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Introduction

This report provides an assessment of the reasons people don't walk and cycle in New Zealand. The purpose is to provide useful background knowledge for a survey of pedestrian and cyclists' perceptions to be conducted in the 2004/2005 financial year, help in the design of measures to increase walking and cycling, and also contribute to the *Getting there – on foot, by cycle strategy*. The assessment is based on a review of New Zealand and international research and analysis of data gathered by Sport and Recreation New Zealand (SPARC).

The focus of the literature review is the reasons people give for not walking or cycling. This excludes certain bodies of literature, for example, studies correlating cycle use with measured weather conditions such as those of Hanson and Hanson (1977) and Emmerson, Ryley, and Davies (1998). Though these studies suggest why people may not cycle, Hanson and Hanson (1977) and Emmerson, Ryley, and Davies (1998) did not examine the reasons people gave for not cycling so these are excluded from the review. Cycling and walking for recreational purposes and for commuting or work purposes may occur in the road environment. Because of this no distinction is made here between recreational and commuting, walking and cycling.

The literature review is presented first. This review begins with a section that summarises the method and results of each reviewed paper, separated into adults reasons for not cycling, adults reasons for not walking, and the journey to school. This is followed by a discussion of the main themes of the literature, variability of results, and wider research issues. The analysis of the SPARC data is then presented followed by the assessment of why people do not walk and cycle in New Zealand and recommendations for further investigations.

Literature Review

1.1 Methodology

A mixture of methods was used to locate the literature reviewed here. The LTSA provided some articles and Opus already had some relevant articles. The author performed some web, TRIS, and *PsycINFO*® searches and examined the references of located articles for further relevant articles. Opus Librarians conducted searches of a number of databases. These included the *Transport* database (on CD-ROM) 1972 – present (this includes the OECD, TRB, and TRIS database), *Australian Transport Index* (on CD-ROM) 1976-present (ARRB's database), *Te Puna* (NZ national bibliographic network), *NTIS* (National Technical Information Service), *Ei Compendex*®, *Social SciSearch*®, *PsycINFO*®, *Dissertation Abstracts Online*, *Inside Conferences*, *Wilson Social Sciences Abstracts*, *Pascal*, and the *Gale Group Health & Wellness Database* (SM). Throughout the search and review process emphasis was placed on providing the range of factors that influence why people don't walk and cycle rather than providing an exhaustive review of all or particular parts of the literature.

1.2 Summary of studies

The studies reviewed are examined in separate sections: Adults reasons for not cycling, adults reasons for not walking, and the journey to school. Some of the studies reviewed here are mentioned in more than one section. Details on and comments about the methodology of the study are generally given when it is first mentioned.

1.2.1 Adults Reasons For Not Cycling

International Studies

Goldsmith (1992) reviews seven North American cycling studies (and states that most surveys report that safety is the major deterrent to bicycle commuting. Goldsmith (1992) presents two tables. The first table contains four North American Studies (of Boston, Gainesville, Portland, and Vancouver) detailing the factors given by the general public for not cycling. Two of these studies have been 'second sourced' from a 1979 review and the third is not fully referenced and could not be located. Safety was the most common reason in one of the four cases; with weather being the most common reason cited in the other three. In one case traffic safety was also rated below inadequate parking. The other categories in the table of "too slow" and "road conditions" were not recorded in enough studies to make similar comparisons possible. The second table contains four North American Studies (of Phoenix, Seattle, Portland, and Orange County) detailing the factors given by cyclists for not cycling. All four of these studies found that "too far to ride" was the most common reason given, with the next most common reasons being safety in three cases. The poor citing of the references means that little weight should be put on this report. While the data cited in the review suggests that safety is important, it does not appear to conclusively support Goldsmith's (1992) view that safety is the major deterrent to cycling.

A national survey has recently been conducted on pedestrian and cyclist behaviour in the U.S (US Department of Transportation's National Highway Traffic Safety Administration and the Bureau of Transportation Statistics (NHTSA & BTS), 2003a; 2003b). At this stage only a summary of the results and the interview questionnaire (NHTSA & BTS, 2003a; 2003b) appear to be available. Complete evaluation and description of this study is not possible but the studies results will be summarised here. The majority of the sample (72.1%) had not ridden a bicycle for at least the last month and reported the primary reasons for this were:

- "lack of access to a bicycle" (26.0 %)
- "too busy/no opportunity" (16.9%)
- "disability/other health impairment" (10.3%)
- "bad weather/wrong season" (8.2%)
- "don't want to/don't enjoy it" (6.5%)
- "age" (5.3%)
- "no safe place to ride" (3.4%)
- "don't know how to ride" (3.0%)
- "prefer to walk/run" (2.6%)
- "other" (18.0%)

It can be seen that the “other” category is quite large, indicating that the categories used in this study do not capture all the reasons people do not cycle. The study was conducted in summer so the role of bad weather in cycling is likely to be under represented in this study.

Davies et al. (1997) gathered qualitative data on why people do not cycle from 13 focus groups in the UK. Davies et al. (1997) found that reasons given for not cycling were: cycling's lack of status, danger from traffic, personal safety fears, sexual harassment, cycle theft and vandalism, traffic fumes, weather, hills, personal image, and cycle technology purchase and maintenance difficulties. The authors note that the majority of participants considered that car dependence was the most important deterrent followed by traffic danger, and note that fear of traffic was often associated with other traffic features such as noise and fumes (Davies et al., 1997). Cars were seen as having advantages over cycling in non-transport areas such as status and sexual potency and the negative features of car transport such as congestion were down played (Davies et al., 1997). Davies et al. (1997) consider that the dependence upon and “dominance of car culture” are more likely to account for why people don't cycle than more direct factors such as safety. The qualitative nature of the data in Davies et al. (1997) means that further research is required to provide convincing evidence of this.

Snelson, Lawson, and Morris (1993) surveyed 1000 UK motorists and examined why motorists do not cycle. Motorists were categorised into non-cyclists, leisure-only cyclists, and cycling motorists (those that replace some car trips with cycle trips). The article does not give enough detail on the methodology to ascertain precisely the survey design but it appears to have utilised some form of closed questions with items being derived from an initial qualitative phase. The lack of methodological detail and the fragmented presentation of the results make interpretation of this study difficult. One problem is that both “reasons” and “main reasons” are discussed and percentages given for some but not all items, while another problem is inaccurate description of the results. Reasons given by non-cyclists (n = 690) include:

- “I bought a car/moped” (>25%)
- “it's more convenient to use a car or motorcycle” (>25%)
- “I'm too old” (17%)
- “cycling is just too much effort” (8-16%)
- “it is too dangerous to cycle” (11-17%)
- “the amount of traffic on the roads” (7-16%)

There is another report (AA, 1993) based on the same data as that reported by Snelson, Lawson, and Morris (1993) which reports the main reason people do not cycle anymore as:

- “I've got a car/motorcycle” (15%)
- “car/motorcycle is more convenient” (13%)
- “I don't own a bike any more” (13%)
- “too dangerous” (11%)
- “too old” (11%)
- “too much effort” (8%)

- “too much traffic” (7%)
- “not fit enough” (10%)
- “other” (12%)

Snelson, Lawson, and Morris (1993) state that while cyclists are concerned with safety this does not stop them from cycling. Snelson, Lawson, and Morris (1993) and AA (1993) also present a decision-making model with the basic form of (1) Buy bike, (2) Assess trip, and (3) Form habit. These authors discuss the factors that influence the decision to cycle in some detail, however, it is not clear where the empirical support for their model comes from and it may or may not be a summary of the authors' views.

