Increasing cycling and walking: an analysis of readiness to change

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Executive summary

Context

In 2003, Sport and Recreation New Zealand (SPARC) and the Cancer Society of New Zealand commissioned a major social marketing survey to segment adult New Zealanders in terms of physical activity and healthy eating habits. The questionnaire included several transport-related questions. The resulting 'Obstacles to Action' database contains responses from over 8000 people aged 16 or over.

Cycling

Regularity of cycling (combining both on- and off-road) during the previous three months (largely March through June 2003) fell into the following three broad groups:

- Noncyclists (69%) – No cycling at all during the last three months, or never learned
- Occasional cyclists (16%) – Cycling up to 1-2 times a month.
- Regular cyclists (11%) – Cycling about once a week or more often.

Previous cycling surveys in New Zealand have also shown that more men than women cycle, and that cycling decreases with age. But the large sample size here enabled us to show that cycling is significantly less common among those with Pacific or Asian ethnicity. Specifically, the proportion of regular cyclists in these groups is roughly half that of Māori and NZ European respondents. (These ethnic differences remained statistically significant after adjusting for age and gender using logistic regression.)

Furthermore we could detect that the effect of obesity on cycling was most apparent among the severely obese, rather simply considering all those above a conventional definition of obesity (Body Mass Index of 30 or more). The proportion of noncyclists rises from 66% (normal weight) to 78% (severely obese[1]) and 82% (morbidly obese[2]).

Overall, 5.8% reported that they had *Never learned to ride properly*. This distinction is important because such adults are not likely to respond to promotional initiatives related to cycling. Those who had never learned were particularly:

- women (8% of women compared with only 3% of men),
- Pacific peoples (17%) and Asians (21%) rather than NZ Europeans (4%) or Māori (6%),
- morbidly obese[2] (24%, compared with 6% for both the severely obese and the obese).

[1] Body Mass Index (BMI) 35-39.9

[2] BMI 40+

Cycling: stages of change

Stage of change questions were added to the base questionnaire, building on the detailed development work concerning cycling done in the UK by the Transport Research Laboratory (TRL). Such questions can be useful for developing active transport strategies and initiatives, because they highlight the extent to which different initiatives may be required for people at different stages of readiness to walk or cycle. In addition, they can be useful for monitoring campaigns because they measure improvements in *readiness to change*, not just current behaviour.

Clearly, not all those who report some readiness to cycle in response to such questions will actually start cycling in response to relevant initiatives (e.g. construction of cycle paths). But the first stage of change, Precontemplation, usefully quantifies those who report quite bluntly that they would *Not even consider using a bicycle*. Realistically, these are a large proportion of adults (41.1%; Table 1). Many others expressed some readiness to cycle (Contemplation, Ready for action, Action stages).

Table 1 Cycling: stages of change.

For a short journey when the weather was fine and you have nothing to carry, would you..

Stage of change	%
Not even consider using a bicycle [Precontemplation]	41.1
Realise that you could use a bicycle but wouldn't actually do it [Contemplation]	13.6
Think seriously about the pros and cons of cycling but rarely do it [Ready for action/Preparation]	8.0
Try cycling on some occasions [Action]	17.6
Cycle quite often [Maintenance1]	9.8
Almost always cycle [Maintenance2]	4.7
Not answered	5.2
Total *(n=8163)*	100.0

Age and gender differences in the cycling stages of change are broadly consistent with those in current cycling behaviour. Nevertheless, the composition of important stage of change segments that might be targeted for promotional initiatives (Ready for action, Action) is fairly evenly balanced between genders. These stages of change also have substantial numbers (around half) aged 35-64 rather than being dominated by the youngest age groups. To provide a benchmark for regional initiatives, stages of change have been reported for twelve different regions. The percentage in the Precontemplation stage ranges from 27% for Nelson-Marlborough up to 45% for Auckland.

Brisk walking

The main question on walking in this questionnaire concerns 'brisk walking' (walking at a pace at which you are breathing harder than normal) for at least 10 minutes at a time because of its focus on health benefits related to physical activity (Table 2). Thus, much walking as a transport mode (e.g. as recorded in typical travel diaries) is excluded by definition, and no distinction is made between walking for leisure rather than utilitarian purposes.

Table 2 Total time brisk walking in the previous seven days.

Time spent brisk walking	%
None	22.6
< 1 hour	16.6
1 – 2.5 hours	24.5
2.5 – 4.9 hours	16.0
5 or more hours	14.9
Not answered	5.4
Total *(n=8163)*	100.0

A widely promoted New Zealand guideline for healthy levels of physical activity is 30 minutes or more of moderate physical activity (or equivalent) on five or more days of the week ('30×5' for short). A substantial group of adults (22%) meet this health-related criterion purely through their brisk walking (and may have done moderate or vigorous activity in addition). We do not have exactly comparable figures for cycling (which was not measured in terms of minutes), but note that only 7% of the total were both 'regular cyclists' and 'regularly active'.

Brisk walking is less related than cycling to external variables such as demographics or geographic differences. Gender, work status, and level of urbanisation all failed to show marked differences. This confirms that demographics need not be considered to the same degree for campaigns to increase walking as for campaigns to increase cycling. Hence, one can more clearly focus on other methods of segmenting or targeting promotional activity such as stage of change.

Walking: stages of change

The Precontemplation group for walking (Table 3) was only 5.8%, much smaller than for the cycling stage of change question (41.1%). Most of the responses were at the highest stages (Action, Maintenance).

Table 3 Walking: stages of change.

For a journey of 1.5 km (about 15 minutes walk at normal walking speed), when the weather was fine and you have nothing heavy to carry, would you...

Stage of change	%
Not even consider walking [Precontemplation]	5.8
Realise that you could walk but wouldn't actually do it [Contemplation]	6.0
Think seriously about the pros and cons of walking but rarely do it [Ready for action]	4.2
Walk on some occasions [Action]	26.8
Walk quite often [Maintenance1]	21.6
Almost always walk [Maintenance2]	25.0
Not answered	10.5
Total *(n=8163)*	100.0

Improvements to this question are recommended before future use so as to reduce the high proportion who did not answer (10.5%). This was particularly a problem among seniors (e.g. 43% of those aged 80+ did not answer).

Walking stage of change did not show marked differences in relation to demographic variables such as gender, ethnicity, work status, level of urbanisation, education, or household income.

Readiness to replace car trips by active modes

Fully 37% of respondents agreed that they could replace car trips by walking or cycling on at least two days most weeks (without too much difficulty). Walking stage of change was strongly associated with agreement to replace car trips by active modes. Agreement that they could replace car trips by walking or cycling on at least two days most weeks (without too much difficulty) was only 18% among those in Precontemplation compared with 46% of those who said they would *Almost always walk* (Maintenance2 stage).

Environmental perceptions

Positive relationships between levels of physical activity levels (particularly walking) and urban design factors such as mixed land use, density, number of street intersections, and public open space have now been found in several studies. Simpler, more specific issues were the subject of questions in this survey. In response to a list of possible neighbourhood barriers to physical activity, the following were the most common (marked as applying by around one in five): not enough street lighting, heavy traffic, not enough cycle lanes or paths, and dog nuisance.

Abstract

In 2003, Sport and Recreation New Zealand (SPARC) and the Cancer Society of New Zealand commissioned a major nationwide survey to segment adult New Zealanders in terms of physical activity and healthy eating habits. The questionnaire included several transport-related questions. The resulting 'Obstacles to Action' database (with responses from over 8000 people aged 16 or over) thus provides opportunities to analyse transport responses with a larger sample size than is usual with New Zealand surveys. This report analyses the Obstacles to Action database with respect to cycling and walking.

A focus is the *stage of change* questions which can be useful for developing and monitoring active transport promotional strategies, given that behaviour change may often involve a number of process steps being undertaken before individuals are ready to change behaviour.

Current cycling and walking, together with stage of change for cycling and walking, were first analysed for demographic differences (age, gender, ethnicity, level of urbanisation, region, effect of children, work status, household income). Differences between stages of change with respect to motivations, perceived benefits, and perceived barriers (physical activity in general) were also briefly considered, as well as readiness to replace car trips with walking and cycling, relevant environmental perceptions, and perceived environmental barriers.

1. Introduction

1.1 Context

In 2003, Sport and Recreation New Zealand (SPARC) and the Cancer Society of New Zealand commissioned a major social marketing survey to segment adult New Zealanders in terms of physical activity and healthy eating habits. The questionnaire, based on previous work by the American Cancer Society, included several questions about current usage of, and attitudes toward, active transport (particularly cycling, and to a lesser extent walking). Thus, although SPARC designed the 'Obstacles to Action' survey to assist increasing physical activity in general, it also provides unique opportunities for research into active transport (cycling and walking).

1.2 Objectives

From analysis of the resulting 'Obstacles to Action' database of over 8000 respondents, the objectives of this project include:

- describing the characteristics and attitudes of various population segments that may be responsive (in different ways) to initiatives to encourage cycling and walking (based on the conceptual framework developed by the Transport Research Laboratory in the UK; Davies et al. 2001),
- quantifying the structure and composition of the 'target' population segments for walking and cycling development programmes,
- providing baseline data for monitoring the progress of transport strategies and other initiatives undertaken in New Zealand.

Thus, a general theme of this report is to contribute to better targeting of interventions aimed at increasing walking and cycling. Others have noted a broad consensus that travel behaviour change interventions need to be better targeted towards the right people at the right times (e.g. Fergusson et al. 1999).

2. Method

2.1 Dataset and analysis

This project analyses a large existing dataset collected in mid-2003 for SPARC and the Cancer Society of New Zealand. Thus, there was no possibility of either changing or adding to the existing questions. These questions appear in the Appendix, which is a facsimile of the questionnaire.

Table 2.1 Questions directly related to cycling and walking.

Questionnaire section & number	Topic
A2g	Whether they agree or disagree that they could replace car trips by walking or cycling on at least two days most weeks without much difficulty
D6i	Whether worrying about their safety keeps them from being physically active
D7a	Readiness to use cycle lanes or paths, and perceived availability of them; (D7c re walking tracks presumably more about recreation than transport)
D7k	Readiness to use shower at work (though note that this could be after a lunchtime run, i.e. not for transport *per se*), and availability of such showers
D9	Whether several aspects of the neighbourhood stop them being physically active (not enough footpaths, footpaths not well maintained, traffic being too heavy, not enough cycle lanes and paths, not enough stop signs/lights)
D10	Availability of bicycle
D11	Frequency of cycling during the last 3 months; whether they have ever learned to ride a bicycle properly
D12	'Stage of change' question for cycling
D13	'Stage of change' question for walking
D14a	Amount of brisk walking. Number of days in the last week on which they walked at a brisk pace (a pace at which they were breathing harder than normal), and minutes per day usually spent doing brisk walking on each of those days. Note that this may not be walking for transport; could be simply for exercise.

A key strength of the Obstacles to Action dataset is the unusually large sample size (over 8000 people aged 16+ years). This allows reliable analysis of sub-groups (e.g. regions, ethnic groups, age groups) to a greater degree than the much smaller sample sizes of most surveys in New Zealand.

A key weakness of the dataset is that most of the survey questions are not directly relevant to transport. This is because the survey was designed with other objectives in mind (promoting physical activity and healthy eating). Fortunately, despite pressures from the length of the draft questionnaire, SPARC agreed to add several questions related to transport. The questions directly related to cycling and walking are summarised in Table 2.1. (The full questionnaire is appended to this report.)

A second weakness of the SPARC dataset for this analysis relates to self-reporting. A recent validation study completed by SPARC showed that self-reports of physical activity substantially overstate actual physical activity as measured objectively by heart rate monitoring (SPARC 2004). It is commonly found in surveys that people over-report socially desirable behaviour they feel they 'should' be doing (e.g. Bradburn et al. 2004).

The final response rate of completed, usable questionnaires was 61%, distinctly higher than most survey research in New Zealand.

The results are weighted by age, gender, and ethnicity to the New Zealand population. Details about weighting are contained in a separate Technical Report available (Sullivan et al. 2003a).

SPSS 12.0.1 was used to produce the tables in this report, and Systat 9 to do the logistic regressions.

2.2 Conceptual background: general

Our conceptual framework largely comes from a set of studies on cycling in the United Kingdom by TRL (Transport Research Laboratory), the largest UK centre for transport research. This project extends the TRL work to cycling and walking in the New Zealand context. With respect to cycling in particular, the UK conceptual framework seems more applicable to New Zealand than other European-based ones, because the low incidence of cycling in the UK parallels generally low cycle use in New Zealand.

TRL's foundation research was particularly thorough. The first report for the UK Department for Transport (Davies et al. 1997) reviewed methods of previous attitude research on cycling and developed a conceptual framework relevant to marketing. It also had a substantial qualitative attitude study incorporating in-depth interviews, 11 focus group discussions, and two 'extended creativity sessions'.

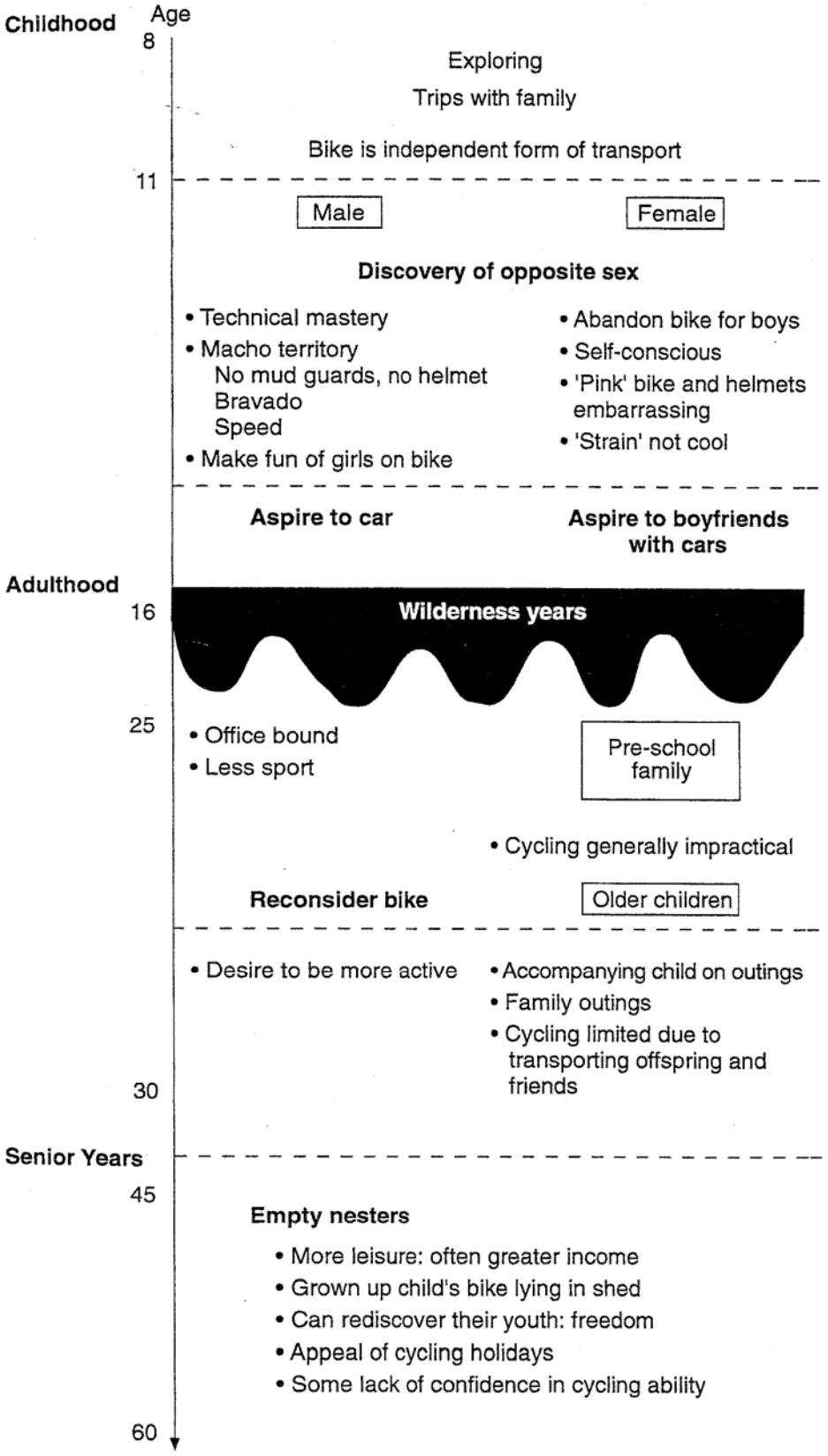


Figure 2.1 Life stage and cycling (Davies et al. 1997).

TRL found that attitudes to cycling were varied and complex, often involving rationalisations and misperceptions. For example, although danger from traffic is clearly a genuine deterrent, improving safety on its own is not sufficient to persuade most people to cycle. Figure 2.1 on the previous page is one of their diagrams useful for considering possible analyses relating to life stage. With our dataset for those aged 16+, life stage can be measured by the questions on age, gender, and number of children.

The later TRL quantitative research (Davies et al. 2001) splits people in a very practical way commonly used in social marketing. Their split is into 'stages of change' as introduced generally in the next section.

TRL recognised, as we do, that cycling promotion strategies need to address not only the individual attitudes of potential cyclists but also driver attitudes and behaviour, as well as the cycling environment/infrastructure. Similarly, the fourth principle in the strategy to increase walking and cycling in New Zealand transport is:

> *Increasing the use of walking and cycling for transport will require a comprehensive approach.* (Ministry of Transport 2005, p.14)

The emphasis on cycling in this section does *not* in any way indicate that we regard it as more important than walking. Rather, it reflects the conceptual starting point from TRL cycling research that has many elements also relevant to walking.

2.3 Stages of change in general

Much of this report focuses on 'stages of change', developed initially by Prochaska and DiClemente in the US, as the transtheoretical model, in order to reflect that the model incorporates a number of elements from other theories of behaviour change such as the Theory of Planned Behaviour (Prochaska et al. 1994). Such stages of readiness to change are widely used in New Zealand and overseas to promote major changes in behaviour (e.g. quitting smoking, increasing intake of fruit and vegetables, alcohol abuse, cocaine abuse, safer sex). There is also evidence that approaches based on the Stages of Change model are effective for promoting physical activity in general (e.g. Marcus & Lewis 2003).

The model specifies an ordered set of stages of readiness to change into which people can be classified, and identifies the factors that can facilitate movement from one stage to the next. Five stages of change are commonly emphasised:

- Pre-contemplation (e.g. not even considering the desired activity or behaviour, such as walking or cycling),
- Contemplation (e.g. aware of walking or cycling, but will not do it),

- Ready for action/ Preparation,
- Action (e.g. cycle/walk sometimes),
- Maintenance (e.g. cycle/walk quite often or almost always).

Movement through the stages is often not in an orderly linear progression. For example, people may advance to trying a target behaviour (the Action stage) and then relapse to merely hoping to improve (Contemplation). Relapse is particularly common the first time individuals try to change, but this is not a reason for despair. Rather, the first attempt is a valuable source of lessons for future attempts to change (hence Prochaska et al. 1994 prefer the term 'recycling' to 'relapse'):

> *The average successful self-changer recycles several times*. (Prochaska et al. 1994 p.47)

In addition, some individuals may remain in the contemplation stage for many years (self-changing smokers typically spent two years in contemplation before taking action according to Prochaska et al. 1994).

To the extent that behaviour change follows a stage process, we can identify the predominant stage or stages in a population, and focus resources on those issues most likely to move people to the next stage (e.g. from no intention of changing, to contemplating change). That is, interventions or 'treatments' can be matched to individuals because people in different stages have different needs (Horwath 1999). In addition, stage models lead us to prepare properly for common 'problems' such as relapse rather than focusing single-mindedly on achieving shorter-term action/behavioural change.

The stage of change model has been used in various transport behaviour change initiatives. For example, Mutrie et al. (2002) report on 295 employees from three Glasgow workplaces who were thinking about walking or cycling to work and were randomly assigned to an Intervention or Control group. The Intervention group received a 'Walk in to work out' pack immediately, whereas the Control group waited six months for the pack. The Intervention group was almost twice as likely to increase walking to work as the Control group at six months. However, the pack was not successful at increasing cycling. The Intervention group also reported greater improvements and physical and mental health functioning at six months compared with the Control group. Of those who received the pack initially, fully 25% maintained active commuting behaviour at the 12-month follow-up.

Other initiatives derived from similar stage-based and psychological principles include:

- A buddy scheme in Bristol, UK, where those wishing to take up cycling or who are lacking confidence (Contemplation or Ready for Action stages) can team up with a buddy cyclist until they feel confident (Adrian Davis pers. comm. 27 August 2004).
- Exploiting the greater readiness to change, and the need for transport information, when people move home or change jobs (a surprisingly large proportion of the population each year). It is easier to challenge habit at such times. For example, this point is emphasised in a travel demand management resource kit for Australian universities.[3] It suggests student orientation time and staff induction procedures as critical points for marketing, and provides examples of relevant promotional initiatives.

Although the relevance of the stages of change model to achieving transport behaviour change has been increasingly apparent to transport researchers and decision-makers, there are some concerns about how the approach is applied. In particular, Fergusson et al. (1999), among others, observed that many transport behaviour change interventions are designed for individuals who are 'ready for action'; missing out what may be the majority of the population who are in an earlier stage of change and thus require greater information, motivation, or incentives to modify their behaviour. A related concern is that promotional initiatives concentrating on removing 'barriers', such as safety risk, may be presupposing a suppressed demand (particularly for cycling) and failing to address the socio-psychological process of behaviour change (Davies et al. 1997). Both of these issues are recognised in the New Zealand walking and cycling strategy, *Getting there – on foot, by cycle* (Ministry of Transport 2005 p.39):

> *Supportive transport systems — plus improved perceptions of walking and cycling — will increase the likelihood of individuals considering the use of these modes for transport. But for many of us, our ability to turn contemplation into action can also benefit from active encouragement and support.*

2.4 Margins of error and weighting

Because we have taken only a sample of New Zealand adults, any results represented for this population will have a margin of error.

[3] *www.travelsmart.gov.au/universities/taking2.html* (accessed 6 March 2005)

Weighting has to be taken into account when considering margins of error. Results here are weighted to correct for the probability of selection and sample imbalances (e.g. age, gender, ethnicity) as described in detail in the Technical Report 'Obstacles to Action' (Sullivan et al. 2003a).

Such weighting typically results in margins of error distinctly larger than those for a simple random sample of the same size.

The indicative margins of error provided below are those that would apply for a simple random sample of the 'effective sample size' shown. As described in the weighting section of the Technical Report, the effective sample size (for the full sample) is about half the actual (unweighted) sample size.

Table 2.2 Margins of error (indicative).

	Sample margins of error					Full sample
Actual sample size	100	200	500	1000	2000	8163
Effective sample size (approx.)	50	100	250	500	1000	4082
Estimate in report %						
50	13.9	9.8	6.2	4.4	3.1	1.5
40 or 60	13.6	9.6	6.1	4.3	3.0	1.5
30 or 70	12.7	9.0	5.7	4.0	2.8	1.4
20 or 80	11.1	7.8	5.0	3.5	2.5	1.2
10 or 90	8.3	5.9	3.7	2.6	1.9	0.9
5 or 95	6.0	4.3	2.7	1.9	1.4	0.7

Note: 95% confidence level used.

