Transport and Well-Being
Among
Older Adolescents

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Abstract

Background

Discussions of teenage transport issues are typically framed from the perspective of crash risk and physical health. This research addresses transport in the context of well-being, from the Positive Youth Development perspective. Issues surrounding mobility affect older teenagers’ life satisfaction and self-perceived strengths, but this is not a focus in the literature. As the transport mode chosen by a teenager is essentially an individual decision, with public health implications, how teenagers choose to travel the way they do, and what impact these choices have on well-being, should help researchers acquire a more nuanced view of the role transportation plays in overall health. Thus the aim of this thesis is to determine which transport practices and/or circumstances support well-being among older teenagers in Southland, New Zealand.

Methods

This thesis comprises five distinct but related projects, all with the aim of addressing the relationship between transport and well-being among older adolescents, by first describing transport and well-being among older teenagers in Southland, New Zealand, and then determining which transport practices and/or circumstances support well-being among this sample. The first project is a literature review describing the topic this thesis addresses. The second, a qualitative photovoice project, sought advice from key informants to provide context for further research. The third and fourth projects focused on testing the feasibility of the final quantitative survey tool used in this thesis, and involved a pilot project, and the translation of the survey tool to te reo Māori. The fifth project, a quantitative online survey of twelve schools in Southland, New Zealand, queried older adolescents about their transport habits and their subjective well-being. This last project provided data for descriptive and regression analysis.

Results

The qualitative photovoice study influenced the writing of the online survey, and the pilot study allowed for the finding and correcting of errors, and informed on best practice for survey dissemination. Survey results suggested that transport habits do in fact have an
effect on the well-being of older adolescents. Multiple linear regression analysis performed on the final online survey data suggests that the practices and/or circumstances that support well-being among this sample differed by gender, and included peer and parental attachment, certain activities, transport frustration, licence status, meeting physical activity guidelines, income, proximity lived to city centre, and transport modes. These are new findings that add to the transport and well-being literature.

Conclusions

In order to fully address transport issues among older adolescents, they must be viewed through the lens of well-being. The information in this thesis provides a good foundation of the “how” with regard to transport and well-being among older adolescents. Future research should consider the “why”, in order to develop and conduct meaningful and effective intervention projects in this area.
Acknowledgements

Once, I heard it said that undertaking doctoral study is a “self-indulgent enterprise”. I must agree; there are very few circumstances in which one finds themselves allowed to focus solely on their area of interest for 36 months. This has truly been a challenging and rewarding experience that I would duplicate in a heartbeat.

My research was funded by a doctoral scholarship from the University of Otago, for which I am very grateful. I am also beholden to the Division of Health Science, the Department of Preventive and Social Medicine, and the Department of Geography, which funded my field research, survey translation, and presentation at conferences. I’m also thankful for awards from the Otago Medical School Research Society and ARRB/Roads Australia, which helped defer field research costs.

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Table of Contents

Abstract ........................................................................................................... ii

Acknowledgements....................................................................................... iv

Table of Contents............................................................................................ vi

Table of Tables................................................................................................ xiv

Table of Figures................................................................................................ xv
Chapter 1
Introduction to the Thesis and its Framework .................1

Overview: The relationship between transport and well-being ................. 1
Location ................................................................................. 4
Target age group .................................................................... 4
Research aim and objectives ...................................................... 6
Overarching aim ........................................................................ 6
Objectives ................................................................................ 6
Research approach and overview of methods used ......................... 7
Research approach .................................................................... 7
Methods used in this thesis ........................................................ 8
The structure of this hybrid thesis ............................................... 10
The conceptual framework ......................................................... 11
The ecological model ................................................................ 11
The public health approach ......................................................... 12
Preliminary model: transport and well-being ............................... 13
Supervision, academic outputs, and the role of the candidate ............. 14
Chapter summary ..................................................................... 17
# Chapter 2

**Putting Transport and Well-Being in Context Among Older Adolescents**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature search</td>
<td>19</td>
</tr>
<tr>
<td>Search strategy</td>
<td>19</td>
</tr>
<tr>
<td>Search results</td>
<td>21</td>
</tr>
<tr>
<td>Well-being among older adolescents</td>
<td>22</td>
</tr>
<tr>
<td>Positive Youth Development</td>
<td>22</td>
</tr>
<tr>
<td>Subjective well-being</td>
<td>24</td>
</tr>
<tr>
<td>Transition Teenagers</td>
<td>27</td>
</tr>
<tr>
<td>Attachment</td>
<td>28</td>
</tr>
<tr>
<td>The influence of peers and family</td>
<td>28</td>
</tr>
<tr>
<td>Place and participation</td>
<td>29</td>
</tr>
<tr>
<td>Transport</td>
<td>30</td>
</tr>
<tr>
<td>The risks of car use</td>
<td>30</td>
</tr>
<tr>
<td>Driver licensing</td>
<td>32</td>
</tr>
<tr>
<td>Active transport and trip chaining</td>
<td>33</td>
</tr>
<tr>
<td>Access and autonomy</td>
<td>36</td>
</tr>
<tr>
<td>Transport and well-being</td>
<td>37</td>
</tr>
<tr>
<td>Research methods and tools employed</td>
<td>40</td>
</tr>
<tr>
<td>Photovoice</td>
<td>41</td>
</tr>
<tr>
<td>Online survey</td>
<td>42</td>
</tr>
<tr>
<td>Research model resulting from literature review</td>
<td>44</td>
</tr>
<tr>
<td>Chapter summary</td>
<td>45</td>
</tr>
</tbody>
</table>
Chapter 3

A Photovoice Project To Inform Research Development ......48

Introduction .............................................................................................................................49

Methods ...................................................................................................................................50

Study design and setting .......................................................................................................50

Participants and recruitment .................................................................................................50

Procedures ...............................................................................................................................51

Analysis ....................................................................................................................................52

Results ........................................................................................................................................53

Descriptive results from questionnaire ....................................................................................54

“It costs lots of money” - Financial .......................................................................................56

“It makes me feel peaceful” - Social and mental well-being .................................................57

“You have to be careful” - Safety ..........................................................................................61

“I feel trapped at home” - Barriers to choice ........................................................................63

Discussion ...................................................................................................................................65

Validating the research model ...............................................................................................68

Chapter summary ....................................................................................................................71
Chapter 4

Testing the Survey Tool to Assess Project Feasibility ..........72

Introduction............................................................................................................. 73
Methods ..................................................................................................................... 74
Study design and setting.......................................................................................... 74
Participants and recruitment...................................................................................... 74
Survey design and measures .................................................................................... 75
Procedures ............................................................................................................... 77
Analysis .................................................................................................................... 78
Results ...................................................................................................................... 79
Discussion ............................................................................................................... 80
Sampling aspects of study ......................................................................................... 80
Measurement aspects of the study ............................................................................. 82
Chapter summary .................................................................................................... 86

Chapter 5

Wharekura Engagement and Translation of Survey ..........87

Introduction............................................................................................................. 88
Methods ..................................................................................................................... 90
Ethical guidance ....................................................................................................... 91
Survey design, recruitment and distribution .............................................................. 91
Engagement and translation ..................................................................................... 92
Discussion ............................................................................................................... 94
Acknowledgements ................................................................................................. 96
Chapter summary .................................................................................................... 97
Chapter 7
Are Transport Habits Associated with Well-Being Among Older Teenagers? .............................................143

Introduction .........................................................................................................................................................143

Methods: Analysing life satisfaction and strengths .........................................................................................144
  Steps in the analysis of variables associated with life satisfaction and self-perceived strengths ........................144

Results ............................................................................................................................................................149
  Variables associated with life satisfaction .....................................................................................................149
  Variables associated with self-perceived strengths .......................................................................................156

Discussion .......................................................................................................................................................162
  Life satisfaction ............................................................................................................................................162
  Self-perceived strengths ...............................................................................................................................167
  Potential limitations ....................................................................................................................................170

Chapter summary .........................................................................................................................................172
Chapter 8

Transport and Well-Being Among Older Adolescents:

Conclusions and Recommendations.................................175

Thesis summary and main findings ........................................175
Summary ..............................................................................175
Main findings .......................................................................178
Implications of findings ........................................................179
Well-being among this sample ..............................................179
Activities and hobbies among this sample .............................179
Transport among this sample ...............................................180
Recommendations for future research .................................182
Recommendations for policy and practice .............................185
Concluding remarks .............................................................186

Chapter 9

References ............................................................................188

Chapter 10

Appendices ...........................................................................235

Appendix 1 Photovoice project questionnaire .........................236
Appendix 2 Photovoice evaluation form for participants ..........242
Appendix 3 Example of certificate of appreciation distributed toparticipants ....243
Appendix 4 Pilot survey ..........................................................244
Appendix 5 Final survey, English version ...............................244
Appendix 6 Final survey, Māori version ................................244
Appendix 7 Survey invitation letter to school principals ..........244
Appendix 8 Example of survey results report to schools ..........244
Tables

Table 1.1 Journal outputs and residing chapter ................................................................. 16
Table 1.2 Conference presentations and other outputs ...................................................... 17
Table 2.1 Initial literature search results .............................................................................. 21
Table 3.1 Characteristics of photovoice participants .......................................................... 55
Table 4.1 Description of pilot survey participants ............................................................... 79
Table 4.2 Pilot survey completion by delivery method ....................................................... 80
Table 6.1 Well-being measures ......................................................................................... 107
Table 6.2 Attachment measures (peer and parental) .......................................................... 109
Table 6.3 Attachment measures (activities) ....................................................................... 111
Table 6.4 Attachment measures (screen time and physical activity) ................................. 113
Table 6.5 Access measures (transport habits) .................................................................... 114
Table 6.6 Access measures (licence status and income) .................................................... 116
Table 6.7 Responding schools (n=12) ............................................................................... 120
Table 6.8 Survey respondents (n=775) ............................................................................. 121
Table 6.9 Response rates ................................................................................................... 122
Table 6.10 Means and standard deviation: Outcome measures ......................................... 122
Table 6.11 Means and standard deviations: Peer and parental attachment ....................... 125
Table 6.12 Means and standard deviations: Respondents' activities ................................. 128
Table 6.13 Respondents' transport habits ......................................................................... 130
Table 6.14 Access to key destinations ............................................................................... 131
Table 7.1 Steps in the analysis of both life satisfaction and self-perceived strengths.. 145
Table 7.2 Results from univariate regression (Step 1) analysis for life satisfaction ......... 150
Table 7.3 Final results (Step 3) of analysis of life satisfaction for males ............................ 155
Table 7.4 Final results (Step 3) of analysis of life satisfaction for females ....................... 156
Table 7.5 Results from univariate regression (Step 1) analysis for self-perceived
strengths ............................................................................................................................ 157
Table 7.6 Final results (Step 3) of self-perceived strengths for males .............................. 161
Table 7.7 Final results (Step 3) of self-perceived strengths for females ............................ 162
Figures

Figure 1.1 Map of Southland, New Zealand (#s in parentheses are populations) ..........5
Figure 1.2 Exploratory mixed methods design..............................................................8
Figure 1.3 Thesis structure ............................................................................................11
Figure 1.4 The ecological model. Adapted from the Institute of Medicine (Committee on Educating Public Health Professionals for the 21st Century, 2003) ..................12
Figure 1.5 The public health approach. Adapted from WHO (World Health Organization, 2017) .................................................................13
Figure 1.6 Preliminary conceptual model of transport and well-being among older adolescents ..............................................................................................................14
Figure 2.1 Updated research model ..............................................................................45
Figure 3.1 All participants photographed their feet as a main mode of transport .........60
Figure 3.2 Sights along their walking route featured prominently in participant photographs and contributed to their feelings of well-being ..................................61
Figure 3.3 Many photographs fostered discussion around the themes of safety and barriers to choice ........................................................................................................65
Figure 3.4 Updated research model ..............................................................................65
Figure 6.1 Final research model ...................................................................................100
Figure 6.2 Respondents' life satisfaction .....................................................................123
Figure 6.3 Respondents' self-perceived strengths .......................................................124
Figure 6.4 Respondents' peer attachment ..................................................................126
Figure 6.5 Respondents' parental attachment ..............................................................127
Figure 7.1 Illustration of multiple linear regression used in this thesis .....................148
Figure 7.2 Variables associated with well-being for males ........................................172
Figure 7.3 Variables associated with well-being for females .....................................173
Transport and Well-Being

Among

Older Adolescents
Chapter 1

INTRODUCTION TO THE THESIS AND ITS FRAMEWORK

This thesis examines the relationship between transport and the well-being issues of life satisfaction and self-perceived strengths among older teenagers in Southland, NZ. It is based on original data collected during my doctoral programme from over 800 older teenagers in this semi-rural region. This first chapter introduces the thesis and serves to establish the thesis framework, as follows:

- Provides a brief overview of the thesis topic and research environment
- Offers research aims and objectives
- Provides a conceptual framework
- Provides an overview of proposed methods and methodological approach
- Details the organisational outline for the rest of the thesis
- Describes the role of the candidate and research outputs resulting from the thesis

OVERVIEW: THE RELATIONSHIP BETWEEN TRANSPORT AND WELL-BEING

Teenage well-being is a subject of broad and major importance. In this thesis, well-being is specifically represented by the subjective factors of life satisfaction and self-perceived strengths. Life satisfaction and self-perceived strengths are key concepts in the well-
being literature, as they relate to various other important emotional, social, and behavioural constructs (McGee, Marsh, & Williams, 2011; Park, 2004; Proctor, Linley, & Maltby, 2009). This thesis will explore life satisfaction and self-perceived strengths from the positive youth development (PYD) perspective. The PYD approach aims to engage youth within their environment in a productive manner that recognizes their strengths and ability to positively contribute to their lived reality (Phelps et al., 2009). From a research standpoint, the PYD perspective provides a positive framework from which to approach research questions and methods. Psychological approaches, life satisfaction, self-perceived strengths, and PYD are further defined, discussed, and put into context by the subsequent literature review chapter in the thesis.

The OECD (Organisation for Economic Co-operation and Development) identifies four main purposes of measuring subjective well-being: subjective well-being can 1) complement other outcome measures; 2) help to better understand what drives well-being; 3) support policy evaluation and cost-benefit analysis; and 4) help identify potential policy problems (OECD, 2013). The projects in this thesis emphasize the OECD’s second main purpose of measuring well-being as stated above, as together the projects aim to help better understand how transport affects well-being among older teenagers in Southland, NZ.

Considering transport in the context of life satisfaction and self-perceived strengths is essential to properly contemplate the basis for future transport-related interventions, as well as policy and infrastructure. Transportation affects older teenagers’ autonomy, and their ability to independently access their friendship groups and key activities (leisure, social, civic, sporting and work), and thus their life satisfaction and self-perceived strengths. The transport modes chosen by New Zealand (NZ) teenagers are essentially individual decisions that in aggregate have significant public health implications. It is necessary to understand why older teenagers choose to travel the way they do, in order to determine what impact transport habits might have on health and well-being, including the mediating and moderating roles that attachment to peers, family and access to transport might play. Issues surrounding transport and mobility have the power to affect older teenagers’ autonomy, because they affect their ability to independently access their friendship groups, and key activities (leisure, social, civic, sporting and work), at an important transition stage as they navigate from childhood to adulthood. These key
activities have direct bearing on one’s life satisfaction and self-perceived strengths. Issues surrounding transport may have an even larger impact on teenagers in rural and semi-rural areas, where transport options may prove more of a stumbling block for access to key activities than in urban centres.

There are many studies dedicated to transport, and most tend to focus on the significance of active (walking, cycling, skateboarding) or passive (traveling by car or bus) transport modes, report on the trip to and from school, or focus on risk and physical safety concerns. They investigate the importance of children’s independent mobility (Freeman & Tranter, 2011), school and work travel plans (Macmillan, Hosking, Connor, Bullen, & Ameratunga, 2013), and satisfaction with one’s work commute (Olsson, Garling, Ettema, Friman, & Fujii, 2013). Studies with younger children report that those who utilise active transport are generally healthier than those that do not (Larouche, Saunders, Faulkner, Colley, & Tremblay, 2014). Health in many of these studies is described primarily by physical traits such as fitness and cardiovascular health, rather than by attributes related to overall well-being. The study of transport as it relates to issues of well-being is important to better understand the changing landscape of transport, specifically the fluctuating modal split in NZ and internationally, and to provide a more nuanced view of the part transportation plays in the overall health of NZ adolescents. Having a licence and driving has been decreasing among older teenagers worldwide since 2005 (Delbosc & Currie, 2013; Schoettle & Sivak, 2014), which raises thought-provoking questions about the future of transport in New Zealand and other OECD countries, and the reasons behind changes in licensure and driving. Studies have identified several possible reasons for this decrease in private car use, including ambivalence, increased use of social media, concern about the environment and the broad initiation of graduated drivers licencing (GDL) programs which make it more costly and difficult to obtain a license (Delbosc & Currie, 2013; Schoettle & Sivak, 2014; Ward, Freeman, & McGee, 2015).

There has been some cross-over between transport and well-being research, with regard to adults and small children. For example, research in some developed countries has discovered that reduced travel and reduced car ownership were both related to social exclusion among adults, and, thus to less well-being (Reardon & Abdallah, 2013; Stanley, Stanley, Vella-Brodrick, & Currie, 2010). Waygood et al. reviewed the existing literature on transport and children’s well-being, and several consistencies in the
literature were reported, including that active travel is positively associated with leisure activities and physical activity, and that children’s independent mobility is positively associated with physical activity and community connections (Waygood, Friman, Olsson, & Taniguchi, 2017). Older teenagers have not yet been the focus of transport and well-being research, with the notable exception of a study that found free universal access to bus travel positively affected the well-being of older teenagers in London (Jones, Steinbach, Roberts, Goodman, & Green, 2012).

**Location**

Southland was chosen for this research because it provides a coherent geographic area that combines both urban and rural transport issues. Generally speaking, rural transport issues are under-represented in NZ transport research, and the trip chain (the series of trips one uses to get from point A to point B) used by rural teenagers is presumably different than those in urban areas. Southland is mainly a rural region, with a population of about 98,000; however, it includes two main city centres, Invercargill and Gore, which are urban in comparison to the region they inhabit (see Figure 1.1). Southland is comprised of mostly European New Zealanders, but has the largest Māori population (about 12%) of any region in the South Island (Statistics New Zealand, 2013b). The “semi-urban, semi-rural” nature of Southland creates an interesting setting for the study of transport (Cheyne & Muhammad, 2009). Public transportation in this area is not well supported, and therefore having a driving licence may be seen as being more necessary, in order to support well-being by being able to access key destinations. Walking and cycling infrastructure, while present within some of the towns in Southland, does not connect the towns to each other, some of which are separated by many kilometres. For example, towns in the rural northern part of Southland are approximately 100 kilometres from the relatively urban centre of Invercargill.

**Target age group**

Those in Southland aged 15-19 years suffer more from injury due to car crash than the rest of NZ (248 per 100,000 persons, versus 199 per 100,000 persons, respectively), a large burden for an age group that makes up about 13% of the NZ population (Ministry
of Transport, 2010). Thus the target age group for this research are older teenagers aged 15-19 years (so called “transition teenagers”). Throughout the rest of this thesis, the terms older teenagers or older adolescents are used to refer to the target population and their age.

Figure 1.1 Map of Southland, New Zealand (#s in parentheses are populations)
RESEARCH AIM AND OBJECTIVES

Overarching aim

The overarching aim of this thesis is to determine which transport practices and/or circumstances support well-being (specifically life satisfaction and self-perceived strengths) among older teenagers in Southland, NZ.

This aim will be realised through five main objectives that will be achieved through the culmination of several stand-alone projects. The objectives presented here are described in detail in subsequent chapters.

Objectives

1. Engage with all secondary schools (n=13) in Southland, NZ in order to gather respondents for projects within this thesis

2. Develop a new measurement tool (online survey)
   a. Use findings from a qualitative photovoice project to inform the content of an original survey, in order to directly address the thesis aim
   b. Test the survey tool for feasibility via a pilot study with a small sample of the target population, to assess survey management, content and distribution methods

3. Describe transport and well-being among older teenagers in Southland, NZ
   a. Via a qualitative photovoice project, with a small sample of the target population, in order to provide context and inform future projects within the thesis
   b. Via quantitative online survey, with a large representative sample, to provide descriptive statistics
4. Assess whether or not there is a relationship between transport and well-being among the target population using multiple linear regression methods

5. Provide recommendations for future research and policy

**RESEARCH APPROACH AND OVERVIEW OF METHODS USED**

**Research approach**

Transport and well-being among older teenagers is a relatively new area of research in public health, and therefore requires description and definition. A mixed methods approach was employed, as combining qualitative and quantitative work is important in new areas of research, “to measure overlapping but also different facets of a phenomenon, yielding an enriched, elaborated understanding of that phenomenon” while summarizing the purposes of “elaboration, enhancement, illustration, clarification of the results from one method with the results from the other method” (Greene, Caracelli, & Graham, 1989)(page 258). This research project therefore employed an exploratory design, and methods were mixed through the development of an instrument. (Cresswell & Plano Clark, 2006)

The exploratory design was chosen for this thesis because it was necessary to first identify which variables were important to measure with regard to transport and well-being among older adolescents, before developing and testing a new survey instrument (Cresswell & Plano Clark, 2006). Thus the exploratory design used results from the qualitative methods to inform the quantitative methods. This process is detailed below in **Figure 1.2.**
Methods used in this thesis

The methods in this thesis are thoroughly discussed in the literature review (Chapter 2). Following Chapter 2, each chapter in the thesis stands alone, as each includes detailed descriptions of the methods used for the project described within. For the purpose of this introduction and to orient the reader, these methods are discussed briefly in this section. (Please see Figure 1.3 for an outline of the chapters in this thesis, and what they contain).
Primary qualitative work is quite important in order to gather crucial information that a quantitative tool might miss (Davison, Ghali, & Hawe, 2011; Newman & Kanjanawong, 2005; Sandelowski, 2000). This will be accomplished through the qualitative tool of “photovoice” (Chapter 3), to provide context for and to inform further quantitative work, allowing for better perspective via extended face-time with a sample of that target group, before a large-scale quantitative project could begin.

The qualitative research will be followed by a quantitative cross-sectional study, in the form of an online survey. The decision to use an original survey allowed for the posing of specific questions of interest, and the generation of unique data, so that relying on other data sources was not necessary. The survey will be developed through feasibility testing via a pilot study (Chapter 4). As reported by Thabane et al (Thabane et al., 2010), a pilot study is defined as an experimental, exploratory, test, preliminary, trial or try out investigation (Waite, 2002), and Everitt described a pilot as “an investigation designed to test the feasibility of methods and procedures for later use on a large scale or to search for possible effects and associations that may be worth following up on in a subsequent larger study” (Everitt, 2006)(page 6). It is rational to assess feasibility of large studies by way of smaller pilot studies (especially in an area of new research) prior to a more costly main study (North & Park, 2014; Thabane et al., 2010). On a retrospective note, the pilot work resulted in the unexpected opportunity to translate the final survey into te re Māori, and this addition to the doctoral work is detailed in Chapter 5.

Following the pilot study, it is expected that changes will be made, either to survey content or survey management (or both), and these will be addressed prior to disseminating the final survey (Chapter 6). Descriptive statistics and multiple linear regression will both be applied (Chapters 6 and 7).

A cross-sectional study was chosen for this thesis because cross-sectional studies lend themselves well to descriptive analysis and generating hypotheses in new areas of research. The projects within this thesis will collect data on a population at a single point in time, to examine the relationship between a health-related state (in this case, adolescent well-being) and other variables of interest (in this case, issues surrounding transportation) (Hennekens & Buring, 1987). The use of cross-sectional studies can provide a “snapshot” of the condition of interest in a given population at a given point in time, in order to
define an issue, assess health or resource burdens, or to plan for the future allocation of resources (Hennekens & Buring, 1987).

Considerations when planning cross-sectional studies include choosing a representative sample, gathering an appropriate sample size, and using suitable research tools. These considerations will be addressed in all respects by including students at all secondary schools in Southland, NZ, which included rural schools that comprised hard-to-reach populations, thereby encompassing a representative sample, and are detailed throughout the chapters in this thesis. By targeting all the secondary schools in Southland, it should provide a large enough sample size to discuss transport and well-being among Southland youth with some precision.

The structure of this hybrid thesis

This thesis is presented in a format which allows for the inclusion of published material directly resulting from the thesis. Thus, some material that has already been published has been inserted as chapters, or sections within chapters. As a consequence, there may be a small amount of repetition, which I have endeavoured to minimise as much as possible. This hybrid thesis format is supported by the University of Otago’s “Guidelines for the Inclusion of Material from a Research Candidate’s Publications in their Thesis” (University of Otago, 2014).

Subsequently, as mentioned, Chapter 2 and Chapters 4-7 include their own introductions, methods, results and discussion sections, as these chapters stand on their own. Chapter 8 closes the thesis, and weaves all findings together to provide an overall summary and a discussion of implications, as well as future research directions. Figure 1.3 illustrates the structure of this thesis based on the hybrid format.
THE CONCEPTUAL FRAMEWORK

The ecological model

In this thesis, the associations between transport habits and well-being are assessed through the lens of the ecological model of health (Figure 1.4). The ecological model postulates that there are many social and physical factors, outside of the individual, that
affect health (Fielding, Teutsch, & Breslow, 2010). Factors in an individual’s environment, and their responses, formulate determinants of health. The Institute of Medicine has defined the ecological model as “a model of health that emphasises the linkages and relationship among multiple factors (or determinants) affecting health” (Committee on Educating Public Health Professionals for the 21st Century, 2003)(page 32). The ecological model regards health as a dynamic process, and it can be used to assess a host of public health issues (Kim & Moen, 2002). As transportation occurs externally, and is affected by factors out of one’s control, such as availability, transport policy, and family and community influences, it seemed most appropriate to view the issue of transport’s effect on well-being through this lens.

![Ecological Model](image)

*Figure 1.4 The ecological model. Adapted from the Institute of Medicine (Committee on Educating Public Health Professionals for the 21st Century, 2003)*

**The public health approach**

Viewing transport and well-being through the lens of the ecological model helped to put the topic in perspective within the public health framework, which provides a systematic
basis for addressing public health issues (Figure 1.5). This four-phase process identifies the problem, determines causes or risk/protective factors, allows for evaluation of potential interventions, and implements interventions (World Health Organization, 2017). This framework has been applied to various health behaviours, in order to prevent illness, injury, or death. This thesis aims to address the first two preliminary steps of the process – 1) conduct surveillance of the transport habits and well-being of a sample of older adolescents in to define the issue in Southland, NZ, and 2) identify any differences or predictors that may exist.

Figure 1.5 The public health approach. Adapted from WHO (World Health Organization, 2017)

Preliminary model: transport and well-being

Based on the ecological model, it is likely that transport choices have an impact on life satisfaction and self-perceived strengths of older teenagers, as transport issues are external influences. The preliminary model used in this thesis, based on the ecological model, can be seen in Figure 1.6. As seen in the figure below, many external factors related to transportation are likely to have an effect on individual well-being issues, such as transport options, licensing, peer and parental influences, community influences,
personal income, socioeconomic effects, school influences, and demographic influences. The model for this relationship will be honed as projects were completed, and this preliminary model will become more and more clear-cut as it evolved throughout this thesis.