Davies and Hartley (1997) interviewed British bicycle purchasers in Birmingham, Essex, and York, of which 41 had not cycled in the last two years. These cyclists were asked whether there was a reason they had stopped cycling. Having acquired a car (44%) was the most common reason followed by “the bicycle fell into disrepair”, “grew out of it/changed lifestyle”, “didn't own a bicycle”, “too busy/no time to cycle”, “roads became more dangerous”, “bicycle was ‘no good’”, “bicycle was stolen”, and “couldn't find anywhere suitable to park”. Percentages for most categories of responses, procedure for categorisation, definitions of categories, and reliability of the categories were not given in Davies and Hartley (1997). This, combined with the sample size and method of selection of participants, limits the generality of the results of this study.

Gardner (1999) reports the results of a pilot survey involving 600 British cyclists and non-cyclists but do not state how many participants of each type took part. Gardner (1999) found that:

- 28% of cyclists and 57% of non-cyclists considered that there were too many barriers to cycling
- 10% of cyclists and 28% of non-cyclists considered that they were not fit to cycle
- 18% of cyclists and 35% of non-cyclists considered that they were too lazy to cycle
- 10% of cyclists and 30% of non-cyclists considered that they could not control a bicycle

The results of this pilot study should be taken as indicative of possible reasons only.

An Australian study (referred to here as Cycle Planning, 2001) conducted qualitative interviews with 41 Sydney women who owned or had access to a bicycle but whose cycling was limited or non-existent. Deterrents to cycling were stated as:

- “lack of bicycle facilities” (36%)
- “lack of on-road safety” (32%)
- “lifestyle choice” (15%)
- “individuals safety concerns” (10%)
- “bike design and bike equipment” (5%)
- “bicycle parking facilities” (2%)
- “too hilly” (0%)

Although descriptions of coding categories are given, no information on the reliability of the categorisation process is given, so the reliability of the results is questionable (Cycle Planning, 2001).

Jackson and Ruehr (1998) report the findings of a San Diego telephone survey (N=3800) on cycling. The most common reason given for not cycling was "not interested" (29%), followed by "no time/too busy" (22%), and "physical limitations" (17%). They report that the main reason given for not cycling in their local community was "a lack of desired bike facilities" (41%) while for not cycling to work it was "too far/distance too great" (Jackson & Ruehr, 1998). Jackson and Ruehr (1998) did not report response rates but did report the number of calls made, the maximum call allowed to each house, and the number of participants. From this data it is clear that the participation rate was low in this study (i.e., <27%).

Nankervis (1999) surveyed 46 cyclists cycling in the Melbourne central business district from 7:00-9:00 am on the effect of weather on cycling and the amount of riding for each month of the year. In response to heavy rain 60.9% reported that they would use an alternate mode, while 17.4% reported that they would use an alternative mode in response to light rain or wind. From a figure presented by Nankervis (1999) it can be seen that the percent riding for each month varied with the winter months appearing lower than the summer months. Nankervis (1999) describes the effect of weather to be less than previously reported in the literature. Cyclists were surveyed on a "generally fine" day, implying that the sample of cyclists selected might have excluded those who would only cycle on a completely fine day and hence underestimate the effect. In addition, only existing cyclists were surveyed. Both these factors might result in an underestimate of the effect of weather in deterring cycling for the general public.

New Zealand Studies

The University of Auckland Bicycle Users Group (2004) conducted a survey of cycle parking demand at Auckland University with approximately 200 participants. Little information is available on the methodology used, which at this stage precludes firm conclusions being made from this study. Under "deterrents to cycling" is given:

- "fear of bike being stolen/damaged" (28%)
- "danger of cycling on busy roads/inconsiderate drivers" (23%)
- "absence of bike-lanes" (18%)
- "no convenient bike storage near workplace" (13%)
- "absence of showers & changing facilities on campus" (10%)
- "fear of bike getting wet" (10%)

Wilde (2000) contains data from a survey of 1476 Canterbury University staff and students on travel to campus (Note that Nicholson & Kingham (2003) present what appears to be the same data and graphs). Car driving participants were asked to indicate the main reasons that they used a car to drive to university from:

- "to visit shops etc. on way to/from University"

- "used during day to perform job"
- "used during day for non-work purposes (e.g. visit to doctor)"
- "personal security during journey"
- "ease of use/convenience"
- "dropping and collecting children"
- "lack of alternative form of transport"
- "cost"
- "free car parking at University"
- "other"

Participants were also asked to indicate all that apply, which may have contradicted the instruction to choose main reasons. "Ease of use/convenience" was the most common reason given followed by "to visit shops", "used during day for non-work purposes", and "used during day to perform job", for both students and staff. Some differences appear for the other items between staff and students (e.g. dropping and collecting children) however from Wilde's (2000) graphs it can be seen that cost and personal security during journey are amongst the lowest reasons given.

Wilde (2000) asked Canterbury University staff and students how they would usually travel to the university under four different travel conditions: warm and dry, cold and dry, warm and wet, and cold and wet. Wilde reports that cold and wet weather increase car usage and decrease bike usage, with wetness having a greater effect than coldness. It is not clear what statistical tests were used to arrive at these conclusions. From Wilde's (2000) graphs it appears that walking also decreases with cold and wet weather.

All participants were also asked in Wilde's (2000) survey how they would get to university if they could not use a car. For students the most preferred alternative was walking followed by cycling, then taking a bus (Wilde, 2000). For staff the most preferred alternative was cycling followed by taking a bus, then walking (Wilde, 2000). The results of a previous item indicated that the two most common ways of getting to university were as a driver and as a passenger of a motor vehicle. This study did not directly ask people why they did not cycle or walk but did ask about perceptions of exposure to air pollution, finding that cycling and walking were perceived as being by far the most exposed to air pollution, and also asked about the travel time taken if a car could not be used, finding that the travel time would be longer.

A survey by the National Research Bureau (NRB; 2003) involved 1002 telephone surveys of residents in the Greater Wellington Regional Council area, which appear to have included open-ended questions on reasons for not walking and cycling more often. The NRB (2003) examined participants who reported that they could easily walk/cycle between 10% and all of their current short trips (n = 712). For cycling the main reasons cited were:

- "don't have a bike/don't cycle/don't like cycling" (41%)
- "safety/no passing lanes/busy roads/traffic too fast" (12%)
- "time/quicker/too busy" (7%)
- "terrain/hilly" (6%)

- "weather conditions/wet/cold/windy" (6%)
- "elderly/age factor" (5%)
- "lazy/can't be bothered" (4%)
- "convenience/easier habit" (4%)
- "distance" (3%)
- "physical condition" (3%)
- "children/easier/more convenient with children" (3%)
- "shopping/too much to carry" (2%)
- "security problems/no where to leave bike" (2%)
- "bike needs repairing/servicing" (1%)
- "have to use car for business/work" (1%)

Examples are given of participant responses that fit into each category but no data on the reliability of the coding are presented. The analysis presented does not include those who did not think that they could walk and cycle less than 10% of their short trips (NRB, 2003). The NRB survey also found that 42% of all participants think that people are unsafe when cycling (NRB, 2003).

