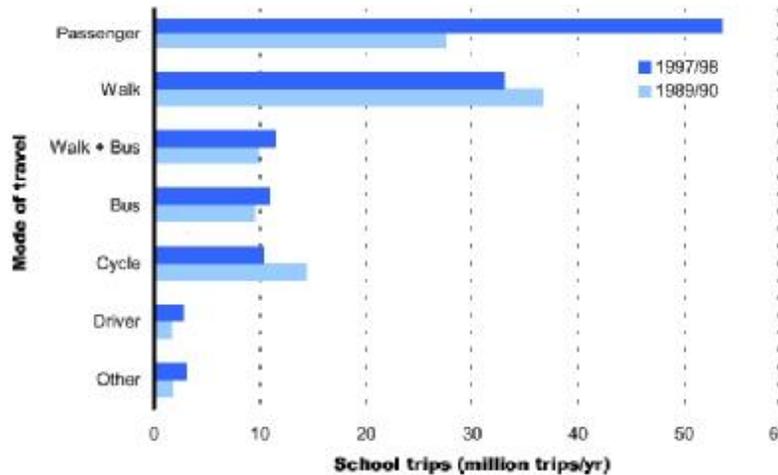
## 5. LITERATURE REVIEW

### STATISTICS

In many highly motorised countries there has been a steady decline of children walking and cycling to school. There is a trend that parents are increasingly “chauffeur” their children to

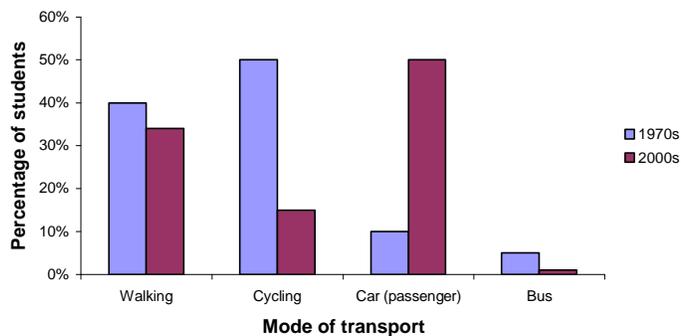
and from school and other activities (Bradshaw, 1995; Davis & Jones, 1997; Frith, 2000; Klöckner, 1999; Lehner-Lierz, 2002). In the UK school journeys made by car have nearly doubled in the past ten years (Department for Transport, 2000). Often children are not allowed to walk or cycle to school (Clearly Hughes Associates, 1994; LTSA, 2000; Lehner-Lierz, 1997; Tranter, 1993).

There is a general decline for walking (National Pedestrian Project, 2000) and a similar decline for everyday cycle commuting in New Zealand. Between 1989/90 and 1997/98, the distance of on-road cycling has decreased by 19%, with the largest decrease among school-age children and teenagers (LTSA, 2000). Figure 1 shows the number of school trips by mode of travel in NZ (Frith, 2000)



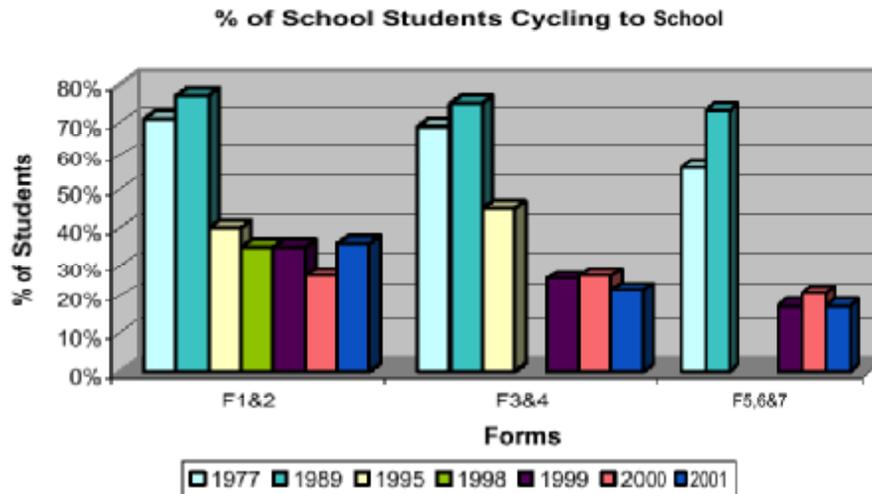
**Figure 1:** Number of school trips by mode of travel in New Zealand (Frith, 2000)

Figure 2 shows the modal split for primary school children in South Christchurch by comparing the 1970s with the 2000s.