3. Situational baseline: cycling

3.1 Introduction

As a foundation for subsequent analysis of cycling, we first describe the current level of cycling and background influences on that behaviour (e.g. whether a bicycle is usually available for them to use). It is important to examine such simple influences carefully before considering more subtle psychological issues such as readiness to change.

Most New Zealand adults do not cycle much at all: around seven in ten respondents did not ride a bicycle at all during the last three months, or had never learned to ride properly (Table 3.1). Given that the vast majority of questionnaires were completed in June and July, 'the last three months' will usually refer to months from March through June. For clarity of presentation and brevity in several later analyses, we often compress the results in Table 3.1 down to the following three categories:

- Noncyclists (69%) – no cycling at all during the last three months, or never learned to ride properly,
- Occasional cyclists (16%) – cycling up to 1-2 times a month,
- Regular cyclists (11%) – cycling about once a week or more often.

Table 3.1 Times ridden a bicycle in the last 3 months. [D11][4]

Action	%
Never learned to ride properly	5.8
Not at all during the last 3 months	62.8
Only once or twice	11.9
1-2 times a month	4.6
About once a week	4.4
2-3 days a week	3.2
Most days	3.8
Not answered	3.5
Total *(n=8163)*	100.0

Overall, these results are plausibly similar to those from an independent survey by the Land Transport Safety Authority (2000), the 1997/98 New Zealand Travel Survey (NZTS). For those aged 16 and above, the NZTS (which was collected over a full 12-month period) shows:

- 70% reported cycling 0 km during the previous year,

[4] The questions analysed are specified in this brief form: e.g. 'D11' indicates question 11 in section D.

- During the two days when the respondents recorded a travel diary, only 4% recorded any trips using a bicycle (which is roughly comparable to those reporting cycling 'Most days' in Table 3.1).

The category 'Never learned to ride properly' is really somewhat separate to the other categories (which directly describe frequency of cycling). Given the particular interest of our project steering group in the characteristics of those who have never learned to ride (especially whether or not an increase is already apparent among young age groups), this category is profiled in detail in Section 7.3.

No information was collected in the questionnaire as to whether the cycling reported is for leisure (e.g. off-road mountain-biking) or utilitarian (e.g. cycling to work). This does limit the use of the results in terms of the ability to accurately target interventions for cycling. Three previous surveys summarised in Ryan (2000) suggest that in New Zealand 50–70% of adults who cycle do so for the purpose of recreation. In particular, the only nationwide study among those reported by Ryan (a telephone survey of 1000 aged 15 or more in 1998) reported that 68% cycle for exercise, leisure, fun, or sport whereas only 30% used their bikes for transport. The surveys providing these percentages do not distinguish whether the recreational cycling is undertaken on-road or off-road.

3.2 Illness, disability and obesity

Some people are unable to cycle because of illness or disability. For example, a UK survey of 132 noncyclists showed 3% reporting that a physical disability prevented riding (Davies et al. 2001).

The Obstacles to Action questionnaire asked respondents to record whether their answers to the major questions about physical activity levels in the last seven days were clearly affected because of pregnancy, illness, injury, or disability. Illness and disability recorded in this way were clearly related to levels of cycling, but not as sharply as we suspected might be possible. For example, respondents noting a permanent injury or disability clearly affecting the level of physical activity in general:

- were only a little more likely to say that they never learned to ride a bicycle properly, compared with those unaffected by illness or injury (7% versus 5%),
- were regular cyclists commonly enough (5% versus 12% for those unaffected by illness or injury).

Given these results and that the question was not targeting cycling *per se*, but rather was focused on physical activity generally, we have chosen *not* to remove respondents who

report illness or disability from later analyses.[5] Note also that the relationship between the frequency of cycling and illness (Table 3.2) may be partly explained by the lower rates of cycling among older people (who, as Figure 3.1 p.28 shows, also cycle less) rather than directly as a result of the illness.

Table 3.2 Effect on cycling of pregnancy, illness, injury or disability. [D11, D16]

Frequency of cycling	Physical activity over last seven days affected by…						
	All respon-dents %	Nothing %	Pregancy %	Temporary illness %	Long-term illness %	Temporary injury %	Permanent injury or disability %
Unweighted count	*8163*	*6258*	*123*	*309*	*271*	*320*	*510*
Never learned to ride properly	6	5	2	11	15	5	7
Not at all during the last 3 months	63	63	79	56	58	61	67
Occasional (up to 1-2 times a month)	16	18	11	14	6	13	8
Regular (at least once a week)	11	12	8	13	10	14	5
Not answered	4	2	0	6	10	7	13
Total	100	100	100	100	100	100	100

Note: 'All respondents' includes a further 453 who did not answer the illness/injury/disability question. The sum of the illness/injury/disability subsample sizes together with this 453 exceeds the 'All respondents' sample size because of multiple responses.

BMI	Weight status
Below 18.5	Underweight
18.5 – 24.9	Normal
25.0 – 29.9	Overweight
30.0 and above	Obese

It appears that obesity may function somewhat like a physical disability in terms of reducing the amount of a person's cycling or walking. A Body Mass Index (BMI)[6] of 30 or more defined obesity.

[5] It is suggested, however, that excluding respondents because of disability might well be a useful approach when a questionnaire designed specifically for cycling includes questions explicitly about whether physical disability prevented cycling.

[6] BMI = weight in kilograms divided by height in metres squared (kg/m^2).

Several difficulties arise from using BMI as an indicator of obesity, not the least being that our survey relied on self-reports of weight and height. Self-reports generally lead to underestimation of BMI (e.g. Australian Institute of Health & Welfare 2004). Also, some studies classify obesity differently for different ethnicities. For example, the 2002/03 New Zealand Health Survey uses higher BMI cut-offs for Māori and Pacific peoples (32 instead of 30 for obese; 26 instead of 25 for overweight; Ministry of Health 2003). We follow the practice of the SPARC and Cancer Society reports of using the same cut-offs for all ethnicities, using the obesity classification cut-offs from the US Center for Disease Control (2003) which are consistent with those used by WHO (2003).[7]

The large sample size enables us to separately profile the cycling behaviour of the severely obese rather than simply combine together as obese all those with a Body Mass Index (BMI) above 30; see Table 3.3. Thus, we have added two more extreme categories:

- Severely obese (BMI 35-39.9),
- Morbidly obese (BMI 40 and above).[8]

Table 3.3 Effect of obesity on cycling. [D11, G2 & G3]

Frequency of cycling	Body Mass Index							
	All respon-dents %	Underweight (Below 18.5) %	Normal (18.5 - 24.9) %	Over-weight (25-29.9) %	Obese (30-34.9) %	Severely obese (35-39.9) %	Morbidly obese (40+) %	Not answered %
Unweighted count	*8163*	*169*	*3588*	*2548*	*906*	*255*	*145*	*552*
Noncyclists (never learned, or not during last 3 months)	69	69	66	69	71	78	82	71
Occasional (up to 1-2 times a month)	16	18	18	17	16	11	11	12
Regular (at least once a week)	11	9	13	11	8	9	4	9
Not answered	4	3	3	3	5	2	2	9
Total	100	100	100	100	100	100	100	100

[7] WHO (2003, p.69) noted: 'In recent years, different ranges of BMI cut-off points for overweight and obesity have been proposed, in particular for the Asia-Pacific region. At present available data on which to base definitive recommendations are sparse.'

[8] Following http://www.halls.md/body-mass-index/bmirefs.htm (accessed 20 October 2004)

Refining analysis by use of these extreme categories proved more enlightening than varying obesity categories by ethnicity. For example, consider 'noncyclists' (defined as those who report never having learned to ride properly or not having cycled at all during the previous 3 months). The proportion of noncyclists rises from 66% (normal weight) to 78% (severely obese) and 82% (morbidly obese).

3.3 Bicycle availability

Bicycles are still widely available: 41% reported that a bicycle (in working order) was usually available for them to use. A similar result (43%) came from a nationwide telephone survey in 1998 (Ryan 2000).

Not surprisingly, cycling is much more common among those with a bicycle usually available to them (Table 3.4). These results also have a warning with respect to promoting cycling: lots of people with a bicycle do not use it at all (43%) or only occasionally (31%). Only a quarter of those with a bicycle reported cycling regularly. Thus, simply having a bicycle available does not necessarily lead to much cycling, so we should be very wary of assuming that simply increasing availability of cycles would cause many noncyclists to start cycling.

However, note that in a recent survey where 258 non-cyclists in Christchurch stated the main factor that would encourage them to cycle, 11% said that they would need a bicycle (Christchurch City Council 2005). The extent to which this reason was a mere rationalisation is unknown.

Table 3.4 Bicycle availability and frequency of cycling. [D11, D10]

Times ridden a bicycle in the last three months	**Is a bicycle usually available for you to use?**			
	All %	Yes %	No %	Not answered %
Unweighted count	*8163*	*3227*	*4672*	*264*
Noncyclists (never learned, or not during last 3 months)	69	43	88	52
Occasional (up to 1-2 times a month)	16	31	6	10
Regular (at least once a week)	11	26	1	7
Not answered	4	1	4	31
Total	100	100	100	100

3.4 Demographics

3.4.1 Age, gender, work status, ethnicity

Cycling is strongly related to both age and gender:

- about twice as many men are regular cyclists (16% overall, compared with 7% of women),
- regular cycling decreases steadily with age, particularly among men.

Profiling age groups separately for each gender (Figure 3.1) shows these patterns.

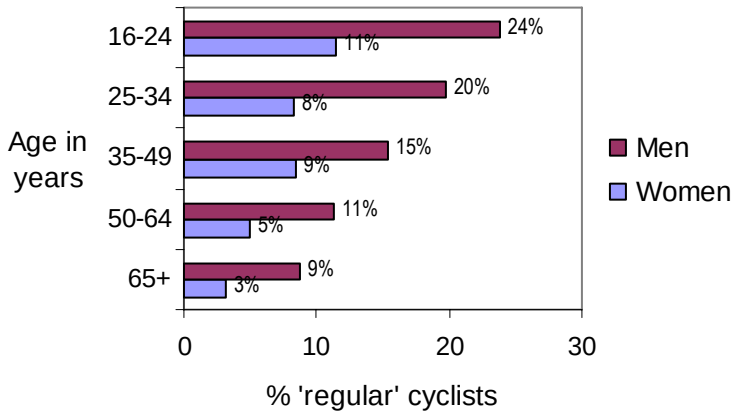


Figure 3.1 Age / gender profile of those cycling at least once a week. [G1, G7, D11]

Cycling is not less common among workers. Among those working full-time, 13% reported regular cycling and 20% occasional cycling. Some of the other results relating to

Table 3.5 Work status and frequency of cycling. [G10, D11]

Frequency of cycling	Work status %						
	All	Working full-time	Working part-time	At home	Retired	Student (full-time, including secondary school)	Other
Unweighted count	*8163*	*3810*	*1374*	*758*	*1249*	*514*	*432*
Noncyclists (never learned, or not during last 3 months)	69	66	71	77	78	55	74
Occasional (up to 1-2 times a month)	16	20	17	11	4	26	13
Regular (about once a week, or more often)	11	13	10	7	6	18	11
Not answered	4	1	2	5	13	1	2
Total	100	100	100	100	100	100	100

Note: 'All' includes a further 26 who did not answer the work status question.

work status are obviously driven by age differences (e.g. low cycling for the Retired category, and relatively high cycling for the Student category). Due to the complexity of the analysis required, the effects of having children on current cycling behaviour are presented with the stage of change analysis in Section 4.2.5 p.43.

Cycling is less common among those with Pacific or Asian ethnicity. For example, the proportion of regular cyclists in these groups is roughly half that of Māori and NZ European respondents (Table 3.6). Given that there are substantial differences in the age profiles of the major ethnic groups in New Zealand, we confirmed that these ethnic differences remained statistically significant after adjusting for age and gender using logistic regression (adjusted odds ratio for Pacific peoples of 0.47 with 95% CI 0.25–0.90; adjusted odds ratio for Asian of 0.44 with 95% CI 0.28–0.69).

The larger number of noncyclists in these groups is particularly driven by larger proportions who have never learned to ride properly (discussed in detail in Section 7.3). For example, 17% of Pacific peoples and 21% of Asians reported having never learned to ride properly compared with only 4% of NZ Europeans.

Table 3.6 Ethnicity and frequency of cycling. [G6, D11]

Frequency of cycling	Ethnicity %					
	All	NZEuro	Māori	Pacific	Asian	Other
Unweighted count	*8148*	*6281*	*719*	*216*	*356*	*999*
Noncyclists (never learned, or not during last 3 months)	69	67	69	77	82	68
Occasional (up to 1-2 times a month)	17	18	13	11	9	17
Regular (about once a week, or more often)	11	12	13	7	7	11
Not answered	4	4	3	5	2	3
Total	100	100	100	100	100	100

Note: the sum of the unweighted numbers of respondents for each ethnicity exceeds the overall total because of multiple responses; that is, those reporting both Māori and Pacific ethnicity are included in both columns.

3.4.2 Differences by level of urbanisation and region

No marked differences were apparent comparing frequency of cycling between larger cities in general and smaller centres or rural areas (Table 3.7).

However, differences between specific localities are marked, no doubt reflecting hilliness, infrastructure, and other characteristics relevant to cycling. For example, among the three main urban centres, Christchurch had nearly twice as many regular cyclists (17%) as

Auckland or Wellington (9% and 10% respectively).[9] This difference is consistent with the substantially higher incidence of cycling in Christchurch in the 2001 Census results concerning the journey to work.

Table 3.7 Urbanisation and frequency of cycling. [G5, D11]

Frequency of cycling	Urbanisation %					
	All	Large city (more than 100,000 people)	Smaller city (30,000 to 99,999 people)	Town (1,000 to 29,999 people)	Small town, commun-ity or village (less than 1,000 people)	Don't know/not sure/not answered
Unweighted count	*8163*	*3382*	*1640*	*1746*	*1109*	*286*
Noncyclists (never learned, or not during last 3 months)	69	69	70	66	69	72
Occasional (up to 1-2 times a month)	16	16	16	17	18	16
Regular (about once a week, or more often)	11	12	11	12	10	8
Not answered	4	3	3	5	3	5
Total	100	100	100	100	100	100

The large sample size of the current study enables us to compare differences between most regions with reasonable accuracy. Table 3.8 shows regions sorted by cycling frequency, with Nelson-Marlborough, Manawatu-Wanganui and Christchurch at the top showing the highest proportion of regular cyclists. Gisborne and Westland are not listed in the table because of their low sample sizes (less than 100); the other regions are based on results from at least 200.

3.5 Current cycling and physical activity levels in general

The extent to which cycling contributes to a healthy overall level of physical activity is of interest to organisations such as SPARC. However, this contribution cannot be assessed precisely with the current database, because the amount of cycling is not measured in days and minutes, which would have been consistent with how the amounts of brisk walking and general physical activity were measured.

[9] 'Auckland' denotes all four cities in the Auckland region (Auckland City, North Shore, Waitakere City, and Manukau City). 'Wellington' refers to the four cities in the Wellington region (Wellington City, Hutt City, Upper Hutt, and Porirua).

Table 3.8 Regional differences in frequency of cycling.

Region	*Unweighted count*	Frequency of cycling in the last three months %				
		Noncyclists	Occasional	Regular	Not answered	Total
Nelson-Marlborough	*305*	60	19	18	3	100
Manawatu-Wanganui	*483*	64	16	16	4	100
Canterbury	*1183*	64	19	16	1	100
Hawke's Bay	*308*	64	19	13	3	100
Otago	*475*	63	21	12	4	100
Wellington	*941*	68	18	12	2	100
Bay of Plenty	*542*	70	16	10	4	100
Southland	*203*	66	14	10	10	100
Waikato	*786*	71	17	10	3	100
Northland	*288*	74	13	9	4	100
Auckland	*2265*	73	14	9	4	100
Taranaki	*223*	73	20	6	1	100
All (incl. small regions)	*8163*	69	16	11	4	100

Note: Region above generally corresponds to a Regional Council area. Nelson-Marlborough is a combination made in the interests of a robust sample size for analysis. The regional classification was created by combining the Territorial Local Authority (TLA) codes in the database; hence classification by region is not necessarily precise in those few cases where a single TLA spans more than one region (e.g. Rotorua district). TLA codes were derived from postcodes.

Overall physical activity levels of cyclists and noncyclists can still be compared. Not surprisingly, given that cycling is a form of physical activity, cyclists were clearly more physically active overall than noncyclists. Bicycling at a regular pace was listed in the questionnaire as one example of a 'moderate physical activity' and fast bicycling as an example of 'vigorous physical activity'.

A key health promotion criterion is being 'regularly active', that is, at least 15 minutes of vigorous activity, or a total of 30 minutes or more of moderate activity, each day for five or more days each week. Fully 64% of regular cyclists reported being active at this level on five of the previous seven days compared with 44% of occasional cyclists and only 36% of noncyclists. (But note that because regular cycling was only reporting by 11% in total only 7%, a fairly small proportion of the total adult population, reported both being 'regularly active' and 'regular cyclists'.)

On average, regular cyclists reported being active (15 minutes of vigorous or 30 minutes of moderate activity) on 4.8 days out of the previous seven days compared with 3.3 days for noncyclists.

It is already known that overall physical activity levels, and the frequency of cycling, have clear relationships with age and gender. Hence the association between the amount of cycling and physical activity needs checking to ensure it is more than simple age and gender differences (e.g. the very old doing both relatively little physical activity in general and little cycling). A logistic regression confirmed a clear association even after adjusting for the effects of gender, age, and ethnic group.[10] The odds of a noncyclist being active on five or more of the previous seven days are only about 60% those of a cyclist (adjusted odds ratio 0.61, 95% CI 0.54–0.67). Being a regular cyclist doubles the odds of being active on five or more of the previous seven days (compared with noncyclists and occasional cyclists; adjusted odds ratio 2.42, 95% CI 2.07–2.83).

[10] Logistic regression analyses in this report used the unweighted data. This avoids switching to specialist software designed to handle complex sampling designs and related weighting (which can prove remarkably time-consuming). The analyses invariably include major weighting variables such as gender, age, and ethnic group (but not household size or region).

4. Cycling: stages of change

4.1 Stage of change measurement

In the questionnaire, the cycling stage of change question immediately followed simpler questions about cycle availability and recent use. We used the exact wording reported for UK research by TRL (Davies et al. 2001) for cycling. The wording was:

> *For a short journey when the weather was fine and you have nothing to carry, would you...*

Table 4.1 Stages of change—cycling. [D12]

Stages of change	%	*Unweighted count*
Not even consider using a bicycle [Precontemplation]	41.1	*3430*
Realise that you could use a bicycle but wouldn't actually do it [Contemplation]	13.6	*1111*
Think seriously about the pros and cons of cycling but rarely do it [Ready for action]	8.0	*695*
Try cycling on some occasions [Action]	17.6	*1438*
Cycle quite often [Maintenance1]	9.8	*733*
Almost always cycle [Maintenance2]	4.7	*314*
Not answered	5.2	*442*
Total	100.0	*8163*

Note: the TRL question wording has six answer options rather than the five stages of change commonly used. Given the relatively small numbers cycling quite often or almost always, we often combine them into a single Maintenance stage.

Around half the responses indicate little interest at all in cycling (55% in Precontemplation and Contemplation). This is to be expected given that 69% of respondents were classified as noncyclists (Section 3.1). Indeed, although relatively few placed themselves in the Maintenance stages (14-15%), it seems fair to suspect some wishful thinking, given that only 7% of respondents reported cycling two or more days a week. Note, however, that the Action stage quite closely mirrors the number of respondent stating that they 'occasionally' cycle (17.6% compared with 16.5%).

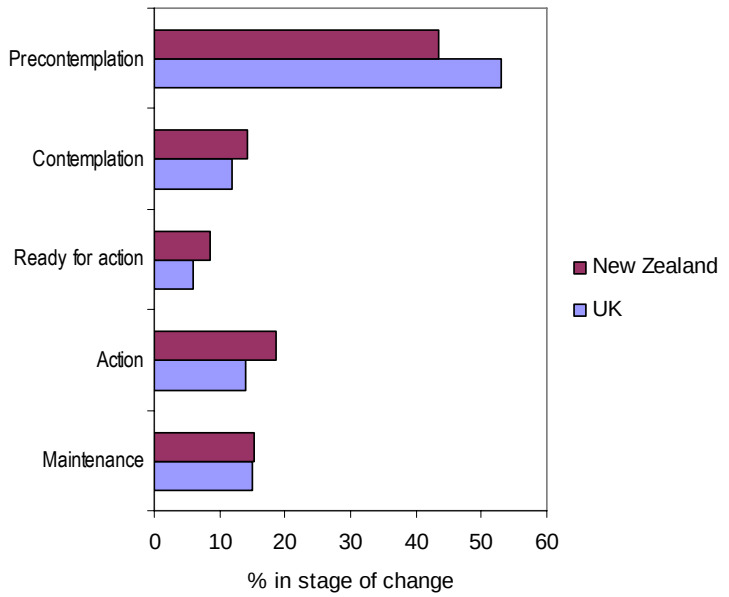
Overall, the question appears to have performed reasonably well:

- Only 5% failed to answer, despite reasonably complex wording (this is little more than the simpler behavioural question about frequency of recent cycling where 3-4% did not answer).
- Comparing the stage of change responses to the reports of recent cycling behaviour showed plausible consistency. For example, 86% of those cycling *most days* placed themselves in the highest stage (Maintenance) compared with only 7% of those who had not cycled in the last three months. Only 1% of those who had never learned to ride properly placed themselves in the Maintenance stage.

- 57% of those without a bicycle usually available for them to use were in the lowest stage (Precontemplation) compared with only 20% of those with a bicycle available.
- Long-term illness and permanent injury or disability did affect stage of change responses noticeably, but not so strongly as to require that we screen out respondents with such health problems from stage of change analysis.

Some might see the level of responses in the Maintenance stages as unrealistic, perhaps reflecting wishful thinking on the part of respondents, particularly given the relatively low frequency of cycling. However, we see these responses as a reasonable measurement, given that the stage of change question aims to measure not simply behaviour but also associated psychological states and intentions (hence the common longer label 'stage of *readiness* to change').

For this reason, we commend the use of this stage of change question by others to monitor progress of cycling strategies, particularly any aimed at producing initial changes in attitude or intention rather than immediate behavioural change.



Note: New Zealand results are adjusted upwards slightly (from those in Table 4.1, which includes *Not answered*) to improve comparability with the UK results (which did not report any *Not answered* category).

Figure 4.1 Cycling stage of change: New Zealand and UK results.

Figure 4.1 shows that our cycling stage of change results are broadly similar to those from the UK nationwide survey (Davies et al. 2001). This is despite levels of cycling in the UK survey being slightly higher (16% about once a week or more compared with 11% in New Zealand), perhaps because the UK survey concerned summer whereas our survey

was in autumn. The UK results are also based on a large sample size (3118) of those aged 16 or over, but they used a different interview mode. Rather than a self-completion questionnaire, the UK questions were presented face-to-face as part of an omnibus questionnaire.