Figure 1.6 Preliminary conceptual model of transport and well-being among older adolescents

SUPERVISION, ACADEMIC OUTPUTS, AND THE ROLE OF THE CANDIDATE

All data collection for this thesis was carried out between April 2014 and June 2015. Data cleaning and statistical analysis took place between July 2015 and June 2017. My supervisors were Professor Rob McGee and Dr Claire Cameron from the Department of Preventive and Social Medicine, and Professor Claire Freeman from the Department of Geography. Professors McGee and Freeman played a considerable role in conceptualising the projects in this thesis. Dr Claire Cameron ran the multiple linear regression analysis detailed in Chapter 7, for which I provided interpretation. One advisor, Emeritus Professor Philip Gendall, provided guidance in the survey design described in Chapters 4 and 6.
As the PhD student, my role in this thesis involved:

- Writing proposals to obtain funding for scholarship, project costs, and conference attendance
- Obtaining ethical approval from relevant committees, and applying for amendments as necessary
- Contacting community stakeholders in order to gain access to secondary school students
- Conducting ongoing literature reviews, developing both qualitative and quantitative data collection methods, conducting all steps of each research project in this thesis, cleaning data, and completing descriptive data analysis
- Interpreting results of the regression analysis presented in Chapter 7
- Drafting, submitting and revising manuscripts for peer-reviewed journals
- Presenting research findings via conferences and other outlets

As this thesis is presented in a hybrid format, Table 1.1 details the peer-reviewed journal outputs from this thesis as of its submission, their current status, and what chapter they reside in. All articles have been given rights for reproduction.
Table 1.1 Journal outputs and residing chapter

<table>
<thead>
<tr>
<th>Chap</th>
<th>Paper title</th>
<th>Authors</th>
<th>Journal or current status</th>
<th>Role of candidate</th>
</tr>
</thead>
</table>

In addition to journal articles, the projects within this thesis have been presented at conferences, or have been made available via online or media outlets. See Table 1.2 for details.
### Table 1.2 Conference presentations and other outputs

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<td>6 &amp; 7 Youth well-being, transport and licensure: Trends and gender differences in New Zealand</td>
<td>Ward AL, McGee R, Freeman C, Cameron C.</td>
<td>Oral presentation at the American Public Health Association conference, Atlanta, Georgia, USA, 8 November 2017</td>
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<th>Other outputs</th>
<th>Authors</th>
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## Chapter summary

Among older teenagers, risks and protective factors involved with transport choice, and individual well-being, are both individually well-documented public health concerns. The purpose of this thesis is to determine which transport practices and/or...
circumstances support well-being (specifically life satisfaction and self-perceived strengths) among older teenagers in Southland, NZ, and will be realised through the five main objectives previously described:

1. Engage with all secondary schools (n=13) in Southland, NZ in order to gather respondents for projects within this thesis
2. Develop a new measurement tool (online survey)
3. Describe transport and well-being among older teenagers in Southland, NZ
4. Assess whether or not there is a relationship between transport and well-being among the target population using multiple linear regression methods
5. Provide recommendations for future research and policy

This hybrid thesis consists of several stand-alone projects that are linked by an exploratory design mixed-method approach. Together, the projects within this thesis will approach the topic of transport and well-being from an ecological standpoint, and address the first two steps of the public health framework. The thesis will provide a comprehensive view of transport habits and well-being among older adolescents in Southland, NZ, and begin to bridge transport and well-being to inform future research in this new area of study.

The next chapter provides an in-depth literature review of the individual topics of transport and well-being among older adolescents, and the methods used in the thesis.
Chapter 2

PUTTING TRANSPORT AND WELL-BEING IN CONTEXT AMONG OLDER ADOLESCENTS

The purpose of this chapter is to review the literature about transportation’s role in well-being among older adolescents. The literature search was done with regard to the state of the public health topics surrounding youth transport and youth well-being, before assessing the gap between them. First, a description of the literature search is provided. Next, the chapter includes a review of the current state of the research with regard to youth well-being, with particular regard to peer, family, and environmental factors. The review also includes a summary of youth transport literature, including studies done with regard to factors that affect access and autonomy. Additionally, the main research tools used in this thesis (the methods of photovoice and online survey), are reviewed. Finally, the proposed research model introduced in Chapter 1 is further refined.

LITERATURE SEARCH

Search strategy

Table 2.1 details the search terms used, databases searched, and number of potential articles found. There were five inclusion criteria. First, articles had to be in English. Second, articles had to be peer-reviewed. Third, the initial search was from 1 January
1970 to May 2014. Fourth, the age of study participants had to be 15 years or older. Finally, the literature had to focus on well-being and transport modes.

Because of the depth of literature on well-being and transport, several key words were used in various combinations, along with limitors. These key words were “youth”, “young people”, “teenager*” “adolescence*”, “well-being”, “transport*”, “car*”, “drive*”, “walk*”, “cycle*”, “skateboard*”, “bus”, and “public transport*”. Following the advice of a Research Librarian at the University of Otago, the literature search was conducted among the following databases: Web of Science Core Collection; PubMed NCBI; nz.research.org.nz; and Embase. After potential articles were located, the inclusion criteria were applied to each article abstract to assess whether it was relevant to the current study. Further searches were conducted using the reference lists from pertinent articles. Duplicates were excluded. After field research commenced in May 2014, continuing literature search alerts were activated through all databases included in the systematic review, using the same search terms and criteria. During this time, Google Scholar was also used, as well as Google, to source non-academic publications such as government reports. Search terms were also adjusted for ongoing searches, based on new findings as work progressed within this PhD, to keep track of the evolving research environment.
### Table 2.1 Initial literature search results

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<th>Embase</th>
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<td>845</td>
<td>783</td>
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<tr>
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<td>831</td>
<td>6</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
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<td>9</td>
<td>132</td>
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<td>5</td>
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<td>1</td>
<td>67</td>
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<td>2</td>
<td>0</td>
<td>1</td>
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<td>(youth OR young people OR teenager* OR adolescen*) AND well$being AND transport* AND (bus OR public transport*)</td>
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<td>21</td>
<td>137</td>
</tr>
<tr>
<td>8</td>
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</table>

#### Search results

The search results in Table 2.1 illustrate the fact that transport and well-being is not well-researched among older teenagers. After reviewing the searches, Search 8 found two articles that met all the inclusion/exclusion criteria set forth. The articles were from the same study, which found that free universal access to bus travel positively affected the well-being of older teenagers in London, by decreasing transportation poverty and social exclusion (Jones, Goodman, Roberts, Steinbach, & Green, 2013; Jones et al., 2012).
Search 1 was deemed too broad. Searches 2-7 located information about the individual topics of well-being and transport among older adolescents, as well as literature on the “fringe” of the thesis topic, such discussion of the issue of transport and well-being among other age groups, as discussed in this chapter. All relevant literature accessed from May 2014 that resulted from the various ongoing search alerts are included in this literature review, but not included in Table 2.1. These additional articles were added to the thesis as they were collected, if appropriate. Thus this literature review chapter is advised by the literature up until the thesis submission date of 31 August 2017.

This chapter discusses six main key themes gleaned from the literature that related to the aim and objectives of this thesis, with regard to older adolescents: well-being, transition teenagers, attachment, transport, access and autonomy and finally, transport and well-being. These themes are discussed below. A review of the research methods used in this thesis is also offered.

**WELL-BEING AMONG OLDER ADOLESCENTS**

Well-being is complex and consists of two main perspectives: the hedonic approach (i.e., happiness, avoiding pain) and the eudemonic approach (i.e., self-realization) (Ryan & Deci, 2001). The hedonic approach uses an assessment of subjective well-being (SWB) to measure life satisfaction and happiness, while the eudemonic approach uses assessment of needs of self-determination such as autonomy and competence to measure psychological health (Diener, Suh, Lucas, & Smith, 1999; Ryan & Deci, 2000). Evidence in the literature indicates that well-being is a multidimensional phenomenon (Ryan & Deci, 2001), and indeed the positive youth development paradigm used as the framework for this thesis includes overlapping aspects of both approaches. Measures assessing both perspectives are planned for this thesis.

**Positive Youth Development**

There are a number of frameworks that extend definitions of well-being beyond just feeling happy to broader concepts of autonomy, self-acceptance and purpose, combined with mental health indicators such as self-esteem and resilience, and values such as
honesty and kindness (Olsson, McGee, Nada-Raja, & Williams, 2012). This positive approach to adolescent well-being is a marked deviation from the past. Prior to the 1990s, research among adolescent well-being framed youth from a deficient perspective (Hall, 1905) and as a “problem to be managed” (Roth & Brooks-Gunn, 2003)(page 94). It has become more common to approach youth well-being with a positive youth development (PYD) perspective, as opposed to simply measuring unhappiness or misery, allowing a glimpse of the bigger picture of a person’s physiological health (Bech, Olsen, Kjoller, & Rasmussen, 2003; Crocetti, Erentaite, & Zukauskiene, 2014; Guell & Ogilvie, 2012; Larson, 2000; Lerner et al., 2005; Olsson et al., 2012; Phelps et al., 2009; Porter, 2010). This positive perspective “moves beyond the negative, deficit view of youth that dominated developmental science, psychology, education, sociology, public health, and other fields through the twentieth century and towards a view of the strengths of youth and the positive qualities and outcomes we wish youth to develop” (Bowers et al., 2010)(p 720).

From the PYD perspective, the methods of assessing well-being are based on the Five C’s of PYD (Davis, 1980; Eisenberg et al., 1996; Lerner et al., 2005; Phelps et al., 2009). The Five C’s of PYD are defined by competence (social, academic, cognitive, and vocational); confidence (internal sense of overall positive self-worth and self-efficacy); connection (positive bonds between the individual and peers, family, school, and community); character (respect for societal and cultural rules, morality, and integrity) and caring (sense of sympathy and empathy) (Andrews, Chen, & Myers, 2014; Geldhof et al., 2013; Larson, 2000; Lerner et al., 2005; Park, 2004; Phelps et al., 2009; Wayne Francis Charitable Trust, 2010). This approach is valuable because it focuses on the strengths and positive characteristics of youth, and may be applicable not only to adolescent health, but to policy and programme frameworks such as relating well-being priorities to transport policy (Porter, 2010). As far as it is known, PYD has not yet been applied to the transport behaviour of youth aged 15-19 years (Lapalme, Bisset, & Potvin, 2013). As applied to this thesis, the Five C’s of PYD will be used as a foundation when planning the methods used for data collection.

The framework of PYD theorises that youth development is bi-directional; in other words, the environment in which a young person exists plays a large role in their well-being (Benson, Leffert, Scales, & Blyth, 1998). The PYD approach acknowledges that
external factors, such as family and friend relationships, as well as community cohesiveness, are supportive or obstructive of health outcomes for young people (Blum, 1998; Roth, Brooks-Gunn, Murray, & Foster, 1998). This is in keeping with the ecological framework of this thesis. Youth, from this standpoint, develop well if provided with environments that support and encourage, rather than focusing on individual risk behaviours, or by the aforementioned “problem to be managed” approach (Roth & Brooks-Gunn, 2003)(page 94).

Thus, the methodology of this thesis is rooted in the PYD perspective (Geldhof et al., 2013; Lerner et al., 2005; Phelps et al., 2009). A recent NZ survey found that PYD intervention approaches help to enhance youth well-being (Canning, Denny, Bullen, Clark, & Rossen, 2017), and the framework has made its way into NZ policy, as a tool to support young people (Ministry of Youth Affairs, 2002). Overall, interventions and strategies built on the PYD framework have been successful in promoting positive youth behaviour, across gender and age groups (Bowers et al., 2010; Wayne Francis Charitable Trust, 2010). This success has been measured by the NZ Youth’07 Survey (one in a series of surveys in what is known collectively as the Youth2000 National Survey, from the University of Auckland) which indicated that the health and well-being of secondary school students increased in 2012, from the same survey done in 2001, although the authors conceded that results could be confounded by time (Canning et al., 2017; Denny et al., 2011; The University of Auckland, 2000). The overall success measured by the Youth2000 National Survey series suggests the PYD philosophy is a valid approach to improving well-being in this age group.

**Subjective well-being**

The constructs of subjective well-being (SWB) play an integral role in PYD, and include life satisfaction and quality of life (Park, 2004). These constructs are often used interchangeably, and are sometimes referred to as “happiness” in the literature. Researchers had begun to turn their attention to SWB in children and adolescents during the early 2000s (Park, 2004), and while most current well-being research focuses primarily on adults and young children, older adolescents are now beginning to get more attention. Research among this age group is important, because older teenagers are at a
Life satisfaction has been found to positively correlate with healthy behaviours, and negatively correlate with risk behaviours (Park, 2004). In a large review of 141 studies, Proctor et al. addressed this issue and highlighted that life satisfaction among youth affects various aspects of life going forward (Proctor et al., 2009). Proctor et al. later conducted a study of over 400 young people that revealed that very happy youths also scored significantly higher on other well-being measures, such as school, interpersonal, and intrapersonal variables, strengths, and had significantly lower mean scores of depression; the happier the youth, the more positive their experiences overall (Proctor, Linley, & Maltby, 2010). Olsson et al. found that life satisfaction was a key part of a broader construct of social connectedness and well-being among young New Zealanders aged 15 to 18 years (Olsson et al., 2012). Likewise, Savage et al. found evidence of a gap in SWB between disabled adolescents and their non-disabled peers (Savage, McConnell, Emerson, & Llewellyn, 2014). Non-disabled adolescents consistently report higher levels of well-being than disabled adolescents (Savage et al., 2014). McCullough et al. explored the interrelationships between SWB and life events qualitatively among 92 high school students, and found that life events contributed strongly to positive and negative aspects of SWB (McCullough, Huebner, & Laughlin, 2000). Lapalme et al. conducted a review to investigate how neighbourhoods could facilitate PYD among older teenagers, and found that, much like McCullough et al. and Benson et al., that health-related behaviours are affected by multiple systems, and are influenced depending on context (Benson et al., 1998; Lapalme et al., 2013; McCullough et al., 2000). Once again, this supports the ecological approach to this thesis. Regarding transport from the context of well-being should result in predictors of life satisfaction.

Gillham et al. found that among 150 high school students, character strengths during adolescence were predictive of future levels of life satisfaction and well-being (Gillham et al., 2011). Other literature also reports that both age and gender predict subjective well-being (Ronen, Hamama, Rosenbaum, & Mishely-Yarlalp, 2016). For example, older adolescents have been shown to exhibit lower well-being than younger adolescents (Gelhaar et al., 2007; Keyes, 2006; Reschly, Huebner, Appleton, & Antaramian, 2008; Ronen et al., 2016). This is supported by evidence cited by Olsson et al., which found in
a longitudinal study that a “pathway” existed between adolescent and adult well-being (Olsson et al., 2012). In other words, a child’s level of well-being, shaped by the external factors previously mentioned, is carried into adulthood, thereby affecting adult well-being. Using a strengths measure, McGee et al. found that self-perceived strengths decreased over time in a large longitudinal study (McGee et al., 2011). This demonstrates the importance of supporting youth well-being as a prevention tool; if well-being generally decreases with age, it makes youth well-being all the more important to sustain, in order to avoid negative health issues in adulthood. Thus, the importance of studying, planning, and implementing interventions to improve well-being, such as life satisfaction and strengths, among young people.

With regards to gender, differences have been found in the ways females and males process and express emotions during adolescence (Ge, Lorenz, Conger, Elder, & Simons, 1994; Gelhaar et al., 2007; Reschly et al., 2008; Ronen, Rahav, & Rosenbaum, 2003; Ronen & Rosenbaum, 2010; Seiffge-Krenke et al., 2013), and how they report on their own perceived strengths and weaknesses (Williams & Mcgee, 1991). In a study of 2,000 youth from six countries, Seiffge-Krenke found that female adolescents reported higher levels of peer-related stress than male adolescents (Seiffge-Krenke et al., 2013). In a large longitudinal study, Williams and McGee found that when self-identifying personal strengths, there were differences between males and females with regard to predictors (Williams & Mcgee, 1991). Another branch of research contends that no gender differences exist with regard to well-being or happiness (Casas et al., 2007; Froh, Yurkewicz, & Kashdan, 2009; Huebner, Suldo, Valois, Drane, & Zullig, 2004; Lambert et al., 2014; Ronen et al., 2016). One recent study of almost 1,500 students found that there was no gender effect with regard to life satisfaction (Chui & Wong, 2016). Interestingly, these examples seem to fit a pattern: most of the literature that show gender differences are from studies about coping with feelings during negative circumstances, and most of those that show no gender differences are from studies measuring levels of happiness and life satisfaction.

As illustrated here, the two variables to be measured in this thesis, life satisfaction and self-perceived strengths, while from different perspectives (hedonic and eudemonic, respectively), are often combined, when looking at the SWB literature. All of these examples illustrate the fact that levels of well-being have the potential to ebb and flow,
and that various factors become intertwined and hard to differentiate from one another. It is probable that the differences in well-being are wholly (or mostly) shaped by individual and external factors. As the genders experience life differently (most likely from the very day we are born), it is reasonable to expect to see differences between genders with regard to issues of well-being, and predictors should, therefore, be different as well. This supports the inclusion of the ecological model as a framework for this thesis as appropriate. As a survey is planned for this thesis, and analysis will be completed with regard to potential predictors, analysis of outcome variables by gender may be a good way to add to this argument in the literature.

**Transition Teenagers**

Older teenagers (15-19 years of age) are positioned to soon become independent members of adult society, and in NZ, represent 6.7% of the population (Statistics New Zealand, 2017b). The significant total number of “transition teenagers” (or,”teens”) means that they are in a unique position as they move from adolescence to adulthood, because their decisions will carry weight and meaning for policy and infrastructure. The late teens are an important time during a young person’s life, literally a transition stage between adolescence and adulthood (Davis, 2003; Kelley-Baker & Voas, 2008; Kypri, McCarthy, Coe, & Brown, 2004; Voas & Kelley-Baker, 2008){#628} It has been labelled as such in the literature to acknowledge that this time in an older teenager’s life is one full of big decisions – *do I live at home? – do I move out? – do I enrol in University? – do I get a driving licence?* As they become old enough to have a driver’s licence, and to autonomously navigate public transport systems, new opportunities are open to them. They could potentially gain more autonomy from their home environment, and face new challenges that affect their overall well-being (Muggenburg, Busch-Geertsema, & Lanzendorf, 2015).

It was suggested a decade ago that from a research standpoint, it may be useful in research to consider transition teens as an independent stage of adolescent development, one separate from “emerging adulthood” (Voas & Kelley-Baker, 2008). Developmental stages are typically defined by significant physical changes, or by age and school grade levels, and thus the environment and external factors are not generally taken into account.
Chapter 2 Literature review

Using transport as an example, if an older teenager is driving in a car alone, or is the passenger in a vehicle being driven by a same-aged peer, or travelling alone on a public bus or train, or using active transport, there is the potential for this new environment to have a significant effect on teenage development (Voas & Kelley-Baker, 2008). The distinction of labelling this stage was argued as being important because of these environmental influences. Voas and Kelly-Baker proposed a conceptual model of transition teens and their behaviour, which put forward three key external features that affect their health status: parental influence, peer influence, and social/environmental influences (Voas & Kelley-Baker, 2008). These three key influences are not unique, as all people, regardless of age, have some or all of these external influences. However, those aged 15-19 years (due to various laws involving age restrictions, and/or dependence on adults for livelihood) have more limited autonomy. Thus, these external influences as described by Voas & Kelley-Baker are more marked in older teenagers prior to emerging adulthood, and the distinction of “transition teens” is therefore justified.

**ATTACHMENT**

**The influence of peers and family**

A recent study of a large sample of older adolescents shows that parental and peer attachment predict life satisfaction (Laghi, Pallini, Baumgartner, & Baiocco, 2016), and a review by Veiga et al. indicates that the literature generally agrees that higher levels of peer attachment are related to a sense of belonging, and in turn overall well-being (Veiga et al., 2014). The influence of friendships affects a variety of well-being outcomes including cognitive, psychological and emotional development (Rubin et al., 2006). These findings were echoed in a meta-analytic review in 2013 that demonstrated peer attachment was positively related to self-esteem, and self-esteem is key to well-being (Gorrese & Ruggieri, 2013). A large nationally representative survey of NZ youth found that both peer and family factors influence happiness (Lambert et al., 2014; Queija & Oliva, 2015). An important distinction, though, is that while peer relationships are voluntary, parental relationships with adolescents are not (Brauer & De Coster, 2015). A review by Lambert et al. found that several factors increased happiness, including good connections with family, friends and school, as well as regular exercise and meals with
family (Lambert et al., 2014). Another large review of adolescent life satisfaction also found relationships with family and friends to positively affect well-being, among other factors; the authors note that there is a lack of research with regard to the negative factors that affect life satisfaction (Proctor et al., 2009). A longitudinal study in NZ studied the effects of perceived attachment on the well-being of teenagers, and found that while adolescents who reported high attachment to both parents and peers had the highest levels of well-being, peer attachment alone was not enough to compensate if parental attachment was low (Raja, Mcgee, & Stanton, 1992). Thus, both Raja et al. and Oldfield et al. found that parental attachment was deemed the more critical variable promoting well-being among adolescents (Oldfield, Humphrey, & Hebron, 2016; Raja et al., 1992). Lambert et al. also found in their nationally representative survey that above all, an adolescent’s relationship with their parents was the strongest factor associated with their well-being (Lambert et al., 2014), as did Ben-Zur, in her survey research (Ben-Zur, 2003). This remains true even as adolescents become more autonomous, and rely less on cues from family, and more on cues from their peers (Sirard et al., 2013).

**Place and participation**

Transition teens make up a large demographic group, in NZ and globally, and often they are seen as a nuisance or a risk, when in fact they are competent actors in their communities, and their habits should be kept in mind when considering matters of urban planning and infrastructure. Skelton and Gough put it well when they stated that young people “… are relatively absent from the academic work that attempts to understand, decipher and explain the city. Consequently, there is juxtaposition between the two apparent opposites of presence and absence. This absent mirrors the marginalisation and exclusion that young people experience in relation to the spatial politics of the city, especially the development, planning, policy and branding politics” (Skelton & Gough, 2013)(page 456).

Involvement in activities and hobbies strengthens community attachment and social bonds (Madgin, Bradley, & Hastings, 2016; Putnam, 2000; Reardon & Abdallah, 2013; Seaman & McLaughlin, 2013). Among adults, mid-levels of engagement in activities are associated with higher well-being compared with those who are non-involved, whereas
low and high levels of engagement were associated with lower well-being (Matz-Costa, Besen, James, & Pitt-Catsouphes, 2014). Among older teenagers, participation in sport has been positively associated with psychological health (Eime, Young, Harvey, Charity, & Payne, 2013), just as children and adults’ social relationships and social connectedness are associated with subjective well-being (Goswami, 2012; McGee, Williams, Howden-Chapman, Martin, & Kawachi, 2006; Olsson et al., 2012). Taking part in creative activities also has a positive effect on youth well-being (Bungay & Vella-Burrows, 2013), and participating in hobbies and activities creates an attachment to place and a sense of social well-being (Albanesi, Cicognani, & Zani, 2007; Bungay & Vella-Burrows, 2013; Freeman & Tranter, 2011). Where young people live cannot help but affect their well-being. In this context, a child’s community has an immediate impact on their daily lives and well-being, subjective or otherwise (Coulton & Spilsbury, 2014). There is a growing body of literature that describes the link between health and place (Andrews et al., 2014; Carpiano, 2009). The relationship between health status and the built environment has become an established research focus, and investigators in this area encourage its consideration in urban and transport planning (Broberg, Salminen, & Kytta, 2013; Freeman & Quigg, 2009; Freeman & Tranter, 2011; Kent & Thompson, 2014). As Skelton and Gough emphasized, the academic research needs to include youth perspectives.

**TRANSPORT**

**The risks of car use**

Even though teenager crash numbers are dropping, between 2000 and 2013 the crude rate of hospitalization of car occupants aged 15-19 years due to motor vehicle accidents was 150/100,000 persons in NZ, higher than any other age group (Ministry of Transport, 2012). The average crash injury rate for all age groups in NZ is currently 63.7/100,000 persons; older teenagers clearly display a disproportionate amount of risk, whether they are a driver or a passenger in a car (Ministry of Transport, 2012; Ward, Baggett, Orsini, Angelo, & Weiss, 2014). Comparatively, young Australians have a road fatality rate one-third lower than in NZ (Australian Government: Department of Infrastructure and Regional Development, 2014; Australian Transport Safety Bureau, 2006). Thus, the
largest research focus with regard to teenagers and transportation continues to be related to their high-injury risk as drivers, or the health benefits of active transportation (Ouimet et al., 2015). However, more and more people are choosing transport modes other than a private car (Badger, 2013). This suggests that measures of crash risk and licence status are only one part of the transport-related health equation, and may not present a comprehensive image of health status.

While injuries such as those caused by motor vehicle accidents would clearly affect well-being, subsequent mental health outcomes (beyond traumatic stress symptoms) among adolescents have not been explored (Di Gallo, Barton, & Parry-Jones, 1997; Mayou, Ehlers, & Hobbs, 2000; Murray, Ehlers, & Mayou, 2002; Williams, Rheingold, Knowlton, Saunders, & Kilpatrick, 2015). Passenger experiences are also not well reported, beyond how it affects the driver, and programs and policies in NZ and elsewhere attempt to reduce the injury harms of young drivers mostly through a focus on driver safety education (Keall, Frith, & Patterson, 2004; King, Vidourek, Love, Wegley, & Alles-White, 2008). There has been some progress in NZ, mainly due to graduated driver licence policies that have reduced exposure to unsupervised driving during the training period (Begg & Stephenson, 2003). This disproportionate risk is key to framing any discussion of youth and transport, but traffic injuries are only one of the harms caused by over-reliance on the car as primary mode of transport. Although not fully understood, other ‘non-traffic’ risks may also be enabled or enhanced by car use. These include obesity due to the inactivity caused by overuse of the car; alcohol/drug use and risky sexual activity due to the private space a car provides; and poorer grades attributed to the distraction provided by access to a private car (Voas & Kelley-Baker, 2008). Ubiquitous driving places huge external costs on society in the forms of noise, pollution, congestion, sprawl, inequity, energy depletion and climate change (Douglas, Watkins, Demont, & Higgins, 2011; NASA, 2010). Car use is indeed a public health concern that has implications for various factors related to public health. By investigating measures related to SWB, such as life satisfaction and self-perceived strengths, in relation to every day transport, this thesis can begin to view transport from a more holistic place.
**Driver licensing**

In NZ, the driving age was increased from 15 to 16 in 2011, and there is a three-stage graduated drivers licensing (GDL) system that applies to all new drivers aged 16-24 years, consisting of a 6-month learner licence (supervised driving) and an 18-month restricted licence stage (with restrictions on night driving and carrying passengers) prior to full licensing (Begg & Stephenson, 2003). The United States (U.S.) and Australia offer a similar scheme, depending on individual state/regional laws; but, even in the face of these restrictions, teenagers in NZ, the U.S. and Australia are little safer than they were 10 years ago (Ministry of Transport, 2012; Ward & Weiss, 2013), and very few studies have addressed potential interventions to reduce exposure to car use (Graham-Rowe, Skippon, Gardner, & Abraham, 2011; Ward & Weiss, 2011). It is interesting that recent studies in high-income countries suggest a reduction in car use; studies show that the rate at which Generation Y (those born in the late 1980s and ‘90s) get their car licence is steadily dropping, by as much as 1% per year since 2005 (Davis, Dutzik, & Baxandall, 2012; Delbosc & Currie, 2013; Highway Loss Data Institute, 2013; Hopkins, 2013; Kamargianni & Polydoropoulou, 2014; Le Vine & Polak, 2014; Schoettle & Sivak, 2014; Sivak & Schoettle, 2011; Tefft, Williams, & Grabowski, 2014). Recent news articles suggest that today’s youth may be the first generation in a century to not advocate car use (Chozick, 2012; Johnston, 2014). It is unknown whether this is a permanent change, but it is interesting to consider what this may mean from an infrastructure and policy standpoint, if this is indeed the “new normal”. In light of verified high injury risks associated with car use, as well as recent research regarding adverse mental health outcomes related to the risks involved with driving a motor vehicle, perhaps this change should be encouraged (Di Gallo et al., 1997; Ehlers, Mayou, & Bryant, 1998; Mayou et al., 2000; Murray et al., 2002; Ward & Weiss, 2011).