**Figure 2:** Primary school travel mode (based on: Douglass & McKenzie, 2001)

Figure 3 shows that there is no clear trend for the recent years, but cycling declined enormously since the 70s and 80s. From 1977 to 1989, the number of school cyclists picked up noticeably (63% to 74%) in Christchurch. However, numbers dropped markedly to 19% in 2001 (Cottam, 2002). Cottam (2002) is of the opinion that the recent drop was no doubt aided by the availability of more modern motor vehicles and cheaper prices than for preceding generations



**Figure 3:** School children cyclists in Christchurch by bike shed cycle count (CCC, 2002a)

A modal shift has also occurred amongst school staff. Thus, surveys show up to 90% of staff arrive as car drivers with a corresponding need for off-street staff and visitor parking at the rate of about 1 space per staff member (Douglass & McKenzie, 2001).

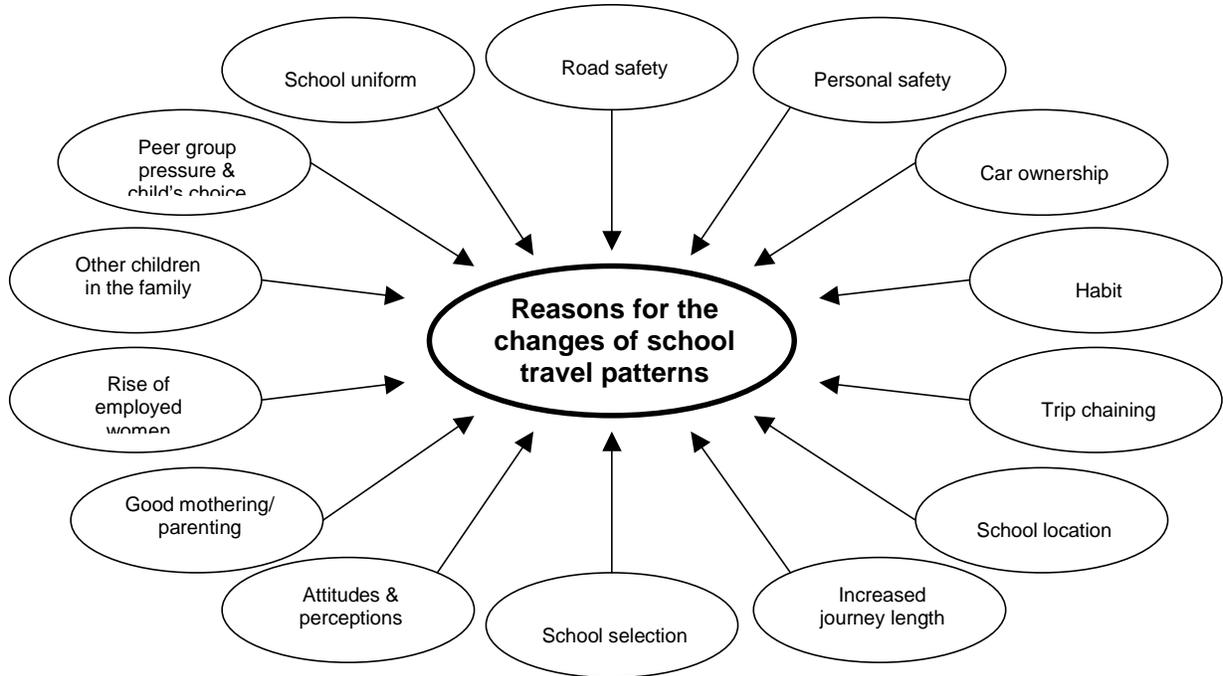
### REASONS FOR CHANGES IN SCHOOL TRAVEL PATTERNS

The number of reasons for people using cars instead of more sustainable modes is linked to individual preferences but generally speaking the following list gives a good overview: The choice of private motor vehicle is linked to the import of cheap second-hand Japanese vehicles, an increased number of people living outside cities in lifestyle blocks and working in the city, people travelling to shopping malls on the outskirts of cities, more single adult households and increased number of women in the workforce, more people moving for job purposes from rural areas towards cities, people shifting jobs or houses often which involves increased travel to workplace, increased safety concerns and certainly an increased physical laziness of the population. New Zealand has lost part of its traditional laidback attitude and compensates this through competitive sports on weekends, which contributes to increased traffic volumes on weekends. It is probably a mix of the reasons listed above that contribute to a busy lifestyle that reflects on the travel pattern of school children.