4.2 Demographics

4.2.1 Age, gender, ethnicity

Consistent with the baseline results that more men cycle regularly, men are clearly more common in the Action and Maintenance stages of change (Figure 4.2). Given this, it also seemed possible that men might dominate all stages of change above Precontemplation. However, the *Ready for action* and *Contemplation* stages did not show a clear gender bias. Thus, a cycling promotion initiative targeting people in these stages should not necessarily be focused on men.

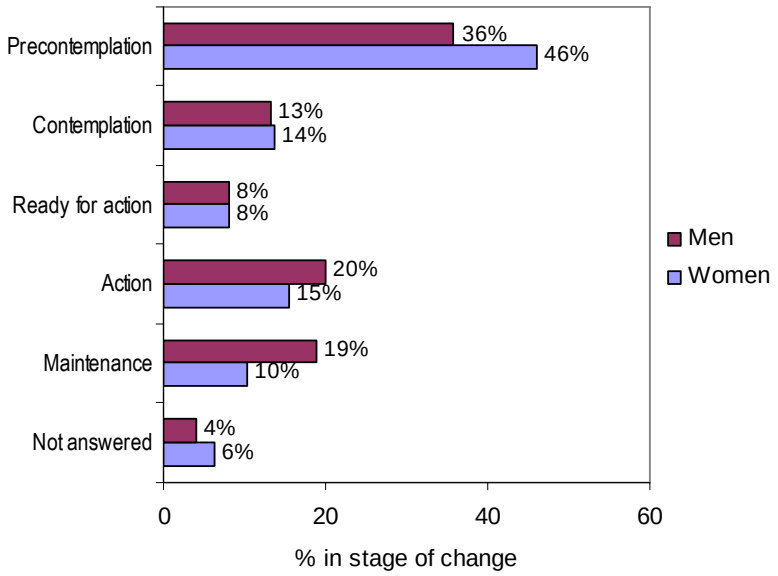
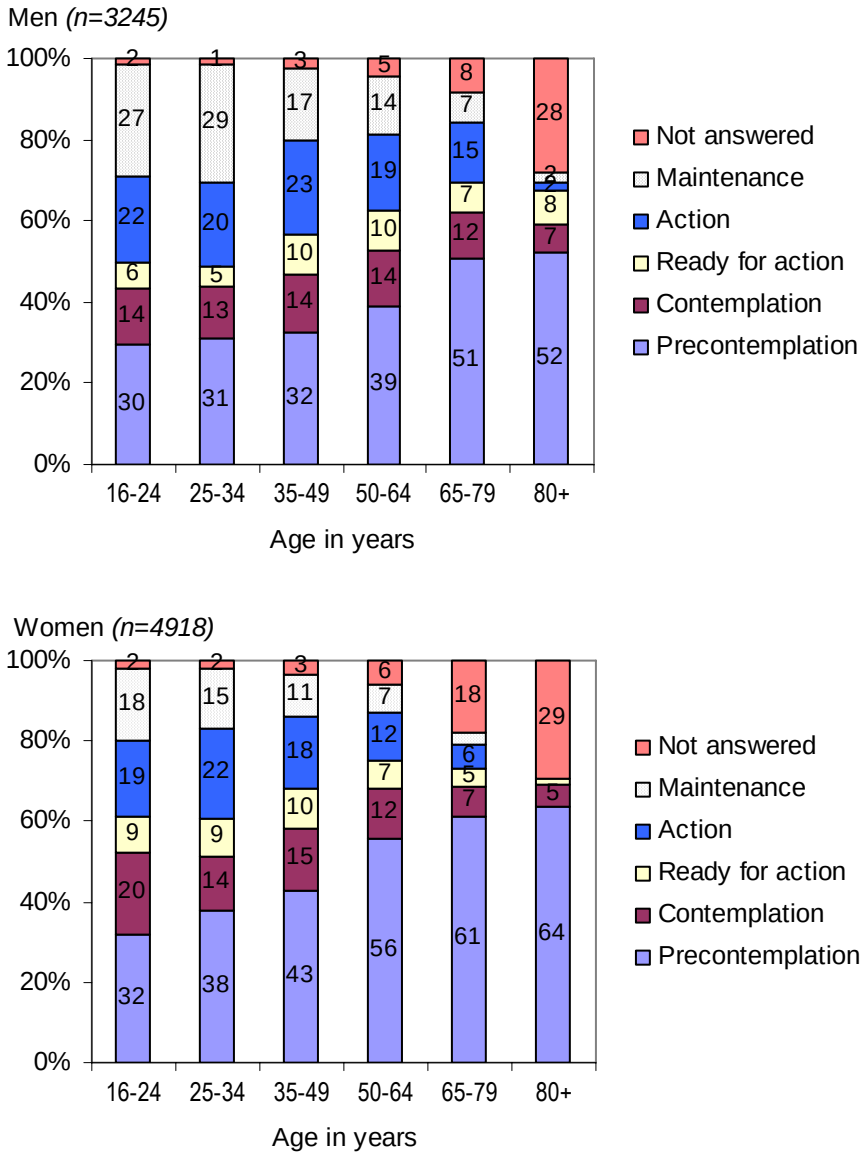


Figure 4.2 Gender and cycling stage of change. [G1, D12]

A significant consideration is that barriers to cycling for women are likely to be substantially different to those for men. Qualitative research about cycling in New Zealand could well find similar results to those from the UK, where women felt more vulnerable to traffic danger, personal attack, sexual harassment, and embarrassment than men. Comments from women cyclists in this study (Davies et al. 1997, p.10) included:

> *I'm worried about the view from behind.*
>
> *Men just have to comb their hair* [Related to cycle helmets and cycling to work].

Furthermore, Davies et al. (2001) reported that 40% of female noncyclists agreed that 'my friends would laugh at me if I were to cycle' (compared with only 7% of female cyclists and 22% of male noncyclists).



Note: Base numbers of respondents are above 300 for all male age groups (apart from 91 aged 80+). Base numbers are above 500 for all female age groups (apart from 122 aged 80+).

Figure 4.3. Age and cycling stage of change. [G7, D12, G1]

Seniors (aged 65+) are much more likely to be in *Precontemplation* (Figure 4.3). The strikingly high number of *Not answered* responses from seniors could also be interpreted as indicative of Precontemplation (e.g. the question may have been dismissed as irrelevant). Thus, levels of Precontemplation may be higher than suggested by results in the graph (e.g. around 59% for men aged 65-79 and 80% for men aged 80+).

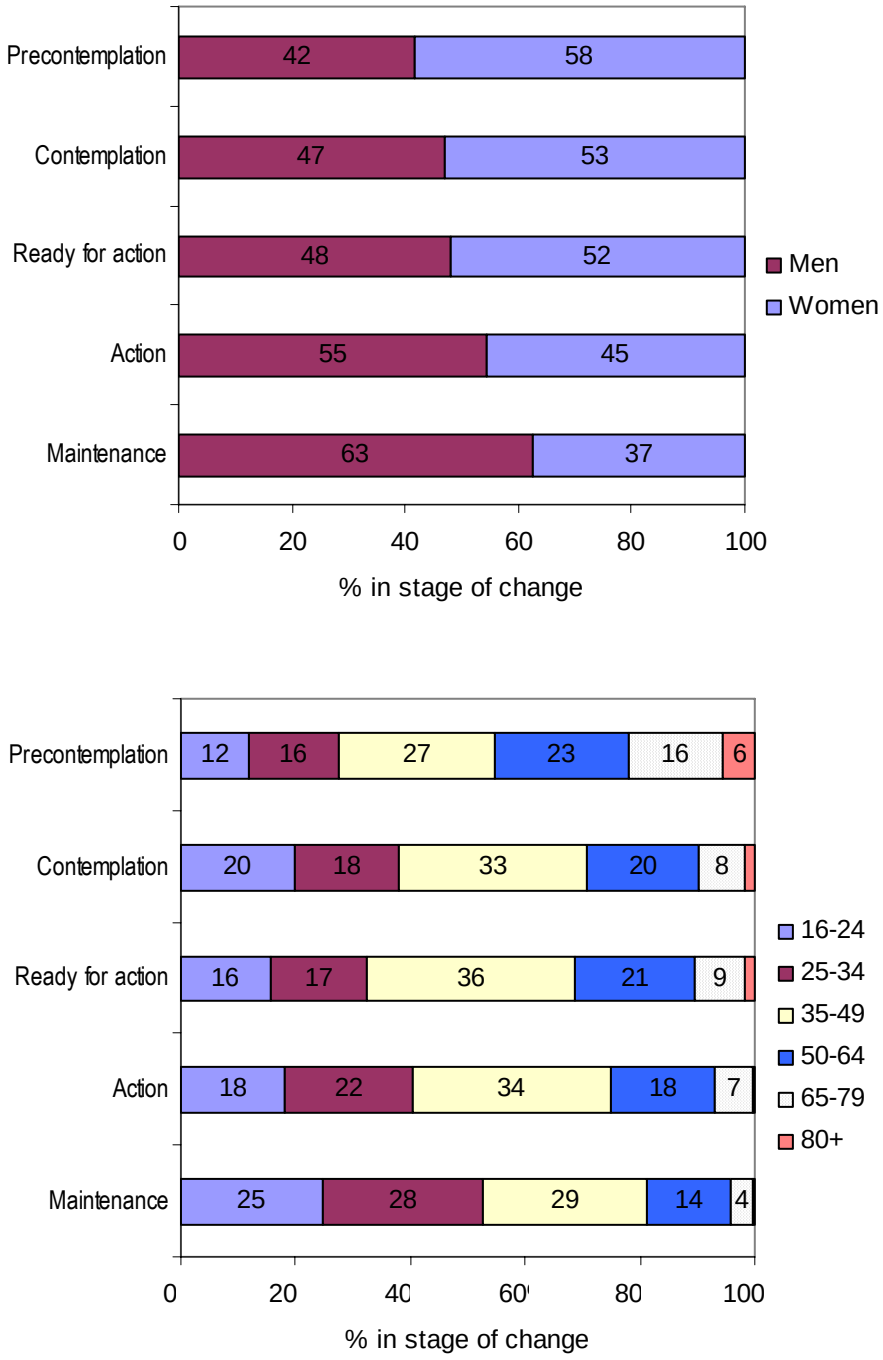


Figure 4.4 Cycling stage of change profiled by gender and age. [G1, G7, D12]

Interestingly, potential for change, as indicated by the *Action* and *Ready for action* stages, is about as common among those aged 35-64 as among younger age groups. This suggests that these age groups may be open to increasing cycling for reasons similar to those found in the UK (Davies et al. 1997): cycling being more practical with older children than young ones, the departure of children from home providing more leisure time, and increased concerns about personal health/fitness with age.

Showing these relationships 'the other way round' is sometimes useful if stages of change are considered more appropriate for targeting than demographic characteristics. Presenting the material in this way provides a visual check on the demographic composition of each stage of change group (Figure 4.4).

Given the much higher levels of noncyclists among Pacific and Asian peoples (see Section 3.4.1), it is not surprising to find that there are marked differences in the stages of change for these groups compared with New Zealand European and Māori (Figure 4.5). This indicates that it may well be more difficult to increase cycling in areas with large populations of Pacific and Asian residents without first undertaking special consultations or qualitative research to identify and address any distinctive underlying cultural barriers to cycling.

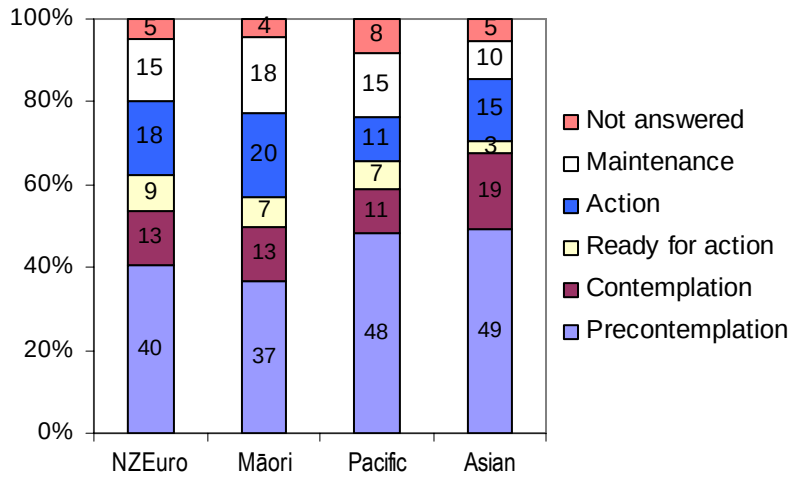


Figure 4.5 Ethnicity and cycling stage of change. [G7, D12]

4.2.2 Differences by level of urbanisation and region

No marked differences in cycling stage of change were apparent between those living in large cities (more than 100,000 people) compared with smaller cities, towns (1000–29,999 people), and smaller settlements.

Stage of change results by region are in Table 4.2 as a reference for regional cycling promotion and as a baseline for any regional research. (The smallest regions, Western and Gisborne, with base sample sizes below 100, are omitted.) The regional results are sorted from Nelson-Marlborough (with a lowest Precontemplation rate of only 27%) to Auckland Region (with a Precontemplation rate of 45%).

Table 4.2 Region and cycling stage of change (sorted on Precontemplation). [Region derived from postcode and TLA, D12.]

Region	*Unweighted count*	Stage of Change %						
		Pre-contem-plation	Contem-plation	Ready for action	Action	Main-tenance	Not answered	Total
Nelson-Marlborough	*305*	27	15	12	20	22	4	100
Hawke's Bay	*308*	35	15	10	17	17	6	100
Canterbury	*1183*	37	15	9	20	16	3	100
Bay of Plenty	*542*	38	12	8	21	14	7	100
Manawatu-Wanganui	*483*	38	13	9	17	16	7	100
Waikato	*786*	39	15	8	18	16	4	100
Otago	*475*	41	13	4	15	20	6	100
Northland	*288*	43	12	10	17	10	9	100
Taranaki	*223*	44	11	7	21	14	4	100
Wellington	*941*	44	12	7	20	14	3	100
Southland	*203*	44	11	9	15	18	3	100
Auckland	*2265*	45	14	8	15	12	6	100
All (incl. small regions)	*8163*	41	14	8	18	14	5	100

There are also clear differences between the three major urban areas, with Christchurch, as expected, having significantly fewer in Precontemplation.

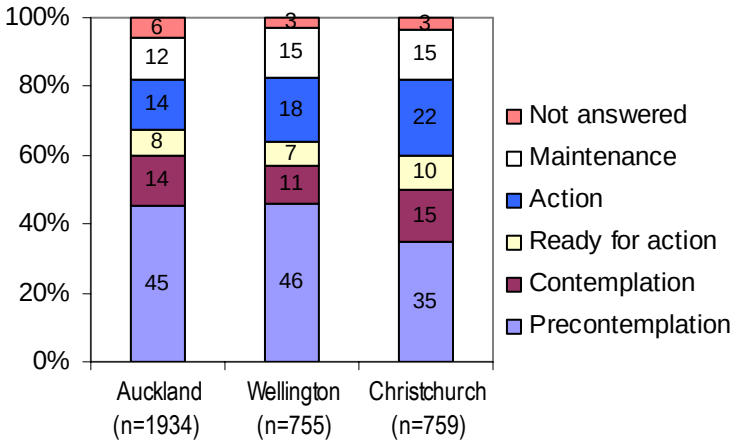


Figure 4.6 Major cities: cycling stage of change. [City derived from postcode, D12]

4.2.3 Work status and income

Analysis of work status (Table 4.3 p.41) provides information useful for workplace initiatives promoting cycling. It was possible that readiness to cycle among those working might have been distinctly low because of greater constraints on their time or because

they commonly travel when roads are particularly busy. However, both full-time and part-time workers included substantial numbers (29% in both cases) in the *Action* and *Ready for action* stages.

Workplace travel plans are currently being implemented or considered at several sites in New Zealand. The set-up costs mean that these are typically larger work sites. Hence it is useful to note that we have over 1000 respondents working at work sites with 50 or more staff, and that their responses are essentially the same as those reported for part-time and full-time workers overall in Table 4.3.

Personal income depends very much on work status, and may bear little relationship to disposable income. As a result we focus on household income. Mean household income before tax (estimated from the income bands in question G15) varies hardly at all between the stage of change groups (only from $59,000 to $63,000).

A refinement that often shows relationships more clearly is to adjust household income for household size. The logic is that a single person household income of, say, $50,000 might be relatively price insensitive, but a household with two adults and four children with the same household income might be much more price-sensitive. To calculate the adjustments, we used results recently presented by Easton (2004). He makes a good case that the underlying econometric analysis provides a sounder basis for such adjustments than the more commonly used Revised Jensen Scale (Perry 1995).

Household income adjusted for sample size also failed to show a strong simple relationship with stages of change. The means varied from $48,000 for Precontemplation to $51,000 for Ready for Action. That the effect of income would only become clear from much more complex analyses, where background effects such as age, gender, work status, and ethnicity are first controlled statistically, remains entirely possible. As there is no strong simple relationship between household income and cycling stage of change, however, justification to complete and report such analyses in this project is insufficient. This is a useful result in itself.

4.2.4 Education

For analysis of education, we excluded those aged under 25 or over 54 as not necessarily having had an equal chance to gain tertiary qualifications. Those with qualifications beyond secondary school were in the Action and Maintenance stages slightly more often. However, the strong relationship of cycling and cycling stage of change with age means that remaining age differences may underlie the current relationship with education. Given that the relationship with education is far from strong, it did not seem worthwhile creating a statistical model controlling for the effect of age.

Table 4.3 Work status and cycling stage of change. [G10, D12]

Cycling stage of change	Work status %							
	All	Working full-time	Working part-time	Unemployed/ Actively seeking a job	At home	Retired	Sick/Invalid	Student (full-time, including secondary school)
Unweighted count	*8163*	*3810*	*1374*	*145*	*758*	*1249*	*149*	*514*
Not even consider using a bicycle [Precontemplation]	41	37	40	31	48	58	58	31
Realise that you could use a cycle but wouldn't actually do it [Contemplation]	14	15	15	13	11	8	13	14
Think seriously about the pros and cons of cycling but rarely do it [Ready for action]	8	9	9	10	8	5	3	8
Try cycling on some occasions [Action]	18	20	20	19	17	7	5	20
Cycle quite often [Maintenance1]	10	11	10	16	6	4	9	14
Almost always cycle [Maintenance2]	5	5	3	8	3	1	1	10
Not answered	5	2	4	3	7	16	10	2
Total	100	100	100	100	100	100	100	100

Note: 'All' includes 138 respondents describing their work status as *Other*, and 26 who did not answer this question.

Table 4.4 Highest educational qualification and cycling stage of change (respondents aged 25-54). [G8 & 9, D12]

Stage of change	Educational qualifications %				
	All	None listed	Secondary school	Qual.other than degree*	Bachelor degree or higher degree
Unweighted count	*4662*	*630*	*1327*	*1651*	*1034*
Not even consider using a bicycle (Precontemplation)	38	45	40	35	36
Realise that you could cycle but wouldn't actually do it (Contemplation)	14	12	16	14	15
Think seriously about the pros and cons... but rarely do it (Ready for action)	9	9	9	8	8
Try cycling on some occasions (Action)	20	18	20	22	19
Cycle quite often (Maintenance1)	11	9	9	13	12
Almost always cycle (Maintenance2)	5	2	5	5	7
Not answered	3	4	2	2	3
Total	100	100	100	100	100

'All' includes 20 respondents who did not answer the questions on educational qualifications.
* Taking 3+ months full-time study.

Given that some promotional initiatives may be aimed primarily at particular stages of change, profiling stages of change by education levels could be more useful (i.e. results 'the other way round') to check whether this might affect communication style and approach. No particularly marked differences of practical interest were apparent between stages.

Table 4.5 Cycling stage of change profiled by highest educational qualification (respondents aged 25-54 only). [G8 & 9, D12]

Highest qualification	Stages of change %					
	All	Precontem-plation	Contem-plation	Ready for action	Action	Maintenance
Unweighted count	*4662*	*1758*	*673*	*438*	*960*	*696*
None of those below	13	15	11	13	12	9
Secondary school	28	29	30	30	27	23
Qual. other than degree taking 3+ months full-time study	36	33	35	34	39	40
Bachelor degree or higher degree	24	23	24	23	22	27
Not answered	0	0	0	0	0	1
Total	100	100	100	100	100	100

Note: 'All' includes 137 who did not answer the stage of change question.

4.2.5 Effect of children

Before looking at stage of change, some results are presented showing the effect of children on current cycling behaviour.

Clearly, demonstrating the impact of children in the household on cycling is not easy, given the strong relationships of age and gender with cycling. First considered is the possibility that children under five years may make a marked impact on their mothers, given the lower mobility in general of such young children. To analyse this, we selected only those age groups (20-44) where substantial numbers of respondents were with and without children under five in their household, and where children aged 5-17 might or might not be also present.[11] As expected, having young children significantly reduced cycling among women (z=2.9, p<.01). Of the 622 women aged 20 to 44 with children under five in their household, 77% were noncyclists and 8% were regular cyclists. Of the 1573 women aged 20 to 44 without children under five (but who might have had children aged 5-17), 68% were noncyclists and 10% were regular cyclists. No such significant difference was apparent among men in this age group.

However, a parallel significant difference was not clearly identified when the stages of change were analysed. Of the women with children under five, 42% were Precontemplators and 13% Contemplators; comparable figures for women without children under five were 37% and 17%.

Restricting the analysis to those with children under 5 and no children aged 5-17 (in order to reflect the life changes associated with the arrival of first children) makes the difference in noncycling rates even larger. Specifically, 81% of the 334 women with children under 5 (and none 5-17) were noncyclists compared with 69% of the 1861 other women aged 20-44 (including some with children under 5 if they also have children aged 5–17). The significance of this difference was confirmed by a logistic regression controlling for age and ethnicity; adjusted odds ratio of 2.0 with 95% CI 1.2–3.2. However, there were still minimal differences in the parallel stage of change results (42% versus 38% Precontemplators). The effect of children aged 5-17 (and no children under 5) is quite different: they significantly increase occasional cycling (up to twice a month) by their fathers. Of the 596 men aged 25-54 with children aged 5-17 in their household, 30% cycled occasionally in the previous three months compared with only 18% of the 1086 men in the same age group without such children.[12] This suggests, perhaps, that

[11] Strictly, the database does not record that a child under five years in the household belongs to the respondent; rather two separate questions (G18, G19) record that at least one child aged under five is in the household, and whether or not any of the people aged under 18 years at the address are the respondent's children.

[12] A slightly different age-group is used here for men than for the comparable analysis of women because fewer men aged 20-24 have children in their household.

fathers may be taking their children out for recreational bicycle rides. A comparable difference was not apparent among women with children aged 5-17. Nor was there a clear impact of children aged 5-17 on stage of change for either gender.