1.2.2 Adults Reasons For Not Walking

International Studies

Goldsmith (1992; see page 2) reviews reasons for not walking from three North American Studies (of Seattle, Toronto, and Ottawa) concluding that distance is the most common reason given for not walking and also listing carrying things, time limitations, and fear of crime as other reasons given. The referencing of these studies is poor, as already noted for the cycling studies reviewed by Goldsmith (1992, see page 2). From the table provided distance is the most common reason across two of the three studies. Wide variation is seen in the commonness of "difficult to carry things" across studies and "fear of crime" is only mentioned in one study where it is ranked seventh out of ten reasons.

A recent national US survey by the NHTSA and BTS (2003a; 2003b, see page 2) found that approximately a fifth of the sample (21.3%) had not walked (defined as walking, jogging, or running for 5 minutes or more) in at least the last month and reported the primary reasons for this were:

- "disabilities/other health impairments" (24.5%)
- "bad weather/wrong season" (22.0%)
- "too busy/no opportunity" (18.8%)
- "other transportation is faster" (4.0%)
- "lazy" (3.9%)
- "don't want to/don't enjoy it" (3.5%)
- "no safe place to walk" (3.0%)
- "prefer to drive/have a vehicle" (2.5%)
- "other" (17.9%)

The high percentage of “other” indicates that the categories used do not account for the reasons people do not walk.

Belden Ressonello and Stewart (2003) surveyed a national sample of 800 Americans by telephone to obtain their attitudes towards walking. The reasons selected for not walking more were:

- “things are too far to get to and it is not convenient to walk” (61%)
- “not enough time to walk” (57%)
- “laziness” (33%)
- “it is hard to walk where I live because of traffic and lack of places to walk” (30%)
- “it is hard to walk where I live because there are not enough sidewalks or crosswalks” (26%)
- “physically I am unable to walk more” (20%)
- “I do not like to walk” (17%)
- “there is too much crime to walk where I live” (13%)

James, John, and McKaskill (2001) conducted interviews with 406 West Australians that included questioning why people did not walk instead of taking a car for trips. The authors state that being too far to walk was cited in 78% cases. From a table that appears to give the number of times each reason was given the following percentages were calculated:

- “distance too far > 2 km” (69.5%.)
- “no reasons” (6.5%)
- “luggage not easy to carry” (6.2%)
- “journey considered too long to walk < 2 km” (6%)
- “usually too uncomfortable” (3.8%)
- “usually too slow” (3%)
- “was taken as a passenger instead” (2.7%)
- “don't want to walk” (2.3%)

Mackett (2003) interviewed 377 UK people (in London, Leeds, Ipswich, Hereford, and Dorset) on their reasons for making particular short trips (<8 km) by car. Interviewers used prompts to elicit responses about trips that were then coded. The definitions for the coding categories used, the procedure for coding, or the reliability of coding are not given, meaning that the results should be interpreted with some caution. Major reasons given for using a car were:

- “heavy goods” (19%)
- “lift for family” (17%)
- “short of time” (11%)
- “long way” (11%)
- “convenience” (10%)
- “further trip” (9%)
- “needed at work” (5%)
- “bad weather” (5%)

- “dark out” (4%)
- “social” (4%)
- “taking old or ill person” (3%)

Safety was not given as a reason, though darkness can be viewed as reflecting a concern for personal safety. Differences across spatial areas and demographic variables are discussed, however no statistical tests are reported.

When questioned on alternatives to use of a car, 22% could come up with no alternative, 31% mentioned walking, 31% mentioned taking a bus, and 7% mentioned cycling (Mackett, 2003). Mackett (2003) presented a table of reported alternatives to the use of a car categorised by reasons for using a car. Again no statistical test was reported, and while Mackett (2003) suggests that mode change strategies might be based on these results, the distribution of alternative modes appears very similar across reasons for using a car except for variation in the number selecting “no alternative”. Mackett (2003) notes that investigating particular short trips is a feature of this study to be contrasted with the normal practice of investigating general trip choice. Interviewing on specific trips has the potential for generating data that is anchored better but may also lead to a greater need for participants to plausibly justify their travel behaviour in a way perceived to satisfy the interviewer.

New Zealand Studies

Longdill and Associates Ltd (2003) surveyed 503 residents of Manakau City to ascertain citizens' perspectives on a range of issues relevant to the Manakau City Council. This survey did not cover walking, however, it did cover reasons why people had not used public transport in the last year, which has some relevance to walking. The majority considered that they “had no need/had a car” (63%) while 12% considered that the bus stops were too far away.

The NRB (2003, see page 6) examined reasons for not walking for Wellington Region respondents who reported that they could easily walk/cycle between 10% and all of their current short trips (n = 712). For walking the main reasons cited were:

- “time factor/quicker/too busy” (33%)
- “weather conditions/wet/cold/windy” (19%)
- “distance” (14%)
- “convenience/easier/habit” (10%)
- “lazy/can't be bothered” (10%)
- “shopping/too much to carry” (9%)
- children/easier/more convenient with children” (6%)
- “terrain/hilly” (6%)
- “physical condition” (5%)
- “safety reasons/too dark/assault/roads unsafe” (5%)
- “elderly/age factor” (2%)
- “have to use car for business/work” (2%)

The NRB survey also found that 9% of participants think that people are unsafe when walking (NRB, 2003).

1.2.3 Reasons for not cycling or walking the journey to school

International Studies

In a telephone survey of 800 Americans by Belden Ressonello and Stewart (2003, see page 8), parents whose children (aged 7 - 17) did not walk or bike to school (n = 166) were asked to indicate the reasons that their children did not walk to school. The most common reasons cited were:

- "School is too far away" (66%)
- "too much traffic and no safe walking route to the school" (17%)
- "fear of child being abducted" (16%)
- "not convenient to have child walk - drop them off by car on the way to work" (15%)
- "crime in the neighbourhood" (6%)
- "your children do not want to walk" (6%)
- "school policy against children walking to school" (1%)
- "none of the above" (8%)

Dellinger and Stanton (2002) report the results of a survey that asked a national U.S. sample with children aged 5-18 years (n = 749) whether six conditions made it difficult for them to walk or cycle to school. Almost a fifth of the participants (18%) did not complete this question. For the remaining 611 the conditions reported were:

- long distances (55%)
- traffic danger (40%)
- other reasons (26%)
- adverse weather conditions (24%)
- crime danger (18%)
- opposing school policy (7%)

Eighteen percent of the respondents reported that there were no barriers to walking or cycling. Comparing primary (5-11) and secondary (12-18) aged children, Dellinger and Stanton (2002) found that traffic and crime danger were reported significantly more than for secondary aged children. The high percentage of participants not completing this question raises some doubt about the adequacy of this item.

Bradshaw (1995) surveyed a sample of UK parents (n = 144) and children aged 9-13 (n = 426) from Leeds. Bradshaw reports that the major deterrent to cycling to school was the possibility of the cycle being stolen. Different reasons were given for the different schools, for example 16% of respondents of a Comprehensive school reported that their bicycle was not road worthy while 17% at a private girls school reported that traffic volume deterred cycling. Bradshaw (1995) also examined reasons for accompanying children to school and found that just over 40% of car drivers

cited convenience as the most common reason, followed by the personal safety of the child at almost 40%.