As a result of interviewing car drivers in Christchurch for reasons for driving their children to school, O'Fallon and Sullivan (2001) identified the following reasons:

- Already using the car anyway
- Age of the child (too young)
- Concerns about children being exposed to weather
- Distance to school
- Concerns about safety

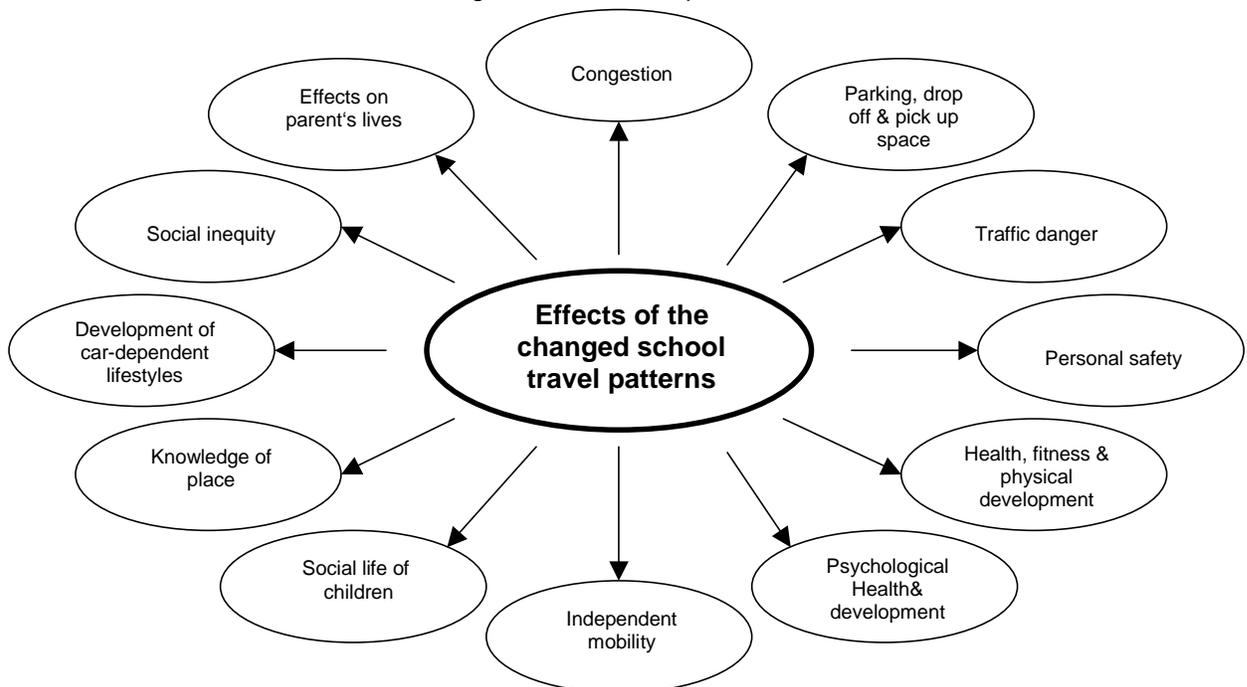
A large number of international studies were reviewed and the major factors can be described best in figure 4.



**Figure 4:** Factors influencing the changes of school travel

### EFFECTS OF THE CHANGED SCHOOL TRAVEL PATTERNS

Chauffeuring has effects on the lives of children, their parents and the society (Gershuny, 1993; Hillman, Adams & Whitelegg, 1990; Jan, 1993). Whitelegg (1997) is of the opinion that there is a growing awareness that children in the developed world are suffering as a consequence of higher levels of motorisation and car use. The motorisation has effects on the independent freedom and mobility of children, their health, sense of geography, place and community. Figure 5 summarises the effects of the changed school travel patterns.