4.3 Motivation, perceived benefits and barriers

The Obstacles to Action questionnaire included a large number of psychological variables relating to motivation, perceived benefits, and perceived barriers. At first sight, these may seem very promising as a way of describing differences between people, in different stages of change, that can be used to help change their behaviour. However, because these psychological measures were worded with respect to physical activity in general rather than cycling specifically (since cycling is only one of a range of physical activities available to people), differences between stages of change with respect to them are of less interest in general than the demographics and so on already profiled. Also, these variables were a natural focus of attention (with respect to physical activity in general) for the segmentation and other analyses publicly available from SPARC (Sullivan et al. 2003b).

In addition, the sheer number of such question items (114 in B6 and D1 through D8) demands prioritising. To prioritise, we tested for differences in means between each stage of change using one-way analysis of variance.

Table 4.6 shows the items with the largest significant differences in means between stages of change (as assessed by a Welch statistic, which is similar to the conventional *F*-statistic but preferable when the assumption of equal variances does not hold). The very large sample size means that it is pointless to look closely at all questions showing statistically significant differences; the very large sample size means that small differences of no practical significance will often be statistically significant.

In short, our brief analysis of over 100 psychological variables concerning physical activity in general did not uncover dramatic or interesting differences between cycling stage of change groups.

It is not surprising at all that question 7A in Section D of the questionnaire had many items closely related to cycling stage of change. But these differences are not worth following up in detail because they overlap substantially in meaning with stage of change.

For example, the first item (D7Aa) concerns how likely they would be to use cycle lanes or paths if they were available. The overlap in meaning is less extreme with other items from question D7A, but still considerable—all these items concern readiness to increase physical activity.

The largest difference, other than items in D7A, concerned a perceived barrier influencing physical activity in general: '*I'm too old* '(D6k). This simply reflects the well-established age differences in actual cycling behaviour, and is also not worth looking at in detail.

Table 4.6 Psychological variables: preliminary screening for differences between stages of change.

Question No.	Variable	Welch statistic
D7Aa	Cycle lanes or paths	141.0
D7An	Sports shop	48.7
D7Af	School gym/pool open to community on weekends	42.2
D7Am	Organised sports (like touch rugby, netball)	41.7
D7Ag	Netball or tennis courts	40.4
D7Ae	Swimming pool, beach or lake	35.7
D6k	I'm too old	29.8
D7Ak	Shower at work	29.2
D1a	I enjoy physical activity	27.3
D7Ad	Public park with playing fields	24.5
D7Ac	Walking tracks	24.2
D7Ai	Health club or gym near work	20.8
D6q	I'm too out of shape to start	20.2
D7Ah	Community recreation centre	20.1
D7Aj	Health club or gym near home	19.4
D8f	I had an extra hour of free time during my day	17.2
D7Al	Home exercise equipment	15.6
D8j	My employer allowed time for it	15.2
D8c	I could get a free or low-cost gym membership	15.0
D6w	Physical activity takes too much effort	14.6
D8i	My employer offered a gym membership	14.4
D1n	I care about keeping in shape	13.9
D6p	Physical activity is uncomfortable for me	13.8
D8k	My employer paid me to be more physically active	12.9
D6s	I don't know how to be physically active	12.7

Base sample size: all respondents (apart from missing values/not answered)

More interesting is the difference relating to enjoyment of physical activity (D1a), reflecting the general underlying factor of 'intrinsic motivation'. Table 4.7 shows that clear differences exist between stages of change on this motivation question. The values shown are mean ratings from 1 *Strongly disagree* through to 7 *Strongly agree* (4 being neutral). However, even though (having excluded D7A and D6k) D1a is the psychological variable of interest with the greatest differences between stages of change (as indicated by the Welch statistics in the previous table), the differences in means are not particularly dramatic. At a practical level, Table 4.7 shows that all the means are moderately high (from 5.2 to 6.1 out of 7), and so these differences may not be enough to help determine different approaches or communications to people in different stages of change.

A rating of a perceived barrier/excuse provides a second illustration*: 'I'm too out of shape to start'* (D6q). By reasoning similar to that above for selecting D1a, this item is the second one of possible practical interest in Table 4.6 above. The scale for these ratings of perceived barriers is an unusual one from 1 *'Doesn't influence me at all'* through to 7 '*Influences me a lot' (*where 4 is neutral). It is important not to overlook the lead-in wording to the ratings:

> *The following is a list of possible things that keep some people from being physically active. For each one, please indicate how much each influences your own activity level.*

However, the mean ratings for all stages are all relatively similar close to the bottom of the influence scale (Table 4.7). Thus we again suggest that these differences between stages of change are unlikely to be of practical use in promoting cycling or to distinguish between people in different stages of change.

A final illustration, '*I don't know how to be physically active'* (D6s), is selected from the very end of Table 4.6 above (i.e. with the lowest Welch statistic). Its main purpose is to show that the many psychological variables not listed in that table will have differences between means that are even less marked, and hence of even less practical interest. D6s is again a perceived barrier/excuse variable rated in terms of influence as described above for D6q. Table 4.7 shows that the means for all stages of change are low (below 2) rather than markedly different.

Table 4.7 Psychological variables: differences between stages of change for three illustrative variables. (Mean ratings from 7-point scales.)

Question D12 **Consideration of using a bicycle**	Question D1a **I enjoy physical activity**	Question D6q **I'm too out of shape to start**	Question 6s **I don't know how to be physically active**
Not even consider using a bicycle	5.2	2.0	1.7
Realise that you could use a cycle but wouldn't actually do it	5.3	2.0	1.7
Think seriously about the pros and cons of using a cycle but rarely do it	5.4	1.9	1.5
Try cycling on some occasions	5.6	1.8	1.5
Cycle quite often	5.9	1.5	1.4
Almost always cycle	6.1	1.3	1.2

Base sample size: all respondents (apart from missing values/not answered), *n*=7466–7606.

Other types of psychological measurements might be more useful to characterise cycling stage of change segments. For example, it would be possible to develop question items directly about cycling that fit with the broader theoretical framework commonly used in conjunction with stages of change (e.g. decisional balance scales, processes of change

scales). Alternatively, question items from other social marketing frameworks could be used, such as those reported in Davies et al. (2001). In particular, they found substantial differences in agreement with '*I hate to stand out from the crowd*' (cyclists 24% versus noncyclists 45%) and '*My friends would laugh at me if I were to cycle*' (cyclists 6% versus noncyclists 26%). In the SPARC questionnaire, the psychological measurements were about physical activity in general rather than directly about cycling. In addition, they were designed to fit with a different theoretical framework, a social cognitive approach. (All stage of change questions in the New Zealand questionnaire, including the one on physical activity in general, were additions to the US questionnaire that was used as a foundation.)

5. Situational baseline: walking

5.1 Introduction

Walking is much more common as a transport mode than cycling. Indeed, the extent to which we walk in everyday life is so great that it creates measurement difficulties for research and analysis.

Given the Obstacles to Action research focus on physical activity relating to health benefits, the main question (D14a) on walking concerns 'brisk walking' (defined as walking at a pace at which you are breathing harder than normal). In addition, only brisk walking for at least 10 minutes at a time is recorded (generally accepted in the health literature as a minimum duration e.g. see Hardman 2001). Thus, respondents are asked to indicate:

- The number of days in the previous seven where they did brisk walking for at least 10 minutes at a time.
- How much time they usually spent doing such brisk walking on each of those days.

The question does not distinguish between walking as a form of transport as opposed to walking for exercise or leisure, and specifically excludes slow walking.

Although this question on walking provides data that are not necessarily transport-related, analysing the extent to which walking behaviour is associated with standard background variables (e.g. demographics) is worthwhile. This analysis is of interest to both those promoting increased walking for health as well as to transport policy makers promoting walking as an environmentally friendly transport mode.

Table 5.1 simply shows the number of days (in the previous seven) that respondents did brisk walking for at least 10 minutes at a time. Table 5.2 approximates the total amount of brisk walking during the week (by multiplying the number of days by the amount of time they usually spent doing such brisk walking). In both cases, instances of walking less than 10 minutes at a time are excluded by definition.

Table 5.1 immediately makes it clear that many people report very little brisk walking at all: one third recorded doing at least 10 minutes or more of brisk walking on only one day or none during the previous week.

Table 5.1 Number of days in the previous 7 when walked 10 minutes or more at a brisk pace. [D14a]

Days	%
0	22.6
1	10.4
2	13.2
3	13.9
4	9.3
5	13.9
6	4.8
7	8.7
Not answered	3.2
Total *n=8163*	100.0

Table 5.2 shows a more comprehensive measure of walking which takes into account the time usually spent brisk walking each day in addition to the number of days in the previous week. We use this measure of walking in most analysis because it is more comprehensive than simply counting days. We chose cut-points at 2.5 and 5 hours to be consistent with the cut-points established by SPARC for physical activity in general (e.g. SPARC 2004). That is, even in the absence of any physical activity other than walking, those doing 2.5-4.9 hours of brisk walking in a week fit the SPARC category 'relatively active' and those doing 5 or more hours fit the SPARC category 'highly active'.

It is important not to have unrealistic expectations of accuracy with such measures. For example, in many cases there may be little or no difference in the actual amount of brisk walking between those classified as doing 'None' and those classified as '<1 hour'; rather, it may simply reflect that respondents interpreted the meaning of 'brisk walking' differently.

Table 5.2 Total time brisk walking in the previous 7 days. [D14a]

Hours	%
None	22.6
<1	16.6
1-2.5	24.5
2.5-4.9	16.0
5 or more	14.9
Not answered	5.4
Total *(n=8163)*	100.0

A second New Zealand guideline for healthy levels of physical activity emphasises regularity more; at least 30 minutes of moderate physical activity (or equivalent) on five or more days of the week ('30×5' for short). Table 5.3 shows that a substantial group of adults (22%) report meeting this health-related criterion purely through their brisk walking (and may have additionally completed moderate or vigorous activity).

We do not have exactly comparable figures for cycling (which was not measured in terms of minutes), but note that only around 7% of the total were both 'regular cyclists' and 'regularly active'. This rough comparison (22% for walking, 7% for cycling) serves to remind us that because walking is more common it makes a greater contribution to health-related physical activity than cycling.

Table 5.3 '30×5' — 30 minutes or more of brisk walking on five or more days of the week. [D14a]

'30x5'	%
No	77.3
Yes	21.6
Not answered	1.1
Total *(n=8163)*	100.0

5.2 Illness, disability and obesity

Those with long-term illnesses or permanent disabilities reported no brisk walking at all more often than those without any illnesses or disabilities affecting their physical activity (44% and 37% respectively, compared with 21%). Nevertheless, substantial numbers in these groups also reported healthy levels of brisk walking: 13% of those with long-term illness reported 2.5+ hours as did 17% of those reporting a permanent injury or disability (compared with 33% of those without any illnesses or disabilities affecting their physical activity). Thus we have not excluded those reporting such illnesses or disabilities from any of the analyses of walking in this section.

Table 5.4 Effect of pregnancy, illness, injury, or disability on brisk walking. [D14a, D16]

Total in the previous 7 days	All	Physical activity over last 7 days affected by ...					
		Nothing	Pregnancy	Tempor-ary illness	Long-term illness	Temporary injury	Permanent injury or disability
	%	%	%	%	%	%	%
Unweighted count	*8163*	*6258*	*123*	*309*	*271*	*320*	*510*
None	23	21	22	29	44	28	37
<1 hour	17	17	19	23	17	23	14
1-2.5 hours	24	25	29	25	20	25	19
2.5-4.9 hours	16	17	13	10	9	10	8
>5 hours	15	16	10	8	4	8	9
Not answered	5	4	7	6	6	6	14
Total	100	100	100	100	100	100	100

Note: 'All' includes a further 453 who did not answer the illness/injury/disability question.

As with cycling, the effect of obesity was stronger at the more extreme levels. The proportion reporting no brisk walking at all rises steadily from 20% for those of normal weight up to 38% for the morbidly obese.

Table 5.5 Effect of obesity on brisk walking. [D14a, G2 & G3]

Brisk walking in the previous 7 days	Weight category %						
	Under-weight	Normal	Over-weight	Obese	Severely obese	Morbidly obese	Not answered
Unweighted count	*169*	*3588*	*2548*	*906*	*255*	*145*	*552*
None	24	20	23	24	30	38	27
<1 hour	21	16	16	20	22	19	13
1-2.5 hours	27	25	25	25	26	16	21
2.5-4.9 hours	14	18	17	14	8	11	11
>5	10	16	15	13	10	14	16
Not answered	4	5	5	4	4	2	13
Total	100	100	100	100	100	100	100

Note: Body Mass Index values underlying the column headings are: Underweight (below 18.5), Normal (18.5–24.9), Overweight (25.0–29.9), Obese (30.0–34.9), Severely obese (35–39.9), Morbidly obese (40 and above).

5.3 Demographics

5.3.1 Age, gender, work status, children, ethnicity

The relationships with age and gender are much weaker for walking than for cycling (e.g. compare Figure 5.1 p.52 with Figure 3.1 p.28). Figure 5.1 profiles those with relatively high levels of walking and, apart from reductions among those aged 65+, shows no marked differences related to age and gender. Considering all brisk walking in a week (Table 5.6) did not bring to light any further differences, apart from reductions for the very old (80+).

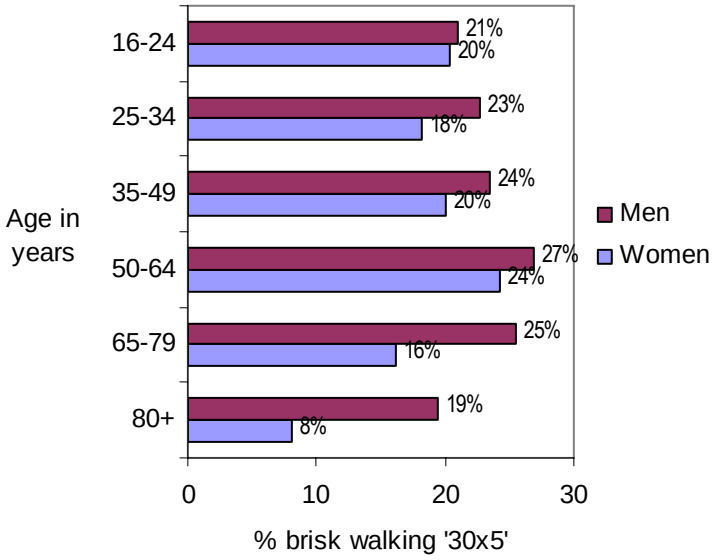


Figure 5.1 Age/gender profile of those brisk walking '30×5' (i.e. at least 30 minutes at least 5 days in the previous week). [G1, G7, D14a]

With respect to age, the definition of brisk walking is important as the questionnaire strictly allows for this to be a slower speed for older people, a brisk pace being defined as one at which you are breathing harder than normal. However, older respondents, especially those aged 80+ years, may have interpreted the question differently. They could have considered the walking they do clearly not brisk, even if it does lead to breathing harder than normal, because they may walk quite slowly.

Table 5.6 Age and gender: time brisk walking in the previous 7 days. [G1, G7, D14a]

Brisk walking in the previous 7 days	**% of age categories**					
Men	16-24	25-34	35-49	50-64	65-79	80+
Unweighted count	*311*	*404*	*968*	*958*	*513*	*91*
None	25	27	26	20	23	39
<1 hour	18	15	18	16	14	7
1-2.5 hours	26	23	20	22	20	14
2.5-4.9 hours	15	14	12	19	18	12
>5 hours	13	19	21	19	18	10
Not answered	3	2	3	4	8	18
Total	100	100	100	100	100	100
Women	16-24	25-34	35-49	50-64	65-79	80+
Unweighted count	*705*	*783*	*1617*	*1267*	*59*	*122*
None	15	20	20	18	28	38
<1 hour	22	21	18	14	11	5
1-2.5 hours	33	27	28	28	22	12
2.5-4.9 hours	18	16	17	22	15	2
>5 hours	9	12	14	13	12	8
Not answered	5	3	4	5	12	35
Total	100	100	100	100	100	100

Nor were striking differences related to work status apparent (Table 5.7).

Table 5.7 Work status and time spent walking briskly. [G10, D14a]

Brisk walking in the previous 7 days	**Work status %**								
	All respon-dents	Work-ing full-time	Working part-time	Unem-ployed/ Actively seeking a job	At home	Retired	Sick/ Invalid	Student (full-time, including secondary school)	Other
Unweighted count	*8163*	*3810*	*1374*	*145*	*758*	*1249*	*149*	*514*	*138*
None	23	22	18	16	25	27	39	18	24
<1 hour	17	18	19	17	16	10	12	20	15
1-2.5 hours	24	23	27	23	25	20	26	32	25
2.5-4.9 hours	16	15	18	18	16	15	10	19	18
>5 hours	15	18	14	22	10	14	8	7	16
Not answered	5	4	3	3	8	13	6	4	1
Total	100	100	100	100	100	100	100	100	100

Note: 'All respondents' includes 26 who did not answer the work status question.

Checking for the impact of having children of various age groups present in the household (as done for cycling in Section 4.2.5 p.43) failed to reveal interesting differences. This may be because parents more often find it easier to combine walking than cycling with looking after children, especially those under five years.

In contrast to the clear ethnic differences found with cycling (Section 3.4.1), fewer major differences are apparent in the reported time spent walking briskly (Table 5.8). This again points to the more universal nature of walking than cycling, and is a useful reminder that walking offers a useful public health opportunity that can cut across health inequalities related to ethnicity. However, Asians are less likely to report walking briskly for 2.5 hours or more (22% compared with 32% for NZ Europeans). This difference remains significant when age and gender are controlled for using logistic regression (adjusted odds ratio for Asians of 0.69 with 95% CI 0.54–0.89).

Table 5.8 Ethnicity and time spent walking briskly. [G6, D14a]

Brisk walking in the previous 7 days	Ethnicity %					
	All	NZEuro	Māori	Pacific	Asian	Other
Unweighted count	*8148*	*6281*	*719*	*216*	*356*	*999*
None	23	22	25	24	26	20
<1 hour	17	16	16	18	19	17
1-2.5 hours	25	25	23	20	29	26
2.5-4.9 hours	16	17	13	13	13	15
>5 hours	15	15	18	20	9	16
Not answered	5	5	5	4	4	6
Total	100	100	100	100	100	100

Note: the sum of the unweighted numbers of respondents for each ethnicity exceeds the overall total because of multiple responses; i.e. those reporting both Māori and Pacific ethnicity are included in both columns.

5.3.2 Differences by level of urbanisation and region

Table 5.9 Urbanisation and time spent walking briskly. [G5, D14a]

Brisk walking in the previous 7 days	Urbanisation %				
	All Respondents	Large city (100,000 or more people)	Smaller city (30,000 to 99,999 people)	Town (1000 to 29,999 people)	Small town, community or village (less than 1000 people)
Unweighted count	*8163*	*3382*	*1640*	*1746*	*1109*
None	23	22	24	25	22
<1 hour	17	18	15	15	16
1-2.5 hours	24	27	25	23	20
2.5-4.9 hours	16	17	16	15	17
>5 hours	15	13	15	15	19
Not answered	5	4	6	8	6
Total	100	100	100	100	100

Note: 'All respondents' includes 286 who did not answer the community size question (or answered *Don't know/unsure*).

No particularly striking differences are apparent in relation to size of locality lived in (Table 5.9). Badland and Schofield (2005a) have done a more detailed analysis of such differences (for physical activity in general, as well as walking) on the same Obstacles to Action database and found several statistically significant (but modest) differences between localities of different size (controlling for age, gender, and household income).

Clear differences do emerge between the main urban areas. For example, significantly more in Wellington (27%) than in Auckland (18%) meet the '30×5' healthy activity guideline purely from brisk walking. This is consistent with the clearly greater proportion in Wellington who walk or jog to work as shown by the 2001 Census results. Evidence about relationships between environment characteristics and active transport has been growing in recent years. Positive relationships with physical activity levels (particularly walking) have now been found in several studies investigating factors such as mixed land use, density, number of street intersections, and public open space (e.g. Li et al. 2005; Badland & Schofield 2005b; Giles-Corti et al. 2005).

Table 5.10 Regional differences in frequency of walking. [D14a, city derived from postcode]

Brisk walking '30×5'	**Urban dwellers %**		
	Auckland cities	Wellington cities	Christchurch
Unweighted count	*1934*	*755*	*759*
No	81	71	78
Yes	18	27	21
Not answered	1	1	1
Total	100	100	100

Brisk walking in this case entails thirty or more minutes per day on five or more days per week (30x5).

Differences between regional council areas are minimal, and so are not presented in detail.

Given how common walking is, that it is less related than cycling to external variables such as demographics or geographic differences is no surprise.

6.1 Walking: stages of change

6.1 Stage of change measurement

The stage of change question concerning walking (Section D, question 13) is simply an adaptation of the wording of the cycling stage of change question from TRL (Davies et al. 2001). The SPARC/Cancer Society project not being focused on transport, neither time nor funding was available for more extensive development of this walking question.

In the absence of international precedent, the choice of length of journey was difficult. The length of 1.5 km was chosen after considering the length of walking trips in the New Zealand Travel Survey database (LTSA 2000) and international research on walking (e.g. Forward 1998) in which 74% of walking 'trip chains' were recorded as less than 2 km (Sullivan & O'Fallon 2004).

The walking stage of change question immediately followed the similar (but simpler) cycling stage of change question. This position required an awkward lead-in to exclude cycling. The full text is:

> *For this question only: if you have a bicycle, please assume that it is temporarily unavailable. For a journey of 1.5 km (about 15 minutes walk at normal walking speed), when the weather was fine and you have nothing heavy to carry, would you...*

Table 6.1 Stage of change—walking. [D13]

Stage of change	%	*Unweighted count*
Not even consider walking [Precontemplation]	5.8	*412*
Realise that you could walk but wouldn't actually do it [Contemplation]	6.0	*426*
Think seriously about the pros and cons of walking but rarely do it [Ready for action]	4.2	*341*
Walk on some occasions [Action]	26.8	*2161*
Walk quite often [Maintenance1]	21.6	*1859*
Almost always walk [Maintenance2]	25.0	*2090*
Not answered	10.5	*874*
Total	100.0	*8163*

Consistent with walking being much more widely used than cycling as a transport mode and for recreation/fitness purposes, responses in the Action and Maintenance stages of change are much more common for walking. Only 6% said that they would *Not even consider walking* (compared with 41% for the comparable cycling answer, see Table

4.1 p.33). Because the high stages of readiness are much more common for walking than for cycling, in analysing walking we present the Maintenance1 and Maintenance2 responses separately (rather than combining them as was done for cycling).[13] Not least this is because the Maintenance1 stage here can well be seen as indicating an important target group to encourage to walk even more often.

The walking stage of change question was often not answered (10.5%). This problem may be related to the awkward lead-in relating to cycling, or possibly the wording does not work as well for walking as for cycling.