Woodside, Gunay, and Seymour (2002) surveyed students of three Northern Ireland schools in Larne. They found that during the winter months there was a shift from walking to being driven to school. Comparing those who are always driven to school with those who walk during summer but were driven during winter, Woodside, Gunay, and Seymour (2002) found that the main reasons given for being driven to school was "only real option" (38% and 45% respectively) and "more convenient /time constraints" (27% and 29% respectively). The next most common reason was "live too close for free transport" (15%) for those walkers being driven in winter, and "more comfortable/weather factors" (15%) for those who were always driven. Although the overall sample size appears to have been high (N=500), the size of the sample of walkers who are driven in winter may have been relatively small (n = 36).

Lord and Murray (2004) surveyed a sample of UK high school children (N=3500) in Leeds and found that the main reason for not cycling to school were:

- "fear of theft" (63%)
- "traffic danger" (59%)
- "bad weather/darkness and fear of attack by strangers" (36%)

When examined by gender, females greatest concern was "fast moving traffic" (72%), while males was "bike may get stolen" (66%). Overall Lord and Murray (2004) found that females (average worry = 34.66%) were more worried about cycling than males (average worry 26.95%). Details of the method used were not reported.

New Zealand Studies

O'Fallon and Sullivan (2001) interviewed parents from Auckland (n = 65) and Wellington (n = 63) who drove their children to school but were not on their way to work. The survey item relating to main reasons for driving children to school appears to have been fixed choice. The main reason was "Already going out in the car at that time" followed by "Child/ren too young", "Concerned about child/ren being exposed to the weather", "Live too far from school", and "Believe it is unsafe for children to walk or cycle to school". Only the order of importance is given, so it cannot be established how much more or less important each reason is.

The National Research Bureau (2003, see page 6) telephone survey of 1002 residents in the Greater Wellington Regional Council area found that 60% of respondents would not let a child (<12 years of age) cycle unsupervised to and from school and 23% would not let a child cycle unsupervised in the vicinity of their home. The reasons given by these participants for not allowing a child to cycle unsupervised to and from school were:

- "too much traffic" (30%)
- "poor driving/traffic danger/accidents" (29%)
- "no cycle lanes/narrow roads/no provision for cyclists" (15%)

- "lack road sense/don't know road rules/unpredictable" (12%)
- "speeding traffic/drive too fast" (11%)
- "stranger danger/child molester/abduction" (10%)
- "dangerous/safety unspecified" (8%)
- "too young" (8%)
- "distance" (6%)
- "hills/too steep" (4%)
- "should be supervised at all times" (3%)
- "winding roads/blinds corners/poor visibility" (2%)
- "heavy traffic" (2%)
- "driveways are unsafe" (2%)

The reasons given by these participants for not allowing a child to cycle unsupervised in the vicinity of their home were:

- "too much traffic" (31%)
- "poor driving/traffic danger/accidents" (19%)
- "dangerous/safety unspecified" (11%), "speeding traffic/drive too fast" (10%), "stranger danger/child molester/abduction" (9%)
- "too young" (9%)
- "hills/too steep" (9%)
- "no cycle lanes/narrow roads/no provision for cyclists" (9%)
- "lack road sense/don't know road rules/unpredictable" (8%)
- "winding roads/blinds corners/poor visibility" (5%)
- "should be supervised at all times" (3%)
- "driveways are unsafe" (2%)

The National Research Bureau (2003) asked questions on walking similar to the cycle questions above, finding that 40% of parents would not let a child walk unsupervised to and from school, and 11% of parents would not let children walk unsupervised in the vicinity of their home. The reasons given for not letting a child walk unsupervised to and from school were:

- "stranger danger/child molester/abduction" (49%)
- "traffic/volume/major roads/have to cross road" (16%)
- "dangerous/safety unspecified" (16%)
- "distance too far" (14%)
- "too young" (9%)
- "accompanied by parent/need supervision" (7%)
- "only in a group/with other children" (5%)
- "lack road sense/experience/easily distracted" (5%)
- "condition of roads/too narrow/no foot paths" (2%)

The reasons given for not letting a child walk unsupervised in the vicinity of their home were:

- "stranger danger/child molester/abduction" (38%)

- “too young” (19%)
- “need supervision/keep an eye on them/inexperienced” (18%)
- “too much busy traffic busy road” (15%)
- “poor driving/traffic danger/speeding” (15%)
- “too dangerous/safety (unspecified)” (14%)
- “condition of roads/too narrow/no foot paths” (5%)

Methodological issues with this study have been mentioned previously and should be considered when interpreting the results (see page 7).

1.3 Discussion of literature

1.3.1 Identification of Main Themes

Overall the robustness of the methods used in the literature and the number of studies found was low. Because of this, relevant studies, including those that have been criticised methodologically, have been included in the discussion below.

Wide variation in the reasons adults gave for not cycling was found in the international and New Zealand literature. Table 1 shows the top three reasons for adults not cycling from the literature reviewed. Main reasons found for individual studies included adverse weather, distance, and safety (Goldsmith, 1992), lack of access to a cycle (NHTSA & BTS, 2003a; 2003b), car dependence (Davies et al., 1997), purchase of a car/moped (Snelson, Lawson & Morris, 1993/ AA, 1993); Davies & Hartly, 1997), lack of bicycle facilities (Cycle Planning, 2001), not interested (Jackson & Ruehr, 1998), fear of cycle being stolen/damaged (University of Auckland Bicycle User Group, 2004), ease of use of car (Wilde, 2000), and “don't have a bike/don't cycle/don't like cycling” (NRB, 2003). This lack of consistency across studies makes it difficult to reach conclusions on the relative importance of reasons. Possible important reasons include lack of access to a bicycle, lack of ability to cycle, lack of status of cycling, safety, laziness, lack of time, lack of cycle facilities, possibility of theft or damage to cycle, hilly terrain, and wet/cold weather.

Few studies investigating the reasons given for not walking were found. The lower section of Table 1 shows the top three reasons for adults not walking from the literature reviewed. Again, little consistency was seen in the reasons given by adults for not walking, with individual studies finding the main reason being distance (Goldsmith, 1992; James, John, & McKaskill, 2001), distance and convenience (Belden, Ressonello & Stewart, 2003), disabilities/other impairments (NHTSA & BTS, 2003a; 2003b), inability to carry things (Mackett, 2003) and “time factor/quicker/to busy” (NRB, 2003). Again the lack of consistency prevents firm conclusions about relative importance of the reasons, however it would appear that distance is an important characteristic. Other reasons that may be important include carrying things, lack of ability to walk, lack of time, bad weather, convenience of other modes, laziness, and fear of crime.

Table 1. Top three reasons for adults not cycling and walking for reviewed studies.