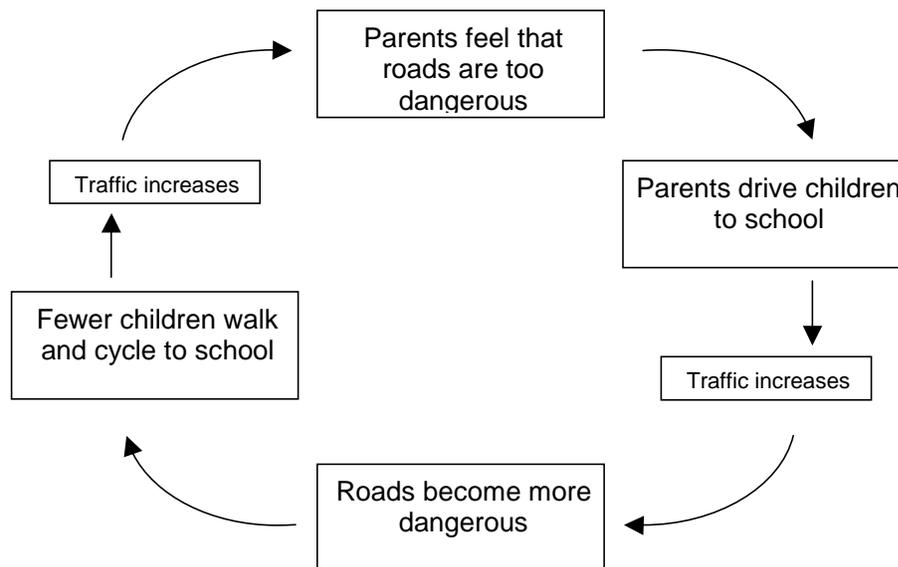


**Figure 5:** Effects of the changed school travel patterns

Although all the effects listed above deserve extensive explanations, *traffic danger* and the *social life of children* will be discussed in more depth in this paper, as it may contribute to a better understanding.

### Traffic Danger

An obvious effect of the rise in car-assisted school travel is the rise in traffic and therefore, traffic danger. Road safety is on one hand a reason for the shift from letting pupils walk or cycle to school to escorting them by car. On the other hand, road safety declines through the increasing volume of traffic created by parents driving their children to school. Many researchers call it a *vicious cycle* (figure 6) that is created to make parents feel the need to escort their children to school (British Medical Association, 1997; Collins & Kearns, 2001; Engwicht, 1992; Hillman, Adams, & Whitelegg, 1990; Klöckner, 1999; Rauh, Fröhlich & Maierbrugger, 2001; Sustrans, 2002a).



**Figure 6:** The effect of ever increasing traffic on children’s freedom of movement (based on: British Medical Association, 1997)

Tranter and Pawson (2000) identified this “social trap” also in Christchurch. In their interviews many parents believed that cars were being used unnecessarily for the journey to school, but took the extra traffic around schools as an excuse for driving their own children to school.

### Social life of children

Lehner-Lierz (1997) mentions that today children’s lives take place on isolated “islands” within driving distance only: residential island, school island, friend’s island, playing island, sports island, ballet island etc. Children meet different children and adults on these islands, often for only one or two hours a week. Meetings with friends have to be arranged by telephone. Children do not have the possibility any more to experience their environments as something coherent as they seem too much shepherded by their parents. They become young commuters, driven by the “mummy-taxi” from one island to the other (Lehner-Lierz, 1999).

## 6. CHRISTCHURCH SCHOOL TRAVEL PATTERNS

### SELECTION PROCESS OF THE SIX SELECTED HIGH SCHOOLS

In order to obtain statistics on school travel patterns six Christchurch high schools were chosen from a total of 26 investigated. All six selected high schools were all situated between two and four kilometres from the City Centre and were almost equally distributed in all directions. Three schools were co-educational and three were single sex schools. The schools were carefully chosen to incorporate students from a different socio-economic background.

### QUESTIONNAIRE

The purpose of the survey was to gather information and data on the transport behaviour. A self-completion questionnaire survey was used to obtain quickly background information. The aim was to survey at least 10% of the students between the age of 13 and 18 of each school. Approximately 1,200 questionnaires could be evaluated representing 11% to 16% of the students of each school. It was assumed that each student was going to fill-in the questionnaire during class time to ensure a response rate close to 100%.

### SURVEY ANALYSIS

The modal split for travel to school was approximately 24% by foot, 19% by bike, 29% as car passengers, 9% as car drivers, less than 1% by motorbike, 6% by school bus, 10% by public bus and 2% not listed or unknown. The comparison between the modes of transport *to* and *from* school identified that a larger number of students walked home *from* school than walked *to* school. More students were driven to school than were collected and more students took the school or public bus for their way home. The mode choice is very much dependent on the distance to school. Walking is the predominant mode of transport for school journeys under 2 km. More than 70% of walking trips were less than 2 km and more than 90% were under 3 km. Very few cycle trips were under 1km, almost 80% are under 5km and only about 21% were 5km or more. Almost the same distribution was given for car passengers, but with a lower percentage of trips between 3 and 5 km and a higher percentage of trips over 5 km. Hardly any public bus trips were less than 2 km and less than 10% were shorter than 3 km. About 37% of the trips by public bus were between 3 and less than 5 km long and roughly 53% of the trips were 5km or longer. Approximately 21% of male students walked compared with 29% of female students. Whereas 29% of boys cycled, only 7% of girls did so. About 23% of male students got to school as car passengers compared with close to 38% of female students. About 11% of male respondents drove their own car to school compared with about 6% of female respondents. Five percent of the boys and about 9% of the girls took the school bus to school. Percentages of public bus users were about equal for male and female students, with 10% of males and 11% of females. The school journey took about 15 minutes overall for most modes of transport, but about 32 minutes for travelling by bus.