The question works well enough to be usable for the current analyses. However, we suggest that any researcher or body wishing to collect such data in future surveys should first make improvements to this question. Our suggestions for improvements are:

- Consider placing the question before the cycling questions. This would simplify the wording and presentation of the walking question. Given that cycling is relatively rare, this may prove more effective than requiring such a prominent and awkward lead-in focused on cycling.
- Consider increasing the time taken from 15 to 20 or 25 minutes. This will allow the question to be more relevant to all the people who may walk more slowly. Furthermore, 15 minutes was on the short side of the specified distance of 1.5 km. For example, assuming a typical walking speed of 5 km/h results in a time of eighteen minutes, and assuming a walking speed of 4 km/h results in a time of 22.5 minutes. (A useful traffic engineering generalisation about walking speed is: 'The average walking speed of pedestrians is 4 to 5 km/h, although the elderly often walk much slower', Akcelik 2000, p.10).
- Make serious efforts to reduce non-answers. We recommend solid cognitive pre-testing to explore and remove difficulties people have with the wording of the question and the answer options. Improving the wording for respondents aged 65+ is a particular priority (they failed to answer this question much more often). This may have been partly because the implied speed was unrealistically high for them. Also, the distance of 1.5 km may be unrealistic for older seniors.

We considered but rejected the option of increasing the distance up to 2 km. This option would help deliver a more even distribution of responses over stages of change (which would improve sensitivity of analysis, in particular analyses aimed at protecting increases in readiness to change over time). However, this distance would be even more unrealistic for older people and depart further from the kinds of distances commonly walked now.

[13] Whether or not *Walk quite often* should be labelled as Maintenance is perhaps arguable, but we do so here for consistency with the cycling results (although with the walking results, we ensure that *Walk quite often* responses can be seen separately from *Almost always walk*).

We also checked whether physical disability or illness had particularly strong effects on this question. There were clear effects, but these were not so strong as to require that such respondents should be removed from the subsequent analysis. For example, around 20% of those reporting a long-term illness and 18% reporting permanent injury/disability affecting physical activity were in the Precontemplation stage, compared with only 5% of those not reporting even temporary illness or injury. On the other hand, fully 30% with a long-term illness and 24% with a permanent injury or disability were in the Maintenance stage. In some cases (e.g. heart disease) walking might have been prescribed by a medical practitioner as a specific means of ameliorating a particular condition.

6.2 Demographics

6.2.1 Age, gender, children, ethnicity

In sharp contrast to the cycling results, walking stage of change showed no marked gender differences (Figure 6.1).

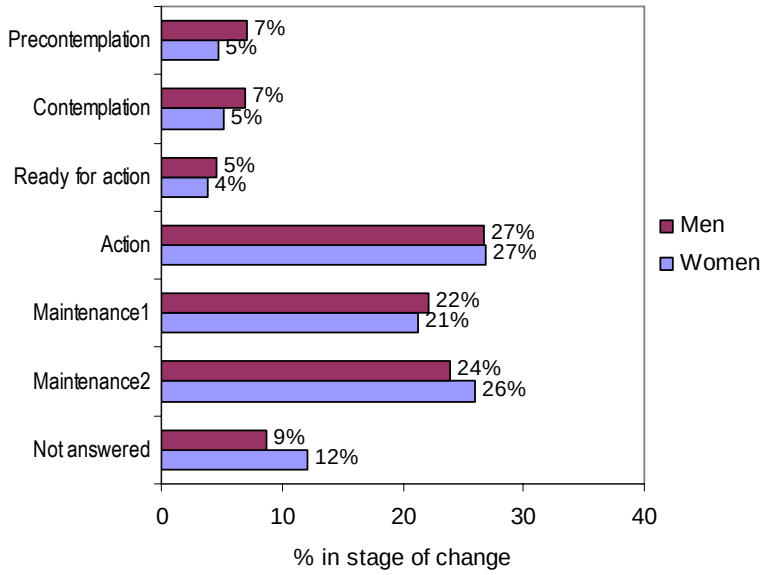


Figure 6.1 Gender and walking stage of change. [G1, D13]

As with the cycling stage of change question, seniors (65+ years, Figure 4.3 p.36) were particularly likely not to answer this question (Figure 6.2 p.60). This suggests that the Precontemplation results for seniors are probably a substantial underestimate.

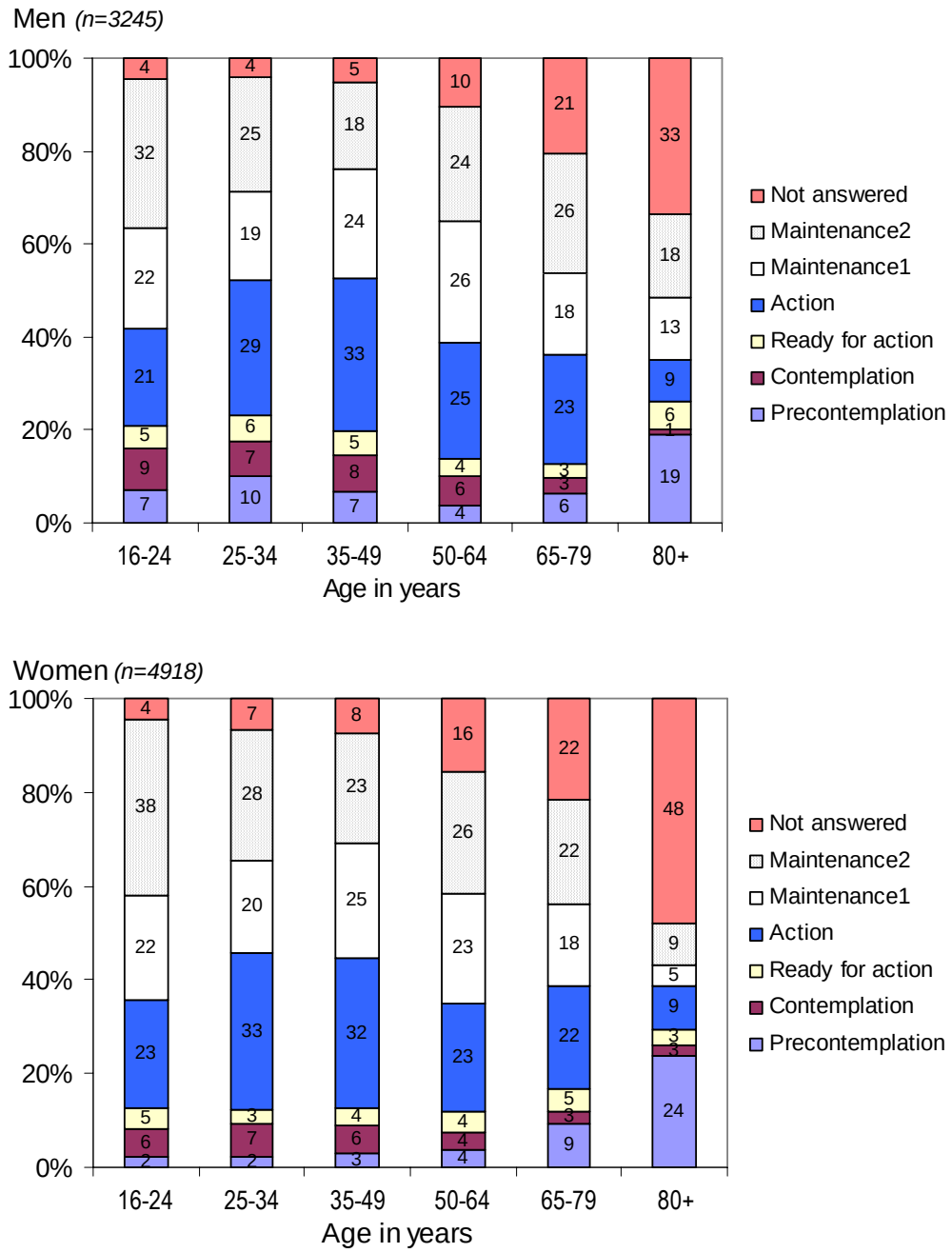


Figure 6.2 Age and walking stage of change. [G7, D13, G1]

Readiness to walk does not simply decrease with age. The possible increase among men aged 50-64 (50% compared with 42% of those aged 35-49) in Maintenance1 and Maintenance2 stages is plausible given the slightly higher numbers also reporting more actual walking (e.g. Figure 5.1 p.52). In addition, a separate survey involving 12,500 adults aged 18 and over shows increases in physical activity levels for those aged 50-64 (SPARC 2003). In terms of targets for increasing walking the 35-49 age group was recorded to have the largest proportion in the Action and Maintenance1 stages.

Those planning initiatives focused on a particular stage of change may well wish to know the age distribution of people at a particular stage, so we also present results by age 'the other way round' (Table 6.2).

Table 6.2 Stage of change profiled by age. [G7, D13]

Stage of change	*Unweighted count*	% of age group						
		16-24	25-34	35-49	50-64	65-79	80+	All
Not even consider walking	*412*	13	19	24	13	16	15	100
Realise that you could walk but wouldn't actually do it	*426*	19	22	34	17	6	1	100
Think seriously about the pros and cons of walking but rarely do it	*341*	18	18	30	19	11	4	100
Walk on some occasions	*2161*	13	22	36	18	10	1	100
Walk quite often	*1859*	16	17	33	23	10	1	100
Almost always walk	*2090*	22	20	25	20	11	2	100
Not answered	*874*	7	10	18	25	24	16	100
All	*8163*	16	19	30	20	12	4	100

No particularly marked differences between ethnic groups with respect to walking stage of change were apparent (Table 6.3).

Table 6.3 Ethnicity and walking stage of change. [G6, D13]

Stage of change	% Ethnicity					
	NZEuro	Māori	Pacific	Asian	Other	All
Unweighted count	*6281*	*719*	*216*	*356*	*999*	*8148*
Not even consider walking	6	5	3	4	7	6
Realise that you could walk but wouldn't actually do it	6	7	10	9	6	6
Think seriously about the pros and cons of walking but rarely do it	4	4	4	4	4	4
Walk on some occasions	26	32	22	32	23	27
Walk quite often	22	21	22	23	22	22
Almost always walk	26	22	22	19	28	25
Not answered	10	9	17	9	11	10
Total	100	100	100	100	100	100

Note: the sum of the unweighted numbers of respondents for each ethnicity exceeds the overall total because of multiple responses; i.e. those reporting both Māori and Pacific ethnicity are included in both columns.

6.2.2 Differences by level of urbanisation and region

No clear differences in walking stage of change were apparent between those living in large cities (more than 100,000 people) compared with smaller cities, towns (1000–29,999 people), and smaller settlements.

Stage of change results by region are presented here as a reference for regional promotional efforts, and as a baseline for any regional research. (The smallest regions, Westland and Gisborne, with base sample sizes below 100, are omitted.) For consistency with the cycling regional results, we have sorted by Precontemplation. But regional differences are probably best seen in the highest stage, Maintenance2. Fully 31-32% say that they would *Almost always walk* in Northland, Nelson-Marlborough, Wellington, and Otago. The comparable figures for Bay of Plenty and Manawatu-Wanganui are only 21-22%.

Differences are apparent between the major cities. Consistent with more brisk walking being reported in Wellington than Auckland (see Section 5.3.2 p.54 and Table 5.10 p.55), 31% in Wellington cities said they would *Almost always walk* compared with only 22% in Auckland cities.

6.2.3 Work status and income

Table 6.5 provides some information useful for workplace initiatives promoting active modes for transport or lunchtime walking groups for health. Readiness to walk among those working could have been distinctly low because of greater constraints on their time.

However, both full-time and part-time workers were comparable to the general population in terms of readiness to walk.

Table 6.4 Region and walking stage of change (sorted on Precontemplation). [Region derived from postcode and TLA, D13]

Region	*Un-weighted count*	Stage of change for walking %							
		Pre-contem-plation	Contem-plation	Ready for action	Action	Mainten-ance1	Mainten-ance2	Not answered	All
Northland	*288*	2	2	4	28	18	32	14	100
Nelson Marlborough	*305*	2	6	3	28	21	32	7	100
Wellington	*941*	4	5	6	24	20	31	11	100
Waikato	*786*	5	7	4	27	25	24	7	100
Auckland	*2265*	5	7	4	28	23	22	12	100
Otago	*475*	6	5	4	21	23	31	11	100
Manawatu-Wanganui	*483*	6	11	4	27	19	22	11	100
Taranaki	*223*	6	4	3	32	20	24	9	100
Hawke's Bay	*308*	7	4	6	27	21	25	10	100
Southland	*203*	7	4	9	27	22	25	6	100
Canterbury	*1183*	8	6	4	26	21	25	10	100
Bay of Plenty	*542*	8	4	3	30	21	21	14	100
All (incl. small regions)	*8163*	6	6	4	27	22	25	10	100

For possible workplace travel plans (typically implemented at larger work sites), it has been noted that we have over 1000 respondents working at work sites with 50 or more staff, and that their responses are very similar to those for all workers presented here.

As with cycling, we focused on household income rather than personal income. Similar to the cycling stage of change analysis, we found that different income groups (as measured by household income adjusted for household size – see Section 4.2.4) did not differ markedly with respect to walking stage of change.

6.2.4 Education

For analysis of education, we excluded those aged under 25 and over 54 as not necessarily having had an equal chance to gain tertiary qualifications. Those with no educational qualifications appear to be slightly less ready to walk than those with bachelor or higher degrees (Tables 6.6 and 6.7). However, interpretation is difficult because a higher percentage of those with no educational qualifications did not answer the question.

Table 6.5 Work status and walking stage of change. [G10, D13]

Walking stage of change	Work status %							
	All	Working full-time	Working part-time	Unemployed/ Actively seeking a job	At home	Retired	Sick/Invalid	Student (full-time, including secondary school)
Unweighted count	*8163*	*3810*	*1374*	*145*	*758*	*1249*	*149*	*514*
Not even consider walking [Precontemplation]	6	6	3	8	2	10	18	3
Realise that you could walk but wouldn't actually do it [Contemplation]	6	7	6	6	5	3	3	5
Think seriously about the pros and cons of walking but rarely do it [Ready for action]	4	5	3	4	3	4	3	4
Try walkling on some occasions [Action]	27	30	28	25	29	18	28	21
Walk quite often [Maintenance1]	22	23	23	31	21	15	21	21
Almost always walk [Maintenance2]	25	22	27	25	24	22	18	43
Not answered	10	7	8	1	15	27	10	3
Total	100	100	100	100	100	100	100	100

Note: 'All' includes 138 respondents describing their work status as *Other*, and 26 who did not answer this question.

Table 6.6 Highest educational qualification and walking stage of change (respondents aged 25-54 only). [G8 & 9, D13]

Stage of change	Educational qualifications %				
	All	None listed	Secondary school	Qual.other than degree*	Bachelor degree or higher degree
Unweighted count	*4662*	*630*	*1327*	*1651*	*1034*
Not even consider walking [Precontemplation]	5	6	5	6	4
Realise that you could walk but wouldn't actually do it [Contemplation]	7	6	6	8	5
Think seriously about the pros and cons... but rarely do it [Ready for action]	4	5	4	5	3
Try walking on some occasions [Action]	31	31	32	30	32
Walk quite often [Maintenance1]	23	17	23	23	25
Almost always walk [Maintenance2]	23	23	22	24	25
Not answered	7	11	8	6	5
Total	100	100	100	100	100

'All' includes 20 respondents who did not answer the questions on educational qualifications.
* Taking 3+ months full-time study.

Table 6.7 Walking stage of change profiled by highest educational qualification (respondents aged 25-54 only). [G8 & 9, D13]

Highest Educational Qualification	Walking stage of change %						
	All	Pre-contem-plation	Contem-plation	Ready for action	Action	Main-tenance1	Main-tenance2
Unweighted count	*4662*	*211*	*260*	*201*	*1378*	*1109*	*1155*
None of those below	13	14	12	16	13	10	13
Secondary school	28	29	27	24	28	28	26
Qual. other than degree taking 3+ months full-time study	36	40	41	40	34	35	36
Bachelor degree or higher degree	24	16	20	20	25	26	25
Total	100	100	100	100	100	100	100

Note: 'All' column includes 348 who did not answer the stage of change question.

Small differences associated with education may perhaps be explained by remaining age differences.

Given that some promotional initiatives may be aimed primarily at particular stages of change, it may be more useful to profile stages of change by education levels (i.e. percentages 'the other way round', i.e. Table 6.7). More individuals in the Action and Maintenance stages than in Precontemplation and Contemplation had degrees.

6.2.5 Effect of children

Children were expected to be more of a barrier for readiness to cycle than for readiness to walk. Our analysis confirmed that few marked differences were noted between stages of change comparing those with and without children. As with the cycling analysis, the effects of children under five and children aged 5-17 were considered separately, as were the effects on men and women. This is consistent with the lack of impact of children on reported amounts of brisk walking (Section 5.3.1). However, the men in this age-group without children under five (*n*=911) were more often (46%) recorded as being in the maintenance stage than those with such young children (36%, *n*=275).

6.3 Relationship between walking stage of change and cycling stage of change

Table 6.8 Both stage of change questions (walking and cycling). [D12, D13]

Walking stage of change	Cycling stage of change %					
	Precontem-plation	Contem-plation	Ready for action	Action	Main-tenance	Not answered
Unweighted count	*3430*	*1111*	*695*	*1438*	*1047*	*442*
Not even consider walking	11	4	3	2	2	0
Realise that you could walk but wouldn't actually do it	6	13	7	4	3	2
Think seriously about the pros and cons... but rarely do it	4	5	11	4	1	2
Walk on some occasions	24	34	33	36	19	12
Walk quite often	17	19	25	27	32	11
Almost always walk	25	18	17	24	41	17
Not answered	13	7	4	3	1	55
Total	100	100	100	100	100	100

As expected, the stage of change questions were strongly related (within the limits imposed by walking being much more common than cycling). For example, only 6% of those in the Maintenance stage for cycling were in the lowest three stages for walking compared with 21% of those in the Precontemplation stage for cycling (see Table 6.8).

6.4 Motivation, perceived benefits and barriers

As with the cycling stage of change analysis, the sheer number of such questions (114 in B6 and D1 through D8) demands prioritising, particularly given that they relate to physical activity in general rather than walking specifically. Table 6.9 shows the question items with the largest significant differences in means between stages of change (as assessed by a Welch statistic from a one-way analysis of variance).

Table 6.9 Psychological variables: preliminary screening for differences between walking stages of change.

Question No.	Variable	Welch statistic
D7Ac	Walking tracks	60.2
D1a	I enjoy physical activity	38.5
D1g	It is consistent with my life goals	30.2
D6m	There are other things I'd rather do during my free time	30.1
D7Ad	Public park with playing fields	28.2
D1n	I care about keeping in shape	27.8
D7Aa	Cycle lanes or paths	26.3
D1b	It is an important choice I really want to make	26.1
D6p	Physical activity is uncomfortable for me	25.7
D6g	It's too hard to stick to a routine	25.3
D1l	I want to take responsibility for my own health	24.6
D6w	Physical activity takes too much effort	23.9
D6c	Lack of time due to family responsibilities	21.3
D6q	I'm too out of shape to start	19.9
D1c	I would feel guilty or ashamed of myself if I didn't	18.0
D6b	Lack of time due to work	17.9
D1d	I believe it is a very good thing for my health	17.9
D7Ab	Walking group	16.5
D7Ae	Swimming pool, beach or lake	15.5
D6a	Lack of energy/too tired	15.4
D6d	Arthritis or other health problems	15.1
D6k	I' m too old	14.9
D6l	I get bored quickly	14.8
D6r	I feel I am too overweight to be physically active	14.7
D6h	Have fun	14.7

Base sample size: all respondents (apart from missing values/not answered).

Question D7A asks for ratings of readiness to use various facilities if they were available, hence a strong relationship between readiness to use walking tracks (presumably interpreted as meaning off-road paths as opposed to pavements alongside roads) and walking stage of change (which also centres on readiness to walk) can be considered as trivial. We can similarly dismiss the other smaller differences in Table 6.9 with items in question D7A as related to the common theme of readiness for greater physical activity.

The remaining items are nearly all of two types illustrated in more detail in Table 6.10:

- Motivations (from question D1, which had a 7-point scale from *Strongly disagree* through to *Strongly agree)*.
- Barriers to physical activity (from question D6, which had a 7-point scale from *Doesn't influence me at all* through to *Influences me a lot*).

For example, average agreement with the statement '*I enjoy physical activity*' (D1a) is clearly higher among those who would walk quite often or almost always (5.7-5.9) than for those at the Precontemplation or Contemplation stages (4.8-5.1). Similar differences can be seen in Table 6.10 for several other motivation-related statements in question D1.

The barriers items (question D6) work somewhat differently. The mean ratings of influence of '*There are other things I'd rather do during my free time*' are lower for the Maintenance stage of change (e.g. means of 3.1 and 2.7 respectively for walking quite often or almost always) than for Precontemplation and Contemplation (where means are 3.8-4.1). Thus, those at the highest stages of change more often report that such barriers have little influence on their physical activity.

The final illustration in Table 6.10 (D5h *Have fun*) derives from a 5-point rating of likelihood. Respondents rated how likely they were to '*Have fun*' if engaged in regular physical activity. The main point of this illustration is to show that the differences between respondents in different stages of change are quite small, and that the remaining psychological variables screened by the Welch test would show even fewer distinct differences. Differences of this size seem of minimal practical use and are thus not analysed further.

Another reason for not pursuing the analysis of such psychological variables here is that existing reports have already analysed these parts of the Obstacles to Action dataset in detail with respect to increasing physical activity in general. Given the widespread nature of walking, that analysis is also useful to those aiming to increase walking.

Specifically, Sullivan et al. (2003b) found that self-efficacy (confidence about being able to do specified levels of physical activity) has a strong relationship with levels of physical activity as does intrinsic motivation (e.g. enjoying physical activity). In contrast, extrinsic motivations (e.g. doing physical activity to get approval from others) lack such a strong relationship. These results suggest that increasing *self-efficacy* and *intrinsic motivation* are likely to be useful campaign approaches.

Table 6.10 Psychological variables: differences between walking stages of change for illustrative variables (mean ratings).

D13 **Level of consideration of walking 1.5km**	**Mean ratings of illustrative psychological variables**							
	D1a I enjoy physical activity	D1g It is consistent with my life goals	D1n I care about keeping in shape	D1b It is an important choice I really want to make	D1d I believe it is a very good thing for my health	D6m There are other things I'd rather do during my free time	D6p Physical activity is uncomfortable for me	D5h Have fun
Not even consider walking [Precontemplation]	4.8	3.9	4.8	4.5	5.5	3.8	3.0	3.4
Realise that you could walk but wouldn't actually do it [Contemplation]	4.8	4.0	4.9	4.7	5.6	4.1	2.4	3.7
Think seriously about the pros and cons of walking but rarely do it [Ready for action]	5.1	4.4	5.3	5.2	5.9	3.8	2.4	3.9
Walk on some occasions [Action]	5.3	4.6	5.3	5.2	5.9	3.5	2.2	3.9
Walk quite often [Maintenance1]	5.7	5.0	5.7	5.5	6.1	3.1	1.9	4.1
Almost always walk [Maintenance2]	5.9	5.1	5.7	5.5	6.2	2.7	1.7	4.1
All	5.5	4.7	5.5	5.3	6.0	3.3	2.1	4.0

Base sample size: All respondents (apart from missing values/not answered), *n ranges from* 7023 to 7167.