Study	Cycling		
	First Reason	Second Reason	Third Reason
Goldsmith (1992) Public (4 studies reviewed)	traffic safety (1 study) adverse weather (3 studies)	traffic safety (2 studies) adverse weather (1 study) inadequate parking (1 study)	traffic safety (1 study) too slow (1 study) road conditions (2 studies)
Goldsmith (1992) Cyclists (4 studies reviewed)	too far to ride (4)	too dangerous (3)	lack of facilities (3)
NHTSA & BTS (2003a; 2003b)	lack of access to a bicycle	too busy/no opportunity	disability/other health impairment
Davies et al. (1997)	car dependence	traffic danger	
Snelson, Lawson, and Morris (1993)	bought a car/moped	it's more convenient to use a car or motorcycle	I'm too old
AA (1993) same data set as above	I've got a car/motorcycle	car/motorcycle is more convenient	I don't own a bike any more
Davies and Hartley (1997)	acquired a car	bicycle fell into disrepair	grew out of it/changed lifestyle
Gardner (1999) cyclists	too many barriers to cycling	too lazy to cycle	not fit to cycle & could not control a bicycle
Gardner (1999) non-cyclists	too many barriers to cycling	too lazy to cycle	could not control a bicycle
Cycle Planning (2001)	lack of bicycle facilities	lack of on-road safety	lifestyle choice
Jackson and Ruehr (1998)	not interested	no time/too busy	physical limitations
University of Auckland Bicycle Users Group (2004)	fear of bike being stolen/damaged	danger of cycling on busy roads/inconsiderate drivers	absence of bike-lanes
Wilde (2000) use car because...	ease of use/convenience	to visit shops	used during day for non-work purposes
NRB (2003)	don't have a bike/don't cycle/don't like cycling	safety/no passing lanes/busy roads/traffic too fast	time/quicker/too busy
Walking			
Goldsmith (1992; 3 studies reviewed)	distance (2 studies) difficult to carry things (1 study)	too slow/takes too long (1 study) distance (1 study) difficult to carry things (1 study)	weather (1 study) too slow/takes too long (2 studies)
NHTSA and BTS (2003a; 2003b)	disabilities/other health impairments	bad weather/wrong season	too busy/no opportunity
Belden Ressonello and Stewart (2003)	things are too far to get to and it is not convenient to walk	not enough time to walk	laziness
James, John, and McKaskill (2001)	distance too far > 2 km	luggage not easy to carry	journey considered too long to walk < 2 km
Mackett (2003) use car because...	heavy goods	lift for family	short of time
NRB (2003)	time factor/quicker/too busy	weather conditions/wet/cold/windy	distance

A number of studies examined the journey to school, but again there are inconsistencies between the studies. Table 2 shows the top three reasons for children not cycling and walking the journey to school. The possibility of the cycle being stolen or damaged was the major reason given by high school children for not cycling in two studies (Bradshaw, 1995; Lord & Murray, 2004), with traffic danger also featuring highly. United States parents whose children do not walk or cycle to school tend give distance as the major reason for children not walking or cycling followed by traffic and crime danger (Belden, Ressonello, & Stewart, 2003; Dellinger & Stanton, 2002). The two New Zealand studies found which examined the journey to school are somewhat contradictory. One found that the main reason for driving children to school was because the parent was already going out in the car at that time followed by the child being too young (O'Fallon and Sullivan, 2001). The other found that the reasons for not letting a child cycle or walk to school were primarily safety related, with fear of strangers being most important for walking and traffic danger being the most important for cycling (NRB, 2003). Weather is also likely to be important.

Table 2. Top three reasons for children not cycling and walking the journey to school for reviewed studies.

Study	The Journey to school		
	First	Second	Third
Belden Ressonello and Stewart (2003) Walk to school	school is too far away	too much traffic and no safe walking route to the school	fear of child being abducted
Dellinger and Stanton (2002) walk/cycle to school	long distances	traffic danger	adverse weather conditions
Bradshaw (1995) cycle to school	possibility of the cycle being stolen		
Woodside, Gunay, and Seymour (2002) use car because	only real option	more convenient /time constraints	live to close for free transport more comfortable/weather factors
Lord and Murray (2004) cycle to school	fear of theft	traffic danger	bad weather/darkness and fear of attack by strangers
O'Fallon and Sullivan (2001) use car	Already going out in the car at that time	child/ren too young	concerned about child/ren being exposed to the weather
NRB (2003) cycle to school	too much traffic	poor driving/traffic danger/accidents	no cycle lanes/narrow roads/no provision for cyclists
NRB (2003) walk to school	stranger danger/child molester/abduction	traffic/volume/major roads/have to cross road	dangerous/safety unspecified

1.3.2 Discussion of Variability

As can be seen from the above discussion, tables, and the summary of studies section there is considerable variability in the reasons given for not cycling or walking across studies. This variability prevents firm conclusions from the review being made but it is worth discussing the possible reasons for this variability.

The studies have examined different populations. Populations surveyed have included people of different age groups, countries, local areas, genders, occupations, destination, purpose, mode

choice groups, and ability to change mode. There is some indication within some of the studies reviewed that variables such as occupation (Wilde, 2000), age/parenthood (Dillinger & Stanton, 2002; Bradshaw, 1995), destination (Bradshaw, 1995), mode choice (Bradshaw, 1995), and gender (Lord & Murray 2004) influence the reasons given for not cycling and walking. This variability might not be taken as surprising given that reasons should depend upon the context, and the individuals context will vary across the variables described. Such an argument suggests that reasons for not cycling and walking need to be determined at a local level for the population of interest and for the mode choice of interest.

The studies also used different methodologies. Some studies used qualitative and open-ended questions or other qualitative methods while others have used closed questions. With both groups the different categories that have been used makes comparison difficult and may introduce variability. Bias and error can be introduced when qualitative data is categorised. Procedures to help ensure reliable coding and assess reliability of coding have not been followed in the studies reviewed here. Closed questions can have the effect of setting the agenda and forcing the participants choice, meaning that the results of different survey items may not be comparable. The studies reviewed here gave different choices of reasons for their closed questions and generally asked a different question.

The literature reviewed did not generally indicate that any underlying psychological model was being used to guide the research, analysis, and interpretation of the results. In part this might account for the variability in methods used in the studies reviewed. Some use of theory to guide research may be useful in future walking and cycling research. In particular the Theory of Planned Behaviour (see Ajzen, 1991 for a brief introduction and a summary of empirical findings) may be useful as it includes the role of social context and behavioural control in predicting behaviour, both of which may have been responsible for some of the variance in the results of the studies reviewed.

1.3.3 Discussion of Wider Research Issues

Statements that “a concern for safety” is the major deterrent to cycling were encountered when searching for literature, but infrequently referenced. This review does not support the concern for safety as being the major reason why adults do not cycle, though it appears to be a major factor in the journey to school. A reference given to support the assertion that the safety concerns deters use was Noland (1995). Noland (1995) measured the perceived likelihood of accident for different modes, finding that cycling was considered the most risky and that the perceived risk of modes was a significant predictor of mode choice. Noland (1995) used statistical techniques to establish a relationship between mode choice and risk perception, rather than explicitly asking participants what their reasons were for not cycling, and also appears to have examined a relatively limited number of factors.

The findings of Noland (1995) raise the issue of what the appropriate data is to examine why people don't walk and cycle. A number of studies exist that use similar methods to Noland (1995) to examine relationships between variables and walking/cycling. Many of these have examined the role of the form of the built environment in walking and cycling. As noted by Brindle (2003),

such data does not indicate a causal relationship between mode choice and the built environment. However, the reasons people give for their behaviour may not always reflect the actual reasons for this behaviour either. For example, the desire to appear socially acceptable, please the researcher, and enhance self-evaluation can all affect verbal responding (see Anastasi & Urbina, 1997; Vaughan & Hogg, 1998 for brief introductions to this area). The literature reviewed here generally does not attempt to mitigate for factors affecting accuracy. Some suggestions for methodological improvement will be made in the recommendation section below.