Comparing the actual and the preferred modes (in parenthesis) the following results were obtained: For walking and cycling: 44% (21 %), for car passengers: 29% (23%), for driving a car: 9% (42%), bus passenger: 17% (2.5%). With a total of 65% the car was the most popular transport mode. This can be compared with 37% of trips to school done by car at the moment. All students were asked what would make walking to school better for them or encourage them to walk. The most frequent answers (up to three out of eleven possible answers could be ticked) were: "more students to walk with (17%, 21%), "if I wasn't so lazy" (7%, 21%), "cleaner pavements" (16%, 6%), "wider pavements" (14%, 10%), "less traffic" (13%, 9%). Eighty-eight percent of male and 76% of female students owned a bike. All students were asked what would make cycling to school better for them or encourage them to cycle. The most frequent answers (up to three out of twelve possible answers could be ticked) were: "more cycle lanes (26%, 16%), "less traffic" (18%, 14%), "if I wasn't so lazy" (2%, 11%), "if I owned a bike or a better bike" (3%, 12%), "a safer place to leave my bike" (8%, 9%), "if I didn't have to wear a helmet"

(10%, 8%), “a cycle friendly uniform” (8%, 8%), “more students to cycle with” (7%, 8%). Trip chaining relationships were evaluated: between 48% and 71% of the 539 escort trips were made on the way to and/or from work. In the same way car pooling relationships were calculated: 48% of the car escort trips were accompanied by other students in the same car.

Figure 7 shows the mode of transport to and from school, where as figure 8 indicates the modal split depending on the distance to school