Furthermore, segmentation of the target group who are not already active (45% of the adult population) identified six segments labelled as follows:

- Others Oriented,
- I'm OK Thanks,
- Go Away—It's Not For Me,
- Busy & Stressed,
- Support Seekers,
- Why Not Then?

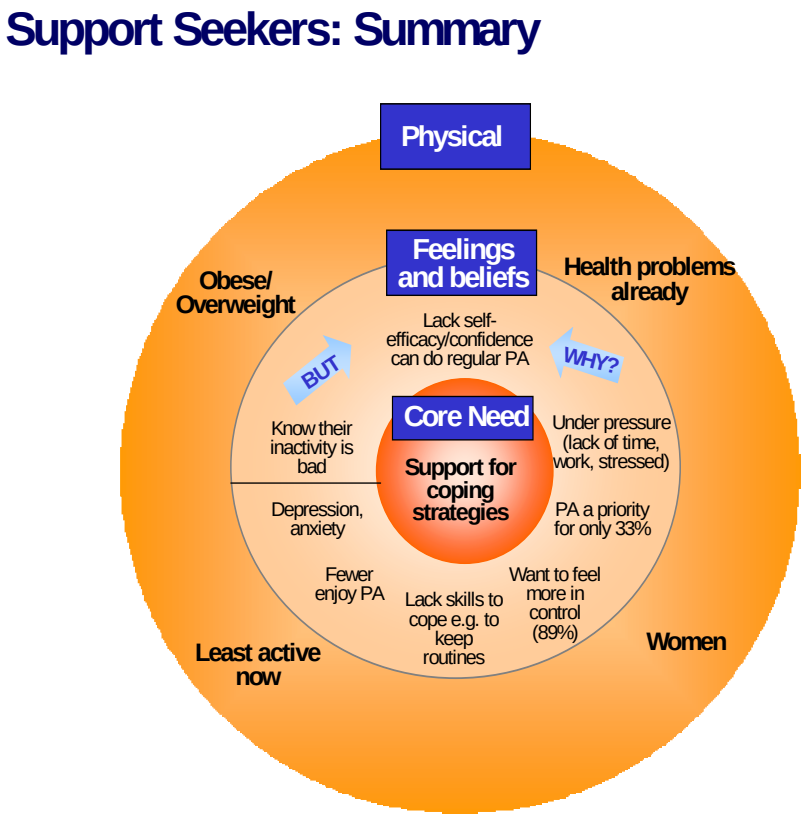


Figure 6.3 Example of psychobehavioural segment for promoting physical activity (from Sullivan et al. 2003b).

Detailed reports have been completed with respect to the Others Oriented and Support Seekers. For example, Figure 6.3 summarises the Support Seekers segment.

7. Other related analyses

7.1 Readiness to replace car trips by active modes

A key issue in travel demand management is the extent to which people may be led to reduce car trips, or to replace them by using active modes such as walking or cycling. The questionnaire included one statement directly relevant to this. A list of agree/disagree items included (A2g):

> *Most weeks I could replace car trips by walking or cycling on at least two days (without too much difficulty).*

Agreement was pleasingly common: 37% agreed (ratings of 4 or 5 on the 5-point scale; Table 7.1).

Table 7.1 Readiness to replace car trips by active modes. [A2g]

Rating	Intent	%
1	Strongly disagree	25
2		17
3	Neither agree nor disagree	17
4		17
5	Strongly agree	20
	Not answered	3
Total *(n=8163)*		100

Age and gender differences in agreement are small. But differences between ethnic groups are large enough to be of interest: Asian respondents (29%) agreed much less often than Māori (46%) or Pacific peoples (48%). The difference between Asian and NZ European respondents (37%) was marginally significant (p=.0501).

Possible regional differences may be of interest to planners and decision-makers. Regional differences are listed with regions showing highest agreement first (Table 7.2). Level of agreement ranges from 48% (Hawke's Bay) down to 34% (Auckland). Relatedly, agreement was lowest (36%) in large cities (more than 100,000 people) and highest (42%) in towns (with 1000-29,999 people).

Walking stage of change was a strong predictor of agreement to replace car trips by active modes. Agreement to change mode was only 18% among those in Precontemplation compared with 46% for those who said they would *Almost always walk* in the stage of change question.

Table 7.2 Region and readiness to replace car trips by active modes. [Region derived from postcode and TLA, A2g]

Region	*Unweighted count*	Readiness %				
		Disagree	Neither agree nor disagree	Agree	Not answered	Total
Hawke's Bay	*308*	37	14	48	2	100
Taranaki	*223*	37	16	44	3	100
Otago	*475*	34	17	44	6	100
Nelson-Marlborough	*305*	37	16	42	4	100
Canterbury	*1183*	42	16	39	3	100
Manawatu-Wanganui	*483*	38	19	38	5	100
Northland	*288*	47	12	37	4	100
Southland	*203*	34	25	37	4	100
Waikato	*786*	43	18	36	2	100
Bay of Plenty	*542*	42	20	36	2	100
Wellington	*941*	44	18	36	2	100
Auckland	*2265*	46	18	34	2	100
All (incl. small regions)	*8163*	42	17	37	3	100

The unweighted count from small regions was 161.

As expected, given that cycling is much less common than walking, cycling stage of change predicted agreement to replace car trips less strongly. Even so, agreement to change mode increased from 32% for those who would *Not even consider cycling* to 51% for those who said they would *Almost always cycle* in the cycling stage of change question.

Of course, in reading such results, it is important to remember that getting people to actually change mode can be quite difficult. Thus, the *willingness to change* reported here might be much higher than the *actual change* in behaviour in response to any initiative promoting active modes of transport.

7.2 Environmental perceptions and impacts

One issue of practical concern (e.g. to local authorities and regional sports trusts) is the extent to which walking and cycling can be encouraged by changes to the environment. As noted in Section 5.3.2 p.54, there is increasing research evidence of associations between environmental characteristics such as mixed land use, density, and availability of public open space.

7.2.1 Facilities: likelihood of use and perceived availability

The questionnaire provided a list of things that people may have in their neighbourhood or at work, and posed two questions:

- Would you use this if it were available? [D7A]

- Is it readily available in your neighbourhood or work? [D7B]

Results from these questions need to be treated with care. This is particularly true of the second question (D7B) on perceived availability, where we had difficulty during questionnaire re-design with the wording 'readily available'. Even so, we remain convinced that this was an improvement to the original American wording, which was 'already available' in the question text and simply 'available' in the column heading above responses. Quick ratings like this, indicating willingness to use infrastructure, may substantially overestimate subsequent use if the infrastructure is provided, because of the many other constraints affecting transport choices (e.g. time, weather, loads, children, etc.).

We illustrate these questions with the first item, on cycle lanes or paths, and then more briefly summarise results from all relevant items.

Table 7.3 Would you use this [cycle lanes or paths] if it were available to you? [D7Aa]

Rating	Intent	%
1	Definitely would not	22
2		10
3		18
4		12
5	Definitely would	32
	Not answered	5
Total *(n=8163)*		100

Note that the wording used in the questionnaire 'cycle lanes or paths' is not explicit as to whether these are provided on roads used by cars or are separate. Nevertheless, fully 32% of respondents indicated that they 'definitely would' use such lanes or paths (and a further 12% gave a rating of 4 just below this). Furthermore, 46% indicated that cycle lanes or paths were readily available in their neighbourhood or at work.

However, if we restrict analysis to those who indicated that cycle lanes or paths were currently 'readily available', and who also said they *Definitely would* use such facilities (1460 respondents in total), we find that their reported cycling behaviour contradicts their rating of *Definitely would*. Fully 50% of this group had not cycled at all during the previous 3 months and a further 4% had never learned to ride properly!

A quick scan of differences between groups for these ratings showed nothing not already apparent from the analyses of current cycling and stage of change earlier in this report. For example, higher ratings of likelihood of using cycle lanes or paths came from men

rather than women, from those aged under 65 years, and from Nelson-Marlborough and Hawke's Bay rather than Auckland.

In addition to the item about cycle lanes or paths described above, D7 included parallel items about likelihood of use if available and current availability of:

- walking groups,
- walking tracks,
- public park with playing fields (which might also be used for walking),
- shower at work (for the sub-sample in paid employment).

Roughly half indicated they would be likely to use such facilities (with the exception of walking groups — only 22%; Table 7.4). Furthermore, about half indicated that they saw cycle lanes/paths, walking groups, and showers at work as being readily available. Perceived availability of walking tracks (68%) and public parks with playing fields (82%) was high. Special arrangements, or segregated facilities such as walking groups and walking tracks, may not be major determinants of walking. Instead, other environmental influences (e.g. attractive surroundings encouraging recreational walking, condition of local footpaths) might possibly be more important. A study comparing US cities (Zlot & Schmid 2005) found a clearly significant association between utilitarian walking/bicycling and percentage of parkland acreage (r = .62).

Table 7.4 Likelihood of use and perceived availability of facilities. [D7A, D7B]

Availability	% likely to be used				
	Cycle lanes or paths	Walking group	Walking tracks	Public park with playing fields	Shower at work*
Would they use if available? (% 4 or 5; 5= *Definitely would)*	44	22	58	44	40
Perceive as readily available in their neighbourhood or work? (% Yes)	46	46	68	82	47

*Shower at work results based on subsample doing paid work (n =5089); all other columns based on full sample (n=8163)

We do not present analysis concerning whether or not those who perceive facilities as available actually do more walking and cycling because of the difficulty of interpretation. For example, if those who perceive walking tracks as available also recorded more brisk walking, we could not be sure whether:

- the physical availability of tracks contributed to their higher level of walking, or
- because they do more brisk walking, they are more aware of available walking tracks.

Testing whether the availability of showers at work was associated with greater use of active modes travelling to work (particularly cycling) would be interesting. With this question, it seems safe to assume that the perceived availability is a relatively black and white matter rather than highly subjective. Unfortunately however, this survey did not include any questions on mode of travel to or from work. Showers are more commonly available at work at larger workplaces (reported by two in three working at sites with 50 or more workers but only by around one in three at sites with fewer than 10 workers).

7.2.2 Perceived barriers in the neighbourhood

Another question relating to the environment concerned perceived barriers:

> *Which of the following (if any) apply to your neighbourhood* and put you off *being physically active?*

Respondents simply marked the items they saw as applying, not rating importance or degree. The most common perceived barriers, marked by around one in five respondents, were: not enough street lighting, heavy traffic, not enough cycle lanes or paths, and dog nuisance (Table 7.5).

Table 7.5 Neighbourhood barriers to physical activity? [D9]

Barrier	% apply
Not enough street lighting	20
Traffic is too heavy	18
Not enough cycle lanes or paths	18
Dog nuisance	18
Footpaths are not well maintained	13
Not enough footpaths	11
Steep hills	11
A lot of crime	11
The scenery is not that nice	8
I rarely see people walking or being physically active	7
Too many stop signs/lights	3
None of the above	44
Not answered [i.e. the entire question blank, including *None of the above*]	5

Base: all respondents (*n*=8163)

We see most of these items as relating to walking rather than cycling. Given that these barriers were simply indicated by a quick mark rather than a more considered rating, we simply noted marked differences by age, gender, and region rather than attempting a more detailed analysis. Badland and Schofield (2005a) have compared these barriers for different levels of urbanisation (i.e. small settlements versus large cities) using the Obstacles to Action dataset.

Older women most commonly cited poorly maintained footpaths as a barrier (19% of those aged 65-79, and 43% of those aged 80+, compared with 13% overall). This is perhaps also particularly a concern for people in the Gisborne region (36%, but based on only 84 responses).

A lack of footpaths was particularly noted by Northland residents (30%, compared with 11% nationwide), the Northland result being typical for respondents from small towns and communities with less than 1000 people.

Heavy traffic was most commonly mentioned by Auckland respondents (27%, compared with 18% nationwide). In addition, heavy traffic was more frequently noted by those under 35 (22%, compared with 14% of those aged 50+). This concern about heavy traffic among the young could be related to cycling — not enough cycle lanes or paths was perceived as a barrier by one in five 16-49 year-olds, but only by around one in ten seniors (age 65+). These responses appear related. Concern about heavy traffic among young respondents (under 35 years old) not concerned about cycle lanes and paths (mentioned by about one in six) differed little from older respondents. But concern about heavy traffic was distinctly more common (nearly one in two) among young respondents concerned about cycle lanes and paths.

Street lighting was particularly a concern for women (25%, compared with 14% of men), and for the young rather than the old (26% of those under 35, compared with only 8% of seniors (65+ years). The latter result may reflect that younger people walk in their neighbourhood after dark much more commonly than seniors (Morris & Reilly 2003).

Crime was particularly a perceived barrier to physical activity by women (13%, compared with 8% for men) and by Auckland residents (16%, compared with 11% nationwide).

The greater concern about security among women (street lighting, crime) is supported by another rating of the influence of safety worries on physical activity in general (D6i). Women were much more likely to say that concern about their safety was an influence on their physical activity level than men (20% gave a rating of 5 or higher on the 7-point scale where 1=*Doesn't influence me at all* through to 7=*Influences me a lot*, compared with only 10% of men).

Scenery not being nice in their neighbourhood was particularly seen as a barrier to physical activity by younger women (19% ages 16-24 and 10% ages 25-34, compared with only 3% of men and women aged 65+).

The relevance of '*scenery not being nice*' cannot be dismissed lightly. A survey of 1803 healthy Perth adults (Giles-Corti 2001) found a significant effect of the access to attractive open space on walking. Importantly, access to attractive public open spaces was rated by interviewers (rather than as a perception/excuse by respondents that could be coloured by their level of activity). The quality of access to attractive public open spaces was a significant predictor (p=0.018) of whether respondents did sufficient walking to benefit health (defined as six 30-minute sessions per week). The logistic regression analysis controlled statistically for effects of age, gender, number of children under 18 years at home, household income, and education.

7.3 Cycling: who never learned?

The SPARC question about recent cycling behaviour (D11) took the unusual step of separating those who had *Never learned to ride properly* from those who had simply not ridden. For brevity and clarity in most of our analysis, the relatively small number of respondents that never learned to ride (5.8%) are usually combined with others who had not ridden during the previous three months. However, the large sample size of the survey provides an opportunity to profile this sub-group (446 respondents) in some detail.

Those who have never learned are mainly women (74%). Put another way, 8% of women reported having never learned to ride properly compared with only 3% of men.

Given that cycling to school has become much less common in recent years, the data was further considered for evidence that young people are increasingly not learning to cycle at all. Interest in this question required us to take an unusually close look at the very youngest age groups. Age differences require some care in analysis. The very old are most likely to report having never learned (14% of those aged 80+). Assuming that just about all those learning to cycle do so by the age of 16, simple description hints that we have some evidence of an increase in those reporting having never learned to ride in those aged 16-19 compared with those aged 20-34 (Figure 7.1). But with this dataset it is difficult to ascertain whether the very youngest age groups in the survey differ significantly from those just a little older. Although the overall response rate to the survey was good (61%), we had fewer responses from the very youngest age groups. Sample sizes are 141 and 199 for those aged 16-17 and 18-19 respectively compared with over 200 for all other age groups in Figure 7.1. [14] Logistic regression did *not* show those aged 16-20 to be significantly more likely to have never learned to cycle than those aged 20-24, 25-29, or 30-34 (having controlled for gender and ethnic differences). Strong ethnic differences were apparent. Pacific peoples (17%) and Asians (21%) are much more likely to have never learned to ride than NZ Europeans (4%). These

[14] Also, calculating appropriate statistical weights for those groups was awkward.

differences remain clearly significant when age and gender are controlled statistically using logistic regression (adjusted odds ratio of 9.3, 95% CI 6.2–14.0 for Pacific; adjusted odds ratio of 11.9, 95% CI 8.6–16.5 for Asian). Māori (6%) reported having never learned to ride at a rate perhaps slightly above NZ Europeans.

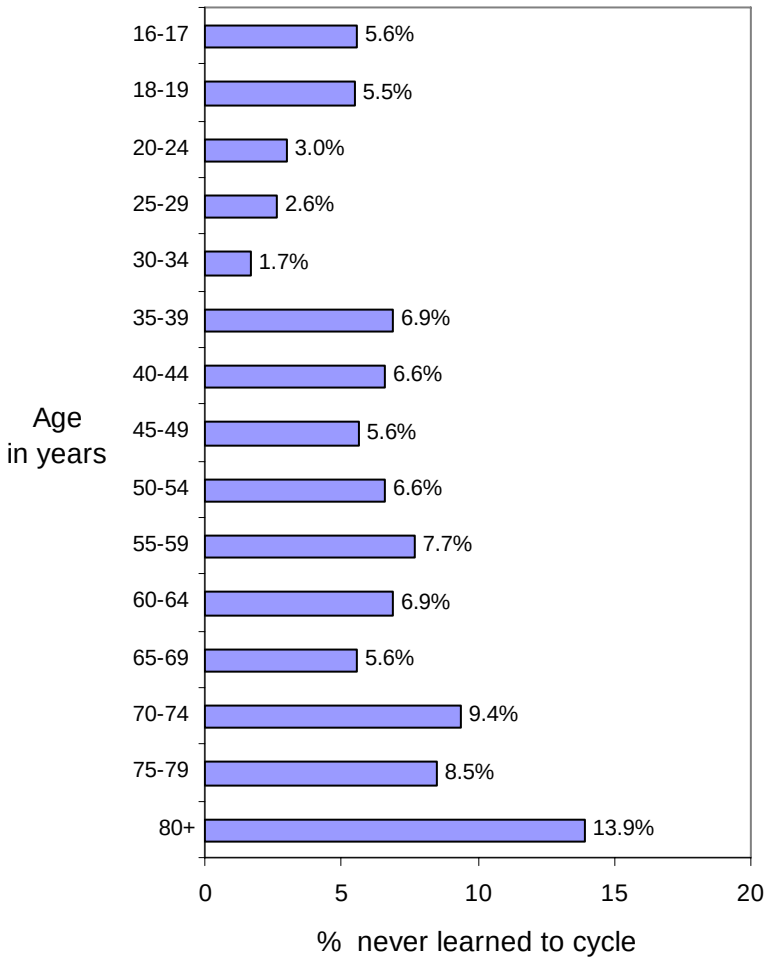


Figure 7.1 Never learned to cycle properly by age group. [G7, D11]

An effect of extreme obesity was also apparent. The morbidly obese (as defined in Section 3.2 p.24) are significantly more likely never to have learned to ride properly (24%, compared with 6% for both the severely obese and the obese). Childhood obesity (presumably more common among those morbidly obese as adults) might well increase the likelihood of never learning to ride a bicycle.

8. Conclusions

8.1 Cycling

Despite widespread availability of bicycles (41% report having one usually available), regular cyclists (cycling about once a week or more often) remain a minority (11%).

Both age and gender strongly affect cycling. The most notable patterns are:

- About twice as many men are regular cyclists (16% overall, compared with 7% of women).
- Regular cycling decreases steadily with age, particularly among men.

A distinctive feature of this survey is a separation of those who had *Never learned to ride properly* from those who had simply not ridden in recent months. Fully 5.8% of the total (446 respondents) reported having never learned to ride properly. They were mainly women: 8% of women reported having never learned to ride properly compared with only 3% of men. Initiatives aimed at increasing cycling are unlikely to work with people who reach adulthood without having learned to ride properly. Thus, given the substantial declines in children's cycling over recent decades (e.g. LTSA 2000), a key factor to monitor and reduce with respect to future cycling may well be the proportion of children who never learn.

The age and gender differences in cycling are known from previous surveys (e.g. LTSA 2000). But we have not seen other New Zealand research showing that cycling is significantly less common among those with Pacific or Asian ethnicity. For example, the proportion of regular cyclists in these groups is roughly half that of Māori and NZ European respondents. Furthermore, Pacific peoples (17%) and Asians (21%) are much more likely to have never learned to ride than NZ Europeans (4%). These ethnic differences remain clearly significant when age and gender are controlled statistically using logistic regression. Such differences warn that there may be specific barriers to cycling in the Asian and Pacific communities that need to be addressed. Māori (6%) reported having never learned to ride at a rate perhaps slightly above NZ Europeans.

Such strong ethnic differences were not apparent with walking. This usefully reminds us that walking offers a useful public health opportunity that can cut across health inequalities related to ethnicity.

The arrival of young children in the household reduces cycling among women. To analyse this, we selected only those age groups (20-44) where there were substantial numbers of

respondents with and without children under five in their household. Fully 81% of women with children under 5 (and no children 5-17) were noncyclists compared with 69% of the other women aged 20-44. Thus, such women with children under 5 are probably not a good target for cycling initiatives (although walking-related initiatives or other activities such as 'buggy-cise' may fit them well).

The large sample size allowed us to detect that the effect of obesity on cycling was most apparent among the severely obese, rather than simply considering all those above a conventional definition of obesity (Body Mass Index of 30 or more). The proportion of noncyclists rises from 66% (normal weight) to 78% (severely obese[15]) and 82% (morbidly obese[16]). The morbidly obese are significantly more likely never to have learned to ride properly (24%, compared with 6% for both the severely obese and the obese). These results warn that childhood obesity might result in a greater likelihood of never learning to ride a bicycle, and point towards the common ground that active transport proponents share with those aiming to reduce obesity.

Cyclists were clearly more physically active overall than noncyclists. A key health promotion criterion is being 'regularly active', that is, getting at least 15 minutes of vigorous activity, or total of 30 minutes or more of moderate activity, each day for five or more days each week ('30×5'). Two in three regular cyclists (64%) reported being active at this level compared with only one in three noncyclists (36%). This is consistent with regular cycling being a means of achieving the 30×5 target (albeit for fewer people than those who achieve it through regular brisk walking).

8.2 Cycling stage of change

Clearly, not all those who report some readiness to cycle will actually start cycling in response to relevant initiatives (e.g. construction of cycle paths). But the first stage of change, Precontemplation, usefully quantifies those who report quite bluntly that they would *Not even consider using a bicycle*. Realistically, these are currently a large proportion of adults (41.1%).

Even though the number of regular cyclists was relatively small, substantial numbers expressed some readiness to cycle and were classified into the following stages: Contemplation (13.6%), Ready for action/Preparation (8.0%), and Action (18%). It is common to focus on individual/psychological factors with stage of change results. With cycling, however, it is important to note that environmental factors in their neighbourhood (e.g. lack of cycling infrastructure, heavy or fast moving traffic) may be

[15]Body Mass Index (BMI) 35-39.9

[16] BMI 40 +

major reasons many reported no contemplation of cycling. For example, the stage of change based 'Walk in to Work Out' initiative in Glasgow successfully increased walking but not cycling (Mutrie et al. 2002). The authors concluded that the environment for cycling had to be improved before cycling would become a popular option. The same may well be true in many parts of New Zealand.

Age and gender differences in the cycling stages of change are broadly consistent with those in current cycling behaviour. Nevertheless, the composition of important stage of change segments in who might be targeted for promotional initiatives (Ready for action, Action) is fairly evenly balanced between genders. These stages of change also have substantial numbers (around half) aged 35-64 rather than being dominated by the youngest age groups to the same extent as regular cycling behaviour. Thus, the stage of change results suggest that current demographic groups showing relatively high cycling rates are not necessarily the best to target to achieve further change.