Analysis of Sport and Recreation Data

1.4 Introduction

The SPARC study “Obstacles to Action: A study of New Zealander’s Physical Activity and Nutrition” was aimed at understanding physical activity in general with a view to supporting a marketing strategy, rather than understanding cycling and walking specifically. The analyses reported by SPARC are thus not especially relevant to the more specific aims of the present project (see http://www.sparc.org.nz/news/290104_obstacles_to_action.php#reports for reports). The survey instrument and technical details of the survey can be found in Sullivan et al. (2003), however a brief introduction will be presented here.

The SPARC survey was a New Zealand adaptation of an American Cancer Society survey and contained a large number of items relating to physical activity and nutrition (Sullivan et al., 2003). Fourteen thousand participants selected from the electoral roll were mailed surveys, with Maori and those aged less than 25 being over selected to offset the usual lower response rates from these groups (Sullivan et al., 2003). A total of 8291 surveys were received giving a response rate of 61% (Sullivan et al., 2003). The response rate is good, especially considering the number of items in the survey.

In the present report the SPARC data are analysed to extract the reasons people do not walk and cycle in New Zealand. There are some problems with analysing the SPARC data from the perspective of walking and cycling. Because of the original function of the SPARC survey, the items in the survey are more general than the items examined in the literature review. For example, the item “I worry about my safety” included in the SPARC survey is more general than the traffic safety and safety from crime aspects investigated in the literature. The questions are also asked about general activity rather than walking and cycling, so participant’s responses may not directly relate to the reasons why they do not walk and cycle. Hence the range of items necessary for a complete understanding of the reasons for walking and cycling are not contained in the survey nor are the specific reasons related to walking and cycling. This poses a problem for the more specific aims of this project as the general nature of the instrument raises the possibility of spurious relationships being found. Because of this the analysis below should be interpreted with caution.

1.5 Data considerations

A weighting added by SPARC was reversed and uncompleted items were coded as missing. The items that give some indication as to the reasons why people do not walk and cycle, are contained in Section D, Question 6 (see Sullivan et al., 2003). Question 6 in Section D examined 23 possible things that might keep people from being physically active. For each item the participants were asked to indicate how much each influenced their activity level from doesn't influence me at all to influences me a lot. These items were tested for normality using the Kolmogorov-Smirnov Z test and none were normally distributed ($p < .001$). The departure from normality for these items appears to be predominately from a large percentage of participants responding that the item does not influence them at all ($M = 57.6\%$, $SD = 18.21$). Table 3 shows the percentage of respondents reporting that they were not influenced for each item. A low percentage indicates a higher proportion of respondents indicating that item has some influence over general activity. "Lack of energy too tired" appears to have the most influence followed by "lack of time due to work", and "lack of time due to family responsibilities". Parametric tests are not suitable to examine the data because a base assumption of these tests is that the data are normally distributed. A level of significance of .05 was used for statistical tests reported below.

Table 3. Valid percent not influenced for Section D, Question 6.

Question	Valid percent not influenced
SD-Q6a Lack of energy/too tired	16.9
SD-Q6b Lack of time due to work	23.9
SD-Q6c Lack of time due to family responsibilities	31.1
SD-Q6d Arthritis or other health problems	60.4
SD-Q6e Costs too much (clothes, equipment, etc.)	58.7
SD-Q6f Facilities (parks, gyms) too hard to get to	59.8
SD-Q6g Its too hard to stick to a routine	32.9
SD-Q6h No one to do physical activities with	52.6
SD-Q6i I worry about my safety	56.9
SD-Q6j I would have to get someone to watch my children	75.7
SD-Q6k I'm too old	72.8
SD-Q6l I get bored quickly	57.8
SD-Q6m There are other things Id rather do during my free time	35.4
SD-Q6n Others discourage me from being physically active	78.8
SD-Q6o I have too many household chores to do	49.4
SD-Q6p Physical activity is uncomfortable for me	61.9
SD-Q6q I'm too out of shape to start	67.0
SD-Q6r I feel I am too overweight to be physically active	74.9
SD-Q6s I don't know how to be physically active	77.1
SD-Q6t I don't like to sweat	79.2
SD-Q6u I don't like feeling out of breath	66.8
SD-Q6v I dont like other people to see me being physically active	72.7
SD-Q6w Physical activity takes too much effort	62.2

1.6 Walking

Table 4 shows the number of days reported walked at a brisk pace in the last seven days and Table 5 shows the consideration given to walking 1.5 km given fine weather, a bicycle being unavailable

and having nothing to carry. The data was recoded into four groups: 1 = 0 days walked, 2 = 1-2 days walked, 3 = 3-4 days walked, and 4 = 5-7 days walked. Table 6 shows the distribution of participants in these new groups.

Table 4. SD-Q14A Number of days during last 7 walked at a brisk pace

Days	Frequency	Percent	Valid Percent
0 days	1708	20.6	20.6
1 day	893	10.8	10.8
2 days	1090	13.1	13.1
3 days	1199	14.5	14.5
4 days	859	10.4	10.4
5 days	1103	13.3	13.3
6 days	409	4.9	4.9
7 days	776	9.4	9.4
Not answered	254	3.1	3.1
Total	8291	100.0	100.0

Table 5. SD-Q13 Consideration of walking 1.5 kms

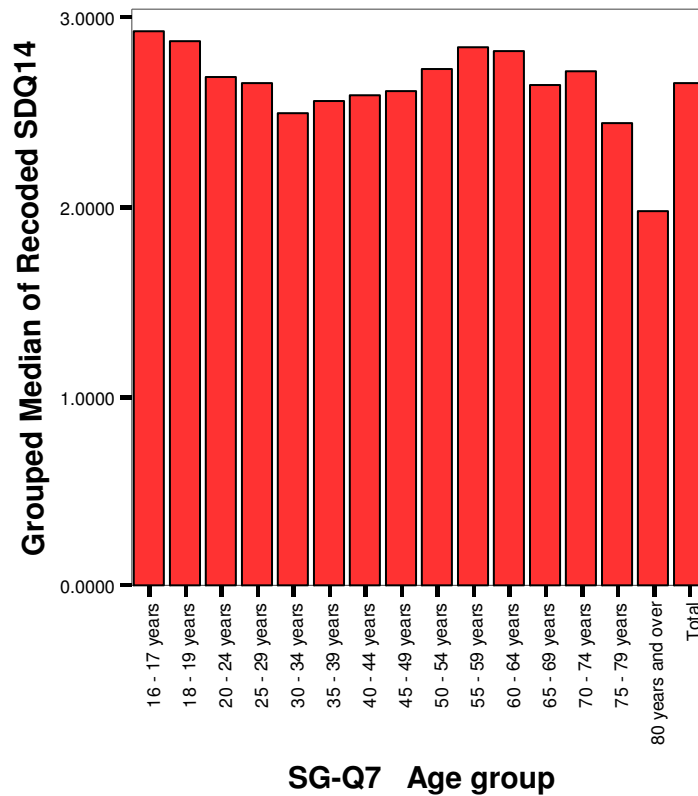
Response	Frequency	Percent	Valid Percent
Not even consider walking	418	5.0	5.6
Realise that you could walk but wouldn't actually do it	429	5.2	5.8
Think seriously about the pros and cons of walking but rarely do	346	4.2	4.7
Walk on some occasions	2189	26.4	29.6
Walk quite often	1892	22.8	25.6
Almost always walk	2130	25.7	28.8
Total	7404	89.3	100.0
Not answered	887	10.7	
Total	8291	100.0	

Table 6. SDQ14 coded into 4 new groups

New Code	Frequency	Percent	Valid Percent
0 days	1708	20.6	21.3
1-2 days	1983	23.9	24.7
3-4 days	2058	24.8	25.6
5-7 days	2288	27.6	28.5
Total	8037	96.9	100.0
Missing	254	3.1	
Total	8291	100.0	

Non-parametric tests revealed that walking group membership was dependant upon gender and age. There were males and less females than expected for the 0 day and 5-7 day groups but the opposite for the 3-4 day group. Figure 1 shows the grouped median of the recoded walking variable for the age groups. Walking appears to be bimodal with peaks at ages 16-17 and 55-59 and troughs at ages 30-34 and 80 years and over.