This slow decrease in car use, known as “peak car”, is seen in all age groups across most developed countries (Kuhnimhof, 2013). However, it is an especially important issue for young people, as they will most likely suffer from (or, benefit from) the results of the “peak car” phenomenon, if a saturation level of car use or car ownership is reached. Additionally, as it is their newly established travel patterns that will persist as this group ages, understanding their transport behaviour is key for planning future infrastructure (Kuhnimhof, 2013). Several explanations have been posed to elucidate this decrease in
uptake of licences and driving among young people. Increased use of social media, concern about the environment, ambivalence, availability and use of other forms of transport, as well as the broad initiation of GDL programmes which make it more costly and difficult to obtain a licence have all been cited as potential causes (Delbosc & Currie, 2013; Line, Chatterjee, & Lyons, 2010; Line, Chatterjee, & Lyons, 2012; Roberts, Popli, & Harris, 2017; Schoettle & Sivak, 2014; Shults & Williams, 2013; Ward et al., 2015). More research is necessary to understand why these changes in licensing rates are happening among young people, and what impact these changes might have on health and well-being.

There has been debate about the issue of the importance of licensing from a geographical standpoint, as some research shows links between transport access and social exclusion (Reardon & Abdallah, 2013; Stanley et al., 2010). Transport disadvantage can be seen in both urban and rural regions, depending on the type of transport one needs to access. For example, if one is unable to obtain a driving licence, then active or public transport modes becomes more important, but these can be large barriers in rural areas (Hine & Mitchell, 2001). One NZ-based study of non-licensed young people in an urban centre found that respondents did not see themselves as disadvantaged by needing to use public or active transport; however, they had the benefit of infrastructure (Ward et al., 2014). Another NZ-based study of urban and rural youth also found that in the absence of a driving licence, youth were not disadvantaged with regard to their ability to access key destinations, even in rural areas (Kingham, Zant, & Johnston, 2004). Thus, licensing is a complex issue and not a good measure of transport access in the absence of other information.

**Active transport and trip chaining**

Active transportation often forms part of a trip chain. Trip chaining is something one does every day. As described by Giles-Corti et al., it involves planning ahead, in order to use one journey to achieve several objectives (Giles-Corti, Foster, Shilton, & Falconer, 2010). For example, taking the bus may be preceded or followed by a walking trip, either to simply reach the bus stop, or to run errands. It is important to contemplate the trip chain when considering transport interventions and infrastructure.
Some studies about active transport (walking, cycling, skateboarding), discuss it as it relates to well-being. These studies focused on using technology and photography as a way to track well-being among teenagers who travel actively to school (Guell & Ogilvie, 2012; Walker et al., 2009), active transport and well-being among working adults and young children (Crane, Rissel, Standen, & Greaves, 2014; Humphreys, Goodman, & Ogilvie, 2013; Martin, Goryakin, & Suhrcke, 2014; Ramanathan, O'Brien, Faulkner, & Stone, 2014), comparative associations of health between active transport and car travel (Goodman, Brand, Ogilvie, & iConnect, 2012), and the overall concept of well-being and active transport (Goodman et al., 2012; Reardon & Abdallah, 2013). Overall, these studies found that those who travel actively report higher levels of health and SWB. Others focus on the factors that contribute to the decision to cycle to school, as well as perceptions of using active transport to get to school (Frater et al., 2017; Mandic et al., 2017). These studies about the school trip show that perceptions of cycling to school are influenced by parental and peer attitudes, as well as geographical and other barriers. One recent study of young children found that a significantly higher proportion of active travellers reported positive emotions when compared to those traveling as a passenger in a car (Ramanathan et al., 2014). Conversely, a study found that while a positive dose-response association existed between physical activity and happiness among adults in fifteen countries, it did not extend to the transport domain; it was specific to recreational activity (Richards et al., 2015). In her white paper, Finn explored how stay-at-home university students in the UK travelled day to day, because transport is closely related to social exclusion, and she found car use emerged as a key mode of transportation; however, travel time with others, for example walking in a group, was found to be therapeutic (Finn, 2017). Research shows that active transport is inversely associated with the distance one wants to travel among older teenagers (Stewart et al., 2015), and consequently males are more likely to cycle than females (Simons et al., 2017). In addition, a new study found that having a driver’s licence was associated with less active transport to work or school among those aged 18-25 years (Kar, Li, Haynie, & Simons-Morton, 2017). These findings show there is a complex relationship between the desire to use a certain form of transport and the reality of needing to get where one needs to go. Resolving these daily commute conundrums directly contribute to quality of life among older teenagers. Life satisfaction and self-perceived strengths would be affected by increased or decreased quality of life.
The health benefits of active transport as physical activity are a common research focus (Larouche, Faulkner, Fortier, & Tremblay, 2014; Larouche, Saunders, et al., 2014; Saunders, Green, Petticrew, Steinbach, & Roberts, 2013). Larouche et al. report that those who utilise active transport, for example, walking, cycling or skateboarding, are generally more healthy than those that don’t (Larouche, Saunders, et al., 2014), but “health” in this framework is usually described by physical traits, and not by attributes related to mental health or overall well-being. More research is needed among older adolescents, deemed a hard to reach population, with regard to interventions to increase active transport (Verhoeven, Simons, Van Cauwenberg, et al., 2016). NZ youth are not meeting physical activity recommendations, nor are youth in other high-income countries (Maddison et al., 2016; Tremblay et al., 2016). While seemingly unrelated, research on the effects of physical activity and screen time among adolescents has become increasingly prevalent, because it has been postulated that screen time may be replacing physical activity, and thus may have an effect on well-being (Garcia, Sirard, Deutsch, & Weltman, 2016; McGee et al., 2011; Zabinski, Norman, Sallis, Calfas, & Patrick, 2007). While physical activity is consistently found to be positively associated with well-being (Spiridon, 2011), and there has been some study of physical activity and screen time among children (Tsiros, Samaras, Goates, & Olds, 2017), little is known about the correlates of screen time among older adolescents and its effect on well-being or how it affects their transport choices.

The health implications of transport infrastructure planning with regard to active transport are well-reported in the literature. In their paper, Cohen et al. make the case for considering health alongside the environment when assessing a transport policy’s sustainability, and provides evidence to assist transport professionals in considering benefits or barriers involved. (Cohen, Boniface, & Watkins, 2014). Pucher et al. found that infrastructure was an effective intervention to increase cycling on an international scale, which in turn helped adults achieve their daily physical activity requirements (Pucher, Dill, & Handy, 2010). Much of the intervention research focuses on factors that motivate transport modal choice with the aim of increasing active transport (walking, cycling, skateboarding) trips to and from school, to increase physical health (Giles-Corti et al., 2010; Lubans, Boreham, Kelly, & Foster, 2011; O’Brien, Ramanathan, Gilbert, & Orsini, 2009). Some studies about whether or not support of active travel increases walking and cycling outside of the trip chain have found that active transport does in fact
support overall physical activity (Dollman & Lewis, 2007; Stone, Faulkner, Mitra, & Buliung, 2014). This suggests that policies to support active transport affect overall health, which has implications for bigger-picture health policy recommendations; increased physical activity decreases many health risks, and thus supports preventive health efforts to decrease health costs.

There is a lot of interest in factors that influence active travel mode selection. While studying the reasons behind mode choice to school in older teenagers in Belgium, Simons et al. discovered three main themes affecting mode selection: personal factors (cost, autonomy), social factors (time with friends, social support), and environmental factors (weather, infrastructure) (Simons et al., 2013). Among younger children, “walkability” issues such as distance lived from school and safety were key to modal choice (Christiansen et al., 2014). Long et al. found that parental encouragement was a strong predictor of active transport among high schools students, and peer attachment was a mediator for cycling as transport (Long, Harre, & Atkinson, 2015). This ties transport directly to issues of attachment and thus SWB.

ACCESS AND AUTONOMY

While there are many projects dedicated to transport independence and youth, these tend to focus on just one transport mode, typically only report on the trip to and from school, and focus on risk and safety concerns. How young people choose to use transport sometimes leads to social, physical, geographical and economic exclusion, and thus affects well-being (Church, Frost, & Sullivan, 2000; Mackett & Thoreau, 2015; Schwanen et al., 2015). There are some exceptions in studies among young children and young adults that look at various types of transport choices more broadly, such as investigating the importance of independent mobility and how it affects autonomy, and by extension, well-being (Clifton, 2003; Delbosc & Vella-Brodrick, 2015; Freeman & Quigg, 2009; Freeman & Tranter, 2011; Giles-Corti et al., 2010; Schoeppe et al., 2015; Schoettle & Sivak, 2014; Simons et al., 2014; Stone et al., 2014). There is, in fact, a great deal of research about autonomy and independent mobility among children. In a review of modal choice among children’s trips to and from school, Mitra found that four main factors moderate school travel: household attitudes, socioeconomic status, the
neighbourhood environment, and to some extent, policy-related influences (Mitra, 2013). In their study of children’s mobility using GPS technology, Mikkelsen and Christensen’s findings were similar. They found current parental perspectives on safety to be an important physical factor in a child’s freedom to travel, along with infrastructure, such as transport availability and playgrounds; they also found that social factors, such as gender, social network, cultures of social cohesion and institutional attendance to have an effect (Mikkelsen & Christensen, 2009). Cass et al. defined several dimensions of access, including financial, physical, organizational, and temporal (i.e. availability) (Cass, Shove, & Urry, 2005). These factors, as pointed out by Mikkelsen and Christensen, and Cass et al., are very helpful in conceptualizing transport in the context of well-being, and again confirms the ecological approach is appropriate.

It has been highlighted in the literature that it is important to become aware of the barriers and facilitators of certain types of travel among youths, in order to shape appropriate interventions with regard to access and autonomy. It has been suggested that, unlike young children, older teenagers may be motivated more by their final destination and not the journey to get there (Simons et al., 2013, 2014). Furthermore, while some young people are concerned about the natural environment, research suggests that in general, the transition teens of today are not overly concerned with climate change as a factor influencing their current or future transport choices, as may be easily assumed (Line et al., 2010; Line et al., 2012). Instead, their choices are framed mostly by a desire to get where they need to go quickly, and also by how they are perceived by their peers (Line et al., 2010; Line et al., 2012). A recent study reports that psychosocial reasons, such as freedom, are the biggest reasons that having a driving licence is important for older teenagers (Scott-Parker, King, & Watson, 2015). This contradicts global trends of decreased licensing and driving, but nonetheless highlights the importance of autonomy and access in this age group.

TRANSPORT AND WELL-BEING

The earliest study of transport with respect to well-being was offered by Cutler in 1975, who found that older adults without access to transportation exhibited lower levels of life satisfaction over time (Cutler, 1975). More recently, Milne considered transport from a
Chapter 2 Literature review

UK public health and well-being policy standpoint (Milne, 2012), a qualitative study in NZ investigated the importance of transport planning and well-being among all-age Māori (the indigenous people of New Zealand) (Raerino, Macmillan, & Jones, 2013), and another examined transport-related social exclusion and policy-related impacts on everyday mobility needs (Rose, Witten, & McCreanor, 2009). These studies did not focus on older teenagers. A photovoice study of nine adults suggests that daily commutes contributed to positive well-being, and participants relayed, through photographs, how their commute affected the way they felt, and what aspects of transport were annoyances and what aspects were pleasing, but again did not focus on older teenagers (Guell & Ogilvie, 2012). Another photovoice study found that older adolescents without a driving licence did not see themselves as disadvantaged; rather, they explained via photographs how their daily commutes by active or public transport contributed to their quality of life (Ward et al., 2014). The concept of transport and health as a multidisciplinary science are summarized by Reardon and Abdallah, who describe the benefits and challenges of regarding transportation and transportation infrastructure through the lens of health and well-being (Hodgson, Namdeo, Araujo-Soares, & Pless-Mulloli, 2012; Reardon & Abdallah, 2013). Older teenagers are largely absent from this research. Studies have focused on travel satisfaction and commute happiness (Abou-Zeid & Ben-Akiva, 2011, 2014; Gao, Rasouli, Timmermans, & Wang, 2017; Morris, 2015), automobile access and happiness (Goetzke & Rave, 2015), the effect of transport policy and infrastructure on health and well-being (Delbosc, 2012; Doyle, 2011; Kent & Thompson, 2014; Litman, 2013; Reardon & Abdallah, 2013; Watkins & Mindell, 2010), active transport and well-being (Humphreys et al., 2013; Martin et al., 2014; Ramanathan et al., 2014), and transport as a predictor of well-being (Ettema, Friman, Gärling, & Olsson, 2016; O'Brien et al., 2009; Vella-Brodrick & Stanley, 2013). None of these studies focused specifically on older teenagers, but provided valuable context for the current research. They found that decreased commute time led to increased well-being, access to a vehicle resulted in decreased social exclusion and transport poverty, and active transport generally led to increased well-being.

When trying to understand transport’s influence on well-being in older teenagers, it is vital to acknowledge the relationship between the multiple policy goals of transport, the effects that any transport-related intervention would have on systems other than transport, and the effects they would in turn have on well-being (Reardon & Abdallah,
The comprehensive review by Reardon and Abdallah shows the importance of transport as a determinant of well-being and provides a sound foundation for investigating older teenagers (Reardon & Abdallah, 2013). They nicely outlined what is currently known about links between transport and well-being, with regard to the economy, the traffic environment, social relationships, and the individual, within an unspecified age group (Reardon & Abdallah, 2013). Some studies show links between a country’s transport infrastructure investment and their gross domestic product (GDP); as infrastructure spending increases, so does the GDP (Banister & Berechman, 2001; Bhatta & Drennan, 2003; Cervero, 2009). It is postulated that this increase in GDP signifies an increase in productivity (i.e., increased employment) which supports higher standards of living that are integral to well-being and allow for the income necessary to have access to transport (Banister & Berechman, 2001; Reardon & Abdallah, 2013). Others have also tied socio-economic status to transport access (Kingham et al., 2004). The traffic environment also plays a direct role in affecting well-being. For example, research shows that as air and noise pollution due to automobile traffic increase, there is a corresponding drop in subjective well-being (Delahanty et al., 1997; Reardon & Abdallah, 2013). One effect is that the stress, worry and annoyance of these environmental traffic issues affect one’s happiness and comfort with travel (Reardon & Abdallah, 2013). The idea of transport and its effect on well-being seems all-encompassing, and this is why, as Reardon and Abdallah point out, it is essential to consider the effects that transport-related interventions would have on systems other than transport, including health systems.

As issues surrounding transport and mobility affect teenagers’ ability to independently access their friendship groups, and key activities such as leisure, sporting and work activities, it makes sense to consider how issues of mobility might play a part in a teenager’s subjective well-being. In their review, Reardon and Abdallah found that individuals who have low levels of mobility – “mobility” meaning the ability to get from point A to point B – have lower levels of well-being (Putnam, 2000; Reardon & Abdallah, 2013). Transport disadvantage was also shown to have a negative effect on well-being (Delbosc & Currie, 2012; Reardon & Abdallah, 2013). With regard to transport disadvantage in the case of car ownership and access, Stanley et al. found that less travel time and car ownership were related to social exclusion, and, therefore, less well-being (Reardon & Abdallah, 2013; Stanley et al., 2010). Conversely, Goetzke and Rave found
that, among adults, car access did not affect well-being, as long as peers were in a similar situation, and that access to a car increased happiness by increasing the potential for more options (Goetzke & Rave, 2015). Psychosocial correlates, such as those that affect well-being, are an important part of understanding the reasons why people choose to travel how they do, as evidenced by recent papers by Verhoeven et al. that highlight their importance in interventions to increase active transport (Verhoeven, Simons, Van Cauwenberg, et al., 2016; Verhoeven, Simons, Van Dyck, et al., 2016).

An important review by Waygood et al. was published in early 2017, studying the literature on transport and children’s well-being, and addressed the fact that “the current body of transport literature does not address how transport influences many facets of well-being beyond physical activity and road traffic crashes” (Waygood et al., 2017)(article in press; page 2). They found several consistencies in the literature, including that active travel is positively associated with leisure activities and physical activity, and that children’s independent mobility is positively associated with physical activity and community connections (Waygood et al., 2017). Additional findings included that car crashes are the main cause of death among children, walking for transport is associated with lower stress and more social interaction, and that traffic noise is associated with anxiety and sleep difficulty (Waygood et al., 2017). Waygood et al. suggested several directions for future research among children, including measuring life satisfaction relative to autonomy and access, and measuring access to cultural events to measure access-related issues (Waygood et al., 2017). Projects within this thesis address some of what Waygood et al. has suggested for future research, albeit among older teenagers. For example, access to activities outside of school will be investigated, as well as peer, parental and community connections, life satisfaction, self-perceived strengths relative to transport and access, and whether or not walking and cycling for transport are associated with better well-being.

**RESEARCH METHODS AND TOOLS EMPLOYED**

As detailed in Chapter 1, this thesis employs an exploratory mixed methods design. Qualitative work will be employed prior to quantitative work, because of its ability to provide necessary context, and for gathering unanticipated information that would
otherwise be missed by quantitative means (Davison et al., 2011; Sandelowski, 2000; Ward et al., 2015). Qualitative methods can also initiate findings, thereby offering new interpretations or points of view, prior to quantitative research (Rossman & Wilson, 1985). Qualitative methods are typically used with respondents individually or in small groups, and involve tools such as one-on-one interviews and focus groups (Sofaer, 1999). They are meant to provide rich data about individuals, and are not meant to provide generalisations (Sofaer, 1999). Conversely, quantitative methods often gather data from large numbers of respondents, and are used to identify trends, and to make comments of a generalizable nature. It is also reasonable to use qualitative methods after preliminary quantitative methods are completed, in order to corroborate or elaborate on the findings of the quantitative work within the sample (Morgan, 1998; Rossman & Wilson, 1985). Quantitative methods lend themselves well to statistical assessment (Greenland, 1987), and to the launch of health-related interventions (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005). In this thesis, qualitative work will be performed first, to inform quantitative work; a photovoice project will be used, prior to survey tools. These methods are reviewed below.

**Photovoice**

The photovoice method is an example of a qualitative method. It is a well-documented research technique that allows for the discussion of a topic via photographs taken by those with little power or status to enhance community needs assessments, empower participants, and induce change by informing policy; many seminal research articles have emerged in the last 25 years (Wang & Burris, 1994; Wang, Morrel-Samuels, Hutchison, Bell, & Pestronk, 2004; Wang, Yi, Tao, & Carovano, 1998). Photovoice can be a powerful health promotion tool (Wang et al., 1998). This method has been successfully implemented in many different settings and populations (Wang & Burris, 1994, 1997; Wang et al., 2004). Young people fit the description of persons with little power or status, as their views as key informants in matters pertaining to their health and well-being are very often overlooked in research (Fusco, Moola, Faulkner, Buliung, & Richichi, 2012; Strack, Magill, & McDonagh, 2004). Photovoice is useful in engaging youth in research as it is based on principles of empowerment and inclusivity (Aldridge, 2012; Strack et al., 2004).
There is a vast and growing literature base employing the photovoice method to explore a variety of health issues among youth. Variations of participant-driven photography programs are being used to access youths’ perspectives on the relationship between health issues (smoking, risky sexual behaviour, mental well-being) and social and physical environments (Cabassa, Nicasio, & Whitley, 2013; Dennis, Gaulocher, Carpiano, & Brown, 2009; Haines-Saah, Oliffe, White, & Bottorff, 2013; Kubicek, Beyer, Weiss, & Kipke, 2012). Photographic methods allow respondents to show exactly how they see the world, quite literally through their own eyes (Aldridge, 2012; Haines-Saah et al., 2013; Strack et al., 2004; Wang et al., 2004; Newman & Kanjanawong, 2005; Nichter, Nichter, Thompson, Shiffman, & Moscicki, 2002; Rice et al., 2013; Ward et al., 2015). While photographic methods such as photovoice are typically based on the previously mentioned principles of empowerment and inclusivity, with the goal of inducing change by informing policy, the methods of photovoice can also be used for “photo-elicitation”, which is the use of photos as an interview guide, with the ultimate aim of informing the development of quantitative tools (Guell & Ogilvie, 2012). This application of the photovoice tool to inform future research is becoming more popular. There are some examples in the literature of photovoice being employed to inform survey development, or to improve and refine survey questions (Newman & Kanjanawong, 2005; Nichter, Nichter, Thompson, Shiffman, & Moscicki, 2002; Rice et al., 2013; Ward et al., 2015). This is in keeping with the research approach of this thesis: using qualitative work to inform quantitative work.

**Online survey**

Online (or web-based) surveys have been a mainstream quantitative data collection method for some time. Recent research shows that both pencil-and-paper and internet collection methods to be equivalent in data quality (Weigold, Weigold, & Russell, 2013). Online surveys make it possible to quickly collect large amounts of data, and the data sets from online survey tools can be easily exported and uploaded into various statistics programmes (Mertler, 2002). Online surveys have proven cost-effective, both from an initial administrative standpoint, as well as with regard to following up with respondents, via administration of reminder emails (Dillman, 2007; Hardigan, Succar, & Fleisher, 2012; Mitra, Jain-Shukla, Robbins, Champion, & Durant, 2008; Sax, Gilmartin, Lee, & Hagedorn, 2008). Online surveys also make it possible to eliminate the interviewer bias
inherent to one-on-one interviews (Chang & Vowles, 2013). Web-based surveys allow researchers the ability to access hard-to-reach populations, either those that are geographically remote, or those unable to take a traditional paper based survey (Coomber, 1997; Mitra et al., 2008; Yun & Trumbo, 2000).

Low response rate is a common problem in self-report surveys, especially among teenagers, and calls for research-based best practices for survey administration. There are several best practice recommendations for online survey administration, and research confirms both personalised invitations and reminder emails increase response rate with web-based surveys (Bosnjak & Tuten, 2003; Fan & Zheng, 2010; Heerwegh & Loosveldt, 2007; Klofstad, Boulianne, & Basson, 2008; Perez, Nie, Arden, Radhu, & Ritvo, 2013; Porter & Whitcomb, 2007; Singer & Cong, 2013). Online surveys are commonly incentivised, and research has shown this is effective in increasing response rate (Bosnjak & Tuten, 2003; Singer & Cong, 2013). These best practices will be kept in mind during the process of developing the online survey tool used in this thesis.

It is well-reported that in addition to having consistently lower response rates, male respondents are also more likely to have missing values in surveys (Mitra et al., 2008; Sax et al., 2008; Underwood, Matier, & Kim, 2000). While research shows that the gender gap in response rate is less for online surveys that include email administration, when compared to mail or telephone surveys, the literature provides little in the way of reasons behind gender disparities in survey research.(Underwood et al., 2000) Some research shows that completion rates are higher when the survey sender is known to the respondent, thereby giving a “face” to the survey (Brehaut, Graham, Visentin, & Stiell, 2006), and this will be taken on board to advise the work in this thesis.

The qualitative research tool of photovoice, and the quantitative tool of an online survey, both seem feasible for investigating transport and well-being among older adolescents via a mixed-method approach. It is reasonable to use photovoice as a tool to collect data in order to inform a larger qualitative project, such as an online survey. It is proven to be a valid method for working with young people, and has been used for “photo-elicitation” to provide context for further research in the past. An online survey has been deemed appropriate for collecting quantitative data for this thesis, in order to contact enough respondents to create a large enough sample size to properly assess the research.
questions. As the sample size will provide a great deal of data, the online survey tool seems practical for data analysis, as data can be easily exported to a statistics programme. An online survey is also in keeping with the target age group, who are typically very comfortable with web-based technology.

**Research Model Resulting from Literature Review**

This literature review led to further evolution of the model introduced in *Chapter 1*, which is shown updated here in Figure 2.1. The literature review suggested that there are external factors that contribute to SWB variables, including issues related to attachment and access, which are affected by transport. The model now shows that attachment issues (such as peer, parental and community attachment) are directly related to well-being. Access issues (such as licensing, transport availability, and access to friends) influence well-being both directly and indirectly. Figure 2.1 illustrates this expanded relationship model for transport and well-being among older adolescents. Well-being outcomes are represented by the top circle; attachment issues are represented by the lower left-hand circle; and access issues are represented by the lower right-hand circle. It was hypothesised that access issues would affect well-being outcomes both directly and indirectly, via a “pathway” to well-being, through issues related to attachment.
CHAPTER SUMMARY

There is a very large body of literature dedicated to the various issues of youth well-being. This literature review is by no means exhaustive. It has endeavoured to briefly review well-being from a historical standpoint, exploring its evolution through to SWB and the PYD approaches. This review singles out life satisfaction and self-perceived strengths, and acknowledges that while they are from two different psychological approaches, they are both present and overlapping in the research about SWB, and thus will be used in this thesis. This review also discussed the age group of focus in this
research and their significance. Outside influences, such as attachment to family and friends, and the importance of participation and place, have been introduced to demonstrate the importance that transport (and therefore access) would have on the well-being of a teenager, endorsing this thesis’ ecological approach.