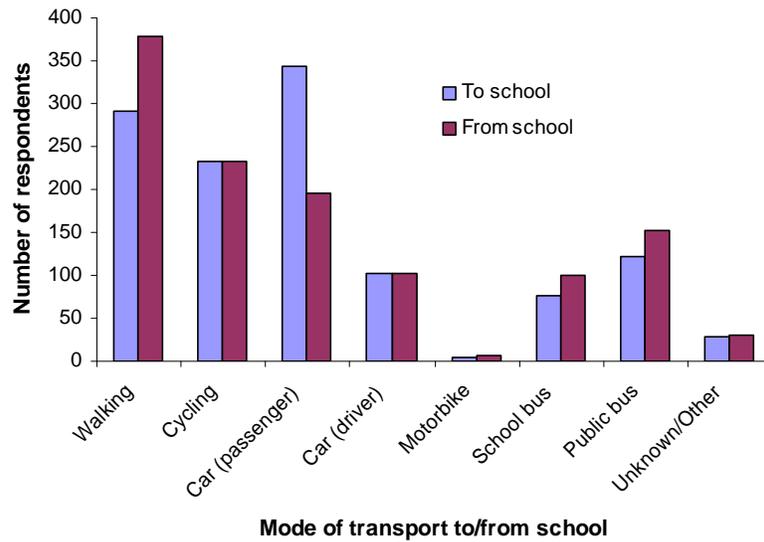


Figure 7: Modal Split on the way to and from school

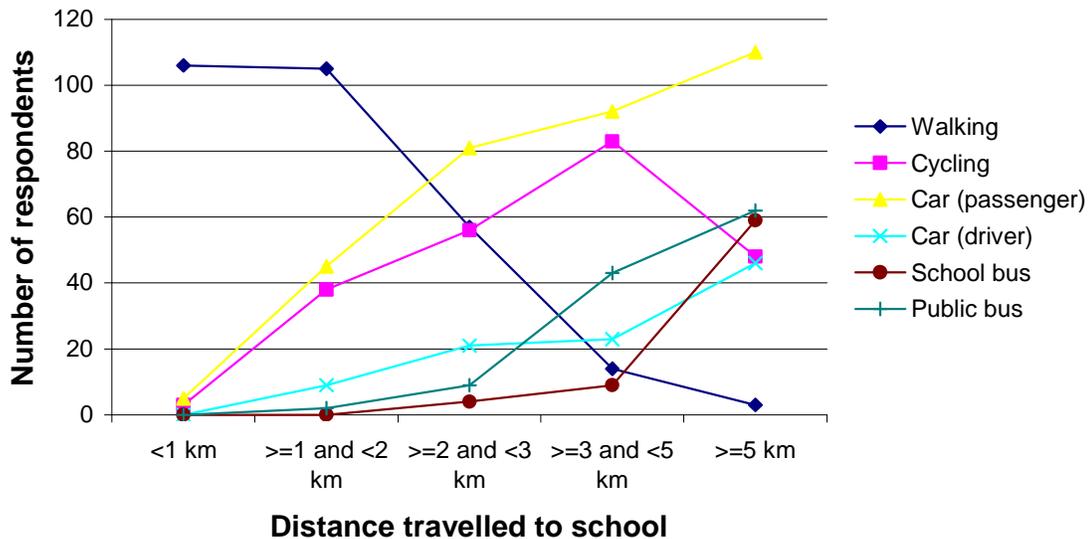


Figure 8: Mode of transport by trip distance

Driver licensing legislation in New Zealand allows students to drive on their own from the age of fifteen. Car driver license ownership rises from 31% at 15 to 65% of the 18 year-olds. It must be noted that 57% of male respondents 15 and older compared to 39% of females hold a license. Thirty-two percent of respondents holding a licence drive to school, about half of them owning their car. Thirty-one percent of all male respondents 15 years and over own a car compared to 18% of all female respondents 15 years and over. Seventy-three percent of the students using the public bus to and/or from school own a bus pass compared to 27% of all surveyed students (22% of male, 33% of female students). The following main criteria that would make travelling by bus to school better or encourage travelling by bus were named: “buses running more often” (19%, 18%), “a bus stop closer to my home” (15%, 20%), “cheaper bus fares” (16%, 19%), “more seats in the bus” (18%, 12%), “a shelter at the bus stop” (10%, 7%), “friendly and helpful drivers” (5%, 8%).

## 7. FUTURE OUTLOOK

The outcome of the study provided data on current attitudes that authorities can use as a basis for developing more efficient transport systems and infrastructure and for assisting with the development of new objectives, strategies and policies. The results of the behavioural assessment will support future policy making. However, the study also revealed that the current behaviour and attitudes do not support the Council’s objectives of sustainable transport as 37% use motor vehicles. The hard measures like restricted parking, improved and safer cycle facilities and improved bus connections will contribute to a shift of modes. However, the soft methods, such as education encouraging the use of more sustainable transport, will only occur if the government is prepared to induce a serious trend, such as increasing the running costs of motor vehicles.