Somewhat surprisingly, we did not find any marked differences by level of urbanisation; i.e. comparing large cities (more than 100,000 people) with smaller cities, towns (1000-29,999) people, and small settlements. One reason is that substantial differences exist between cities within one level of urbanisation (e.g. over 100,000 people) in terms of cycling environment such as cycle-friendly infrastructure and hilliness. For example, as expected, Christchurch had fewer in the Precontemplation stage (35%) than Auckland and Wellington (45% and 46% respectively).

To provide benchmarks for regional initiatives, we have reported stage of change for twelve different regions. The percentage in the Precontemplation stage ranges from 27% for Nelson-Marlborough up to 45% for Auckland. Regions such as Nelson-Marlborough may well provide useful lessons for other regions with respect to cycling policies.

8.3 Brisk walking

The questionnaire's focus on health-related physical activity means that analysis of walking focuses on brisk walking (walking at a pace at which you are breathing harder than normal, for at least 10 minutes at a time). Even this brisk walking is very common, with 31% reporting 2.5 hours or more in the previous week.

A New Zealand guideline for healthy levels of physical activity emphasises regularity — 30 minutes or more of moderate physical activity (or equivalent) on five or more days of the week ('30×5' for short). *A substantial group of adults (22%) report meeting this health-related criterion purely through their brisk walking* (and may have done moderate or vigorous activity in addition). We do not have exactly comparable figures for cycling

(which was not measured in terms of minutes), but note that only 7% of the total were both 'regular cyclists' and 'regularly active'.

Given how common walking is, it is no surprise that brisk walking is less related than cycling to external variables such as demographics or geographic differences. The only particularly marked age difference is the clearly lower level of brisk walking in those aged 80 or more; nearly four in ten of them recorded no brisk walking in the previous seven days compared with just over two in ten in other age groups. This should not be seen as suggesting that walking is a less important transport mode for seniors. Indeed, analysis of the New Zealand Travel Survey 1997/98 (O'Fallon & Sullivan 2003) suggests that walking is the transport mode for a greater proportion of trips (24%) made by those aged 65 years or more than by younger adults (20%). Gender, work status, and level of urbanisation all failed to show marked relationships with the amount of brisk walking.

This confirms that demographics need not be considered to the same degree for campaigns to increase walking as for campaigns to increase cycling. Hence, one can more clearly focus on other methods of segmenting or targeting promotional activity such as stage of change.

8.4 Walking stage of change

The Precontemplation group was only 5.8%, much smaller than for the cycling stage of change question (41.1%). Most of the responses were at the highest stages (Action, Maintenance). But even people at the Action and Maintenance1 stage (reporting that they would *Walk on some occasions,* or *Walk quite often)* may still be valid targets for initiatives aimed at increasing walking.

We recommend improvements to this question before future use in order to reduce the high proportion who did not answer (10.5%). This was particularly a problem among seniors (e.g. 43% of those aged 80+ did not answer). For example, increasing the time specified to around 20 minutes (or allowing a range of times) may be more realistic for many, particularly older walkers.

For prioritising target audiences in terms of demographics, one pointer is that the 35-49 age group has the largest proportion (57%) in the Action and Maintenance1 stages (among both men and women). This substantial group already report some walking and so might most easily be convinced to do more. In general though, walking stage of change did not show particularly marked differences in relation to demographic variables such as gender, ethnicity, work status, level of urbanisation, education, or household income. This prevalence of walking, combined with it not requiring any substantial

equipment (e.g. a bicycle) confirms the appropriateness of focusing on walking in active transport strategies. The stage of change concept could be used within such strategies:

- to help judge whether sets of proposed active transport initiatives have appropriate coverage of population segments (e.g. are they overly focused on achieving short-term action, without proper preparation for dealing with relapse/recycling?);
- to design content of active transport initiatives (e.g. to consider whether communications should be sharply focused on people in one particular stage, or broadened so that the benefits of a particular initiatives are seen as relevant by people in more than one stage);
- to exploit the greater readiness to change when people move home or change jobs (e.g. employee travel plans could well have a special focus on new staff).

An example of a stage of change approach that could be used in New Zealand is 'Walk in to Work Out', an active commuting initiative trialed in Glasgow (reported by Mutrie et al. 2002). Such approaches involve more than simply using stages of change to identify people most likely to successfully change their behaviour. They can also make use of other elements of the transtheoretical model, such as the 'processes of change' (strategies that people use to help themselves to make change). Various introductions to the transtheoretical model outline ten processes of change to consider making use of in initiatives.[17] These include both experiential processes (consciousness raising, dramatic relief, self re-evaluation, social liberation, environmental re-evaluation) and behavioural processes (self liberation, counterconditioning, stimulus control, reinforcement management, and helping relationships).

The questionnaire had an unusually large number of non-demographic ratings about motivations, perceived benefits, and perceived barriers for physical activity in general. Relatively few of these ratings showed relationships with the walking stage of change questions that may be of practical interest. The most important of these were several items relating to motivations (e.g. doing physical activity because they enjoy it, because it is consistent with their goals, or because they care about keeping in shape) and two relating to perceived barriers (preferring to do other things during free time, feeling that physical activity is uncomfortable). Most of these items either showed a minimal relationship or were not of practical interest. Detailed analysis of motivations and benefits with respect to physical activity in general (which should remain substantially relevant for walking) is already readily available in existing SPARC analysis of the Obstacles to Action dataset (e.g. the segments and path analysis in Sullivan et al. 2003b). In particular, increasing self-efficacy (confidence that they can regularly walk more) and intrinsic motivation (e.g. enjoyment of walking) are likely to be useful campaign approaches.

[17] For example, a useful introduction is available at *www.uri.edu/research/cprc/transtheoretical.htm*

8.5 Readiness to replace car trips by active modes

Fully 37% of respondents agreed that they could replace car trips by walking or cycling on at least two days most weeks (without too much difficulty). Walking stage of change was strongly associated with agreement to replace car trips by active modes. Agreement that they could replace car trips by walking or cycling on at least two days most weeks (without too much difficulty) was only 18% among those in Precontemplation compared with 46% of those who said they would *Almost always walk* (Maintenance2 stage). This helps to confirm the usefulness of targeting by walking stage of change for transport-related behaviour change.

8.6 Environmental perceptions

The focus of this particular questionnaire on individual motivations and perceived benefits of physical activity should not overshadow the importance of recent research findings emphasising the importance of environmental factors. Several studies have now found positive relationships between physical activity levels (particularly walking) and factors such as mixed land use, density, number of street intersections, and public open space.

In response to a list of possible neighbourhood barriers to physical activity included in the Obstacles to Action dataset, the following were the most common (marked as applying by around one in five): not enough street lighting, heavy traffic, not enough cycle lanes or paths, and dog nuisance. However, this list did not cover more complex aspects of urban design. Hence we conclude that local authorities would do well to consider not only the more concrete environmental issues that may be discouraging active transport (such as poor street lighting, dog nuisance) but also broader aspects of urban design requiring longer term action (such as encouraging mixed land use or increasing the amount of public open space).

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Appendix A Questionnaire

JNA: RS1882
JNN:1401720

Physical activity and nutrition in New Zealand

SPARC
ihi AOTEAROA
Sport & Recreation New Zealand

Cancer Society

Thank you for helping with an important study about the physical activity and eating habits of New Zealanders. Sport and Recreation New Zealand (SPARC, formerly the Hillary Commission) and the Cancer Society will use this study to improve the health of New Zealanders. By chance, your address has been chosen to be part of this study. Only one person in your house should complete this questionnaire – **the adult who has the first birthday after 1 June**. (Adult means someone aged 16 or over.)

Your answers will be totally private. No one other than the researchers will be able to tell that it was someone from your house who answered the survey. Each person's answers will be put together with those of others to show the results.

You can return your completed questionnaire in the Freepost envelope supplied.

If you have any questions, ACNielsen will be happy to talk with you. Their toll free number is 0800 226 737. Call any time (including nights and weekends) and ask for Gordon Stewart or Sandra Dodds.

We'd like to thank you in advance for your time and effort.

Sincerely

Nicholas Hill
Chief Executive, SPARC

Neil Chave
Chief Executive, Cancer Society of New Zealand

How to answer

Use a **blue** or **black** pen (that does not soak through the paper), or a **dark** pencil. Put an **X** inside the box provided. (Do not mark any areas outside the box.)

☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5

If you change your mind or make a mistake:
Fill in the whole box and mark the correct one as shown.

☐ 1 ■ 2 ☒ 3 ☐ 4 ☐ 5

Office use only

Office use only

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

SECTION A – ATTITUDES AND OPINIONS

"Physical activities" are things you do that increase your breathing and/or heart-rate (this includes but is not limited to exercise). Examples of these physical activities include brisk walking, biking, swimming, dancing, aerobics, gardening, sports and other activities that "get you moving".

1. Below are a number of statements with which you may or may not agree. For each statement, please indicate how much you personally agree or disagree with it. *If you don't understand a statement, please leave that line* ***blank.***

After each statement, there are five boxes numbered 1 to 5. Mark ☒ one box on each line. (That is, please ☒ the box beside 1 if you strongly disagree, 2 if you moderately disagree, 3 if you neither disagree or agree, 4 if you moderately agree, or 5 if you strongly agree.)

		Strongly disagree		Neither agree nor disagree		Strongly agree
a	I get enough "physical activity" to keep me healthy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b	I eat enough fruit and vegetables to keep me healthy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c	If I get enough "physical activity", I don't really have to worry about what I eat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d	If I eat right, I don't really have to worry about "physical activity"	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e	I prefer to be physically active on my own rather than in a group with an exercise leader	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f	I am more physically active than typical for people my age	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g	I eat more fruit than typical for people my age	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h	I eat more vegetables than typical for people my age	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i	Lately I have been under a lot of stress	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
j	I am so busy at work that I am too tired to be physically active when I get home	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
k	I get enough "physical activity" according to recommended guidelines	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
l	I eat enough fruit and vegetables according to recommended guidelines	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
m	People who are not physically active are at risk of health problems	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
n	People who don't eat fruit and vegetables are at risk of health problems	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
o	Being physically active is a priority in my life	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
p	Having healthy eating habits is very important to me	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
q	I used to be better at sports and other "physical activities"	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
r	I don't pay attention to recommended "physical activity" guidelines because they are always changing	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
s	I don't pay attention to recommended healthy eating guidelines because they are always changing	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
t	I go out of my way to buy organically grown fruit and vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
u	Frozen vegetables are as healthy as fresh vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

"Regular physical activity" means at least 15 minutes of vigorous activity (makes you 'huff and puff') **or** a total of 30 minutes or more of moderate activity (causes a slight but noticeable increase in breathing and heart rate) each day for **5 or more days** each week. Include brisk walking.

2. Please indicate how much you personally agree or disagree with each statement.
(*Mark* ☒ *one box on each line)*

		Strongly disagree		Neither agree nor disagree		Strongly agree
a	"Regular physical activity" will help me live a healthy life	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b	Eating fruit and vegetables will help me live a healthy life	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c	"Regular physical activity" decreases the risk of heart disease	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d	Eating fruit and vegetables decreases the risk of heart disease	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e	"Regular physical activity" decreases the risk of cancer	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f	Eating fruit and vegetables decreases the risk of cancer	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g	Most weeks I could replace car trips by walking or cycling on at least 2 days (without too much difficulty)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h	Dinner doesn't seem right without meat (chicken, pork, beef, lamb)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i	I am concerned about the amount of pesticides on my fruit and vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
j	I don't need to eat a lot of fruit and vegetables because I take multivitamin tablets	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
k	Eating healthier means giving up the foods I like	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
l	I would count 100% fruit juice as a serving of fruit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
m	I would count dried fruit (raisins, dried apricots, etc) as a serving of fruit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

3. For each of the following, how important is it to you that <u>you</u> ...

		Not at all important				Very important
a	Live a healthy life	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b	Do things to lower your risk of heart disease	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c	Do things to lower your risk of developing cancer	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d	Make changes in your daily routine in order to prevent health problems	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e	Follow recommended health guidelines	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

4. **In your opinion**, about what percent of the following people do "regular physical activity" ?

		0%	20%	40%	60%	80%	100%	Does not apply
a	Your family members	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 9
b	Your friends	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 9
c	People your age in New Zealand	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 9

A **"serving"** of fruit means: 1 medium piece of fruit
or 2 small pieces of fruit
or 1/2 cup of stewed fruit.

*Example: 1 apple + 2 small apricots = 2 servings. Do **not** include fruit juice or dried fruit.*

A **"serving"** of vegetables means: 1 medium potato/kumara
or 1/2 cup cooked vegetables
or 1 cup of salad vegetables

*Example: 2 medium potatoes + 1/2 cup peas = 3 servings. Do **not** include vegetable juices.*

5. **In your opinion**, about what percent of the following people eat five or more "servings" of fruit and vegetables a day?

		0%	20%	40%	60%	80%	100%	Does not apply
a	Your family members	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 9
b	Your friends	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 9
c	People your age in New Zealand	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 9

SECTION B – YOUR HEALTH

1. In general, would you say your health is... (*Mark ☒ one box*)

Poor	Fair	Good	Very good	Excellent
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

2. How would you describe your weight?

Very underweight	Slightly underweight	About the right weight	Slightly overweight	Very overweight/obese
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

3. Are you trying to...

Gain weight	Lose weight	Neither of these
☐ 1	☐ 2	☐ 3

4. **During the past 12 months** have you had (or do you currently have) any of these health conditions?
(*Mark ☒ all boxes that apply*)

High blood pressure	☐ 1	Anxiety disorder	☐ 10
High cholesterol	☐ 2	Depression or mood disorder	☐ 11
Asthma	☐ 3	Breast cancer	☐ 12
Respiratory tract infection	☐ 4	Colon cancer	☐ 13
Hay fever or other seasonal allergies	☐ 5	Prostate cancer	☐ 14
Heart attack, heart disease or angina	☐ 6	Other cancer	☐ 15
Diabetes	☐ 7	Other physical health condition	☐ 16
Osteoporosis	☐ 8	Other mental health condition	☐ 17
Arthritis	☐ 9	None of the above	☐ 18

5. **During the past 12 months**, has a doctor, nurse, or other health professional ...

		Yes	No	Not sure
a	Told you to be **more** physically active	☐ 1	☐ 2	☐ 3
b	Told you to eat **fewer** foods that are high in fat	☐ 1	☐ 2	☐ 3
c	Told you to eat **more** fruit and vegetables	☐ 1	☐ 2	☐ 3
d	Given you a Green Prescription (recommended/prescribed physical activity)	☐ 1	☐ 2	☐ 3
e	Given you any advice or treatment at all	☐ 1	☐ 2	☐ 3

6. The following is a list of possible results people may experience when they do things to improve their health (such as regular physical activity or eating at least 5 servings of fruit and vegetables a day).
Please indicate how **personally important** each result is to you.

	How important is it to YOU to ...	Not at all important				Very important
a	Look better (appearance)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b	Lose or maintain weight	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c	Have more energy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d	Feel more relaxed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e	Feel more in control of your life	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f	Set a good example for others	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g	Live a longer life	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h	Have fun	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i	Sleep more soundly	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
j	Avoid constipation	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
k	Feel good about yourself	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
l	Get to be with people/socialise	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
m	Improve your overall fitness level	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Reminder: Use a **blue** or **black** pen (that does not soak through the paper), or a **dark** pencil. Put an **X** inside the box provided. (Do not mark any areas outside the box.)

CORRECT ☐ 1 ☒ 2 ☐ 3

INCORRECT ✓ / ✗

SECTION C – HEALTH BEHAVIOUR

1. Assume that you **want** to do each of the following. How **confident** are you that you can do each, beginning this week and continuing for at least **ONE month**? *(Mark ☒ one box for each statement)*

How confident are you that you could…		Not at all confident									Extremely confident
a	Be physically active at least 5 days per week for a total of at least 30 minutes a day	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10
b	Eat a low-fat diet (eating less fried foods, chips, mayonnaise, cream, etc.)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10
c	Maintain a healthy weight, or begin to lose excess weight	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10
d	Get 7 or more hours of sleep each night	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10
e	Try a new fruit or vegetable this month to see if you like it	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10
f	Try a new physical activity this month to see if you like it	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10
g	Eat at least five servings of fruit and vegetables every day	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10

2. Have you had a drink containing alcohol in the last year?

Yes	No	Don't know
☐ 1	☐ 2	☐ 3

Go to **6.**

3. How often do you have a drink containing alcohol?

Monthly or less	2 to 4 times a month	2 to 3 times a week	4 or more times a week
☐ 1	☐ 2	☐ 3	☐ 4

4. How many drinks containing alcohol do you have on a typical day when you are drinking?

As a guide, a drink is:
- a can or small bottle of beer
- a small glass of wine
- a nip of spirits (a 'single' in a pub)

1 or 2	3 or 4	5 or 6	7 to 9	10 or more
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

5. How often do you have 5 or more drinks on one occasion?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

6. During the past 30 days, on about how many days did you smoke cigarettes?
(If you did not smoke at all in the last 12 months, write in an ☒)

☐☐ days

7. During the past 30 days, on the days you smoked, about how many cigarettes a day did you usually smoke?
(If you did not smoke at all, write in an ☒)

☐☐☐ cigarettes each day

SECTION D – PHYSICAL ACTIVITY

1. Please indicate how much you personally agree or disagree with each statement.
(*If you don't understand a statement, please leave that line blank)*

When I am physically active, it is because…		Strongly disagree			Neither agree nor disagree			Strongly agree
a	I enjoy physical activity	☐1	☐2	☐3	☐4	☐5	☐6	☐7
b	It is an important choice I really want to make	☐1	☐2	☐3	☐4	☐5	☐6	☐7
c	I would feel guilty or ashamed of myself if I didn't	☐1	☐2	☐3	☐4	☐5	☐6	☐7
d	I believe it is a very good thing for my health	☐1	☐2	☐3	☐4	☐5	☐6	☐7
e	Others would be upset with me if I didn't	☐1	☐2	☐3	☐4	☐5	☐6	☐7
f	I feel pressure from others to be more active	☐1	☐2	☐3	☐4	☐5	☐6	☐7
g	It is consistent with my life goals	☐1	☐2	☐3	☐4	☐5	☐6	☐7
h	I want others to approve of me	☐1	☐2	☐3	☐4	☐5	☐6	☐7
i	I want others to see I can do it	☐1	☐2	☐3	☐4	☐5	☐6	☐7
j	Not doing so puts my health at serious risk	☐1	☐2	☐3	☐4	☐5	☐6	☐7
k	My family wants me to	☐1	☐2	☐3	☐4	☐5	☐6	☐7
l	I want to take responsibility for my own health	☐1	☐2	☐3	☐4	☐5	☐6	☐7
m	I want to be a good role model for my children	☐1	☐2	☐3	☐4	☐5	☐6	☐7
n	I care about keeping in shape	☐1	☐2	☐3	☐4	☐5	☐6	☐7
o	My work is physically active	☐1	☐2	☐3	☐4	☐5	☐6	☐7
p	It is important to me that my dog gets enough exercise	☐1	☐2	☐3	☐4	☐5	☐6	☐7

2. Do you have (or share) responsibility for regularly exercising a dog?

Yes	No
☐1	☐2

3. How much encouragement do you get from the following people to be physically active?

		None						A lot	Does not apply
a	Your spouse or partner	1	2	3	4	5	6	7	9
b	Your family/whanau/children (other than spouse/partner)	1	2	3	4	5	6	7	9
c	Your close friends	1	2	3	4	5	6	7	9
d	People you work with	1	2	3	4	5	6	7	9
e	People at your church or place of worship	1	2	3	4	5	6	7	9
f	Your doctor or health care provider	1	2	3	4	5	6	7	9
g	Your employer	1	2	3	4	5	6	7	9
h	People at your marae	1	2	3	4	5	6	7	9

4. Overall, would you say the amount of encouragement you get is ...

Not enough			About right		Too much	
1	2	3	4	5	6	7

5. The following is a list of possible results people may experience when they engage in "regular physical activity". Please indicate how **likely** YOU are to experience each result if you engage in physical activity.

> **"Regular physical activity"** means at least 15 minutes of vigorous activity (makes you 'huff and puff') **or** a total of 30 minutes or more of moderate activity (causes a slight but noticeable increase in breathing and heart rate) each day for **5 or more days** each week. Include brisk walking.

How likely is it YOU would...		Not at all likely				Very likely
a	Look better (appearance)	1	2	3	4	5
b	Lose or maintain weight	1	2	3	4	5
c	Have more energy	1	2	3	4	5
d	Feel more relaxed	1	2	3	4	5
e	Feel more in control of your life	1	2	3	4	5
f	Set a good example for others	1	2	3	4	5
g	Live a longer life	1	2	3	4	5
h	Have fun	1	2	3	4	5
i	Sleep more soundly	1	2	3	4	5
j	Feel good about yourself	1	2	3	4	5
k	Get to be with people/socialise	1	2	3	4	5
l	Improve your overall fitness level	1	2	3	4	5

6. The following is a list of possible things that keep some people from being physically active. For each one, please indicate how much each influences your own activity level.

		Doesn't influence me at all						Influences me a lot
a	Lack of energy/too tired	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
b	Lack of time due to work	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
c	Lack of time due to family responsibilities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
d	Arthritis or other health problems	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
e	Costs too much (clothes, equipment, etc.)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
f	Facilities (parks, gyms) too hard to get to	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
g	It's too hard to stick to a routine	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
h	No one to do physical activities with	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
i	I worry about my safety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
j	I would have to get someone to watch my children	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
k	I'm too old	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
l	I get bored quickly	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
m	There are other things I'd rather do during my free time	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
n	Others discourage me from being physically active	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
o	I have too many household chores to do	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
p	Physical activity is uncomfortable for me	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
q	I'm too out of shape to start	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
r	I feel I am too overweight to be physically active	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
s	I don't know how to be physically active	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
t	I don't like to sweat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
u	I don't like feeling out of breath	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
v	I don't like other people to see me being physically active	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
w	Physical activity takes too much effort	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

Reminder: If you change your mind or make a mistake:
Fill in the whole box and mark the correct one as shown.

☐ 1 ☒ 2 ☒ 3 ☐ 4 ☐ 5

7. Below is a list of things you may have in your neighbourhood or at work.

First, in column A mark one box that best indicates whether or not you would use each of these things ***if they were available to you.***

Secondly, in column B please mark one box to indicate which ones you consider are ***readily available*** *to you now.*

		Column A					Column B	
		Would you use this if it were available to you?					Is it readily available in your neighbourhood or at work?	
		Definitely would not				Definitely would	Yes	No
a	Cycle lanes or paths	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
b	Walking group	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
c	Walking tracks	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
d	Public park with playing fields	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
e	Swimming pool, beach or lake	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
f	School gym/pool open to community on weekends	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
g	Netball or tennis courts	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
h	Community recreation centre	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
i	Health club or gym near work	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
j	Health club or gym near home	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
k	Shower at work	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
l	Home exercise equipment	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
m	Organised sports (like touch rugby, netball)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2
n	Sports shop	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2

Check: Have you answered both column A and column B?