As described, just one study addressed transport and well-being among older teenagers. Jones et al. found that free public transport was supportive of teenage well-being in two published articles (Jones et al., 2013; Jones et al., 2012). This universal access to free bus travel resulted in less transport poverty, and less social exclusion, leading the authors to postulate that bus fare exemption positively affected the well-being of older teenagers in London (Jones et al., 2013; Jones et al., 2012). It is clear from the literature that both transport research and well-being research are important bodies of work with regard to young people. However, until recently, they have remained mostly siloed, and rarely considered in tandem. Since 2012, this has begun to change and the focus of transport and how it relates directly to factors of well-being is more considered. It is acknowledged that commuting is a large part of adult lives, and that the large chunks of time one spends traveling to their job is being recognised as significant. Issues related to transport, such as the autonomy it provides, or the happiness or satisfaction active transport achieves, are now being explored in relation to well-being. Children, reliant on others and not able to make their own decisions, are also a focus in the literature with regard to the effect transport has on their overall health and well-being.

It is important to note that the aim of this research is not to interrogate this age group about risky behaviour, nor to find out if respondents drink drive, text while driving, use drugs, or looked at anything inappropriate on the internet. Rather, it simply plans to address how they accomplish their daily travel, and assess any associations with their overall well-being, making it possible to look at transportation and health from a non-physical perspective, and to see the effect of transport in a holistic sense. While well-represented, the well-being literature does not agree on the effects of gender. I hypothesize that the effect of gender is dependent on these external factors, and expect to see differences in predictors of well-being with regard to transport among this sample as the projects progress throughout the thesis.
Additionally, qualitative and quantitative methods were reviewed, and found to be regularly used in research related to transport, as well as well-being. These methods are acceptable among the age group in questions, and will be combined for complementary purposes in this thesis, using an exploratory mixed methods design (Sale, Lohfeld, & Brazil, 2002).

In the next chapter, a photovoice project is implemented with a sample of the target age group in Southland, NZ, to test the research model and to address objectives laid out in Chapter 1.
Chapter 3
A PHOTOVOICE PROJECT TO INFORM
RESEARCH DEVELOPMENT

This chapter presents a qualitative photovoice project, completed between June and August 2014 in Southland, NZ. The main objectives of Chapter 3 are to:

1) Engage with secondary schools in Southland, NZ in order to gather respondents for projects within this thesis, and
2) Use findings from this project to inform content in the writing of an original survey, in order to directly address the thesis’ overall aim

This was a significant project. It served to further develop the proposed research model expanded on in Chapter 2 (Figure 2.1), informed the development of the pilot survey described in Chapter 4, and the final survey presented in Chapter 6.

The content of this chapter was previously peer-reviewed and published as a full-length journal article in the Journal of Transport and Health (Ward et al., 2015), titled “The influence of transport on well-being among teenagers: A photovoice project in New Zealand”, and appears here in full, albeit with some slight rewording and reorganising, and some expanded detail. There is also a discussion of the project’s contribution to the research model evolution, and a chapter summary. The reader will find a small amount of repetition in this chapter.
INTRODUCTION

Participatory photography or “photovoice” has been used by researchers for decades, utilising photographs to generate new knowledge, and to provide new insights in a unique way, either in a group setting, one-on-one, or both (Collier & Collier, 1986; Newman & Kanjanawong, 2005; Wang & Burris, 1994, 1997; Wang et al., 2004; Wang et al., 1998). It was developed by Wang and Burris (Wang & Burris, 1997), who explain that, “The goal of [photovoice] is to use people’s photographic documentation of their everyday lives as an educational tool to record and to reflect their needs” (Wang & Burris, 1994)(p. 171). They go on to describe photovoice as “a qualitative method based on feminism …[photovoice] allows people to document and discuss their life conditions as they see them. [Photovoice’s] underpinnings [include]: empowerment education, feminist theory, and documentary photography” (Wang & Burris, 1994) (p. 172).

This method is ideally suited for working with youth (Strack et al., 2004; Ward et al., 2014), and has been successfully implemented in many different settings and populations (Al-Nakeeb et al., 2012; Lopez, Eng, Randall-David, & Robinson, 2005; Wang & Burris, 1994; Wang, Cash, & Powers, 2000; Wang et al., 1998; Warne, Snyder, & Gadin, 2013). There is a growing literature base utilising participatory photography to explore health among youth, including youth perspectives on the relationship between their health issues and the social and physical environments they experience (Cabassa et al., 2013; Catalani & Minkler, 2010; Dennis et al., 2009; Haines-Saah et al., 2013; Kubicek et al., 2012; Walia & Leipert, 2012). Photographic methods are useful in engaging youth in research, because they are based on principles of empowerment and inclusivity, are more enjoyable to older adolescents than the use of more traditional focus groups, and allows them to show, quite literally through their own eyes, exactly how they see the world (Aldridge, 2012; Haines-Saah et al., 2013; Strack et al., 2004; Wang et al., 2004; Ward et al., 2014). For example, Ward et al. found that a diverse group of young Māori, Pacific and Asian non-drivers in Auckland could easily get around as non-drivers, and were enjoying a healthy and happy lifestyle without access to a car (Ward et al., 2014). In the current study, the aim was to explore transport and its effect on youth well-being more generally, to gain a better understanding of participants’ transport choices and their well-being as they travelled in their environment. The qualitative method of photovoice was
employed, because of its ability to provide necessary context, and for gathering unanticipated information that would otherwise be missed by quantitative means (Newman & Kanjanawong, 2005; Sandelowski, 2000). Baseline information was also gathered via questionnaire, to aid in sample description.

METHODS

Study design and setting

This study employs a cross-sectional design, providing an important “snapshot” of the relationship between transport and well-being using the photovoice methodology. The current study was conducted among senior secondary school students in Invercargill, NZ. Invercargill is the commercial centre and largest city in the Southland region of the country (population 53,000) which has several schools within the city limits (491 km²). It is a flat city, characterised by surrounding farm land and a distinct city centre. Although its surroundings are rural, the schools within the Invercargill city limits are considered urban. All data collection took place in Invercargill, on school grounds (in classrooms) after school hours.

Participants and recruitment

Senior secondary students were purposefully sampled. Older teenagers were chosen so that theoretically, only those old enough to gain a learner’s licence (age 16 years in NZ) would be examined, and therefore would hypothetically have all transport options open and available to them. This was done in order to gain a better understanding of participants’ transport choices and their well-being as they travelled in their environment.

Each school principal was contacted individually via email, followed by a face-to-face meeting with regard to the finer points of the study. The schools were chosen for this study because they volunteered to participate after being approached, and because they contained Years 12-13, which comprise the age group of focus. With school principal approval, chain-sampling was then used to recruit participants. Chain-sampling, a mostly
respondent-driven process, proved successful with this unknown target sample and geographical area. Chain-sampling involves identifying a few initial potential participants from stakeholders, and asks them to identify additional participants to contribute, in what is known as a “snowball” recruitment method (Morgan, 2008). Once identified, the participants formed three groups from two secondary schools (one group from one school, and two from another). After recruitment was complete, a project timeline was constructed, and an initial meeting planned for each group. Both schools offered classroom space after school for the purpose of meetings for the duration of the project. All participation was voluntary.

Procedures

Data collection occurred in two parts. Firstly, each of the three groups had an initial meeting at which time participants completed consent forms, and a brief baseline questionnaire that collected demographic data and transport information (Appendix 1). During these initial sessions, the photovoice method was explained, and digital cameras were provided for those who did not have a camera readily available (i.e. cell phone camera). Participants were given a 15-minute “practice” photography assignment, and were asked to take a photo of something transport-related in the immediate environment. Some examples used included the bike rack, parking spaces, and walking paths on campus. In each initial session, participants volunteered to upload their photos from this practice assignment and explain the photographs’ significance to the group. This was done using the SHOWeD framework, based on a series of questions as a structured way for discussing photos:

*What do you see happening here? What is really happening? How does this relate to our lives? Why does this problem/condition/asset exist? How could this image educate the community/policy makers/etc.? What can we do about it?* (Strack et al., 2004).

Thus, the participants had an instant and practical introduction to the planned method of discussion, so they knew what to expect in coming weeks.

A timeline for future meetings was discussed, and dates were agreed upon collectively. The second part of data collection consisted of three weekly group discussion sessions.
that lasted 60-120 minutes per meeting per group. All sessions were recorded. Participants agreed on weekly assignments to frame the context of photographs, based on group consensus. Participants showed photos about the transport modes they used, barriers they faced, and how their happiness and mood related to their transport choices. Participants could take as many photos as they wished, but were asked to pick a few favourites from each assignment to discuss during group sessions.

During these group meetings, the SHOWeD method of open-ended questions was used as previously described (Strack et al., 2004). Questions were asked, to stimulate more detail from the stories, to elicit attitudes and beliefs about transport and related well-being. Participants contributed questions and comments to each other’s photo discussions, serving to deepen the narratives and the data collected. While the photographs were mainly a tool to foster discussion about the topic at hand, the dialogues themselves were the most crucial component as they provided context for each photograph and for the discussions. These group discussions were crucial for context; as Morrow states, “a photograph has no meaning in and of itself, it is the interpretation and explanation that is important” (Morrow & Richards, 1996) (page 266). While the methodology in this project was based on qualitative description, it also included reflection and interpretation, in order to ultimately identify shared themes from the narratives accompanying the photographs (Sandelowski, 2000; Starks & Trinidad, 2007; Thomas, 2006; van Manen, 1984).

After the third group concluded its meetings, it was clear that it was unlikely new topics would arise from further group meetings, suggesting that saturation criteria had been reached (Mason, 2010; Morse, 1995). Consequently, data collection was concluded. At the last meeting for each group, cameras were returned, project evaluations were completed by participants (Appendix 2), and certificates of appreciation were distributed (Appendix 3).

Analysis

Participants provided demographic information, complied via questionnaires, and this information was tabulated. The group discussions surrounding the photos constituted the
primary source of data. Recordings of each meeting were fully transcribed, while secondary data sources, such as any handwritten notes and emails between me and the participants, were referred to for clarification.

The analysis involved intensively scrutinising transcribed data to recognise and interpret themes related to transport and well-being (Sandelowski, 2000; Strauss & Corbin, 1998; Thomas, 2006). This was done manually. Main themes were classified by how often they were mentioned during discussions of photographs, via transcription of recordings, using inductive categorisation, a convenient method when working with narrative and visual data (Bernard, 2002; Cabassa et al., 2013; Strauss & Corbin, 1998). Prominent patterns emerged, and were grouped into themes. For example, if the same issue was mentioned by several participants or a similar photograph was taken by several participants independent of each other, that issue was classified as a theme.

To more easily discuss findings of the current photovoice study, the results and discussion sections in this chapter include qualifiers (for example, ‘none’, ‘few’, ‘some’, ‘most’, ‘almost all’ and ‘all’) that have been adapted from previous studies (Sandelowski, 2001; Simons et al., 2014; Van Cauwenberg et al., 2012). Following the example of Simons et al (Simons et al., 2014), when an issue was not discussed by any participants, it is referred to as ‘none’ or ‘nobody’ or ‘no one’; for less than five participants, it is referred to as a ‘few’; for between five and nine participants, it is referred to as ‘some’; for between nine and 14 participants, it is referred to as ‘most’; for more than 14 participants, it is referred to as ‘almost all’; and for 18 it is referred to as ‘all’.

**RESULTS**

Ethical approval was obtained from University of Otago Human Ethics Committee (reference numbers 14/062 and 14/163). Amendments were applied for with and approved by the University of Otago Human Ethics Committee as research continued from project to project. In NZ, care needs to be taken to ensure that Māori, the indigenous people of NZ, are able to participate in research that is relevant. Consultation was completed with and subsequent approval received from the Ngāi Tahu Research Consultation Committee (University of Otago, 2010), for incorporation of and response
to Māori thoughts and ideas about the research topic. Both approvals covered all projects associated with this thesis.

Premeditated approaches to sample size are not always in keeping with the principles of qualitative research. The sample size of this study (n=18) was consistent with the generally accepted recommendation of $n \geq 15$ (Mason, 2010). This is typical of other photovoice project sample sizes, and was acceptable with respect to the purposes of the current study (Cabassa et al., 2013; Mason, 2010; Morse, 1995; Pickin, Brunsden, & Hill, 2011; Ward et al., 2014; Watson & Douglas, 2012). The recruitment and study design suited the target group, as senior students have notoriously busy schedules, and finding those willing to commit to such an in-depth study proved more difficult than in similar studies with young children. In addition, the small groups allowed me to spend more time with the participants.

**Descriptive results from questionnaire**

Three groups of students (total n=18; 50% male) from two schools participated in the project, and **Table 3.1** shows the characteristics of the participants. The participants mostly self-identified as NZ European, Māori, with three others identifying as Fijian, Filipino and South African. Ethnicity is reported only as a total, and not reported as male and female, for confidentiality. Their average age was 16.5 years. They differed with respect to licence status, which had an effect on their transport choices, providing a variety of responses.
Table 3.1 Characteristics of photovoice participants

<table>
<thead>
<tr>
<th></th>
<th>Total n=18 n(%)</th>
<th>Male n=9 n(%)</th>
<th>Female n=9 n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year at school</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 12</td>
<td>11 (57.9)</td>
<td>5 (27.8)</td>
<td>6 (33.3)</td>
</tr>
<tr>
<td>Year 13</td>
<td>7 (41.1)</td>
<td>4 (22.2)</td>
<td>3 (16.7)</td>
</tr>
<tr>
<td><strong>Type of school</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-ed</td>
<td>14 (77.8)</td>
<td>5 (27.8)</td>
<td>9 (50.0)</td>
</tr>
<tr>
<td>Boys</td>
<td>4 (22.2)</td>
<td>4 (22.2)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ European</td>
<td>10 (55.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maori</td>
<td>5 (27.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fijian</td>
<td>1 (5.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filipino</td>
<td>1 (5.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South African</td>
<td>1 (5.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Licence status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no qualification</td>
<td>10 (55.6)</td>
<td>5 (27.8)</td>
<td>5 (27.8)</td>
</tr>
<tr>
<td>learners</td>
<td>6 (33.3)</td>
<td>4 (22.2)</td>
<td>2 (16.7)</td>
</tr>
<tr>
<td>restricted</td>
<td>2 (11.1)</td>
<td>0</td>
<td>2 (16.7)</td>
</tr>
<tr>
<td>full</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Year 12 includes ages 15-16, Year 13 includes ages 16-19

All participants reported “trip chaining”, defined as a set of separate trip segments used to access a destination (i.e. walking from home to the bus stop, and then taking the bus to school) (Primerano, Taylor, Pitakrungkarn, & Tisato, 2008). Most participants did not have any form of vehicle licence. The car (mostly as passenger) was the primary mode of transport to school for most participants, and for almost all participants to destinations outside of school. Only two participants reported cycling for transport. All recounted walking as an important part of their daily trip chain and for some was the sole mode of transport to and from school. Almost all participants recounted walking to other destinations. Buses were used for some school trips, but few students used them outside of school.

Those participants without any type of licence were asked, “Why don’t you have your licence?” Most chose the option “I can usually get a ride with someone” and “I walk where I need to go”. Some selected “It’s too expensive to get a licence and drive”, “I don’t feel ready to drive” and “I can’t be bothered”. A few participants chose “I take
"It costs lots of money" - Financial

Almost all participants took photographs that prompted discussion about the financial aspects of transport. Commonly, the cost of licensing itself was mentioned:

“It is $100 to get your learner licence … [when I was 16] there were other things I wanted to do … it will happen when it happens“ and, “I’m old enough to go for my learner’s, but like, I don’t need it. There’s no rush, and it costs a lot of money too.”

One restricted driver showed a photo and spoke about the cost of driving a car:

“When [the petrol indicator is] on empty I don’t really [drive] as much. It is $100 I think, to fill. [If the car is on empty] I walk to school rather than have to drive to school. If [petrol] is really low I really try to make all my arrangements walking.”

The cost of getting a licence and driving a car was prohibitive to the point that almost all participants chose to walk to access destinations and activities outside of school. However, some mentioned that driving was an asset, despite the cost:
“People who [participate in sport] that don’t drive have it rough ... it’s easier to get to practices [by driving] and easier to organise their day and don’t have to bother mum and dad. Even if buses ran frequently rugby gear isn’t allowed on the bus.”

The cost was something willingly accepted by a few:

“I got my licence right away because I’m a swimmer and I have early and afternoon training. I do netball too – so I have freedom to get there and don’t have to bother my mum.”

Almost all participants had positive things to say about non-car transport with regard to finances:

“I like to walk places. Like, in between houses, if I want to go see a friend, I’ll walk. Generally it’s more economical to walk, otherwise I’m just driving around the block and wasting petrol.”

“I don’t have a job, I’m on like a permanent budget, so my bike works best for me.”

"It makes me feel peaceful" - Social and mental well-being

All participants took at least one photograph of their feet (see Figure 3.1 for a collage of these photos). Regardless of their main mode of transport, all reported walking at some point during the day. All participants took photographs of the sights they saw along their walking route (see Figure 3.2 for a collage of these photos):

“I like walking ... I appreciate the beautiful skies [here].”

Most discussed how walking made them feel:

“When I walk ... I think about things and ... it makes me feel peaceful. If I was driving, I couldn’t do this – I’d be too focused on the road. I feel like, when I drive I won’t be able to ‘sight see’ like this.”
Most also talked about how walking contributed to their well-being:

“I like to walk cuz I’m alone and walking and listening to my music. It’s time for myself. I don’t do much exercise, so [walking] is the main thing I do for exercise. It’s easy – I like that it’s easy” and, “I walk when I want to clear my mind.”

Walking was also a social activity for most:

“We always walk during study period every week. We’ll go to town or to someone’s house, its social time...I like it, it’s a good time to chat.”

Walking alone versus walking with friends was brought up by some participants:

“When you walk by yourself, it seem like it takes ages, but when someone is with you it seem like it takes 5 minutes!”

Electronic etiquette was also acknowledged and discussed by a few:

“My music keeps me entertained [while I’m walking]. It’s a little bit antisocial but oh well. I listen to [my headphones] while I’m alone, but if there are other people with me I don’t do it, it’s kind of rude.”

Participants who lived out of town did not walk as much as those in town due to distance. But most were willing to walk either home from school or to a friend’s house if the duration was less than an hour:

“Sometimes I start walking and somebody picks me up before I get where I’m going... it’s about 45 minutes home or to my friend’s house. I walk at least part of the way every day.”

Taking the bus was referred to by a few as their “me time”:

“There aren’t a lot of people that take the bus, it’s quite empty. It takes 45 minutes and I listen to music – a little ‘me time’.”
While an empty bus would not be an advantage for the city authority, a few participants liked it that way:

“The bus is quite empty, but um, it just kinda shows, I don’t know, time I guess ... it’s like an hour that I can listen to music and kind of like see the view, it’s a nice time.”

Taking the bus was discussed as a social activity for a few:

“The car is for transport only ... it’s not about being social. The bus is a social activity for me.”

A few talked about what they would miss out on if they drove everywhere:

“I have morning football training, and then after that’s finished I walk to [a friend’s house]. It’s like my ‘run down’ time from training, my cool down - I would miss that if I drove or got picked up.”

Another noted what she missed socially by driving:

“This is [a photo off] my passenger seat – my only company in the car is my swim bag. I find it really lonely driving on my restricted, it’s not a social activity.”
Figure 3.1 All participants photographed their feet as a main mode of transport
Figure 3.2 Sights along their walking route featured prominently in participant photographs and contributed to their feelings of well-being

"You have to be careful" - Safety

The few who cycled took photographs of the infrastructure they encountered on their route. A cyclist who lived in town commented:

“You can see the cycle path that people take – there is a sign on the pole saying it’s a walking and biking track. In the mornings, there are a lot of people cycling to school and work. I feel safe having my own path.”

This is in stark contrast to another cyclist, who lived 30 km outside of town. His photos described a different environment:
“Typically there are no cars and you can see clearly down the road [and] vehicles typically go into the opposite lane to pass, so that’s good. Once a car pulling a trailer honked at me and edged me, trying to force me off the road. You have to be careful.”

The issue of bikes competing with cars for space also came up in town. A few took photographs of bike lanes, and mentioned that they prefer the road or the foot path when biking:

“In the bike lane, you feel like you’re in the way. The bike lanes aren’t always protected lanes.”

Most pedestrians took photos that described safety matters as well, typically in relation to cars:

“Sometimes [cars] stop. Cars think they only have to stop if you are in the cross-walk. So you have to step out …but sometimes I don’t feel comfortable. My friend doesn’t like it when cars stop and wait – she feels like she’s being a nuisance. But that’s what they are meant to do!”

Of school crossings, a few had mixed feelings:

“We have a lot of crossings situated in places here. It makes it easy to be a pedestrian. And, the roads aren’t really taken up by cars here.”

But, a few also mentioned problems involved with these crossings:

“At 8:45 there are so many cars out there – people getting dropped off, people crossing the street – it’s very busy.”

Photographs from pedestrians living outside of town indicated different concerns:

“Out where I live, sometimes I have to walk from my house to the bus stop or vice versa, it’s about 4 km, and it’s hilly, sometimes the visibility is quite low, quite hilly, so at the bottom of a hill, I don’t know, I like to get to the top of the hill quite quickly in case a car is coming down the hill. There is no shoulder, just a ditch so there is nowhere to go.”
Some participants, especially those without a licence, mentioned their perceptions of drivers:

“I notice how other people drive ... it’s putting me off [getting my licence].”

“I don’t feel the urge to get my licence – there are a lot of scary people on the road.”

“I feel trapped at home“ - Barriers to choice

All participants mentioned weather as a barrier to walking or biking:

“I always walk home across the field, and it’s always really muddy, I know that sounds ‘girly’, but it’s gross. I could walk along the road, but [going through the rugby field] is a short cut. I wish it wasn’t so gross. It’s always nicer on my way to training in the morning, before all the kids tramp across it.”

Availability and location of facilities provided difficulties for a few:

“The bike stands at school aren’t covered, so if it’s raining, not as many people bike.”

Few related how they were able to overcome weather problems:

“Rain or shine, I walk to school. I wear a raincoat approved by the school.”

This comment brought up school uniforms:

“I know there are girls that would be happy to bike if we didn’t have to wear skirts to school.”

Only a few participants lived far enough outside of town that they were unable to walk or bike to their desired destinations. Their photographs were dramatically different from those living in town:

“This [photo] shows the distance sign – it’s 33 km to my house! If there was a [public] bus, of course I would take it, but there’s not enough people [where I live].”
Another showed a photo of a stark landscape, and described that:

“Sometimes I feel trapped at home.”

A few described how they managed their trip chain, mainly owing to the subject of distance:

“Every morning, to get to my bus, I get up [early] to have time to get a ride with my mum or dad to catch the public bus, it’s pitch black in the winter.”

Most used the school bus on a regular basis, but it was uncommon among this group to use the public bus, mainly due to knowledge barriers:

“I don’t really use public transport, aside from the school bus... I don’t really know how the town buses work. Whenever I see a town bus, they aren’t that full. Living here, it’s just easier to get around in your own car.”

Most participants had negative things to say about the public bus, and lack of a comprehensive public transport system was perceived by all as a major barrier:

“Public transport is really bad here, but it’s because there isn’t a big enough population.”

Figure 3.3 depicts a photo collage combining the themes of safety and barriers to choice.
Many photographs fostered discussion around the themes of safety and barriers to choice.

DISCUSSION

This photovoice study describes how participants used various modes of transport to access a range of destinations, and how these choices affected their well-being. Four main themes emerged: financial costs; social and mental well-being; safety; and barriers to choice. Apart from safety, these themes replicate the findings of Simon et al. with regard to factors motivating transport modal choice (Simons et al., 2013). As reported elsewhere in the literature, young people are delaying licensing and driving (Davis et al., 2012; Delbosc & Currie, 2013; Schoettle & Sivak, 2014; Sivak & Schoettle, 2011; Sivak & Schoettle, 2012). This literature finding was reflected in the results here, as well over half of the participants had no form of licence, and almost all discussed the issue of the cost of licensing and driving via their photographs and dialogues. They all discussed active transport, particularly walking, in a positive light. The effect of transport cost on transport choice may therefore have the unintended result of supporting well-being, as all reported
walking at some point during their day, and depicted how walking in their neighbourhood positively affected their well-being. However, sometimes not having a licence or not being able to drive was an obstacle; thus, the cost of transport negatively affecting well-being as well.

Walking, cycling and taking the bus provided social and mental benefits, and positively affected the well-being of this group, as it was employed by all at some point during their day. Walking in particular was a key part of the trip chain for these participants, as they walked to and from other forms of transport. Participants reported walking to be especially easy, and for most it provided a much-needed escape and time to think, as well as a social outlet. In the literature describing child and adult users, the active transport portion of the trip chain has been designated as important for accessing public transport, showing its importance to infrastructure policy (Giles-Corti et al., 2010; Jones et al., 2012; Villanueva, Giles-Corti, & McCormack, 2008).

As participants were all vulnerable road users at some point during their day, safety featured prominently in their photographs. The pedestrians’ dilemma of whether or not to trust that cars would in fact stop and allow for crossings on foot was prominent during discussions. This concern is echoed in literature that investigates real and perceived dangers imposed on pedestrians and cyclists by car users (Jacobsen, 2003; Jacobsen, Racioppi, & Rutter, 2009). All of the rural-living youth expressed safety concerns regarding the nature of the rural roads. This, combined with lack of access, seemed to negatively affect well-being for these participants.

It is acknowledged that other aspects of well-being may be positively affected by living rurally; however, it is beyond the scope of this study to identify these non-transport characteristics of rural living that might positively influence well-being. Regardless of the destination, the photos and narratives of participants who lived close to town and who were able to walk to destinations as part of their daily trip chain displayed independence, happiness and positive social well-being. Living farther away from town elicited photo stories of loneliness and decreased autonomy. Thus, transport seemed to have an influence on the well-being of this group of teenagers with regard to transport availability.
Various obstacles negatively affected the independence of participants. Some, either because they lacked access to a vehicle or other modes of transport, or because of the distance between their home and the city centre, reported feeling lonely or trapped. Others used their photos to describe how discouraged they were by having to manage their complicated trip chain. Weather and distance as factors affecting transport mode have been reported elsewhere, but not in the context of well-being (Faulkner, Stone, Buliung, Wong, & Mitra, 2013; Simons et al., 2013).

For all of the female participants, the necessary school uniform of a skirt and flat shoes was a hindrance to biking to school. Interestingly, the female participants did not report cycling outside of school either, which invites inquiry about whether the school uniform impedes young women getting into the habit of cycling, or whether the “sporty” types of bikes most available in NZ do not encourage those in street clothes to cycle. Obstacles with regard to public bus use among this group were mainly a reflection of their lack of familiarisation with the local bus system.

**Strengths and limitations**

Photovoice methods utilised, while highly effective, were time consuming, and the research relied heavily on cooperation between stakeholders, such as between school principals and teachers who allowed for the use of their classrooms. Almost all of the participants lived in town, so the results regarding active transport likely reflected this reality. Also, the city of Invercargill is relatively flat, making active transport easier in general. In self-report studies such as this, social desirability bias likely played a role in participant responses. Sample sizes in most qualitative studies are too small to make broad generalisations, but the aim of this study was not to attempt to describe the experience of all NZ youth. This study allowed for the description of a range of lived experiences of a group of young people finding their way around their physical environment, and provided context for future research in this area.