Figure 1. Grouped median of the recoded SDQ14 for the age groups



A multinomial logistic regression was performed, with the 23 items and gender as factors, age as a covariate, and the four walking groups as the dependant variable. A significant model was produced but it accounted for little variance in walking, having a pseudo R^2 of .16 (Cox and Snell). Significant factors in the model were “age group”, “lack of energy/too tired”, “arthritis or other health problems”, “it’s too hard to stick to a routine”, “no one to do physical activities with”, “I worry about my safety”, “I’m too old”, “there are other things I’d rather do during my free time”, “physical activity is uncomfortable for me”, “I’m too out of shape to start”, “physical activity takes too much effort”, and “gender”.

1.7 Cycling

Table 7 shows the times participants reported riding a bicycle in the last 3 months. Approximately 71% of the sample had not ridden in the last six months or never learnt to ride properly. Table 8 shows the consideration given to riding a cycle given fine weather and nothing to carry, from which it can be seen that 42% would not consider cycling at all. Table 9 shows the frequency of cycle availability to the sample. A chi-square test revealed that considering cycling was dependant upon cycle availability, with 80.8% of those who would not consider cycling also not having a cycle available. The cycling frequency data were recoded into three groups (with “never learnt to ride properly” eliminated): 1 = no riding in the last three months, 2 = between once and 6 times in the last three months, and 3 = between once per week and most days. Table 10 shows the

frequency for this new variable. Nonparametric tests revealed that gender and age were related to cycling, as found for walking. Fewer males and more females than expected were found in group 1 (no riding in the last three months) and the reverse of this in groups 2 (between once and 6 times in the last three months) and 3 (between once per week and most days). Figure 2 shows the grouped median of the recoded cycling variable for the age groups. Cycling appears to decrease with increasing age.

Table 7. SD-Q11 Times ridden a bicycle in the last 3 months

Response	Frequency	Percent	Valid Percent
Never learned to ride properly	460	5.5	5.5
Not at all during the last 3 months	5459	65.8	65.8
Only once or twice	908	11.0	11.0
1-2 times a month	391	4.7	4.7
About once a week	320	3.9	3.9
2-3 days a week	239	2.9	2.9
Most days	247	3.0	3.0
Not answered	267	3.2	3.2
Total	8291	100.0	100.0

Table 8. SD-Q12 Consideration of using a bicycle

Response	Frequency	Percent	Valid Percent
Not even consider using a bicycle	3489	42.1	42.1
Realise that you could use a bicycle but wouldn't actually do it	1123	13.5	13.5
Think seriously about the pros and cons of cycling but rarely cycle	703	8.5	8.5
Try cycling on some occasions	1459	17.6	17.6
Cycle quite often	745	9.0	9.0
Almost always cycle	322	3.9	3.9
Not answered	450	5.4	5.4
Total	8291	100.0	100.0

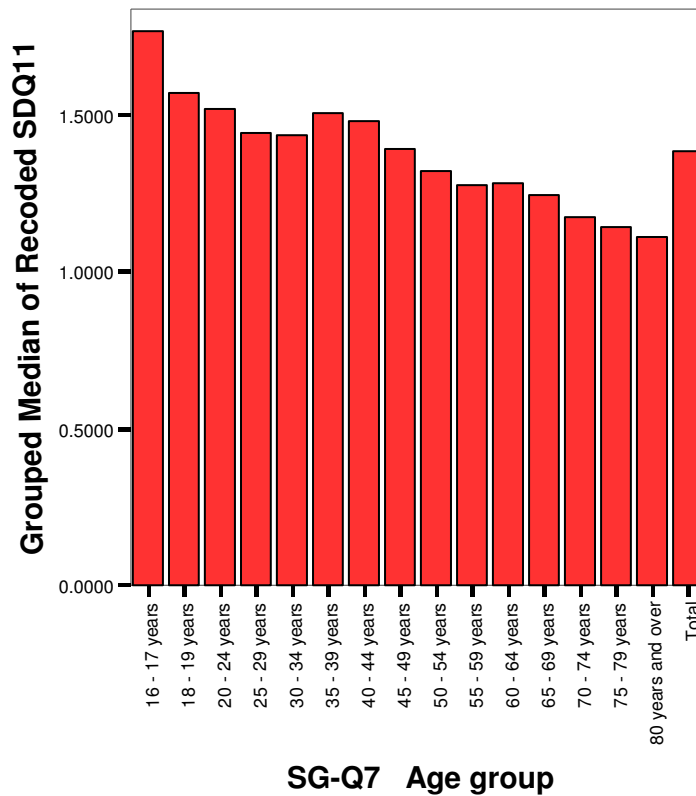
Table 9. SD-Q10 Is a bicycle usually available for you to use?

Item	Frequency	Percent	Valid Percent
Yes	3271	39.5	39.5
No	4748	57.3	57.3
Not answered	272	3.3	3.3
Total	8291	100.0	100.0

Table 10. Times ridden a bicycle in the last 3 months recoded in 3 new groups

New Code	Frequency	Percent	Valid Percent
1.00	5459	65.8	72.2
2.00	1299	15.7	17.2
3.00	806	9.7	10.7
Total	7564	91.2	100.0
Missing	727	8.8	
Total	8291	100.0	

Figure 2. Grouped median of the recoded SDQ11 for the age groups



A multinomial logistic regression was performed, with the 23 items and gender as factors, age as a covariate, and the three cycling groups as the dependant variable. Output from the test indicated that the validity of the model was questionable because infinite solutions were possible. Three items (“I’m too out of shape to start”, “I feel I am too overweight to be physically active”, and “I don’t know how to be physically active”) were removed because they each contained a cell count of 1 and the multinomial logistic regression was performed again. For both regressions the significant factors in the model were “age group”, “gender”, “I would have to get someone to watch my children”, and “there are other things I’d rather do during my free time”. The model was significant but accounted for little variance in cycling, having a pseudo R^2 of .118 (Cox and Snell).

Question 9 of Section D asked participants to indicate any of 12 neighbourhood environmental features that put them off being physically active. “None of the above” was the most common feature chosen (44.8%) suggesting that the items given did not sufficiently cover the neighbourhood factors that deter physical activity. Other commonly chosen features were “There is not enough street lighting” (19.5%), “There are not enough cycle lanes or paths” (18.2%), “Dog nuisance” (17.8%), and “traffic is too heavy” (17.4%).