8. I would be more physically active if…

		Not at all likely				Very likely	Does not apply
a	I could call a toll-free number to get advice from an expert	1	2	3	4	5	9
b	I could get a free pamphlet on how to do it	1	2	3	4	5	9
c	I could get a free or low-cost gym membership	1	2	3	4	5	9
d	My health insurance company rewarded me with lower premiums	1	2	3	4	5	9
e	Every time I was physically active I would earn points towards free things like magazines, clothes, and travel	1	2	3	4	5	9
f	I had an extra hour of free time during my day	1	2	3	4	5	9
g	Someone agreed to support me/check on my progress	1	2	3	4	5	9
h	I could get someone to watch my children	1	2	3	4	5	9
i	My employer offered a gym membership	1	2	3	4	5	9
j	My employer allowed time for it	1	2	3	4	5	9
k	My employer paid me to be more physically active	1	2	3	4	5	9
l	I thought it would get my children to be more active	1	2	3	4	5	9
m	I had someone to go with	1	2	3	4	5	9

9. Which of the following (if any) apply to your neighbourhood **and put you off** being physically active?

(Mark ☒ all boxes that apply)

There are not enough footpaths	1
Footpaths are not well maintained	2
Traffic is too heavy	3
There are steep hills	4
There is not enough street lighting	5
There are not enough cycle lanes or paths	6
There are too many stop signs/lights	7
The scenery is not that nice	8
I rarely see people walking or being physically active	9
There is a lot of crime	10
Dog nuisance	11
None of the above	12

10. Is a bicycle (in working order) usually available for you to use?

Yes	No
1	2

11. How often have you ridden a bicycle during the last 3 months? (*Mark* ☒ *the **first** box that applies)*

Never learned to ride properly	☐ 1
Not at all during the last 3 months	☐ 2
Only once or twice	☐ 3
1-2 times a month	☐ 4
About once a week	☐ 5
2-3 days a week	☐ 6
Most days	☐ 7

12. For a short journey when the weather was fine and you have nothing to carry, would you ... (*Mark* ☒ ***one** box)*

Not even consider using a bicycle	☐ 1
Realise that you could use a bicycle but wouldn't actually do it	☐ 2
Think seriously about the pros and cons of cycling but rarely do it	☐ 3
Try cycling on some occasions	☐ 4
Cycle quite often	☐ 5
Almost always cycle	☐ 6

13. *For this question only: if you have a bicycle, please assume that it is temporarily unavailable.* For a journey of 1.5 km (about 15 minutes walk at normal walking speed), when the weather was fine and you have nothing heavy to carry, would you ... (*Mark* ☒ ***one** box)*

Not even consider walking	☐ 1
Realise that you could walk but wouldn't actually do it	☐ 2
Think seriously about the pros and cons of walking but rarely do it	☐ 3
Walk on some occasions	☐ 4
Walk quite often	☐ 5
Almost always walk	☐ 6

14. The next questions ask about physical activity that you may have done in the past 7 days. Please answer each question even if you do not consider yourself to be an active person. Think about the activities you do at work, as part of your housework and gardening, to get from place to place, and in your spare time for recreation, exercise or sport. The questions ask you separately about brisk walking, moderate activity and vigorous activity.

Do not count the same time more than once:
Example 1. You run for 20 minutes. Count this time as vigorous activity only, not also as moderate.
Example 2. A 45 minute ball game with 30 minutes at moderate intensity then 15 minutes at vigorous intensity. Count this activity as 30 minutes moderate and 15 minutes vigorous.

a Walking

During the last 7 days, on how many days did you **walk at a brisk pace?** *(A pace at which you are breathing harder than normal.)* This includes walking at work, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure.

Think about **only** that walking done for at least 10 minutes at a time. *(Mark ☒ one box)*

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
☐ 9	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

How much time did you **usually** spend doing such brisk walking on each of those days? *(Write in number)*

☐☐☐ minutes a day **OR** ☐☐ hours a day

b Moderate physical activity

During the last 7 days, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking. (*Moderate physical activity will cause a slight, but noticeable, increase in breathing and heart-rate.)*

Think about **only** those physical activities done for at least 10 minutes at a time.

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
☐ 9	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

How much time did you **usually** spend doing moderate physical activities on each of those days? *(Write in number)*

☐☐☐ minutes a day **OR** ☐☐ hours a day

c Vigorous physical activity

During the last 7 days, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, running, rugby, netball, or fast bicycling? *(Vigorous activity is activity that makes you "huff and puff", and where talking in full sentences between a breath is difficult.)*

Think about **only** those physical activities done for at least 10 minutes at a time.

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
☐ 9	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

How much time did you **usually** spend doing vigorous physical activities on each of those days? *(Write in number)*

☐☐☐ minutes a day **OR** ☐☐ hours a day

Please check that you have not counted the same time more than once.

15. ***Crucial Question!*** *Please answer carefully.* Thinking about all your activities (brisk walking, moderate, or vigorous), on how many of the last 7 days were you **active**? ("Active" means doing 15 minutes or more of vigorous activity, or a total of 30 minutes or more of moderate activity or brisk walking.)

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
☐ 9	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

16. Were your answers to the last questions (Q14-Q15) clearly affected because of pregnancy, illness, injury, or disability? *(Mark ☒ all boxes that apply)*

No	☐ 1
Yes, because of pregnancy	☐ 2
Yes, because of a temporary illness	☐ 3
Yes, because of a long-term illness	☐ 4
Yes, because of a temporary injury	☐ 5
Yes, because of a permanent injury or disability	☐ 6

17. Overall, how physically active do you consider yourself to be?

Not at all physically active						Very physically active
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

18. How long have you been active **at this level**?

Less than one month	1-3 months	4-6 months	7-9 months	10-12 months	More than 12 months
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

19. Over the next 6 months, do you think you will be...

Less physically active			About the same			More physically active
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

20. Are you "regularly physically active" according to the definition below? (*Mark ☒ **one** box)*

> **"Regular physical activity"** means at least 15 minutes of vigorous activity (makes you 'huff and puff') **or** a total of 30 minutes or more of moderate activity (causes a slight but noticeable increase in breathing and heart rate) each day for **5 or more days** each week. Include brisk walking.

No, and I do not intend to be in the next 6 months	☐ 1
No, but I am thinking about starting to be in the next 6 months	☐ 2
No, but I intend to begin in the next 30 days	☐ 3
Yes, I am but only began in the last 6 months	☐ 4
Yes, I am and have been for more than 6 months	☐ 5

Remember: Only one person should fill in this questionnaire.

SECTION E – NUTRITION

1. How much do you personally agree or disagree with each statement?

When I eat fruit and vegetables, it is because…		Strongly disagree			Neither agree nor disagree			Strongly agree
a	I enjoy eating fruit and vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
b	It is an important choice I really want to make	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
c	I would feel guilty or ashamed of myself if I didn't	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
d	I believe it is a very good thing for my health	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
e	Others would be upset with me if I didn't	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
f	I feel pressure from others to eat healthier	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
g	It is consistent with my life goals	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
h	I want others to approve of me	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
i	Not doing so puts my health at serious risk	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
j	My family wants me to	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
k	I want to be a good role model for my children	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
l	I want to take responsibility for my own health	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
m	Fruit makes an easy snack	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
n	I want to get more vitamins	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

2. How much encouragement do you get from the following people to eat fruit and vegetables?

		None						A lot	Does not apply
a	Your spouse or partner	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 9
b	Your family/whānau/children (other than spouse/partner)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 9
c	Your close friends	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 9
d	People you work with	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 9
e	People at your church or place of worship	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 9
f	Your doctor or health care provider	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 9
g	Your employer	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 9
h	People at your marae	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 9

3. Overall, would you say the amount of encouragement you get is…

Not enough			About right			Too much
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

4. The following is a list of possible results people might experience when they eat at least five servings of fruit and vegetables a day. Please indicate how **likely** YOU are to experience each result if you eat at least five servings of fruit and vegetables daily.

	How likely is it YOU would ...	Not at all likely				Very likely
a	Look better (appearance)	1	2	3	4	5
b	Lose or maintain weight	1	2	3	4	5
c	Have more energy	1	2	3	4	5
d	Feel more in control of your life	1	2	3	4	5
e	Set a good example for others	1	2	3	4	5
f	Live a longer life	1	2	3	4	5
g	Avoid constipation	1	2	3	4	5
h	Feel good about yourself	1	2	3	4	5

5. The following is a list of possible things that keep people from eating fruit and vegetables each day. For each one, please indicate how much each influences the number of fruit and vegetables you eat each day.

		Doesn't influence me at all						Influences me a lot
a	Fruit costs too much	1	2	3	4	5	6	7
b	Vegetables cost too much	1	2	3	4	5	6	7
c	Fresh fruit spoils too quickly	1	2	3	4	5	6	7
d	Fresh vegetables spoil too quickly	1	2	3	4	5	6	7
e	I prefer to eat other snacks (like chips and biscuits)	1	2	3	4	5	6	7
f	They don't give me 'quick energy' like a chocolate bar does	1	2	3	4	5	6	7
g	I'm not a good cook	1	2	3	4	5	6	7
h	Fruit and vegetables are not available where I work	1	2	3	4	5	6	7
i	The supermarket I go to most doesn't carry a lot of different fruit and vegetables	1	2	3	4	5	6	7
j	I can't get good quality fruit and vegetables at my local shops	1	2	3	4	5	6	7
k	Fruit takes too much time to prepare (clean, cut up, cook)	1	2	3	4	5	6	7
l	Vegetables take too much time to prepare (clean, cut up, cook)	1	2	3	4	5	6	7
m	Fruit isn't filling enough	1	2	3	4	5	6	7
n	Vegetables aren't filling enough	1	2	3	4	5	6	7
o	I don't like most fruit	1	2	3	4	5	6	7
p	I don't like most vegetables	1	2	3	4	5	6	7
q	My family doesn't like fruit	1	2	3	4	5	6	7
r	My family doesn't like vegetables	1	2	3	4	5	6	7
s	Fruit is difficult to eat when I'm 'on the go'	1	2	3	4	5	6	7
t	Vegetables are difficult to eat when I'm 'on the go'	1	2	3	4	5	6	7

6. Please indicate how likely you would be to eat **more** fruit and vegetables if …

		Not at all likely				Very likely	Does not apply
a	I could call a toll-free number to get advice from an expert on how to prepare or cook fruit and vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
b	I could get a free pamphlet on how to prepare fruit and vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
c	Fruit and vegetables came in more convenient packages (pre-washed, cut up)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
d	My employer offered free or low-cost fruit and vegetables at work	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
e	There was more information on TV about how to prepare or cook fruit and vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
f	The place I buy my lunch had more fruit and vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
g	My doctor or nurse told me it would improve my health	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
h	I could collect bar codes from fruit and vegetables which go into prize draws	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
i	I could get free advice from a dietitian	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9
j	I could get a free cookbook about fruit and vegetables	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 9

7. On average, how many **"servings"** of fruit (fresh, frozen, canned or stewed) do you eat per day? Do **not** include fruit juice or dried fruit.

A **"serving"** of fruit means: 1 medium piece of fruit
or 2 small pieces of fruit
or 1/2 cup of stewed fruit.

*Example: 1 apple + 2 small apricots = 2 servings. Do **not** include fruit juice or dried fruit.*

I don't eat fruit	☐ 1
Less than 1 serving per day	☐ 2
1 serving per day	☐ 3
2 servings per day	☐ 4
3 servings per day	☐ 5
4 servings per day	☐ 6
5 or more servings per day	☐ 7

8. Do you consistently eat 2 or more "servings" of **fruit** a day? (*Mark ☒ **one** box)*

No, and I do not intend to in the next 6 months	☐ 1
No, but I intend to in the next 6 months	☐ 2
No, but I plan to in the next 30 days	☐ 3
Yes, I have been, but for less than 6 months	☐ 4
Yes, and I have been for more than 6 months	☐ 5

9. On average, how many "**servings**" of vegetables (fresh, frozen, canned) do you eat a day? Do **not** include vegetable juices.

A **"serving"** of vegetables means: 1 medium potato/kumara
or 1/2 cup cooked vegetables
or 1 cup of salad vegetables

*Example: 2 medium potatoes + 1/2 cup peas = 3 servings. Do **not** include vegetable juices.*

I don't eat vegetables	☐ 1
Less than 1 serving per day	☐ 2
1 serving per day	☐ 3
2 servings per day	☐ 4
3 servings per day	☐ 5
4 servings per day	☐ 6
5 or more servings per day	☐ 7

10. Do you consistently eat 3 or more "servings" of **vegetables** a day? (*Mark ☒ **one** box)*

No, and I do not intend to in the next 6 months	☐ 1
No, but I intend to in the next 6 months	☐ 2
No, but I plan to in the next 30 days	☐ 3
Yes, I have been, but for less than 6 months	☐ 4
Yes, and I have been for more than 6 months	☐ 5

11. Overall, how do you feel about the amount of fruit and vegetables that you typically eat?

Not enough			**About right**			**Too much**
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

12. Over the next 6 months, do you think you will...

Eat fewer fruit and vegetables			**Eat about the same**			**Eat more fruit and vegetables**
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

13. Do you consider yourself to be a vegetarian?

Yes (no meat or fish) ☐ 1 No ☐ 2

14. Who usually does the cooking in your house?

I do	☐ 1
Someone else living with me does	☐ 2
Shared equally	☐ 3
Other (e.g. my meals are delivered)	☐ 4

15. When vegetables are cooked in your house, how are they **usually** prepared? (*Mark ☒ all boxes that apply*)

Deep fry them in oil	☐ 1
Steam or microwave them	☐ 2
Pan fry/sauté them in oil, butter or margarine	☐ 3
Boil them	☐ 4
Bake or grill them	☐ 5
Roast them	☐ 6
Don't know	☐ 7

16. If you wanted to add a **vegetable** to your diet, when would be the easiest time to do it? (*Mark ☒ **one** box*)

At breakfast	☐ 1
At lunch	☐ 2
At dinner	☐ 3
As a dessert	☐ 4
As a snack	☐ 5

17. If you wanted to add a **fruit** to your diet, when would be the easiest time to do it? (*Mark ☒ **one** box*)

At breakfast	☐ 1
At lunch	☐ 2
At dinner	☐ 3
As a dessert	☐ 4
As a snack	☐ 5

18. How many nights do you usually eat out or bring home take-away food instead of preparing dinner at home?

Less than once a month	☐ 1
1-2 times a month	☐ 2
About 1 time a week	☐ 3
About 2 times a week	☐ 4
About 3 times a week	☐ 5
About 4 times a week	☐ 6
About 5-7 times a week	☐ 7

19. How many nights a week do you eat dinner while watching television?

0 nights	1 night	2 nights	3 nights	4 nights	5 nights	6 nights	7 nights
☐ 9	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

20. Have you heard of "5+ A Day" ?

Yes ☐ 1 No ☐ 2

SECTION F – GETTING HEALTH AND PHYSICAL ACTIVITY INFORMATION

1. Please indicate how much you would **trust** each of the following sources for health and physical activity information.

		Don't trust at all				Trust a lot
a	Your doctor	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b	Your doctor's nurse	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c	Dietitian	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d	Naturopath or homeopath	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e	Other health professional (e.g. physiotherapist)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f	Pharmacist/chemist	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g	Your local hospital	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h	Your local Public Health Unit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i	Your local District Health Board	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
j	The Ministry of Health	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
k	SPARC/Push Play Campaign (previously Hillary Commission)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
l	Regional Sports Trusts	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
m	Cancer Society	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
n	Diabetes New Zealand	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
o	Heart Foundation	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
p	Gym personnel or personal trainer	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
q	Your family	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
r	Your friends	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
s	The Internet	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
t	Books or journals	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
u	Magazine articles	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
v	Newspaper articles	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
w	Television programmes	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
x	Radio programmes	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

2. Which of the following health areas would you be most interested in learning more about? (*Mark ☒ all boxes that apply)*

Physical activity/exercise	1
Nutrition/food choices	2
Weight control	3
Quitting smoking	4
Stress management	5
Blood pressure control	6
Improving sleep	7
Information on specific diseases and conditions	8
Information on drugs and medications	9
Information on alternative therapies	10
How to stay healthy	11
None of these	12

3. How often do you use **the Internet** to find **health information** (including health-related news, information about specific conditions, etc.)?

Never	1
A few times a year	2
Once a month	3
Several times a month	4
A few times a week	5
Every day	6

4. When you log on to the Internet for **personal** reasons (not for work), what is your Homepage? (The page that opens first)

Not applicable	1
nzoom	2
yahoo	3
nzherald	4
nzjobs.co.nz	5
xtramsn.co.nz	6
Alta Vista	7
Google	8
stuff.co.nz	9
Other	10
Don't know	11

5. Which of the following websites do you commonly use? (*Mark ☒ all boxes that apply)*

None of those below	1
yahoo	2
xtramsn.co.nz	3
Alta Vista	4
Google	5

SECTION G - ABOUT YOURSELF

Finally, a few questions to help us describe the groups of people who have responded to this questionnaire. All this information remains confidential.

1. Are you...

Male ☐ 1 Female ☐ 2

2. What is your height without shoes?

☐☐☐ cm **or** ☐ feet ☐☐ inches

3. What is your weight without shoes?

☐☐☐ kg **or** ☐☐ stone ☐☐ pounds

4. Are you ... *(Mark ☒ the one box which best describes you now)*

Single	☐ 1
Married/living with partner	☐ 2
Separated/divorced	☐ 3
Widowed	☐ 4
Other	☐ 5

5. Which location best describes where you live?

Large city (more than 100,000 people)	☐ 1
Smaller city (30,000 to 100,000 people)	☐ 2
Town (1,000 to 29,999 people)	☐ 3
Small town, community or village (less than 1,000 people)	☐ 4
Don't know/not sure	☐ 5

6. Which ethnic group do you belong to? *(Mark ☒ the box or boxes which apply to you)*

New Zealand European	☐ 1
Māori	☐ 2
Samoan	☐ 3
Cook Island Maori	☐ 4
Tongan	☐ 5
Niuean	☐ 6
Chinese	☐ 7
Indian	☐ 8
Other Asian (such as Korean, Filipino, Japanese)	☐ 9
British/ European	☐ 10
Other	☐ 11

7. To which of these age groups do you belong?

16 - 17 years	☐ 1
18 - 19 years	☐ 2
20 - 24 years	☐ 3
25 - 29 years	☐ 4
30 - 34 years	☐ 5
35 - 39 years	☐ 6
40 - 44 years	☐ 7
45 - 49 years	☐ 8
50 - 54 years	☐ 9
55 - 59 years	☐ 10
60 - 64 years	☐ 11
65 - 69 years	☐ 12
70 - 74 years	☐ 13
75 - 79 years	☐ 14
80 years and over	☐ 15

8. What is your highest secondary school qualification? *(Mark ☒ one box)*

None	☐ 1
NZ School Certificate in one or more subjects, or National Certificate Level 1	☐ 2
NZ Sixth Form Certificate in one or more subjects, or National Certificate Level 2	☐ 3
NZ University Entrance before 1986 in one or more subjects	☐ 4
NZ Higher School Certificate, or Higher Leaving Certificate	☐ 5
University Entrance qualification from NZ University Bursary	☐ 6
NZ A or B Bursary, Scholarship, or National Certificate Level 3	☐ 7
Other NZ secondary school qualification	☐ 8
Overseas secondary school qualification	☐ 9

9. Apart from secondary school qualifications, do you have another qualification? Don't count incomplete qualifications or qualifications that take less than 3 months of full-time study (or the equivalent) to get. *(Mark ☒ all that apply)*

No	☐ 1
Bachelor Degree or higher degree	☐ 2
Other complete qualification taking 3 or more months of full-time study, or the equivalent (e.g. diploma, trade certificate)	☐ 3

10. Which one of the following best describes you? (*Mark ☒ **one** box - if more than one category applies, mark the one you spend most time doing over a week.)*

Working full-time	☐ 1
Working part-time	☐ 2
Unemployed/Actively seeking a job	☐ 3
At home	☐ 4
Retired	☐ 5
Sick/Invalid	☐ 6
Student (full-time, including secondary school)	☐ 7
Other	☐ 8

11. Which one of these best describes where you work?

Not doing paid work	☐ 1
Mainly in an office	☐ 2
Mainly in a shop	☐ 3
Mainly in a factory	☐ 4
Mainly outside	☐ 5
Mainly at home (inside)	☐ 6
None of the above	☐ 7

12. How many people (including working owners) work for your organisation at the place where you work? *Include both full-time and part-time workers. Ignore any physically separate sites your organisation may have.*

Not doing paid work	☐ 1
1 - 5	☐ 2
6 - 9	☐ 3
10 - 49	☐ 4
50 or more	☐ 5

13. When you are at work, which one of the following best describes what you do? Would you say you…

Mostly sit	☐ 1
Mostly stand	☐ 2
Mostly walk or perform light labour	☐ 3
Mostly do heavy labour or physically demanding work	☐ 4
Not applicable	☐ 5

14. Which of these best describes your **personal** income before tax in the last 12 months? That includes benefit and retirement income, as well as paid income from all sources.

Zero income or loss	☐ 1
$1 - $5,000	☐ 2
$5,001 - $10,000	☐ 3
$10,001 - $15,000	☐ 4
$15,001 - $20,000	☐ 5
$20,001 - $30,000	☐ 6
$30,001 - $40,000	☐ 7
$40,001 - $50,000	☐ 8
$50,001 - $70,000	☐ 9
$70,001 - $100,000	☐ 10
$100,001 or more	☐ 11
Don't know	☐ 12

Reminder: If you change your mind or make a mistake:
Fill in the whole box and mark the correct one as shown.

☐ 1 ☒ 2 ☒ 3 ☐ 4 ☐ 5

15. Which one of these best describes the **total household** income before tax in the last 12 months? That includes benefit and retirement income, as well as paid income from all sources.

Same as personal income	1
Up to $10,000	2
$10,001 – $20,000	3
$20,001 – $30,000	4
$30,001 – $40,000	5
$40,001 – $50,000	6
$50,001 – $70,000	7
$70,001 – $100,000	8
$100,001 or more	9
Don't know	10
Not applicable - flat, hostel, boarding etc	11

16. Which of the following best describes your address?

Private household or flat	1
Home for the elderly	2
Other institution (e.g. hostel)	3
Other *(please specify below)*	4

_____

17. Counting yourself (and any boarders), how many people **in total** live at this address? *Only count people usually living with you at least 4 days a week.*

people

18. Of these, how many are…

people aged 18 years or more

people aged 16 – 17 years

children aged 5 – 15 years

children 0 – 4 years

Total

***Check:** Total should equal previous answer*

19. Are any of the people aged **under 18 years** at this address …

	Yes	No
Your child/children	1	2
Your grandchild/grandchildren	1	2

20. At a later stage, we would like to contact a few people for some follow-up research. If you are happy to be contacted, please write your telephone number here:

Area Code

0 –

Check: Have you answered all pages of this questionnaire?

Thank you very much for your time and effort.

Please put the completed questionnaire in the Freepost envelope provided and post it to:

Freepost 727
ACNIELSEN
PO Box 11 346
Wellington