A strong feature of the study, then, was that it allowed for the examination of the “research terrain” of transport and well-being, a topic that has been relatively unexplored in NZ, and identified areas worthy of further study. Participatory photography has been used at times in the literature as a means to develop survey tools (Davison et al., 2011;
Newman & Kanjanawong, 2005; Nichter et al., 2002; Rice et al., 2013). Qualitative research methods can be extremely helpful in suggesting where new survey questions can be added or altered. For example, it is often difficult to implement larger-scale projects to explore topics that “have not been previously studied, are rapidly changing, and exist in groups quite different from the investigator’s own” (Newman & Kanjanawong, 2005)(page 53). The process of group discussion to relate photographs’ meanings and backgrounds introduced collective ideas and themes potentially missed by quantitative assessments. These issues certainly apply here, and were helpful as research of this new topic progressed.

Results could also provide direction for future studies, as findings confirmed the discoveries of other research endeavours. Photovoice findings in this study corresponded with the literature with regard to delayed licensing, as most of the participants did not have any form of licence, and with regard to environmental concerns among this age group. In keeping with the literature, the habits of participants were not seemingly influenced by environmental concerns (Andrews et al., 2014; Delbosc & Currie, 2013; Schoettle & Sivak, 2014). Another strong point of this study was the richness of resulting themes, due to the cohesiveness of the sample population. The three separate groups reiterated details of each other’s individually produced photos and discussions, making me confident that resulting themes were valid.

VALIDATING THE RESEARCH MODEL

Well-being was discussed a great deal in the context of participants’ daily transport habits. Satisfaction with one’s travel, and confidence based on travel emerged. Access issues were also prominent, as was attachment with regard to leisure activities. Peer attachment themes emerged during this project; however, it was not clear how family attachment affected well-being among the participants. While it is well-known in the literature that family attachment affects well-being, further testing from a quantitative standpoint is required to validate that portion of this model. Additional testing is also required to examine the impacts that age and gender may have on transport and well-being, as those did not emerge here.
It is clear from this published project that transport issues do indeed have an effect on well-being, and that it is a topic worthy of further research. In Chapters 1 and 2, a dynamic model was introduced hypothesising that access and attachment would influence well-being. This photovoice project has expanded on that model to describe specific access issues, such as licensing, transport frustration, ability to access friends and the closest city centre, use of active and passive transport modes, and personal income. Also, this project has identified that attachment issues, such as peer and family relationships, and the opportunity for participation in leisure activities, have a direct relationship to well-being. Thus this photovoice project served to test and inform the research model. The four main themes that emerged from this project (financial costs; social and mental well-being; safety; and barriers to choice) fit well into the updated model, which can be seen in Figure 3.4.
Access Issues
Transport options, frustration, licensure, access to friends and city centre, and personal income
Access issues that caused frustration, such as living far away from friends, had a direct impact on well-being. Other access issues, such as not having a license, or improper infrastructure, made it difficult for participants to partake in leisure activities, indirectly affecting well-being.

Attachment
Attachments to peers and family, leisure & community activities
It was clear from photos and discussions that being able to participate in activities affected well-being. Time spent talking with friends while walking, or alone in a car because the participant was driving on a restricted license, also had an effect on that person’s well-being.

Well-being Outcomes
Self-perceived life satisfaction, and individual strengths
Well-being emerged as a theme, and was reflected in the other themes of safety, barriers, and financial cost. It is clear transport plays a role in well-being.

Figure 3.4 Updated research model
CHAPTER SUMMARY

This chapter demonstrated that photovoice is a successful method for engaging older teenagers in research to gain deeper insight into participants’ transport habits and well-being. The themes identified throughout this photovoice project confirmed the validity of the research model. Photovoice findings suggest that transport has an influence on well-being among participants, outside of the well-reported physical risks of car crashes and the benefits of active transport. Understanding their perspective in this area through qualitative means provided a platform to better inform future work in this thesis.

Next, this thesis examines the link between transport and well-being among older adolescents quantitatively, via an online survey. First, the survey underwent rigorous testing via a pilot study (Chapter 4), and was also translated to te reo Māori (Chapter 5), to include more respondents. The final survey and results are then discussed in Chapters 6 and 7.
Chapter 4

Testing the Survey Tool to Assess Project Feasibility

This chapter describes the process of piloting an online survey in two NZ secondary schools, prior to large-scale distribution. The main objectives of Chapter 4 are to:

1) Use findings from the qualitative photovoice project (Chapter 3) to inform content in the writing of an original survey, in order to directly address the thesis aim
2) Test a new measurement tool (online survey) for feasibility via a pilot study with a small sample of the target population, and
3) Assess survey management, content and distribution methods and make changes as necessary, prior to the roll-out of the final survey tool

Chapter 4 does not provide survey findings; survey findings can be found in Chapters 6 and 7.

The motivation for initiating the pilot study was to assess the overall feasibility of the online survey that provides the main quantitative findings for this thesis. Pilot study findings reported here were previously peer-reviewed and published in the Journal of New Zealand Sociology (Ward, Gendall, McGee, Freeman, & Cameron, 2016), titled, “Testing the waters on the South Island: Insights from a pilot study”, and are included in
this chapter in full, albeit with some rewording and expanded detail, and the addition of a chapter summary (which includes the conclusions from the published article). There is a small amount of repetition in this chapter.

**INTRODUCTION**

As reported by Thabane et al (Thabane et al., 2010), a pilot study is defined as an experimental, exploratory, test, preliminary, trial or try out investigation. Another similar definition includes a test of the methods and procedures of a study to be used on a larger scale in the future (Everitt, 2006). It is rational to assess feasibility of large studies by way of smaller pilot studies, especially in new areas of research, prior to more costly main studies (North & Park, 2014; Thabane et al., 2010). Piloting a project enhances the likelihood of success of the main study, but these studies receive little attention in social science literature or training (Lancaster, Dodd, & Williamson, 2004; Moher, Schulz, & Altman, 2001; Thabane et al., 2010; Van Teijlingen, Rennie, Hundley, & Graham, 2001). Often, pilot studies are mislabelled as such, and merely report on a project with a small sample size, with no plan for a main study (Thabane et al., 2010).

There were three main aims of this pilot study. The first was to test that respondent-oriented questions elicited data that was truly valuable – in other words, responses that made it clear respondents understood instructions and that questions asked produced the type of information sought (Dillman, 2007; Gendall, Hoek, & Douglas, 2009). The second aim was to provide information to plan appropriately for resources, with regard to the time burden on survey respondents and the staff at participating schools, as well as with regard to financial budgeting. Third, the aim of testing various methods of survey delivery was to assess the best way to maximise response rate, including the evaluation of the role of the survey environment, and the effect of reminder emails on response rate (Fan & Zheng, 2010).

Pilot study findings focused on issues of feasibility, not survey results. The pilot study was a small version of the main study used to test whether the components worked. It focused on the processes of the main study, and was external from the main study, meaning that the data was used for “practice” and then set aside, and the pilot data was
not included in the analysis of the main study, nor were the pilot respondents. Therefore, discussion of the thesis topic in this chapter is used only as a technique to illustrate decisions with regard to design and procedures, and to explain the pilot survey findings from a methodological standpoint.

Pilot survey questions were informed by the photovoice project in Chapter 3. The origins of survey questions are presented in the methods section of this chapter, and the questions included in survey analysis are described in detail in Chapter 6. The pilot survey can be found in Appendix 4.

**METHODS**

**Study design and setting**

This study employed a cross-sectional design, providing a “snapshot” of the feasibility of an online survey with regard to content, delivery method, and resources. Study design and procedures are described in detail below. All data collection took place in Dunedin and Lumsden, NZ, on school grounds during school hours, during the months of October and November 2014 (spring in NZ).

**Participants and recruitment**

Recruitment of participants was done via convenience sampling because the desired respondents were age-specific and geographically diverse (Fan & Zheng, 2010). Two schools were chosen to participate in the pilot that reflected the types of schools invited to participate in the main study, and the method used to recruit them was identical to that of the planned main study to follow. School principals were contacted first via email, to schedule face-to-face meetings, at which time they were interviewed and logistics were discussed. Teachers of the Information Technology classes were contacted by the principals. Those teachers then suggested classes of students to survey for the pilot study.
One school was an urban school in Dunedin, with a total roll of 797 (Education Review Office, 2013). The other was rural, based in Southland, with a total roll of 159 (Education Review Office, 2014). The NZ decile levels of the schools were eight and seven, respectively, indicating both were located in areas of moderate socio-economic advantage (Ministry of Education, 2014). Both schools were co-educational and included Year levels 7-13. In order to avoid “contaminating” sample schools for the main survey sample, classes were deliberately chosen that would not be participating in the main study, therefore avoiding problems associated with multiplicity (Thabane et al., 2010). Sampling only senior secondary students (Years 12 and 13, aged 15-19 years) was purposeful, in order to include mostly those old enough to obtain some level of licence to gauge access to all modes of transport.

**Survey design and measures**

A web-based survey was used, which has many advantages, including lower delivery cost, more design options, less data entry time, and its suitability for convenience samples (Fan & Zheng, 2010; Fricker & Rand, 2002). The Qualtrics on-line survey tool was used to construct and administer the questionnaire (Qualtrics software, Version 2015, Copyright © 2017).

The intention was to include existing and, as far as possible, validated measures. The choice of validated measures were supported by findings from the photovoice project. Questions about transport behaviour, licence status, and transport modes used were adapted from other surveys (Kamargianni, Polydoropoulou, & Gouilas, 2012; Schoettle & Sivak, 2013). Measures of attachment originated from the ‘Peer and Parent Attachment Survey’ (Raja et al., 1992). Happiness was measured by the ‘Life Satisfaction Scale’ (Olsson et al., 2012). Personal competencies were measured by the ‘Strength Questionnaire’ (McGee et al., 2011). Questions about television and internet use were included, as screen time has been found to be inversely associated with mental health indicators (Trinh, Wong, & Faulkner, 2015) and came from the ‘New Zealand 2012 Youth Insights Survey’ (White, 2013). A single-question activity query, shown to be effective elsewhere, was included to address physical health (Milton, Bull, & Bauman, 2011; Richards et al., 2015).
Questions about demographic information (including age, gender, school, home address, and ethnicity) were included. Collecting the participants’ home addresses as part of the survey demographic data allowed for the possibility to explore where participants live in relation to their school, with the potential to map their lives geographically, and to assess the distance they travel to and from school and any impact that may have on their transport behaviour and well-being (Villanueva et al., 2012). The ethnicity query was identical to that used by the NZ Census (Statistics New Zealand, 2013d). As this is a new research area, some original survey questions were written, because a suitable alternative did not exist. These included inquiries about future plans regarding licensing, key destinations outside of the school trip, attitudes and beliefs about chosen transport modes, feelings about how mobility affects independence, as well as barriers.

The survey was opt-in and voluntary. It was designed to be completed in less than 30 minutes. It consisted of 43 questions, 31 of which were offered to all respondents, and 12 supplementary questions which were offered to respondents based on answers to some of the previous questions by way of skip pattern automation. A back button and progress bar were employed. The Qualtrics survey tool offered the option to apply validation to each question, either “force response” (if the respondent tried to skip a question, they were prompted to answer and could not continue until that question is answered), or, “request response” (if the respondent tried to skip a question, they were given a prompt asking them if they wanted to skip the question and if they said yes, the survey continued with the question unanswered, and if they said no, the survey allowed them to go back and answer the question). The pilot survey was set to “request response” for each question.

Questions were purposely phrased in ways that would encourage rather than discourage meaningful responses; this helped to decrease non-response, which could adversely influence data quality (Fricker & Rand, 2002). The order of question response choices was randomised to address the concern of order bias, taking into account the fact that respondents tend to favour responses at the beginning and at the end of response lists, and that first items are often chosen by respondents to save time (Fricker & Rand, 2002). Six question formats were used – yes/no, matrix, sliding scales, rank lists, free-text, and multiple responses – were included to maintain interest (Dolnicar, Grun, & Yanamandram, 2013). Jargon was minimised. Many of the questions included a free-text
response option, for which the literature reports web-based surveys are particularly well-suited (Fricker & Rand, 2002). A free-text question was also included at the end of the survey, asking for additional input regarding process and content. This last question was unique to the pilot in order to gain feedback from participants, and was not planned for the main study. Decisions related to survey design allowed for the minimisation of measurement errors, the maximisation of the likelihood of collecting reliable data of good quality, and the reduction of the cognitive burden put upon survey respondents (Schoeppe, Oliver, Badland, Burke, & Duncan, 2014).

Procedures

The information, consent and survey processes were all designed and ethically approved to be paperless. However, as a hardcopy consent process was planned to be made available to schools during the main study, in anticipation that some schools may be reluctant to dedicate class time to the survey, it was trialled during this pilot study. Thus, two methods of delivery were trialled to gauge response rates for each. These are referred to here as the “in-class” (completed during class and paperless consent) and “at-home” (completed on one’s own time and hardcopy consent) methods. It was hypothesised that the in-class method would result in a higher response rate.

Research demonstrates that personalised invitations and incentives increase survey response rates, so these were built into the process, and participants were advised of incentives (one $25 gift voucher per school) during the consent process (Fan & Zheng, 2010; Fricker & Rand, 2002; Heerwegh & Loosveldt, 2007; Singer & Cong, 2013) (Bosnjak, 2003 #1300)(Klofstad et al., 2008; Perez et al., 2013; Porter & Whitcomb, 2007). Reminder emails were used, and assessed for their effect on response yield, to inform the main study, as it is estimated that the response rate for online surveys is about 11% lower than that of other survey modes (Fan & Zheng, 2010).

Both delivery methods were designed to keep the burden on school staff to a minimum. Students were invited to participate in the online survey via personalised email in both methods. For the “in-class” method, student emails were gathered from staff in advance, and invitations emailed to 35 potential respondents. An introduction was presented in-
class, consisting of the information provided in the online survey information section of the survey (survey purpose, expected completion time, and description of incentives). As the in-class method was paperless, complete survey information was given and consent was obtained online when the participants accessed the link. Students then completed the survey during class time. A debriefing session after the survey was audiotaped.

The “at-home” method was designed for completion at home. In this case, hardcopy information sheets and consent forms were distributed during class, and invitations were later emailed to potential participants’ preferred email addresses as indicated on their consent forms ($n=20$). Participants were asked during the survey to comment on any questions in the survey that were ambiguous, difficult to answer or did not allow them to express their views accurately.

Two follow-up emails were planned to prompt response from those who had not started or completed the survey. The final reminder emails gave a cut-off date of one additional week, at which time the prize drawing would take place and the voucher winner was contacted.

**Analysis**

All responses to each individual survey were fully reviewed, one at a time, in order to assess response variability, missing values, inconsistent answers, or results that did not make sense. This permitted the direct evaluation of data quality. The analysis aimed to assess issues of survey feasibility. However, data obtained were exported from the Qualtrics tool to Stata (StataCorp, 2017) for data cleaning and descriptive analysis, as a practice exercise, and to determine if the responses to questions seemed reasonable, or if the questions were eliciting little respondent variability. The audio tapes subsequent to in-class dissemination, and comments from the at-home respondents, were reviewed and relevant suggestions were noted and applied to the main survey.
RESULTS

Ethical approval was obtained from University of Otago Human Ethics Committee (reference number 14/163). Consultation was also completed with and subsequent approval received from the Ngāi Tahu Research Consultation Committee (University of Otago, 2010), for incorporation of and response to Māori thoughts and ideas about the research topic.

Fifty-five students (male=58%) were sampled for this pilot study. Participants self-identified mostly as NZ European. The average age of participants was 16.9 years. See Table 4.1 for a description of participants.

| Table 4.1 Description of pilot survey participants |
|---------------------------------|--------|-------|
| Gender                          | n     | %     |
| Male                            | 32    | 58.2  |
| Female                          | 23    | 41.8  |
| Total                           | 55    | 100   |
| School                          |       |       |
| Urban                           | 38    | 69.1  |
| Rural                           | 17    | 30.9  |
| Total                           | 55    | 100   |
| Ethnicity*                     |       |       |
| NZ European                    | 43    | 95.6  |
| Māori                          | 8     | 17.8  |
| Pacific Islander               | 4     | 8.9   |
| Indian                         | 1     | 2.2   |
| Other Asian                    | 2     | 4.4   |
| Other                          | 7     | 15.6  |

*This measure adds up to more than 100% because per the NZ Census, respondents could self-identify as more than one ethnicity

Forty-five of the 55 students sampled responded to the survey (82%). Females were more likely than males to complete the survey regardless of method. The average time to complete the survey was 16.6 minutes (16.2 in-class, and 16.9 at-home). Missing data occurred in 6.7% of surveys, meaning that 93.3% of respondents who started the survey answered all questions posed. The missing data came from male respondents only. Email
reminders increased participation only after the first reminder, but not the second. See Table 4.2 for all survey completion results.

Table 4.2 Pilot survey completion by delivery method

<table>
<thead>
<tr>
<th>Survey respondents by gender</th>
<th>In-class method</th>
<th>At-home method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
</tr>
<tr>
<td>Male</td>
<td>13 (38)</td>
<td>9 (82)</td>
</tr>
<tr>
<td>Female</td>
<td>21 (62)</td>
<td>2 (18)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response rate by gender</th>
<th>In-class method</th>
<th>At-home method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
</tr>
<tr>
<td>Male</td>
<td>12 (93)</td>
<td>5 (56)</td>
</tr>
<tr>
<td>Female</td>
<td>21 (100)</td>
<td>2 (100)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall response rate</th>
<th>In-class method</th>
<th>At-home method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
</tr>
<tr>
<td></td>
<td>33 (97)</td>
<td>7 (64)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Overall the pilot proved that a main study was feasible. Changes were made to the content of the main survey based on preliminary analysis, respondent feedback, and collaboration with secondary school staff. For example, the Māori language version of the study was based on secondary school feedback (discussed in Chapter 5).

**Sampling aspects of study**

The pilot study demonstrated how to successfully engage with schools and students to create “buy-in” and support. For example, negotiating access ahead of time has been reported as being important for good participation (Smith, Gaffney, & Nairn, 2002). Survey completion time was much shorter than expected and served as a “selling point” for the main study. This, coupled with the fact that in-class, students were a “captive audience”, may have contributed to the high response rate achieved. Thus for the main study, the in-class method was presented as the preferred method of distribution, and the at-home method was offered as an alternative. The $25 gift vouchers as incentives could
also have played a part in the high response rate, although this was not assessed, as it is well-reported elsewhere that incentives increase response rate.

It was helpful to locate the survey in the school curriculum. The survey was introduced during Information Technology classes, and used as an example of web-based assessment by the teachers involved. Some unforeseen barriers with regard to resource management surfaced. School scheduling, even when done in advance, had its limitations. For example, at one school there was a misunderstanding with regard to class availability, and it was necessary to return back the next day to meet with two classes to distribute information sheets and consent forms for the at-home method. Thus, what was planned to take two hours ended up taking two days. Therefore it was expected and planned for that the main study would take up more time than what was prearranged.

There were also issues with student email access during the pilot study. Schools that approved the in-class method forwarded students’ school email addresses to me, as opposed to their preferred address. Thus those who did not use their school email addresses on a regular basis had forgotten their passwords and had to ask the teacher, who in the case of the pilot was available for consultation. The situation was easily remedied with such small groups. It was foreseen, however, that with bigger groups at larger schools this would prove to be problematic. During the main study therefore, this limitation was discussed with schools beforehand. This issue was not seen with the at-home method during the pilot, as per the paper consent process, participants were able to give their preferred email address that they used often.

It became clear that this age group utilised email less than expected. Some participants asked if they could access the survey via Facebook. Consequently, the decision was made to include a Facebook page in the main study as a way to disseminate the survey, to maximise participation. Unanticipated problems with email access emerged, resulting in coverage errors. Some invitations ended up in “spam” or “junk” folders, so some thought was given to the subject line of invitation emails, to avoid this in the main study. Use of reminder emails increased participation by 15%, particularly with the at-home method where an initial lower response rate was seen, so this practice continues in the main study. While research has found the effect of reminders increases with the number of reminders
sent (Booker, Harding, & Benzeval, 2011), pilot study outcomes demonstrated participation did not increase after the first reminder.

Research conducted via survey is vulnerable to response bias, especially with large samples, as non-responders usually differ from responders, thereby potentially affecting validity and generalisability. The pilot study findings are notable in that female respondents had a 100% response rate, compared to the male response rate of 67%. It is also significant that all missing data in the online surveys was due to male respondents. The issue of lower male response rate and survey completion have been reported in the literature (Mitra et al., 2008; Sax et al., 2008). Reasons for this disparity have not been fully explored, suggesting that future research on how to better engage older adolescent males in survey-based research is needed.

**Measurement aspects of the study**

As the relatively small sample size of this feasibility study allowed for the individual assessment of each respondent’s answers, it was possible to directly gauge data quality. Questions that didn’t work were deleted or amended to improve clarity, in order to collect missed information, or save time by avoiding unnecessary queries. While testing a survey helps to establish how well the process works and may reveal exceptional deficiencies in the questionnaire, most feasibility studies do not allow for assessment of whether or not survey questions are misunderstood by respondents (Gendall, 1994). Inclusion of debriefing sessions with respondents after the in-class method allowed for the unique opportunity to identify questions that had been misinterpreted.

After the survey content was assessed and changes were made, the main survey version consisted of 50 questions, 36 of which will be offered to all respondents and 14 of which were offered to respondents based on their answers via display logic. Content changes included the addition of demographic measures; changes to activity measures; changes and additions to transport measures; and additions to well-being measures.

Two demographic questions were added and one changed, to better relate ethnicity and living situations. The main ethnicity query was further scrutinised by an additional yes/no question from the NZ Census, “Are any of your parents, grandparents or great-
The brief question, “How many households do you live in?” was also added. When assessing responses to the question, “In the past 7 days, how much money did you get or earn for yourself?” and its options (seven in total, in $10 increments between “I did not get/earn any money” and “over $50”) (Health Promotion Agency, 2012), 55% of respondents chose “over $50”. The question, although validated, was modified to, “In the past week, how much money did you have to spend on yourself and the things you wanted to do?” and its options were changed to eight, between “I did not get/earn any money” and “over $100”.

Two questions assessing internet and television use were also changed. While there is an interest in screen time generally with regard to health and well-being, it was not a research focus. Thus to avoid confusion among respondents – many watch television on their laptops, for example – and to cut down on total question number, two questions about internet/television use were reduced to a single question about screen time, adapted from another study (White, 2013).

Some questions were reconsidered if seemingly not well-received by respondents. Among the well-being questions included, assessing happiness and competence was in part done with a validated question asking, “In general, how do you feel about ....” with 10 aspects of life offered on a matrix of “Very Happy”, “Happy”, “Unhappy” and “Very Unhappy”. This was purposeful, to avoid “fence sitting”; furthermore, these response options came from pre-existing validated questions, and it is not advisable to change validated queries. During real-time feedback, a student asked why there was not a neutral option. To address this issue and to add diversity to the survey, an additional single-question happiness measure was added that allowed for a neutral response (Jalloh A, Flack T, Chen K, & Fleming K, 2014), as a “catch-all” to sum up happiness, and to compare responses with the other questions.

In the survey, prior to a question about transport to and from school, the query “Did you go to school at least one day last week?” was inserted to save time of those who did not attend. The wording of question “In the last month, which of these transport modes have you used to get places? Tick as many as apply to you” was changed to “In the last month, which of these have you used to get places? Tick as many as apply to you” to omit the jargon of the word “mode”. The options available in this question (and other questions

83
Chapter 4 Pilot study

related to transport throughout the survey) included bus, walking, bike, skateboard or non-motorised scooter, motorbike, car as passenger, and car as driver. Based on feedback, non-motorised scooter was removed from the list for the main survey, as respondents related that scooters were only used by younger children, and motor scooters or motorcycles were preferred by their age group. Also, skateboarders felt that their activity should not be combined with others. As current literature combines skateboarding with other “walkability” issues (Andrews, Hall, Evans, & Colls, 2012), this suggestion was apt and could elicit new knowledge about skateboarder behaviour and well-being for future research. Queries also arose about whether or not bus meant school bus or public bus. Based on this feedback, the transport options offered became school bus, public bus, walking, cycling, skateboarding, car as driver, car as passenger, and motorbike or scooter.

Four questions asked respondents to indicate, from a list, the sporting, outdoor, cultural, social, leisure, and civic or community-related activities they were involved with, either within or outside school. Real-time feedback and responses to the free-text survey question advised the final version of these four questions. Consequently, 11 additional activities were added to the options available. In the pilot version, the activities not chosen by a respondent were offered up for explanation in the question, “Following are the activities you said you didn’t participate in last month. Which of these didn’t you do because you didn’t have reliable transport?” This resulted in 98% choosing the option “none of these”, and one respondent choosing all activities, suggesting in the first instance that the question was not providing useful information, and in the second that it was misunderstood. This question was replaced with one allowing a free-text response, "In the past month, were there any hobbies or activities that you were unable to participate in because you didn’t have reliable transport?"

Depending on their responses to the query “In the last month, which of these transport modes have you used to get places? Tick as many as apply to you”, respondents were offered specific questions about why they used the modes they used, and how they felt about it. The most frequent mode of transport was “car as passenger” (87%). There is very little about passenger behaviour or passenger experiences available in the literature. To address this, three additional questions were added to the main survey regarding the passenger experience: 1) “You mentioned in the last month you were a passenger in a
car. How well do the following statements describe how you feel as a passenger?” with statements on a matrix of “Always/Mostly true”, “Often true”, Sometimes true” and “Never/Almost never true” to assess their attitudes about being driven; 2) When you drive, which of these statements best describes the passenger situation in the car?” to assess whether they drove alone or with others; and 3) “You said you either always or sometimes drive with passengers in the car. Who is it that usually rides with you?” to assess the age of their passengers.

As transport safety was found to correspond with well-being in the photovoice project included in this thesis (Ward et al., 2015), a safety-related query was added encompassing all forms of transport that read, “Think about your experiences with transport in the last month. In general, how often have you felt safe?” with situations (driving, riding the bus, and/or being a passenger, pedestrian or skateboarder) on a sliding scale from “never feel safe” to “always feel safe”.

To capture future intentions regarding transport, the following question was asked, “If you had your choice, what would be your preferred mode of transportation?”, and 78% of respondents choose “Driving yourself”. In order to capture a broader range of comparable options, the question was changed to rank list format, so that participants could rate their preferred choices on a numbered scale instead of choosing just one, to give us a better and more nuanced picture of their plans. The question itself was amended to “If you had your choice, how would you choose to get around? Please click and drag each up or down to rank them in order of preference”.