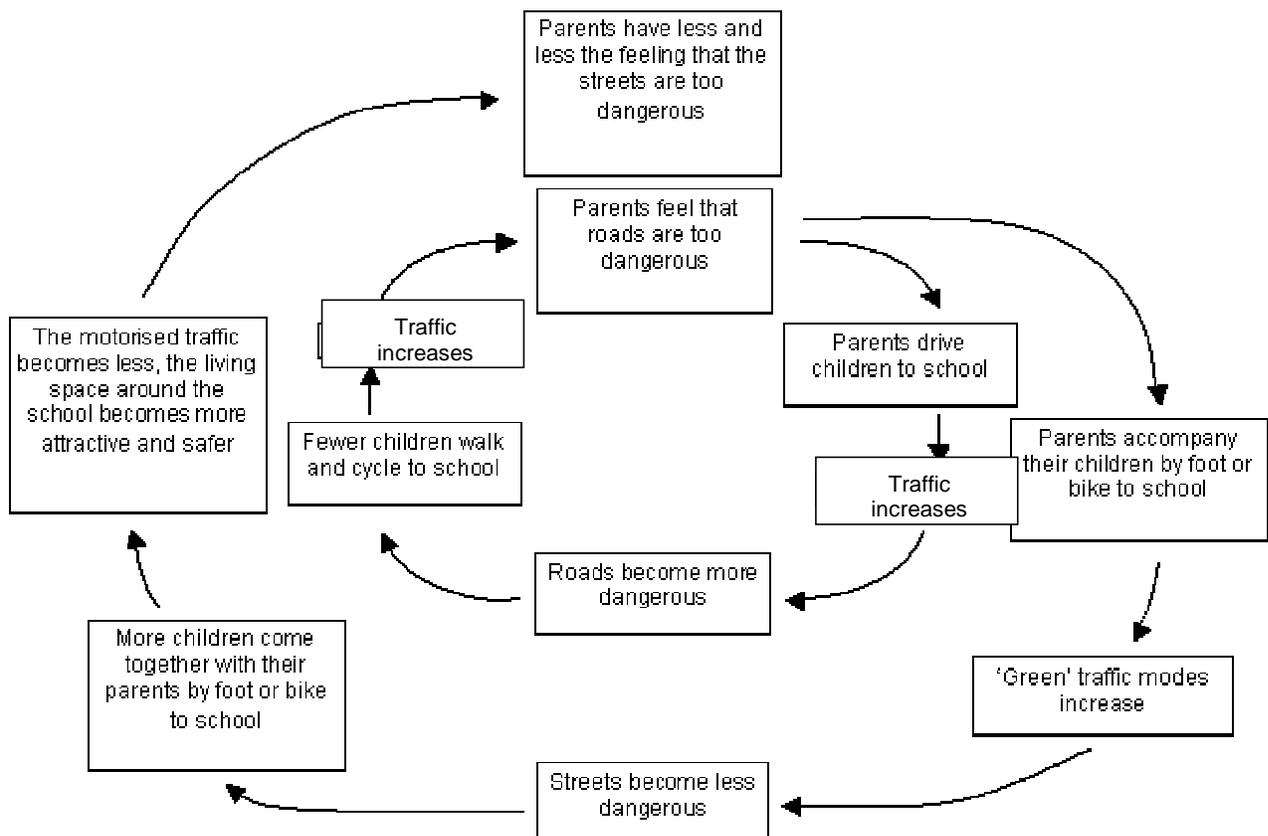


Figure 9: Mobility Management Diagram based on increased sustainability

Some countries in Europe have already moved in the right direction. The European Commission funded MOST (Mobility Management Strategies) the largest R&D project in the field of mobility management (MOST, 2000). At the same time EPOMM, the European Platform on Mobility Management was created (EPOMM, 2003). SUN (Saving Energy by Using Mobility Management in Schools) is another research and demonstration models based on findings to enhance the expansion of further development. Schools as traffic generators and responsible for education in an increasing surrounding of environmental protection, were seen as an important target group by local actors as needing to take responsibility in the management of local mobility management (Institut für Landes- und Stadtentwicklungsforschung, 2001 & 2002).

The Traffic Club Austria produced a brochure highlighting the participation process of bringing common-interest groups together to put mobility management for schools into practice through easy solutions and at low costs (Rauh et al., 2001). The Austrians considered participating and involving the students in the process will help to develop a fully conscious and critical attitude to mobility, which will influence their choice of mode of transport in later life (Rauh et al., 2001).

Rauh et al. (2001) created a new diagram (figure 9) based on figure 6 to indicate a new circle of mode of choice

## 8. RECOMMENDATIONS

The Christchurch findings are similar to other studies and similar means can be applied to achieve a modal shift in New Zealand. However, new measures need to be developed to overcome barriers specific to high schools in Christchurch. The background research (section 4) showed that there are many activities in New Zealand and Christchurch concerning school transport. An overall concept, however, is missing. Therefore, a coherent approach to school travel should be developed with an overarching organisation, such as the Ministry of Transport. A mixture of measures are required to initiate a modal shift. “Hard policies” (engineering measures) as well as “soft policies” (educational, enforcement, and especially encouraging measures) are required. A concerted effort by different authorities, health promoters, policy makers, planners, schools, students, parents, and other stakeholders is necessary to achieve a modal shift. This can only be comprised with Mobility Management, which can be implemented using Mobility Education and School Travel Plans.

**Recommendations to the Energy Efficiency and Conservation Authority (EECA)** are that this public body could take the lead in introducing Mobility Management for Schools and in the trial and development of School Travel Plans.

**Recommendations to the Ministry of Transport** include policies on a national level to reduce car use, such as increasing fuel taxes and introducing road taxes, but also the obligation for local authorities to produce School Travel Strategies.

**Recommendations to the Ministry of Education** are that School Travel Plans should be given a high priority and be part of an accreditation process when assessing schools. Road safety education could be broadened to Mobility Education including road safety, environmental, health and social education. Planning decisions affecting the size and geographical catchments of schools could promote independent travel and ensure accessibility with existent public transport. It could be made a requirement to prepare School Travel Plans for new schools, relocations or major developments. Together with the Ministry of Transport the extension of free bus travel for all students could be considered.

**Recommendations to the Land Transport Safety Authority** say that in driver education behaviour towards children, cyclists and pedestrians should be of high priority instead of focussing on road safety education. A parental education programme aimed at improving driver behaviour in the vicinity of schools could be implemented.