1.8 Discussion

The SPARC data showed that a large percentage of the sample would not consider cycling while a small percentage of the sample would not consider walking. Walking entails relatively little equipment when compared to cycling. Consideration of cycling was related to whether a cycle was available. It cannot be said from this data whether not having a cycle deters cycling or whether people who do not intend to cycle do not buy cycles. If it was the case that cycle availability constrains cycling then this might account for the difference in the percentage of participants that would not consider walking versus those that would not consider cycling.

As noted above, the SPARC study was not designed to investigate walking and cycling specifically. Because of this the items used did not target the full range of potential factors important to walking and cycling or question the effect on walking and cycling specifically and the results of this analysis should be interpreted within these constraints.

Responses on a number of items were found to influence the likelihood of walking. Some of these refer to relatively fixed factors such as age, gender, "being too out of shape to start", and "arthritis or other health problems". Some relate to the desirability of walking versus other activities i.e., "lack of energy/too tired", "physical activity is uncomfortable for me", "physical activity takes too much effort", "its too hard to stick to a routine", and "there are other things I'd rather do during my free time". It was also found that having no one to do physical activities with and worries about safety influenced the likelihood of walking. These results 'paint a picture' of people not walking primarily because of physiological factors and because walking is not as desirable as other activities.

Some items found to influence walking were also found to influence cycling. These were age, gender, and there are other things I'd rather do during my free time. I would have to get someone to watch my child was also found to influence cycling. These results are patchy but could be interpreted as similar to walking, i.e., that is that people are not cycling because of physiological factors and the effect of other activities.

For the sample overall participants generally reported that the items in section D did not influence them at all. In addition the analysis revealed that little of the variation in walking and cycling was accounted for. This suggests that the items in the survey did not cover the reasons for not walking or cycling in a sufficient fashion. In conclusion the SPARC data gives an indication as to some possible factors influencing walking and cycling in New Zealand but the original design of the survey instrument precludes complete reasons for walking and cycling being established from the data.

Assessment of Why People Don't Walk and Cycle in New Zealand

Two approaches were taken here to investigate why people do not walk and cycle in New Zealand. The first was to review the international and New Zealand literature on walking and cycling and the second was to examine the data from the SPARC study "Obstacles to Action: A study of New Zealander's Physical Activity and Nutrition". The literature review revealed

considerable variability in the results of studies, making firm conclusions from the literature difficult. Likewise, the SPARC data did not generate specific variables to account for the variation in walking and cycling seen in that study. Neither approach, therefore, generated good information from which to assess why people do not walk and cycle in New Zealand. Further investigations are required to establish precisely which factors are important, and to what extent they are important.

The main reasons why people don't cycle in New Zealand will likely include the benefits of car use, not having cycle equipment, effort, time, safety, distance, health/physical factors, and weather. The main reasons for not walking are likely to include distance, time, having to carry things, health/physical factors, effort, weather, and the benefits of car use. For the journey to school the main reasons are likely to be distance, car benefits, road safety, fear of crime, and weather.

Recommendations For Further Investigations

The reasons why New Zealanders do not walk and cycle cannot be ascertained with certainty from the reviewed literature and data. The present review of the literature was not a comprehensive review and there are likely to be more international studies that exist that have not been included. Examination of further international studies is, however, unlikely to give good information of the reasons why New Zealanders do not walk and cycle because the results of such studies are unlikely to generalise to the New Zealand context. The main evidence for this is the considerable variance in the findings of international studies, reasons for which were discussed above. To develop valid inferences to why people do not walk and cycle in New Zealand there is a need for reliable and valid data over the population of interest in New Zealand. No study was located that meets these criteria and it is suggested that a survey be conducted with a New Zealand sample. Recommendations are given below for the content and methodology of a future survey.

International and New Zealand research brings up a variety of different reasons for not cycling and walking. It is possible that part of this is because reasons for not walking and cycling are dependant upon local factors. If this is the case then applying items used in previous studies might lead to results not reflecting the true situation. Because of this development of the content for the survey instrument should include a qualitative phase and/or pilot testing. This qualitative phase should be looked at as providing the range of what might be the case for the later quantitative phase to show what actually is the case. Care needs to be exercised with survey and content development in defining and communicating appropriate concepts. Surveys reviewed sometimes did not communicate concepts clearly or included categories not necessarily distinct. An example of this can be seen in Mackett (2003) where the category of "convenience" was used along with a range of more specific factors that one might include in "convenience". Psychometric subscales, where a number of items which logically and empirically correlate highly together, might be used to measure reasons to increase the confidence in reason measurement. In addition items should, where possible, be designed to generate normally distributed responses to allow for better statistical and psychometric analysis (Anastasi & Urbina, 1997).

The focus on the content and population of the survey will need to be clear. The review revealed the possibility that the reasons given for not cycling/walking at all may be different from the reasons for not cycling/walking for transportation. Investigating the latter would involve not just the reasons for not walking or cycling but also the reasons for taking the alternative transport mode. The reasons for not walking may also be different from those for not cycling. A number of studies treat walking and cycling as one behaviour and this will lead to erroneous conclusions if walking and cycling are indeed different to participants. From the literature it would appear that reasons could differ for specific journeys, such as the journey to school, and different populations. Reasons may also differ depending upon how walking and cycling are defined. All of the above possibilities suggest that any future survey investigating the reasons for walking or cycling needs to be focused on the particular context, behaviours, and population of interest for valid conclusions to be made. Deciding what behaviours are of interest, in what context, and for what population are thus an important part of designing a future study.

There are a number of methodological difficulties in investigating the reasons why people do not walk/cycle. The reasons given may not be accurate descriptions of actual factors. Some of this may be the result of biases to deliver what the surveyor wants, to maintain a particular view of themselves, or to avoid others viewing them badly. This problem can be partly overcome by using a paper survey (rather than telephone or in person interview), careful construction of items, ensuring anonymity, and the use of distracter questions. Items can be structured to look at why other people do not walk/cycle to reduce the need for participants to justify their behaviour. This should limit the possibility of justifications being given instead of reasons and, if the reasons people give for their own behaviour of not walking and cycling are examined, allow for biases to be investigated.

Even if participants' responding is not biased in any way, the verbal reasons given for not walking or cycling may not actually be the actual reasons that people do not walk or cycle. We do not necessarily know why we do what we do even if we think we do. One way of increasing the likelihood of identifying the actual reasons is to examine the reasons against behavioural correlates. This has been done in a number of studies such as (e.g. Walton, Thomas, & Dravitzki, 2004). In a future study this could be done by surveying walkers, non-walkers, cyclists, and non-cyclists and examining the differences between them. Such a methodology will be able to separate factors that people report are highly influential in decision making from those that are actually associated with behavioural variance.

A number of demographic and background information should be collected in any future survey. For example items relevant to cycling might include cycling history, access to a cycle, access to cycle helmet and other equipment, and trip data. The qualitative phase mentioned above can be used to generate demographic items.

In addition to the factors that need to be considered above, the design of a future study might benefit from inclusion of items relevant to the Theory of Planned Behaviour (see Azjen, 1991). This would incorporate social norms and behavioural control variables into the research. Social norms may be particularly relevant, because, as seen in the SPARC study, the vast majority of New Zealanders do not cycle. In a normative sense it might thus be against the social norm to cycle.

Whether cycling is against the social norm, and whether this affects the number of people who cycle, requires assessment.

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