With the exception of region-specific questions such as those querying ethnicity, specific activities, and a few culture-specific questions, this survey is generalisable to other respondents of the same age group in different countries. It is acknowledged that a pilot study is an “idealised” version of the main study, and while some problems can be planned for, it was anticipated that new complications will surface during the main study, and that constant trouble-shooting would perhaps be necessary. Nonetheless, this pilot survey was invaluable with regard to confirming the feasibility of the survey design, content, and resource facilitation.
CHAPTER SUMMARY

This feasibility work confirmed a web-based survey is an effective way to survey older adolescents, and is consistent with their use of social media. It is better to survey young people in-class than at-home because the response rate will be higher. For the main study, the in-class method was therefore presented as preferred, with the at-home method as an alternative. The use of school email addresses may be problematic. If it is not possible to survey students in school, reminders and incentives will be required to achieve a satisfactory response rate for an at-home survey, though more than two reminders are unlikely to improve response, despite research that shows the effect of reminders increases with the number sent (Marshall, 1996).

This pilot study permitted changes to the survey in ways that otherwise would not have been obvious, so as to avoid missed opportunities for better measurement and survey delivery later on. While testing a survey may reveal deficiencies, most feasibility studies do not allow for assessment of whether or not survey questions are misconstrued; respondents can give plausible answers to questions they have misinterpreted or misunderstood (Gendall, 1994). Inclusion of debriefing sessions after the in-class method, and the use of free-text responses during both methods, allowed for the unique opportunity to identify and clarify questions that were not working as intended. This ensured a well-run main survey, resulting in meaningful data.

The over-riding principle of survey design is that the respondent defines what can be done: the types of questions one can ask, the types of words one can use, the concepts one can explore and the methodology one can practice (Gendall et al., 2009; Tremblay, 1957). In the following chapter, collaboration with a Kura Kaupapa (Māori immersion school) is described, specifically with regard to the translation process, as an example of applying this principle of respondent orientation to survey distribution. Chapter 5 details the translation methods only, as the data resulting from the survey at the Kura Kaupapa were analysed in tandem with the data from the entire Southland region.
Chapter 5

Wharekura Engagement and Translation of Survey

This chapter relates the experience of engagement with a wharekura (Māori immersion school) in Southland, NZ, which was not a planned project in this thesis. The main objective of this chapter relates to the first objective, which was to engage with all secondary schools in Southland. While results are not reported here, this chapter describes the process of engagement with the wharekura and what I learned from the experience.

The translation was an exercise in the feasibility of translating our English language survey to te reo Māori (the Māori language), and was a powerful reminder of the significance of applying the principle of respondent orientation in a cross-cultural collaboration. A version of this chapter was peer-reviewed and published in Kōtuitui: New Zealand Journal of Social Sciences, titled, “Found in (survey) translation: Lessons learned while engaging with a wharekura in Southland, New Zealand” (Ward, Wyeth, Mcgee, Freeman, & Cameron, 2018). Consequently, there is some repetition. Special acknowledgements and a chapter summary are included at the end of this chapter.

Reflecting on this chapter, Māori participant views were not taken into account during the writing of the translated survey, as advised by the kaupapa Māori approach, as the
Chapter 5 Māori translation of survey

The project was an unanticipated “add-on” to the research. This is a limitation. However, the use of a wholly te reo Māori survey does reflect some aspects of the principle of tino rangatiratanga - incorporating principles of sovereignty, self-determination, governance, autonomy, and independence (Pihama, Cram, & Walker, 2002; Walker, Eketone, & Gibbs, 2006). Practically speaking, tino rangatiratanga calls for Māori researchers to lead research projects, or for non-Māori researchers to collaborate with Māori participants and stakeholders prior to project inception, and all the way through to dissemination of results and evaluation, as well as the use of te reo Māori in research (Cram, 2017). On a personal note, this experience has certainly better informed me for future research endeavours.

INTRODUCTION

New Zealand has three official languages: English, NZ Sign Language, and the indigenous language, te reo Māori (Human Rights Commission). In NZ, educational administration of language learning is positioned within individual schools, and is reviewed regularly by the Educational Review Office (the governmental audit agency) (Spence, 2004). As of 2016, 20.5% of students were enrolled in Māori language courses in schools, and 2.3% of NZ students attended a Kura Kaupapa (Ministry of Education, 2017).

Care needs to be taken in NZ to ensure that Māori (the indigenous population in NZ) are able to participate in research that is relevant and beneficial to them. Over 15% of people living in NZ report Māori ethnicity (Statistics New Zealand, 2013a). Māori are a youthful population when compared to the majority population, NZ European, with 33% of all Māori being under the age of 15 years (Statistics New Zealand, 2013a). The majority of those residents reporting Māori ethnicity live in the North Island of NZ. The South Island of NZ presents a varied demographic; the Southland region of the South Island is comprised of mostly NZ Europeans but this region has the largest Māori population (approximately 12%) in the South Island (Statistics New Zealand, 2013b).

The Treaty of Waitangi, considered the founding document of NZ, was signed in 1840 between Māori and British Crown representatives. One research implication of the Treaty
Chapter 5 Māori translation of survey

emphasises the importance of Māori participation in determining research processes for best practices (Kingi, 2007; Wyeth, Derrett, Hokowhitu, Hall, & Langley, 2010). Over recent years, NZ researchers have been increasingly recommended to involve Māori in health research, not just as participants. Consequently, public health research should be meaningful and appropriate for Māori, and conducted in a manner that respects and recognises Māori worldviews (Health Research Council, 2010). It is important that the approach to any research involving Māori participants include collaboration with key organisations, groups and communities (Health Research Council, 2010). Also, reporting research results should be carefully considered, to ensure that findings are presented appropriately and meaningfully for Māori, and have the potential to bring about beneficial change (Durie, 1985; Health Research Council, 2010). To that end, this chapter reports on the application of the principle of respondent orientation (Gendall, 1998) as used in the engagement, translation, and dissemination of an existing English language survey for a group of Māori youth at a wharekura in Southland, NZ.

Among teenagers, transportation is typically considered in the context of risk; it is rarely considered in the context of well-being. Preliminary research suggests that transport choice is in fact related to one’s well-being (Reardon & Abdallah, 2013; Vella-Brodrick & Stanley, 2013), with regard to the work commute (de Vos, Schwanen, Acker, & Witox, 2015; Guell & Ogilvie, 2012; Olsson et al., 2013), and active transport among adults and children (Crane et al., 2014; Humphreys et al., 2013; Martin et al., 2014; Ramanathan et al., 2014). However, there has been little work on this topic with older teenagers, who are at an important transition stage as they navigate from childhood to adulthood. Exceptions are a UK study which found that universal access to free bus travel positively affected the well-being of older teenagers in London (Jones et al., 2013; Jones et al., 2012), and photovoice research that suggested a relationship exists between transport choice and issues of access to well-being among older teenagers in Southland, NZ (Ward et al., 2015).

This section of the thesis describes the process of translating and distributing an existing survey for a young Māori audience. While associations between transport and well-being are the ultimate focus of this research, it is not the emphasis of this chapter. Rather, methods and approaches that were used are described, and reflections on the processes of engagement are offered. In lieu of a traditional “results and analysis” section, there is
an expanded “methods” section, that better describes the journey through the process of engagement, translation, and survey dissemination.

**METHODS**

This research addressed transport and well-being from a multidisciplinary and mixed-methods perspective. The research group was made up of researchers from the disciplines of geography, public health, marketing, biostatistics, and Māori health, and both qualitative and quantitative methods were employed. When it comes to survey research, keeping respondents in mind is paramount for success. This may sound obvious, but too often, survey tools are created with little thought to the engagement of and distribution to potential respondents. Practically speaking, the survey respondent determines what one can do; the type of questions one can ask, the concepts one can explore, and the methodology one can use (Gendall, 1998; Gendall et al., 2009; Ward et al., 2016).

With this principle in mind, the research project was approached in a stepwise fashion. First, as detailed in *Chapter 3*, a qualitative photovoice project was conducted in Southland, NZ, with small groups of rural secondary school students, in order to explore this new topic (Ward et al., 2015). This provided much-needed context for subsequent survey-based research, and gave valuable insight into our target population, older adolescents in Southland. After the qualitative work was completed, an online survey was established. No appropriate questionnaire addressing both transport habits and well-being among older teenagers could be sourced, thus one was developed based on preliminary research and a review of the literature. As seen in *Chapter 4*, a pilot study was then conducted to test its feasibility, prior to broader dissemination to a larger sample (Ward et al., 2016). While contacting secondary school principals in the Southland region during the survey recruitment process, staff at the wharekura expressed interest in allowing their students to participate, so long as the survey was translated into *te reo* Māori.
Ethical guidance

In addition to the ethical approval for the photovoice project and the pilot study, it needed to be ensured that the research followed the University of Otago Research Consultation with Māori Policy. This included consultation with mana whenua Ngāi Tahu (the local tribe with authority over the Otago region) through an established procedure via the Ngāi Tahu Research Consultation Committee (University of Otago, 2010). This process allows for incorporation of, and responses to, Māori views and advice about the research topic (Wyeth et al., 2010). After considering our research proposal, the Committee encouraged our collection of ethnicity data and ancestry via the latest NZ census questions (Statistics New Zealand, 2017a), and considered the research outcomes of transport and well-being to be of importance to Māori health. Suggestions also included seeking advice from Māori researchers and stakeholders, and dissemination of findings to Māori health organisations and communities. During the school recruitment process for this research, both the University of Otago Human Ethics Committee and the Ngāi Tahu Research Consultation Committee were kept up-to-date of any changes that occurred, so that either Committee could ask questions or provide comments at any time.

It was not intended to report survey findings by ethnicity, because NZ Europeans were over-represented in the Southland-wide survey (85%), and in the current study. Research shows that the way one’s ethnicity is viewed can be associated with health risk or disadvantage, and therefore is a determinant of health (Cormack, Harris, & Stanley, 2013; Harris, Cormack, & Stanley, 2013). It follows, then, that reporting findings of transport and well-being by ethnicity could erroneously report an inequitable distribution of health determinants, due to the relatively low number of Māori respondents in our sample.

Survey design, recruitment and distribution

As survey design, recruitment, and distribution details are reported elsewhere (Ward et al., 2016), only brief design details are provided here, for context. Questions were included to allow for cross-sectional examination of both physical and mental well-being associated with involvement in activities, connection with family and friends, and access to key destinations. Personalised invitation emails with a link to the survey were emailed
Chapter 5 Māori translation of survey

to students. The survey was administered online via the Qualtrics survey tool, and participants worked through the survey sections sequentially. The online process included reminder emails, and an incentive scheme, all of which have been shown to increase response rates (Fan & Zheng, 2010; Fricker & Rand, 2002; Heerwegh & Loosveldt, 2007; Singer & Cong, 2013). All decisions related to survey design were made to allow for the minimisation of measurement errors, the maximisation of the likelihood of collecting quality data, the maximisation of response rate, and the reduction of the cognitive burden put upon both survey respondents and school staff. A total of 12 secondary schools, including the wharekura, participated in the transport and well-being survey. Two methods of distribution were offered – the “in class” method (students took the survey online as part of their school day) and the “at home” method (students took the survey online at home on their own time).

Engagement and translation

Initially, school staff at the wharekura expressed no interest in participating in the online survey, because the survey was written only in English, and not in te reo Māori. To overcome this barrier, steps were taken to safeguard authentic engagement, including how the survey translation was conducted. This ensured engagement was meaningful for and beneficial to the wharekura, and in keeping with Treaty of Waitangi, specifically articles II and III, rangatiratanga (chieftainship) and ōritetanga (equality) (Wyeth et al., 2010).

The survey was discussed kanohi ki te kanohi (face to face) with staff at the wharekura during two hui (meetings). Regular email contact was kept with the pouako (teacher) who was the direct contact person at the school, during the six month period leading up to survey distribution. At the recommendation of the pouako, a professional translator was hired to translate the survey. Also at his suggestion, the survey translation was prepared in the generic Māori dialect, instead of the Southern Māori dialect. In their 2007 report, the Measurement and Methods Core at the University of California, San Francisco stated that “a well-translated survey instrument should have semantic equivalence across languages, conceptual equivalence across cultures, and normative equivalence to the source survey” (Center for Aging in Diverse Communities: Measurements and Methods
Semantic equivalence means that translated questions in a survey should express the same meaning as in the original language; conceptual equivalence refers to the fact that the idea being measured remains the same regardless if wording to describe it changes; and normative equivalence refers to the ability of translated survey questions to address the same social norms as the original version (Center for Aging in Diverse Communities: Measurements and Methods Core, 2007). These factors were all considered during the development of this translation.

The simplest form of translation is a one-way translation (McGorry, 2000). This involves engaging a translator to review the original document, in this case a survey, and translate it into the target language. While this is more cost-effective, it includes no review, and no comparison with the original document. Thus, this method does not address semantic, conceptual, or normative equivalence. In the case of this survey, a process known as double translation (also referred to as “back-translation”) was used, which is one of the more accurate processes of translation (Marin & Marin, 1991). Double translation safeguards correct conversion from one language to another, because during this process more than one person independently reviews the final translation (McGorry, 2000). This helped ensure the survey was accurate, as well as in keeping with the spirit of the original version, thereby addressing the equivalencies cited above.

During the double translation process, the original English version was translated into te reo Māori by a professional translator. A second bilingual reviewer translated the survey back to English, and compared it with the original survey tool, to check for inconsistencies. Final comparisons and checks for inconsistencies were made, and changes were discussed via email communications between the pouako and the original translator. After the translation to te reo Māori was complete, the survey was then transferred into the online Qualtrics survey tool by hand. The online format was also checked for accuracy and previewed by two bilingual reviewers, prior to the survey being disseminated to students. The wharekura opted for the in-class delivery method, as the staff there wanted to use the survey as a language learning tool. The pouako supplied student email addresses, and the survey was consequently disseminated via email and facilitated by teachers during class time.
Chapter 5 Māori translation of survey

DISCUSSION

The research described here suggested that a translation exercise such as this is feasible and effective. This engagement with the wharekura is an example of applying the overriding principle of respondent orientation to survey design (Gendall, 1998), as it helped to improve engagement by allowing for the opportunity to consult with community stakeholders in a different cultural environment, regarding better ways to genuinely include Māori youth. As previously discussed, the respondent determined everything one can do with regard to a survey. The schools themselves were considered to be respondents in the sense that they agreed to participate, and allowed for the distribution of the online survey to potential individual respondents. Making sure the approach was orientated to the respondent, with regard to survey translation in this instance, allowed for the chance to include a group in the research that would have otherwise been unavailable. Had no inquire been made as to why the wharekura did not want to participate initially, and not taken steps to fulfil their wishes, this would have been a missed opportunity for all. Instead, a dialogue was opened about how to overcome the barrier of survey language. This fulfils specific research expectations as described by Wyeth et al 2010, relating to Articles II and III of the Treaty of Waitangi (Ministry of Health, 2001; Wyeth et al., 2010).

This study confirmed that a web-based survey is an effective and efficient way to survey older Māori adolescents, especially as a class-based exercise that can be incorporated into a wharekura curriculum. While the te reo Māori version took longer for students to complete when compared to the English version, the wharekura staff confirmed that the difference in the average time to complete the Māori version of the survey was attributed to the fact that Māori was the second language for most students at the school, and that the survey was utilised as an educational language exercise.

This research had limitations. For example, for research involving Māori, it is most advisable to involve key organisations and groups from the very beginning, during preliminary research planning, and not late in the process, as was the situation here. If the translation had been planned as part of this research process from the beginning, there would have been the opportunity to incorporate different survey content or design, based
Chapter 5 Māori translation of survey

on principles of respondent orientation and cooperative participation with the wharekura. Additionally, it would have been preferable to offer the *te reo* Māori version of the survey as an option to all Southland respondents, not only the wharekura students.

With regard to the translation process, while the double translation engaged in is a best practice method, the process of “decentering” would have been an improvement on the translation procedures (McGorry, 2000). The use of the decentering method during the translation process involves a constant comparison, back and forth, between the two survey instruments (McGorry, 2000). In the case of the use of double translation, the original language was considered to be the most important language in the process, and served as a guide that is followed and referred back to. Conversely, decentering would have allowed for a “culturally and linguistically equivalent translation to evolve… [and] involves actual revision of the original instrument to fit the new research situation” (McGorry, 2000) (page 76). However, this may result in slightly different phrasing or answers, meaning there may be issues of comparability across participants taking the survey in different languages. This would decrease the ability for researchers to analyse large amounts of data together. Some research suggests that when addressing translation via decentering, developing both language surveys at the same time is desirable, in order to prevent the survey from being based too deeply within one culture and language (Beaton, Bombardier, Guillemin, & Ferraz, 2002; Center for Aging in Diverse Communities: Measurements and Methods Core, 2007). Furthermore, some researchers have begun to consider whether the same questions should be asked of all populations, and whether or not full cultural consideration might include providing different questionnaires (Center for Aging in Diverse Communities: Measurements and Methods Core, 2007). This requires more research, and is beyond the scope of the current study.

This work helped attain goals set out by the Ngāi Tahu Research Consultation Committee. The first goal, *seeking advice and guidance from Māori stakeholders*, was realised through the kanohi ki te kanohi hui with the wharekura staff. Through these hui, details with regard to the processes of translation and dissemination of the survey were discussed and agreed upon in order to engage appropriately with their students. Consulting with the wharekura staff prior to beginning the project and writing the survey would have been more appropriate than translating the survey retrospectively, and this
Chapter 5 Māori translation of survey

lesson as been taken on board for future research. In addition, advice was sought from a professional translator who was then hired for the project.

The second goal, *dissemination of findings to Māori health organisations and communities*, was achieved by distributing preliminary descriptive survey results to the wharekura. Complete survey results, which include regression analysis to test for relationships between transport and well-being, were distributed to them and all Southland schools once they became available. Furthermore, I will look to the wharekura for advice on what other organisations they would like contacted with the findings. This mutually beneficial and successfully completed research project will help to continue to foster relationships within the Southland Māori community.

The experience of translating the English language survey to *te reo* Māori was not only a powerful reminder of the significance of applying the principle of respondent orientation in a cross-cultural engagement, but also proved to be a valuable research exercise that will impact future work, and hopefully can provide recommendations for other researchers. This experience is an example of the significance of the multidisciplinary research approach, which allows researchers the opportunity to work outside of normal boundaries, and look at research issues from a new perspective. When contemplating survey translation, it is most advisable to seek buy-in from organisations and groups by collaborating with them early on in the survey translation process. This is not only an ethical approach, but one that will improve the quality of the partnership, as well as the quality of the survey itself, by allowing for full cultural consideration during the survey design, translation, and dissemination processes. Funding for translation work should be included in research proposals from the very beginning, to avoid financial hurdles later. Finally, survey translation methods should include techniques such as those used with double translation and “decentering”, for accuracy and also to avoid bias toward one language. The survey is available to other researchers.

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**CHAPTER SUMMARY**

The interactions described here with regard to the Māori translation process are examples of applying this principle of respondent orientation to survey distribution. The data resulting from the survey at the wharekura were not analysed alone, but in tandem with the data from the entire Southland region.

In the following *Chapter 6*, the final survey version and questions of interest are presented, as well as the descriptive results of the survey. The descriptive results in *Chapter 6* address the first aim of this thesis, *to describe transport and well-being among older teenagers in Southland, NZ.*
Chapter 6

DESCRIBING TRANSPORT HABITS AND WELL-BEING IN SOUTHLAND, NEW ZEALAND

The purpose of this chapter is to address the overarching aim of this thesis, to determine which transport practices and/or circumstances support well-being among older teenagers in Southland, NZ. The main objectives of Chapter 6 are to:

1) Engage with all secondary schools in Southland, and
2) Describe transport and well-being among a large representative sample of older teenagers in Southland, NZ, to provide descriptive statistics

A version of this chapter was peer-reviewed, and is currently in press with the Australian and New Zealand Journal of Public Health, titled, “Transport behaviours among older teenagers from semi-rural New Zealand“ (Ward, Mcgee, Freeman, Gendall & Cameron, In press).

INTRODUCTION TO THE ONLINE SURVEY

This chapter describes the methods and descriptive findings of the main survey, which was distributed to 12 schools in Southland, NZ, between January and June 2015 (summer
and autumn in NZ). The methods used in the main survey described here were in large part the same as the pilot study, and therefore the methods section frequently refers back to Chapter 4, and there may be a small amount of repetition. Thus, the procedures are described here in brief, while the survey measures of interest are described in full. The final version of the survey, in both English and te reo Māori, can be found in Appendices 5 and 6.

**METHODS**

**Research model and study design**

*Figure 6.1* illustrates the final research model, as introduced in *Chapters 1 and 2*, and further examined and updated in *Chapter 3*. Here, the model includes the specific survey question numbers (indicated by Q) that are included in the analysis of the survey. These questions are fully described in the methods and results section of this chapter.

It was decided that reporting survey results by ethnicity would be inappropriate in the context of this research. One reason for this is because, as reported by Carter et al. (Carter, Hayward, Blakely, & Shaw, 2009), ethnicity can be dynamic, not static. For example, Māori and Pacific people in NZ are more likely than others to report multiple ethnic affiliations (Carter et al., 2009) as NZ is one of a few countries that allows citizens to self-report multiple ethnicities. Research shows that the way one’s ethnicity is viewed can be associated with health risk or disadvantage, and therefore is a determinant of health (Cormack et al., 2013; Harris et al., 2013). It follows, then, that reporting findings of transport and well-being by ethnicity may report an inequitable distribution of health determinants, when in fact that is not the case. Additionally, interpreting the results from a Māori health standpoint is beyond the scope of this thesis. Therefore, the ethnicity data collected was only used to describe the population, and comparisons were not made between ethnic groups.

The final study employed a cross-sectional design, providing an important snapshot of the relationship between transport and well-being among older adolescents in Southland, NZ, and mediating factors such as attachment and transport access. Cross-sectional
studies have many advantages, including that they are cost-effective, can contain multiple measures at a single point in time, and that many different findings and outcomes can be analysed in order to create other studies or other in-depth research. Since this is a new area of research, it requires thorough description prior to an in-depth study, and this approach is warranted.

Figure 6.1 Final research model

Overview of survey design

The survey was created using Qualtrics software, as previously described in Chapter 4 ("Qualtrics," 2013; Ward et al., 2016), for which the University of Otago has a licence
for student and staff use. The main survey was designed to be opt-in and voluntary, just like the pilot survey. While some questions were amended after the pilot survey, as described in Chapter 4, the main survey contained the same question formats, the same use of personalised invitations, incentives, and reminder emails used previously (Fan & Zheng, 2010; Fricker & Rand, 2002; Laguilles, Williams, & Saunders, 2011; Ward et al., 2016).

Sampling and recruitment

Schools

Southland, NZ includes three school districts: Southland, Gore, and Invercargill. Each principal at all thirteen secondary schools in Southland was sent a letter offering information about the survey and requesting participation (Appendix 7). A follow up phone call was made to those who did not respond. Twelve of the thirteen schools agreed to allow the researcher access to their students, either in class or at a senior assembly. One school abstained due to lack of time to commit to the survey. Prior to the survey, each principal was visited in person to discuss the method most suitable to them, the dates of the survey roll-out, and any other details of concern or interest. Eight schools chose the in-class method of survey delivery, and four chose the at-home method. These methods were previously detailed in Chapter 4.

Respondents

In all of the twelve of participating Southland secondary schools, classes of senior students aged 15 years and older (Year 12 and 13) were deliberately targeted, in order to capture mostly respondents old enough to obtain at least the first stage of a driving licence (aged 16 years in NZ). This meant that, theoretically, most respondents had access to all transport modes. The 12 participating schools included a total of 1,684 Year 12 and 13 students (Education Review Office, 2016).
Survey distribution, procedures, and consent

Like the pilot study, personalised invitation emails containing the survey links were emailed to potential respondents. In NZ, those aged 16 and over can give consent. Consent was given online after participants had read the information page of the survey, procedures that were approved by the University of Otago Human Ethics Committee (reference # 14/163). For the in-class method, student email addresses were provided by the schools directly. Students were sent an invitation to the survey via Qualtrics on the day the survey was to take place, and students accessed their email during class time to complete the survey. During the in-class method, students were not left on their own, because during the pilot, there were some instances where a student could not find the invitation to the survey in their email because it ended up in their trash or spam folders. In these instances, students were advised to look in these files, and if the survey link was still not found, a new invitation was emailed on the spot.

For the at-home delivery method, student email addresses were collected directly from interested students, at approved senior assemblies that were scheduled in advance. These students were either sent an invitation to the survey, or directed to the study’s Facebook page to access the survey link, per students’ request via the consent form. The Facebook option was added per the pilot survey results, and was approved by the University of Otago Human Ethics Committee through the amendment process.

Procedures

Online survey

Like with the pilot survey, the main survey was administered online using Qualtrics ("Qualtrics," 2013). After the survey invitations were sent, reminder emails were sent via Qualtrics twice for non-responders, the same as during the pilot survey. The Qualtrics tool proved valuable as it allowed for randomisation of response lists, different question formats to maintain interest, and “skip logic” which personalised each survey depending on each individual’s responses to certain questions. For example, if a respondent ticked that they did not have a driver’s licence, they were directed to a question that asked them why not. It also allowed for the easy export of data into Excel for later upload into a statistics programme, decreasing human error in the transfer of data. As in the pilot study,
Chapter 6 Survey methods and descriptive survey results

the survey included six main sections: basic information, friends and family, hobbies and activities, how you get around, driving licence, and miscellaneous. Participants worked through the survey sections sequentially. While participants were encouraged to answer every question, questions could be skipped.

Pre-testing
In addition to the comprehensive pilot study described in Chapter 4 (Ward et al., 2016), the final version of the survey was submitted to colleagues and friends for a final “once-over” to gauge any additional feedback prior to dissemination to participants.

Survey measures

The final survey described in this chapter consisted of 50 questions, 36 of which were offered to all respondents and 14 of which were offered to respondents based on their answers. Many measures were included, allowing for cross-sectional examination of both physical and mental health associated with involvement in activities, connection with family and friends, and access to key destinations, as well as consideration of transport habits and reasons for those habits. However, only the questions that directly relate to the research aims of this thesis, and any pertinent score developed from those questions, are discussed in this chapter, and included in analysis. Remaining data will be addressed later, either by sharing it with others to be used as a secondary data source, as part of a future project, or as part of a post-doctoral project.

Cronbach’s alpha was used to assess the internal consistency of likert scale measures and combined score measures used in analysis, and it is most commonly used to check that likert scale questions are reliable (Bland & Altman, 1997). Cronbach’s alpha is scored on a scale of zero to one. Research in the social sciences specifies that a Cronbach’s alpha below 0.5 is unacceptable, and a score between 0.65 and 0.8 (and often higher) indicates a scale with good internal consistency of measurement. Cronbach’s alpha is reported where appropriate in tables, but not in text.
Demographic measures

School attended (question 6)
The overall characteristics of the twelve participating schools were as follows (Ministry of Education, 2014; New Zealand Ministry of Education, 2006; Statistics New Zealand, 2013c):

Type of school. There were three types of schools included in this study: co-educational, single sex boys, Kura Kaupapa. There was a single sex girls’ school in Southland which chose not to participate. Some schools include ‘boarding’ facilities so students can live there during the school term. While there are private schools in NZ, no private schools were included in this study.

Geographical location. Rural and urban, as defined by Statistics New Zealand population numbers.