**Recommendations to the Police** concentrate on the enforcement of traffic regulations to reduce car use and improve safety. Sessions for children and parents on personal safety may be offered.

**Recommendations to Health Organisations** are strategies that promote awareness of the health benefits and improved personal well-being to be derived from active school travel.

**Recommendations to the Regional Authorities** relate to information, promotion and encouragement to use public transport by reconsidering their fare strategy (ie. most German universities include a compulsory semester ticket for public transport into their fees and only offer restricted fee paying car parks for people from outside town). Environment Canterbury (ECan) could carry out a survey among high school students to find out their attitudes towards travelling by bus and their specific needs (ie. better & more frequent schedules). ECan could be present as a partner of school projects. Devoting a web site to young customers was found to be an effective and low cost platform to reach young people and for market research. Since teachers can form opinions (multiplier-effects) and serve as role models, they could be targeted by transport operators to create a positive image for public transport in the classrooms. The survey showed that bus services in Christchurch have to be faster, more frequent, on time and offering sufficient space in rush-hours in order to be competitive with car travel. ECan may therefore adapt routes and timetables to the school travel requirements. ECan may consider pushing harder on their contracts with the bus companies to allow young people to combine different transport means with bus travel like roller blades and bikes. So far LTSA has been the main block for allowing bikes on buses, but examples overseas show that it is possible (ie. Seattle, some German cities), as the buses are designed in a different way to enable prams and bikes on board as long as sufficient space is given.

**Recommendations to the City Council** concentrate on improving the accessibility of schools through town and traffic planning. From a European perspective, it is perceived that it would be beneficial to have education facilities more clustered with shopping and retail facilities, as this would make the journey to school for walkers and cyclists more interesting, exciting and appealing. Traffic calming measures should include speed restrictions of 30 km/h in residential areas and in the proximities of schools, including car free residential areas (many European cities have adopted this scheme with new residential areas), extensive pedestrianisation around schools. Safe crossing facilities should be provided with traffic lights in favour of pedestrians and not motor vehicles. Parking should be restricted around schools. Pedestrian and cycle facilities need to be improved, especially along main high speed arterial roads by introducing wider and cleaner pavements, larger and well maintained cycle lanes, denser network of walk- and cycleways providing shortcuts, walkways with meeting points. It is crucial to have safe cycle ways on main traffic corridors and to ensure the intersections are safe to cross. The Christchurch City Council should encourage schools to create School Travel Plans in combination with their traffic planners. They could be linked with the creation of Local Area Traffic Management Schemes and Neighbourhood Improvement Plans. Other measures by the City Council could be monetary support for Mobility Management at schools. The bicycle should have a special role as a transport means for secondary students in Christchurch. Bus priority measures (ie. at traffic lights) or special bus lanes in busy locations will help make public transport faster, especially during peak travel times. As New Zealand is a signatory to the UN Convention to the Rights of the Child, "due weight" to the views of the child should be given. Young people could be encouraged to participate in urban and traffic planning.

**Recommendations to the schools** focus on school policy, curriculum work, publicity and promotion and suggested changes to facilities (ie. Parking, drop-off places in safe areas away from main entrance). School Travel Plans should be developed.

**Recommendations concerning parents** are aimed at changing their mode choice and making them aware of the downside of their current practice.

## 9. CONCLUSION

The effects of escorting and passive forms of travel are congestion, extra parking requirements, drop off and pick up spaces, increased traffic danger, reduced personal safety, reduced health and fitness, disturbed psychological health and development, loss of independent mobility, poorer social life of children, reduced cognitive skills, development of car-dependent lifestyles and social inequity. The effects on the parents' lives are the time spent driving, the financial cost and possible external losses, such as leisure time.

The number of Christchurch high school students is likely to increase and the costs of motor vehicle use in New Zealand is unlikely to rise significantly, therefore, congestion will not disappear. It can be seen from the effects listed in this paper that a change in modal choice is necessary and highly desirable. The means to change modal choice are road safety education and road safety measures at schools such as School Crossing Patrols and speed limits, Safe Routes To School programmes and School Travel Initiatives. A relatively new approach is Mobility Management for Schools. Unlike other approaches, Mobility Management involves new partnerships and tools to support and encourage a change of attitude and behaviour towards sustainable modes of transport. These tools are usually based on information, communication, organisation, coordination and require active promotion and ownerships taken by authorities, schools, parents and students in order to apply sustainable travel management plans for each school. Education, sustainable infrastructure and cooperation will become the key drivers to overcome this particular congestion problem.

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