Composition (levels). There were two types considered: secondary, and composite (levels 9-13, 1-13, respectively). Levels 12-13 corresponds with the age range of 15-19 years (older adolescents), the target of this research.

Decile level. In NZ, deciles are a measure of the socio-economic position of students in a school, relative to other schools. It is measured on a scale of 1-10. A measure of “1” designates a school has the highest percentage of students from low socio-economic areas, and a measure of “10” designates a school has the highest percentage of students from high socio-economic areas. Deciles measures are only used to designate funding; the lower a school’s decile, the more funding they receive (Ministry of Education, 2014). These levels are often referred to as low (1-3), medium (4-7), and high (8-10). All were considered in this study.

Institutional authority. There were two types of institutional authorities included: state and state integrated. State schools are funded by the government, and the majority of NZ children (85%) attend state schools (New Zealand Ministry of Education, 2006). Schooling is free at these schools, although parents are asked for a contribution to help cover costs of activities that are outside of the core curriculum (typically this will be around NZ$250- $500). State integrated schools are schools with a special character -
they may be run by a particular religious faith, or use specialist education methods.
Education in state integrated schools is also funded by the government but the schools
may charge fees for various facilities which are usually around NZ$1,500 a year (New
Zealand Ministry of Education, 2006). Both types were included in this study.

Age, gender and ethnicity (questions 3, 4, 6, 43, and 44)
Respondents were asked demographic questions about their age, gender, school, and
ethnicity. The ethnicity queries were identical to that used by the NZ Census (Statistics
New Zealand, 2013d). The first ethnicity question asked respondents “Which ethnic
group do you belong to? Tick all that apply to you”. NZ allows for self-perceived
identification with more than one ethnicity, and defines ethnicity as the ethnic group or
groups that people identify with or feel they belong to. Ethnicity is a measure of cultural
affiliation, as opposed to race, ancestry, nationality or citizenship. Ethnicity is self-
perceived and people can belong to more than one ethnic group (Statistics New Zealand,
2013d). The second ethnicity question, meant to mediate the first, was “Are any of your
parents, grandparents or great-grandparents Māori?”

Geographic location (question 47)
At the end of the survey, respondents were asked for their main home address. This was
defined for them as “where they spend the most time”. This question was meant to aid in
directly assessing the distance respondents travelled to and from school and any impact
that may have had on their transport behaviour and well-being.

Well-being measures

The two main outcome measures in this study were life satisfaction and self-perceived
strengths. These outcomes were measured by two questions, both previously existing and
validated, and all resulting in continuous data. Details about the outcome measures are
described below in text, and in Table 6.1.

Respondents were asked: “Now I’d like to know how you feel about your life. Right now,
how do you feel about ...” to assess life satisfaction, using the ‘Life Satisfaction Scale’
(Olsson et al., 2012). They were presented with a list of ten situations to gauge with
regard to satisfaction, on a four point Likert scale including “Very happy”, “Happy”,

Chapter 6 Survey methods and descriptive survey results
“Unhappy”, “Very unhappy”. By default these responses were automatically assigned points: one, two, three, and four points, respectively. For purposes of descriptive analysis, the scale was reverse coded, so that if respondents gauged their feeling about a situation as “Very Happy”, they received a score of four. Consequently, “Happy” resulted in a score of three, “Unhappy” resulted in a score of two, and “Very unhappy” resulted in a score of one. This re-coding of the point scale was done so that well-being measures consistently reported a higher score, related to higher levels of well-being. As there were ten items respondents needed to rank for this question on a scale of 1-4, the highest possible score they could achieve was a Life Satisfaction Score of 40.

The second well-being measure, self-perceived personal strengths, was assessed by using the validated ‘Strengths Questionnaire’ measure (McGee et al., 2011). The question was posed as, “Now I'd like to ask you some questions about you and how you see yourself. Which of the following words describe you? Please choose as many or as few as fit you”. Respondents were offered a list of 22 items and asked to tick which strengths they perceived themselves as having. The list of strengths were randomly ordered for each respondent to address the problem of order bias, taking into account the fact that respondents tend to favour responses at the beginning and at the end of response lists, and that first items are often chosen by respondents to save time (Fricker & Rand, 2002), as discussed in Chapter 4. This resulted in a Strengths Score scale of 0-22 points.
Table 6.1 Well-being measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question number</th>
<th>Question</th>
<th>Response Scale</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life satisfaction scale</td>
<td>12</td>
<td>“Now I’d like to know how you feel about your life. Right now, how do you feel about …”</td>
<td>0-40</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Your school</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>The people you go to school with</td>
<td></td>
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<td></td>
<td></td>
<td>Your independence</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Your social life</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>The money you have to spend on things</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Your ability to get on with people</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Your spare time activities</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Your standard of living</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>The future</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Your life as a whole</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>“Now I’d like to ask you some questions about you and how you see yourself. Which of the following words describe you? Please choose as many or as few as fit you?”</td>
<td>0-22</td>
<td>0.87</td>
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<tr>
<td></td>
<td></td>
<td>Friendly</td>
<td>1 point for each item ticked</td>
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<td></td>
<td></td>
<td>Trustworthy</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Good with pets/animals</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Healthy</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Reliable</td>
<td></td>
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<td></td>
<td></td>
<td>Good sense of humour</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Helpful</td>
<td></td>
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<td></td>
<td></td>
<td>Easy going</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Kind</td>
<td></td>
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<td></td>
<td></td>
<td>Careful</td>
<td></td>
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<td></td>
<td></td>
<td>Independent</td>
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<td></td>
<td></td>
<td>Lively</td>
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<td></td>
<td></td>
<td>Lots of common sense</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Good at sports</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Confident</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Outgoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Popular</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Affectionate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lots of interests and hobbies</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Creative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good at music/art</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Attractive</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Attachment measures**

**Peer and family attachment (questions 11 and 14)**

Respondents were asked questions about their relationship with friends and family (Table 6.2). The existing validated measures originated from the ‘Peer and Parent
Attachment Survey’ (Armsden & Greenberg, 1987; Raja et al., 1992). The question about friends was posed as, “How well do the following statements describe your relationship with your friends?” The question about family was posed as, “How well do the following statements describe your relationship with your family/whanau?”

Respondents were presented with a list of statements with regard to peer and parental attachment, from four choices: “Always true/ Almost always true”, “Often true”, “Sometimes true” and “Never true/ Almost never true”. As with the ‘Life Satisfaction Scale’, the peer attachment question scale was reverse coded so that if respondents chose “Always true/ Almost always true”, it resulted in a score of four, “Often true” resulted in a score of three, “Sometimes true” resulted in a score of two, and “Never true/ Almost never true” resulted in a score of one. Again, this re-coding was done so that attachment-related measures consistently reported that a higher score related to higher levels of attachment. One exception to this re-coding process for attachment measures was with the solitary negative statement in the peer attachment question, “I get upset a lot more than my friends know about”. This question was coded inversely, with “Always true/Almost always true” scored as one, “Often true” scored as two, “Sometimes true” scored as three, and “Never true/ Almost never true” scored as four.

There were seven items in the peer attachment question, scored 1-4. Thus a 28 point Peer Attachment Score emerged. As there were four items in the family attachment question on a scale of 1-4, a 16 point Family Attachment Score was created.
Table 6.2 Attachment measures (peer and parental)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question number</th>
<th>Question</th>
<th>Response Scale</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer attachment</td>
<td>11</td>
<td>“How well do the following statements describe your relationship with your friends?”</td>
<td>0-28</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>My friends listen to what I have to say</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>I like to get my friends’ point of view on things I’m concerned about</td>
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<tr>
<td></td>
<td></td>
<td>My friends are concerned about my well-being</td>
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<tr>
<td></td>
<td></td>
<td>When I’m angry about something, my friends try to be understanding</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>I tell my friends about my problems and troubles</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>I get upset a lot more than my friends know about</td>
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<td></td>
<td></td>
<td>I feel my friends are good friends</td>
<td></td>
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<td></td>
<td></td>
<td>Always true/Almost always true=4</td>
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<td></td>
<td></td>
<td>Often true=3</td>
<td></td>
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<td></td>
<td></td>
<td>Sometimes true=2</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Never true/Almost never true=1</td>
<td></td>
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</tr>
<tr>
<td>Family attachment</td>
<td>14</td>
<td>“How well do the following statements describe your relationship with your family/whanau?”</td>
<td>0-16</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I like to spend free time with my family/whanau</td>
<td></td>
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<td></td>
<td></td>
<td>We can easily think of things to do together as a family/whanau</td>
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<tr>
<td></td>
<td></td>
<td>My family/whanau ask each other for help</td>
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<tr>
<td></td>
<td></td>
<td>My relationships with my parents are good</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Always true/Almost always true=4</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Often true=3</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Sometimes true=2</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Never true/Almost never true=1</td>
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</tr>
</tbody>
</table>

*The asterisk indicates that this item is scored inversely as “Always true/Almost always true”=1; “Often true”=2; “Sometimes true”=3; “Never true/Almost never true”=4

Leisure and community activities (questions 15, 16, 17, 18, 49, 50)

Respondents were asked about the activities and hobbies they participated in during the previous month, as a measure of attachment (Table 6.3). These activities and hobbies were grouped into four categories: sports activities (such as team sports and sporting events); cultural activities (for example, creative activities and/or involvement in the arts); social/leisure activities; and community activities (for example, clubs outside school, volunteering, and part time jobs). These four categories were represented by four separate questions, based on other validated surveys (Kamargianni et al., 2012; Olsson...
et al., 2012). Respondents were also queried about the activities of screen time and physical activity (i.e. exercise).

For the first category, respondents were asked “In the last month, how often did you participate in or attend the following sport-related or outdoor activities?”, and offered a list of 12 such activities to choose from. To explore the second category, respondents were asked, “In the last month, how often did you participate in or attend the following cultural activities?”, and offered a list of nine activities to choose from. The third query, about social activities, asked “In the last month, how often did you take part in the following social/leisure activities?” with seven possible choices. Finally, civic and community activities were gauged by “In the last month, how often were you involved in any of the following community activities?” with seven possible activities to choose from. They were allowed to tick as many activities as they wished in each category. Respondents gained one point per activity if they attended an activity one or more times per month. As with the self-perceived strengths measure, the four activity questions included randomisation of the possible selections to address order bias (Fricker & Rand, 2002).

Activity questions were converted into five activity scores. These scores were simply the number of activities they ticked in each section. A Sports Score was developed, (on a scale of 0-12), a Cultural Score (on a scale of 0-9), a Social Score (on a scale of 0-7), and a Civic/Community Score (on a scale of 0-7). These scores were developed to allow for the comparison of activity participation with other measures.
Table 6.3 Attachment measures (activities)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question number</th>
<th>Question</th>
<th>Response Scale</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sporting activities</td>
<td>15</td>
<td>“In the last month, how often did you participate in or attend the following sport-related or outdoor activities”</td>
<td>≥1 times=1</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Any team sport (game or match))</em></td>
<td>Never=0</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>(Any team practice)</em></td>
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<tr>
<td></td>
<td></td>
<td><em>(Sporting event (for example at stadium or velodrome))</em></td>
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<td></td>
<td></td>
<td><em>(Athletics (weight lifting, cycling or running))</em></td>
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<td></td>
<td></td>
<td><em>(Skateboarding)</em></td>
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<td><em>(Tramping)</em></td>
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<tr>
<td></td>
<td></td>
<td><em>(Ice sports (curling, skating, hockey))</em></td>
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<tr>
<td></td>
<td></td>
<td><em>(Water sports (rowing, kayaking, surfing, swimming, etc))</em></td>
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<td></td>
<td></td>
<td><em>(Hunting/shooting)</em></td>
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<td><em>(Equestrian activities)</em></td>
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<td></td>
<td></td>
<td><em>(Racquet sports (tennis, badminton, etc))</em></td>
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<tr>
<td></td>
<td></td>
<td><em>(Martial arts)</em></td>
<td></td>
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</tr>
<tr>
<td>Cultural activities</td>
<td>16</td>
<td>“In the last month, how often did you participate in or attend the following cultural activities?”</td>
<td>≥1 times=1</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Singing (in a band, choir, etc))</em></td>
<td>Never=0</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>(Dancing)</em></td>
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<td></td>
<td></td>
<td><em>(A concert/music/dance event)</em></td>
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<td></td>
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<td><em>(An art or theatre event)</em></td>
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<td></td>
<td></td>
<td><em>(Painting, sculpting or drawing)</em></td>
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<td></td>
<td></td>
<td><em>(Played an instrument)</em></td>
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<td></td>
<td></td>
<td><em>(Performed in a kapa haka)</em></td>
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<tr>
<td></td>
<td></td>
<td><em>(Visited a place of worship)</em></td>
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<tr>
<td></td>
<td></td>
<td><em>(Visited a marae)</em></td>
<td></td>
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</tr>
<tr>
<td>Social or leisure activities</td>
<td>17</td>
<td>“In the last month, how often did you take part in the following social/leisure activities?”</td>
<td>≥1 times=1</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Went to the movies)</em></td>
<td>Never=0</td>
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<tr>
<td></td>
<td></td>
<td><em>(Visited a beach)</em></td>
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<tr>
<td></td>
<td></td>
<td><em>(Visited a park)</em></td>
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<td></td>
<td></td>
<td><em>(Went shopping)</em></td>
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<td></td>
<td></td>
<td><em>(Went somewhere with a group of friends)</em></td>
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<td></td>
<td></td>
<td><em>(Attended a party)</em></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>(Went to the public library)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community/Civic activities</td>
<td>18</td>
<td>“In the last month, how often were you involved in any of the following community activities?”</td>
<td>≥1 times=1</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Club or leadership role at school)</em></td>
<td>Never=0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Volunteer or charity organization)</em></td>
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<td></td>
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<td></td>
<td></td>
<td><em>(Church group)</em></td>
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<td><em>(Club outside of school)</em></td>
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<tr>
<td></td>
<td></td>
<td><em>(Leadership role outside of school)</em></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Scouts/Guides/Brigade)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(A paid job)</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Questions about TV and internet use (Table 6.4) were included from the NZ ‘2012 Youth Insights Survey’ (Health Promotion Agency, 2012), as screen time has been found to be inversely associated with mental health indicators (Trinh et al., 2015; White, 2013). This question was adapted from validated measures, and based on findings from the Chapter 4 pilot study, was combined into one question that covered the amount of time spent on television and the internet (i.e. all screen time combined). It read “On average, how many HOURS PER DAY would you say you spend on the Internet and watching TV combined? Please enter a number between 0-24 hours per day.” According to the NZ Ministry of Health, young people should spend no more than two hours per day looking at screens (this includes phones, tablets, computers and television) (Ministry of Health, 2007). Therefore, respondents’ self-reported screen time use was re-coded and dichotomised into two categories: meets guidelines (2 hours or less) and exceeds guidelines (3 hours or more). Thus a Screen Time Score of 0-1 was developed (0=no, 1=yes), to indicate whether or not respondents met or exceeded screen time guidelines.

A single-question physical activity query, previously used elsewhere, was included to quickly address physical health (Milton et al., 2011; Richards et al., 2015), asking “In the past week, on how many DAYS have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate? This may include sport, exercise, and brisk walking or cycling for recreation or to get to and from places, but should not include physical activity that may be part of your daily routine or part of your job. Please enter a number between 0-7 days per week.” According to the NZ Ministry of Health, young people should spend 60 minutes or more of moderate to vigorous physical activity each day (Ministry of Health, 2010). However, some literature reports that guideline to be 30-60 minutes on most days of the week (Garcia et al., 2016; Troiano et al., 2007). In keeping with the format of the question asked, and defining ‘most days of the week’ as 4 or more days, for the purpose of this study, respondents’ self-reported physical activity was dichotomised into two categories for analysis: meets guidelines (4 days or more per week) and does not meet guidelines (3 days or less per week). Thus a Physical Activity Score of 0-1 was developed (0=no, 1=yes), to gauge if a respondent was meeting physical activity requirements.
Table 6.4 Attachment measures (screen time and physical activity)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question number</th>
<th>Question</th>
<th>Response Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen time</td>
<td>49</td>
<td>“On average, how many HOURS PER DAY would you say you spend on the Internet and watching TV combined? Please enter a number between 0-24 hours per day.”</td>
<td>0= no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1= yes</td>
</tr>
<tr>
<td>Physical activity</td>
<td>50</td>
<td>“In the past week, on how many DAYS have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate? This may include sport, exercise, and brisk walking or cycling for recreation or to get to and from places, but should not include physical activity that may be part of your daily routine or part of your job. Please enter a number between 0-7 days per week.”</td>
<td>0= no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1= yes</td>
</tr>
</tbody>
</table>

Access measures

Transport habits, transport frustration, and the school uniform (questions 8, 28, and 42)

Queries about transport habits can be found in Table 6.5. Transport questions were adapted from existing surveys (Kamargianni et al., 2012; Schoettle & Sivak, 2013). However, as this is a new research area, some questions were unique and written by the researcher. To start with, respondents were asked how they got around in the past month, “In the last month, which of these have you used to get to places? Tick as many as apply to you.” The wording of the question was meant to gather data on travel modes used for transport, and was advised by the pilot study. The potential responses included eight choices: school bus, public bus, walking, cycling, skateboarding, car (as driver), car (as passenger), and motorbike/scooter. They could tick as many as they wanted.

Overall frustration about transport was examined with question 28, “In the last month, how often have you been frustrated because you can’t get where you want to go?” This was an original question. Respondents could choose from four choices: “Never”, “1-3 times”, “4-6 times” and “More than 6 times”. Later, it was deemed that the amount of
times per month that a respondent felt frustrated was not useful, nor easy to analyse, and question 28 was ultimately dichotomised into two categories. “Never” was kept the same, but “1-3 times”, “4-6 times”, and “More than 6 times” were combined into one score labelled “Sometimes”. This created a Transport Frustration Score of 0-1 (0=“never frustrated”; 1=“sometimes frustrated”).

Based on results from the photovoice study that found uniforms to be a deterrent to cycling, the survey included a question that asked, “Does wearing a uniform affect what transport mode you choose to get around during the week?” Those who chose “yes” were given room to elaborate.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question number</th>
<th>Question</th>
<th>Response Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport modes</td>
<td>8</td>
<td>“In the last month, which of these have you used to get to places? Tick as many as apply to you.”</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>School bus</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public bus</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Walking</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cycling</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skateboarding</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Car (as driver)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Car (as passenger)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motorbike or scooter</td>
<td></td>
</tr>
<tr>
<td>Transport frustration</td>
<td>28</td>
<td>“In the last month, how often have you been frustrated because you can’t get where you want to go?”</td>
<td>0-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Never</td>
<td>0=never frustrated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-3 times</td>
<td>1=sometimes frustrated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-6 times</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 6 times</td>
<td></td>
</tr>
<tr>
<td>School uniform</td>
<td>42</td>
<td>“Does wearing a uniform affect what transport mode you choose to get around during the week?”</td>
<td>0-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0=no</td>
<td>0=no</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=yes</td>
<td>1=yes</td>
</tr>
</tbody>
</table>
Licensing (question 33), access to key destinations (questions 10 and 42), and personal income (question 48)

Respondents were asked about their licence status, how they accessed key destinations, and their personal income (Table 6.6). Including measures about licensing were intended to evaluate whether or not respondents could drive themselves, and therefore was a measure of ability to access, and to some extent autonomy (Delbosc & Vella-Brodrick, 2015). Respondents were asked, “What sort of driver's licence do you have?” (Schoettle & Sivak, 2013). Respondents could choose one of four options: “I don’t have any sort of licence” (a score of 1); “I have my learners permit” (a score of 2); “I have my restricted licence” (a score of 3); or “I have my full licence” (a score of 4). These scores are categorical and were used to differentiate between levels of licensing during analysis.

Knowing their home address allowed for assessment of any impact location may have had on their transport habits and well-being (Villanueva et al., 2012), so respondents were asked, “What is your MAIN home address, where you spend the most time? Please type your street address here. (Note: I only want to know how far you live from the town centre - your address will NOT be used to identify you!” Collecting the participants’ home addresses as part of the survey demographic data made it possible to explore where participants live in relation to their school, and the closest city, to determine their access to key destinations. Ascertaining this information also allowed the opportunity to put respondent data into context during analysis, especially when faced with seemingly illogical results. Addresses were entered into Google Map© individually, to gauge how far each respondent lived from the nearest city centre. City centres were defined as Invercargill (population 50,000) and Gore (population 12,000), the two largest cities in Southland, whichever was closer to the respondent’s home address. Those who were boarders (lived in school dormitories during the school year) gave their school address as their home address.

Research has found that young people find about two kilometres (km) an acceptable distance for walking, and 12 km an acceptable distance for cycling (Chillon, Panter, Corder, Jones, & Van Sluijs, 2015; Heinen, van Wee, & Maat, 2010; Rodríguez-López et al., 2017). Therefore, respondents’ self-reported distance lived from the nearest urban centre was coded and grouped into three categories: “3 km or less” (easy access - score of 1); “between 4 and 12 km” (satisfactory access - score of 2); and “13 km or more”
(difficult access, must rely on passive transport - score of 3). Passive transport in the context of this research is defined as using a car or bus to travel. Therefore distance scores were assigned on a scale of 1-3.

A single query income question was included, as the literature shows that income increases children's welfare, and therefore affects well-being (OECD, 2013). The questions asked, “In the past week, how much money did you have to spend on yourself and the things you wanted to do?” with eight choices for income range possible, adapted after the pilot study (Health Promotion Agency, 2012): $0 (score of 1); $1-10 (score of 2); $11-20 (score of 3); $21-30 (score of 4); $31-40 (score of 5); $41-50 (score of 6); $51-99 (score of 7); and over $100 (score of 8). Thus they received a score on a scale from 1-8.

Table 6.6 Access measures (licence status and income)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question number</th>
<th>Question</th>
<th>Response Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensing</td>
<td>33</td>
<td>“What sort of driver’s licence do you have?”</td>
<td>1-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I don’t have any sort of licence</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I have my learners permit</td>
<td>1=none</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I have my restricted licence</td>
<td>2=learner</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I have my full licence</td>
<td>3=restricted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4=full</td>
</tr>
<tr>
<td>Distance to closest</td>
<td>42</td>
<td>“What is your MAIN home address, where you spend the most time? Please</td>
<td>1-3</td>
</tr>
<tr>
<td>urban centre</td>
<td></td>
<td>type your street address here”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1= walkable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2= can cycle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3=need PT*</td>
</tr>
<tr>
<td>Income</td>
<td>48</td>
<td>“In the past week, how much money did you have to spend on yourself and</td>
<td>1-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the things you wanted to do?”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1=$0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2=$1-10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3=$11-20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4=$21-30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5=$31-40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6=$41-50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7=$51-99</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8=Over $100</td>
</tr>
</tbody>
</table>

*=passive transport
Feedback of results to schools

After the descriptive analysis was completed, a two-page report was mailed to each participating school’s principal (see Appendix 8 for an example).

Analysis

Descriptive statistics

Data were cleaned, and descriptive findings were analysed, using Stata (StataCorp. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP2013) (StataCorp, 2017) and included frequencies and proportions for the measures of interest included in the analysis. Means, ranges of observed values (min/max) and standard deviations (SD) were reported where appropriate, along with the number of responses. Unpaired t-tests (indicated by $t$) were performed on the mean values of scores to assess differences by gender and were reported in the text if statistically significant. Pearson’s chi-squared tests (indicated by $\chi^2$) were performed on categorical data, also to assess associations by gender. All statistically significant $p$-values ($p<0.05$) were reported in the text. In his book, John Harraway (Harraway, 1993) describes the Central Limit Theorem, stating that “even if the population distribution is not normal, the sample averages will be approximately normally distributed if the sample size $n$ is large” (page 90). Thus, the sample sizes that answered each question are provided along with the mean values, ranges, and SD, in order to assure the reader that there is a relatively large sample associated with each test.

Multiple linear regression

The regression process and results are detailed in Chapter 7.
Chapter 6 Survey methods and descriptive survey results

DESCRIPTIVE RESULTS

Data cleaning

A small amount of data cleaning was necessary. A minor issue was that the age variable required attention. The survey offered respondents five options for age: 15, 16, 17, 18 and 19 years. There were only 17 respondents who reported being 18 years old, and just one who reported being 19 years old. Thus the age category was collapsed to three groups for regression analysis: 15, 16, and 17+ years.

Two respondents reported gender and school seemingly incorrectly. One respondent reported to be female, but attended an all-boys school, and the other reported to be male and attended an all-girls school. After comparing the dates of the responses against the school survey roll-out schedule, it could confidently be concluded both respondents in question were, in fact, from the all-boy school that participated. This was confirmed by the fact that the only all-girls school in the region declined to participate. It is possible that the respondent in question in fact identified as female. However, gender was corrected to male in the first case, and the school was corrected to the all-boys school in the second case. This brings up an important issue for consideration during survey research. Recent studies look at the impact of mischievous or “jokester” respondents that is inherent in survey research among adolescents (Savin-Williams & Joyner, 2014). Adolescent boys are more likely to give inaccurate “joke” answers than adolescent girls, and research also shows that jokester adolescents are more likely to report extreme levels of high-risk or problem behaviours (Savin-Williams & Joyner, 2014). Because this survey did not ask respondents to report high-risk behaviour, it is likely this was not a large problem in the current study; however, the possibility needs to be acknowledged.

Demographic measures

Characteristics of the study sample

Of the thirteen secondary schools in Southland, twelve schools participated in the study, for a school response rate of 92%. Table 6.7 presents the characteristics of these
participating schools. Most schools were co-educational (a mix of boys and girls). One was an all-boys school, and one was a Kura Kaupapa (Māori immersion) school. Both urban and rural schools were included, and most were state schools. Half of the schools were designated as medium decile (Ministry of Education, 2014).
Table 6.7 Responding schools (n=12)

<table>
<thead>
<tr>
<th>Type of school</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-educational</td>
<td>10</td>
<td>92</td>
</tr>
<tr>
<td>Boys</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Kura Kaupapa</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Institutional authority</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>11</td>
<td>92</td>
</tr>
<tr>
<td>State integrated</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Decile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (1-3)</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Medium (4-7)</td>
<td>6</td>
<td>50</td>
</tr>
<tr>
<td>High (8-10)</td>
<td>4</td>
<td>33</td>
</tr>
<tr>
<td>Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>7</td>
<td>58</td>
</tr>
<tr>
<td>Rural</td>
<td>5</td>
<td>42</td>
</tr>
</tbody>
</table>

The schools included a total of 1,684 Year 12 and 13 students (Education Review Office, 2016). Due to students being absent from class on the day of the survey or level assembly visit, there was direct access to just over two-thirds of Year 12 and 13 students (n=1,084). Table 6.8 reports that 775 respondents participated in the online survey (49% male); eleven surveys did not include age or gender information, and were excluded from analysis and are not included in this number. All participants were from Years 12 and 13, in an attempt to capture those aged 16-19 years of age. Over two-thirds of respondents were from urban-placed schools. Gender was roughly evenly dispersed within urban schools, but not within rural schools (male=46.2%).

Eighty-five percent of survey respondents self-identified as NZ European, while 19.5% percent of the total survey respondents self-identified as Māori, via the NZ Census ethnicity question included in the survey (Statistics New Zealand, 2013a). The average age of respondents was 16.7 years. See Table 6.8 for a full description of respondents.
Chapter 6 Survey methods and descriptive survey results

Table 6.8 Survey respondents (n=775)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>380</td>
<td>49.0</td>
</tr>
<tr>
<td>Female</td>
<td>395</td>
<td>51.0</td>
</tr>
<tr>
<td>Age (yrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>61</td>
<td>7.9</td>
</tr>
<tr>
<td>16</td>
<td>381</td>
<td>49.2</td>
</tr>
<tr>
<td>17</td>
<td>315</td>
<td>40.7</td>
</tr>
<tr>
<td>18</td>
<td>17</td>
<td>2.2</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>552</td>
<td>71.2</td>
</tr>
<tr>
<td>Rural</td>
<td>223</td>
<td>28.8</td>
</tr>
<tr>
<td>Ethnicity*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ European</td>
<td>592</td>
<td>85.1</td>
</tr>
<tr>
<td>Māori</td>
<td>136</td>
<td>19.5</td>
</tr>
<tr>
<td>Samoan</td>
<td>18</td>
<td>2.6</td>
</tr>
<tr>
<td>Cook Island Māori</td>
<td>17</td>
<td>2.4</td>
</tr>
<tr>
<td>Tongan</td>
<td>13</td>
<td>1.9</td>
</tr>
<tr>
<td>Niuean</td>
<td>6</td>
<td>0.9</td>
</tr>
<tr>
<td>Chinese</td>
<td>10</td>
<td>1.4</td>
</tr>
<tr>
<td>Indian</td>
<td>5</td>
<td>0.7</td>
</tr>
<tr>
<td>Other</td>
<td>66</td>
<td>9.5</td>
</tr>
</tbody>
</table>

*This measure adds up to more than 100% because per the NZ Census, respondents could self-identify as more than one ethnicity

**Characteristics of survey distribution**

Eight schools opted for the in-class method of survey distribution, and four schools opted for the at-home version. All surveys were completed online, and the average time to complete the survey was 16 minutes. The overall response rate was 71.5%.

The in-class method resulted in a better response rate (77.2%) than the at-home method (65.6%). Reminder emails increased response rate by 8.8%, and had a larger impact with the at-home method. While male and female respondents were roughly equally represented, the in-class survey delivery saw significantly more male respondents than females, while the opposite was true for the at-home method. See Table 6.9 for a full description of response rates. These were calculated based on the number of students there was access to (n=1,084).
Table 6.9 Response rates

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th></th>
<th>In-class method (549 invited)</th>
<th>At-home method (535 invited)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall response rate</td>
<td>775</td>
<td>71.5</td>
<td>77.2</td>
<td>65.6</td>
</tr>
<tr>
<td>Response rate by gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>380</td>
<td>49.0</td>
<td>62.3</td>
<td>33.0</td>
</tr>
<tr>
<td>Female</td>
<td>395</td>
<td>51.0</td>
<td>37.7</td>
<td>67.1</td>
</tr>
<tr>
<td>Increase in responses after reminder emails</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1st reminder</td>
<td>47</td>
<td>6.1</td>
<td>1.3</td>
<td>4.7</td>
</tr>
<tr>
<td>After 2nd reminder</td>
<td>21</td>
<td>2.7</td>
<td>1.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>8.8</td>
<td>4.5</td>
<td>14.1</td>
</tr>
</tbody>
</table>

Over three-quarters (77.5%) of the surveys were completed. Incomplete surveys were included in all results and analysis. More complete surveys resulted from the in-class method versus the at-home method (54% and 46%, respectively).

**Well-being measures**

The mean for life satisfaction was 31.6 overall, out of 40. The mean for strengths was 11.5 out of 22. The means and standard deviations of life satisfaction and self-perceived strengths are presented in Table 6.10, both overall and by gender.

Table 6.10 Means and standard deviation: Outcome measures

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th></th>
<th>Total</th>
<th></th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>Min/Max</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Life satisfaction*</td>
<td>761</td>
<td>31.6</td>
<td>4.5</td>
<td>10/40</td>
<td>32.0</td>
<td>4.5</td>
<td>31.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Self-perceived</td>
<td>765</td>
<td>11.5</td>
<td>5.4</td>
<td>1/22</td>
<td>11.7</td>
<td>6.1</td>
<td>11.3</td>
<td>4.8</td>
</tr>
</tbody>
</table>

* All tables including “Min/Max” refer to observed minimums and maximums
* = indicates a statistical significant difference between genders for this variable
The self-reported life satisfaction of all respondents is shown in Figure 6.2. Males reported a significantly higher mean life satisfaction than females ($t=2.59, p=0.011$).

Figure 6.2 Respondents' life satisfaction
While there were differences between the genders for self-perceived strengths, they were not statistically significant ($t=0.83$, $p=0.405$). The self-perceived strengths of all respondents are shown in Figure 6.3.

![Figure 6.3 Respondents' self-perceived strengths](image)
Attachment measures

Peer and parental attachment

Overall, the mean for peer attachment was 20.9 out of a possible 28, and females scored higher on the peer attachment scale than males, with means of 21.6 and 20.2, respectively. An unpaired t-test showed that difference to be statistically significant ($t = -5.19$, $p < 0.001$) between the genders for peer attachment. The mean and standard deviation of the overall levels of attachment are also presented in Table 6.11. Figures 6.4 and 6.5 illustrate respondents’ self-reported peer and parental attachment levels overall. The mean for parental attachment was 11.7 out of a possible 16, and while females exhibited a higher mean, it was not a statistically significant difference ($t = -0.40$, $p = 0.690$).

<table>
<thead>
<tr>
<th>Attachment</th>
<th>Total $n$</th>
<th>Total Mean</th>
<th>Total SD</th>
<th>Total Min/Max</th>
<th>Male Mean</th>
<th>Male SD</th>
<th>Female Mean</th>
<th>Female SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Attachment*</td>
<td>762</td>
<td>20.9</td>
<td>3.8</td>
<td>9/28</td>
<td>20.2</td>
<td>3.7</td>
<td>21.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Parental Attachment</td>
<td>751</td>
<td>11.7</td>
<td>2.9</td>
<td>4/16</td>
<td>11.7</td>
<td>2.8</td>
<td>11.8</td>
<td>3.1</td>
</tr>
</tbody>
</table>

* = indicates a statistical significant difference between genders for this variable
Figure 6.4 Respondents' peer attachment
Activities

Respondents reported the sporting, cultural, social and community activities they participated in, including screen time and overall physical activity, during the month prior to the survey. Thirteen percent of respondents met the recommended screen time guidelines of two hours per day or less set out by the NZ Ministry of Health (Ministry of Health, 2007). Fifty-seven percent of the sample met or exceeded weekly physical activity requirements of four or more days per week set out by the NZ Ministry of Health (Garcia et al., 2016; Ministry of Health, 2010; Troiano et al., 2007).

As shown in Table 6.12, the mean activity score was 15.8, out of 35 possible activities (sporting, cultural, social, and community), participated in during the last month. Unpaired t-tests showed significant differences between the genders for sporting
activities \((t=3.92, p<0.001)\), cultural activities \((t=-4.45, p<0.001)\), and social activities \((t=-3.28, p=0.001)\), but not community activities \((t=-0.20, p=0.839)\). The overall mean of screen time was 4.9 hours per day, and the overall mean of physical activity was 4.3 days of exercise per week. An unpaired \(t\)-test showed a significant difference between the genders for physical activity \((t=4.39, p<0.001)\), but not for screen time \((t=0.76, p=0.445)\).

### Table 6.12 Means and standard deviations: Respondents' activities

<table>
<thead>
<tr>
<th></th>
<th>Total (n)</th>
<th>Mean</th>
<th>SD</th>
<th>Min/Max</th>
<th>Total</th>
<th>Mean</th>
<th>SD</th>
<th>Min/Max</th>
<th>Male</th>
<th>Mean</th>
<th>SD</th>
<th>Female</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sports(^*)</strong></td>
<td>747</td>
<td>4.0</td>
<td>2.7</td>
<td>0/12</td>
<td>4.4</td>
<td>2.8</td>
<td>3.7</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cultural(^*)</strong></td>
<td>738</td>
<td>1.8</td>
<td>1.9</td>
<td>0/9</td>
<td>1.5</td>
<td>1.9</td>
<td>2.1</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social(^*)</strong></td>
<td>739</td>
<td>4.8</td>
<td>1.6</td>
<td>0/7</td>
<td>4.6</td>
<td>1.7</td>
<td>5.0</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Community</strong></td>
<td>735</td>
<td>2.5</td>
<td>1.8</td>
<td>0/7</td>
<td>2.5</td>
<td>1.9</td>
<td>2.5</td>
<td>1.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Screen time</strong></td>
<td>682</td>
<td>4.9</td>
<td>5.0</td>
<td>1/24</td>
<td>5.2</td>
<td>6.4</td>
<td>4.7</td>
<td>3.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td>677</td>
<td>4.3</td>
<td>2.1</td>
<td>0/7</td>
<td>4.7</td>
<td>2.1</td>
<td>4.1</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^*\) = indicates a statistical significant difference between genders for this variable

### Access measures

#### Transport habits

Respondents were asked how they had chosen to get around in the month prior to the survey. They could choose as many modes as they used. The most common mode of transport was being a passenger in a car, followed by walking (86.2% and 69.3%, respectively). The other modes used, in descending order, were driving (48.3%), school bus (42.8%), cycling (27%), public bus (11.3%), motorcycle (7.1%), and skateboarding (6.5%). Chi-squared tests were conducted for each transport mode. Significant associations existed between the genders for transport for six of the eight modes, including cycling \(\chi^2=14.14, p<0.001\), skateboarding \(\chi^2=11.35, p=0.001\), being a
passenger in a car ($\chi^2=10.056, p=0.002$), riding a motorcycle or scooter ($\chi^2=11.15, p=0.001$), using the school bus ($\chi^2=5.04, p=0.025$), and the public bus ($\chi^2=5.00, p=0.025$). The transport modes used by respondents during the preceding month are presented in Table 6.13 by gender.

**Transport frustration**

Respondents were asked how often in the past month they were frustrated because they couldn’t get where they wanted to go due to lack of access to transport. Half of respondents (50.5%) felt frustrated sometimes during the preceding month with regard to transport. Pearson’s chi-squared testing revealed significant associations, with females expressing more frustration than males ($\chi^2=15.93, p<0.001$).

**Licensing**

Respondents were asked what level of vehicle licence they had achieved thus far. The results were split roughly by thirds: one-third of respondents reported having no licence, one-third had their learner’s licence, and one-third had either their restricted or full licence. Unpaired t-tests were performed on the mean values ($t=-1.02, p=0.306$), and there were no significant differences between genders for licence status.
Table 6.13 Respondents’ transport habits

<table>
<thead>
<tr>
<th>Transport mode in the last month</th>
<th>Total n</th>
<th>Male %</th>
<th>Female %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>537</td>
<td>32.8</td>
<td>36.5</td>
</tr>
<tr>
<td>Cycle*</td>
<td>207</td>
<td>16.1</td>
<td>10.6</td>
</tr>
<tr>
<td>Skateboard*</td>
<td>50</td>
<td>4.6</td>
<td>1.8</td>
</tr>
<tr>
<td>Public bus*</td>
<td>87</td>
<td>4.3</td>
<td>7.0</td>
</tr>
<tr>
<td>School bus*</td>
<td>332</td>
<td>19.1</td>
<td>23.7</td>
</tr>
<tr>
<td>Drive</td>
<td>374</td>
<td>23.2</td>
<td>25.0</td>
</tr>
<tr>
<td>Passenger in car*</td>
<td>668</td>
<td>40.5</td>
<td>45.7</td>
</tr>
<tr>
<td>Motorcycle/Scooter*</td>
<td>55</td>
<td>5.0</td>
<td>2.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transport frustration in the last month*</th>
<th>Total n</th>
<th>Male %</th>
<th>Female %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never frustrated</td>
<td>308</td>
<td>51.3</td>
<td>36.4</td>
</tr>
<tr>
<td>Sometimes frustrated</td>
<td>397</td>
<td>48.7</td>
<td>63.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Licensing</th>
<th>Total n</th>
<th>Male %</th>
<th>Female %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No licence</td>
<td>247</td>
<td>36.6</td>
<td>33.7</td>
</tr>
<tr>
<td>Learner’s licence</td>
<td>248</td>
<td>36.6</td>
<td>34.1</td>
</tr>
<tr>
<td>Restricted licence</td>
<td>186</td>
<td>22.7</td>
<td>30.1</td>
</tr>
<tr>
<td>Full licence</td>
<td>22</td>
<td>4.1</td>
<td>2.2</td>
</tr>
</tbody>
</table>

* = indicates a statistical significant association between genders for this variable

Accessing key destinations

Respondents were asked to input their main home address during the survey. As previously described, distances from city centres were converted into scores that indicated whether the distances were walkable or accessible by cycling or by car (Table 6.14). Over one-third of respondents reported living within walking distance (less than or equal to 3 km) of the nearest city centre, almost a third lived within cycling distance (between 4-12 km), while a third lived within driving distance (more than 13 km away). There were no significant gender differences with respect to how far respondents lived from the closest city centre ($r=2.06, p=0.400$).
Table 6.14 Access to key destinations

<table>
<thead>
<tr>
<th>Distance from respondents’ homes to nearest city centre</th>
<th>n</th>
<th>Total %</th>
<th>Male %</th>
<th>Female %</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤3 km</td>
<td>220</td>
<td>33.6</td>
<td>35.8</td>
<td>31.6</td>
</tr>
<tr>
<td>4-12 km</td>
<td>192</td>
<td>29.1</td>
<td>32.1</td>
<td>26.8</td>
</tr>
<tr>
<td>≥13 km</td>
<td>243</td>
<td>37.1</td>
<td>32.3</td>
<td>41.6</td>
</tr>
</tbody>
</table>

**Personal income**

Respondents were asked how much money they had available to spend on themselves in the previous week. The average income range was $31-$40. Almost one-third of respondents reported having over $100 to spend in the previous week. Unpaired t-tests were performed on the mean values, and personal income did not differ significantly by gender ($t=0.71, p=0.480$).

**School uniform**

One out of ten female respondents reported their school uniform as a reason for not walking or cycling during the previous week. Significant associations existed between the genders ($\chi^2=6.05, p=0.01$).

**Missing values**

Complete data for all of the survey questions and their subsequent results were available for 81% of respondents ($n=634$). Stata was used to describe missing data within the measures of interest. Altogether, 98.6% of respondents ($n=775$) answered the demographic questions regarding gender, age, and school attended. With regard to well-being measures, 97% of respondents ($n=759$) answered both the life satisfaction and self-percieved strengths measures. With regard to attachment measures, 85% of respondents ($n=669$) answered all of the measures about peer and parental attachment and activities. Respondents were counted as missing in the well-being and attachment measures only if they failed to tick any items within each measure. Overall, 83% of respondents ($n=654$)
answered all of the access measures with regard to transportation modes used, transport frustration, licensing, the distance lived from the city centre, and personal income. Respondents were counted as missing only if they failed to tick any items on the response list about transport, or failed to enter distances when prompted. Overall, 132 respondents had missing values in this section of the survey.

**DISCUSSION**

The aim of this chapter was to *describe transport and well-being among older teenagers in Southland, NZ*, thus descriptive results are discussed here. In *Chapter 7*, further statistical analysis is completed, in order to make additional inferences about transport habits and their associations with well-being, to address the second aim of the thesis.

**Study sample**

It is likely the survey results are representative of Southland, NZ because 12 of all 13 secondary schools participated. At a glance, urban schools and urban schools students seem to have more representation in this study, as seven of the twelve participating schools were urban, and almost three-quarters of respondents reported being from urban schools. This is reflective of school rolls in Southland. Year 12 and 13 rolls for urban schools in Southland represent three-quarters of all Year 12 and 13 students in Southland (Education Review Office, 2016). Thus the percentage of the study sample from urban schools closely matched the population.

In the survey sample, the largest ethnic group represented was *NZ European*, followed by *Māori*. In NZ at the time this survey was distributed, 15% of all New Zealanders identified as Māori, 74% identified as NZ European, and the age group of 15-19 years made up 9.8% of the Māori population (Statistics New Zealand, 2013a). Māori are well-represented in this survey sample from Southland, especially considering that the majority of Māori live in the Auckland region of the North Island. Males and female respondents were roughly equally represented in survey responses, even though one of the largest schools to contribute to the survey was an all-boys school, and the one
abstaining school was the region’s only all-female school. Gender differences existed, though, by survey delivery method, and are discussed as follows.

**Survey delivery**

As with the pilot study in Chapter 4, in the main survey females had a slightly higher response rate than males. Interestingly, with the main survey, gender response rate varied based on the delivery method. With the in-class method, males had a much higher response rate than females (62.3% and 37.7%, respectively). This could be explained by the fact that the solitary all-boys school opted for the in-class method of survey delivery, a method proved in this study to have a higher response rate. However, the at-home method showed females had a higher response rate than males (67.1% and 33%, respectively). The at-home delivery method response rate result is more in keeping with the literature, which reports that generally males exhibit a lower survey response rate (Mitra et al., 2008; Sax et al., 2008). However, the literature about gender and response rate provides little in the way of reasons behind gender disparities in survey research.

As the pilot study demonstrated, reminder emails played an important role in the main study, especially for the at-home method, where respondents perceivably had less motivation to complete the survey and reminder emails increased response rate by 8.8%. Recent literature reports that reminder emails are more effective for increasing response rate the more you send (Van Mol, 2016). However, in this study, the largest increase was seen after the first reminder, and much less improvement in response rate was seen after the second one.

**Well-being measures**

**Life satisfaction**

With regard to life satisfaction, eight of every ten respondents said they were happy or very happy with various aspects of their life. The only exception was the money domain ("How happy are you with the amount of money you have to spend"), where about two-thirds of respondents reported being happy or very happy. These findings of relatively
high life satisfaction among the sample are supported by the literature, as in 2017, NZ ranked high on life satisfaction scales when compared to other OECD countries (Cordero, Salinas-Jimenez, & Salinas-Jimenez, 2017). The literature review in Chapter 2 reported that opinions are split as to whether or not gender differences exist in well-being overall, but it does report gender differences within life satisfaction specifically (Cordero et al., 2017; Inglehart, 2002). In the current study, males expressed higher mean life satisfaction than females. This is in direct contradiction to Chui and Wong, who found no difference between the genders for life satisfaction (Chui & Wong, 2016). However, some research shows that gender-related differences are sometimes concealed by age, and that younger females report higher levels of life satisfaction than young males, a comparison that reverses itself with age (Inglehart, 2002). A review chapter by Nolen-Hoeksema and Rusting found that gender differences are found in measures of well-being, but that they vary based on what aspect of well-being is being measured (Nolen-Hoeksema & Rusting, 1999). Goldbeck reported that males had higher levels of happiness and satisfaction (Goldbeck, Schmitz, Besier, Herschbach, & Henrich, 2007), while others report no gender differences (Casas et al., 2007; Froh et al., 2009; Huebner et al., 2004). These differing findings may be best explained by Chui and Wong, who postulate that even if one accepts the theory that gender has no effect on subjective well-being, it is quite possible that the formation of various factors of well-being fluctuates between the genders (Chui & Wong, 2016). This seems a reasonable supposition.

**Self-perceived strengths**

On average, respondents saw themselves as having about half of the possible strengths listed in the ‘Strengths Questionnaire’. The mean strengths for males were slightly higher than females. The most common strengths reported were being friendly and trustworthy. Over half of participants thought they were kind, helpful, reliable, independent, easy-going, and had a good sense of humour. Less than one-third of all respondents reported that they were popular, attractive, or good at art and music. In 1991, Williams and McGee found a mean strength score of 14.6 among their teenage sample in NZ, and in their 2012 paper, McGee et al. reported a mean strength score of 14.4 among the same sample (who were by then adults), using the same strength measure, reflecting a 2% difference from adolescence to adulthood (McGee et al., 2011; Williams & Mcgee, 1991). These means are higher than in the current study. While it isn’t possible to directly
compare the Williams and McGee results with this sample, it may be reasonable to speculate that self-perceived strengths are changing. Comparing that sample with the sample of the current study demonstrates a marked drop in strengths over time. A 2004 study found that in the UK and the U.S., subjective well-being and life satisfaction were on the decline in general (Blanchflower & Oswald, 2004). This downward trend requires more research.

**Attachment measures**

**Peer and parental attachment**

Eight of every ten respondents thought that *always, almost,* and *often,* their friends were good friends, and that they liked to get their friends’ point of view. Over two-thirds of respondents thought that *always, almost,* and *often,* their friends listened to them, were concerned about their well-being, and were understanding. Almost half of respondents reported they got upset more than their friends knew about. Moreover, females scored higher on the peer attachment scale than males. This gender difference of females showing higher levels of attachment with peers than males is consistent with other findings in the literature (Queija & Oliva, 2015; Raja et al., 1992). Compared to previous research using the same measure of peer attachment with a different NZ sample, the current findings showed an overall decrease in peer attachment for females (-12%), but no change for males (Raja et al., 1992). Again, while it is not possible to directly compare the two samples, it may be reasonable to conclude that female peer attachment is generally decreasing in NZ.

Over three-quarters of respondents thought that their relationship with their parents was *always, almost,* and *often* good. Over half said they could *easily think of things to do together.* The mean score for parental attachment was nearly the same for both male and female respondents, thus there was no significant difference between parental attachment and gender. However, when compared to research done in NZ twenty years ago using the same measures, the current findings showed a marked drop in parental attachment (-13%), suggesting that parental attachment might be dropping over time (Raja et al., 1992). This is concerning considering the strong effect of parental attachment has on overall well-being as described in *Chapter 2.* Further research with different samples is
needed in NZ to better identify trends with regard to peer and parental attachment, and to discover if gender-specific approaches are necessary to address attachment levels.

**Activities**

The most represented activities in this sample were of a sporting and social nature. The most common sports were *water sports, athletics, and team events and practices*. The least common sporting activities were *ice sports, equestrian events, and martial arts*. The most common social activities were *going shopping, going out with friends, going to the beach, going to the movies, going to a party, and going to the park*. The least common social activity was *going to the library*. Generally, participation in cultural activities was low. The most common cultural activities were *visiting a place of worship, dancing, and playing an instrument*, and the least common activities were the *kappa haka* and *visiting a marae*. Two-thirds of respondents reported having a job (Statistics New Zealand, 2013e). This is twice as much as the national average of one-third for this age group. A quarter of the sample volunteered for a charity. Participation in activities has been shown to be related to the well-being measures of life satisfaction, happiness, and self-perceived strengths (McGee et al., 2006), hence its deliberation in the current study. In Chapter 7, these activities will be further investigated in the context of transport via regression analysis.

Screen time use was higher than recommended, with nine of every ten respondents reporting screen use more than two hours per day. Screen time use was slightly higher among males. Findings in the literature vary, as a new German study has found that males score higher with respect to “problematic” internet use in the same age group (Reiner et al., 2017). Over half of respondents met or exceeded physical activity (PA) recommendations. Males reported significantly more PA than females. In the literature, reviews of PA offer mixed results with regard to gender differences (Larouche, Saunders, et al., 2014; Sterdt, Liersch, & Walter, 2014). These findings point to the necessity for more research with regard to gender differences with both screen time and PA.
Access measures

Transport habits

The most common mode of transport was being a passenger in a car, followed by walking. Recent research in NZ confirms the assertion in the current study that 2 km is considered a comfortable walking distance for older teenagers (Duncan et al., 2016). The least popular modes of transport were skateboarding and motorcycle or scooter. Gender associations existed with respect to cycling, skateboarding, and motorcycle or scooter (more males), as well as being a passenger in a car, walking, and using the school or public bus (more females). Gender differences with regard to cycling are well-documented in the literature. Among a large adult sample in Australia, Heesch et al. found that regardless of the purpose (transport or recreational), more men than women cycled (Heesch, Sahlqvist, & Garrard, 2012). Their findings about barriers to cycling (traffic conditions, safety), as well as the motivators for cycling (personal, social) were remarkably similar to the findings of the photovoice study in Chapter 3 (Ward et al., 2015). Skateboarding, while not well-represented here, is interesting to consider as a mode of transport. Like driving, it is mostly addressed from an injury risk standpoint, from a prohibition perspective, or just as recreation; contrarily, a recent paper about skateboarding among university students found that skateboarders were able to balance both utilitarian and hedonic considerations when using a skateboard for transport (Fang & Handy, 2017).

In the current study females showed a significantly higher level of transport frustration, even though slightly more females than males held some sort of driver’s licence. This could be because 1 of every 10 female respondents expressed that their school uniform was a barrier to active transport. With regard to licensing, the current study showed that roughly one-third of respondents had their learner licence, one quarter had their restricted licence, a few had their full licence (n=22), and just over one-third had no licence at all. Thus about half of this sample had some sort of driving licence. The Ministry of Transport figures showed the number of licences issued each year had been increasing until 2010, before dropping back to levels of more than a decade ago (Ministry of Transport, 2015b). This corresponds with the increase in driving age in NZ in 2011; however licensing numbers have not recovered. NZ population statistics categorise older
adolescents in the 15-24 year age bracket (Index Mundi, 2013), while NZ licence statistics categorise older adolescents separately, in the 16-19 year age bracket (Ministry of Transport, 2015b), making comparisons between the current sample and national statistics difficult.

This Southland sample presented an interesting case with respect to mode share, as it was vastly different than what has most recently been reported NZ-wide. The NZ Ministry of Transport released 2015 household travel survey statistics with regard to transport modal share as follows:

- Car as driver 52%
- Car as passenger 27%
- Pedestrian 13%
- Cycling 1.6%
- Bus or other public transport 4% (Ministry of Transport, 2015a)

Specific to the 15-24 year age group, mode share NZ-wide was as follows:

- Car as driver 36%
- Car as passenger 33%
- Pedestrian 18%
- Cycling <2%
- Bus or other public transport 10% (Ministry of Transport, 2015a)

In comparison, this sample in the present study exhibited much higher car use (as driver and as passenger), five times as much active transport use, and slightly more public transport use than their age group overall in NZ. These numbers are consistent with the data showing that people living in rural areas (who make up 21% of New Zealanders) generally travel significantly more than those living in urban areas, and so perhaps the higher car use seems plausible in this context (Ministry of Transport, 2015a; Watkins & Mindell, 2010). However, the current findings are inconsistent with the NZ Ministry of Transport figures that state those living in urban areas walk more than those in rural areas (Ministry of Transport, 2015a). It is possible that the nature of Southland’s geography...
has caused the resulting higher use of active transport, as it is relatively flat. In Chapter 7, the relationship between mode share and well-being are considered.

Limitations

A total of 51 students surveyed were 15 years of age, meaning they did not have the ability to obtain a driving licence, and therefore did not theoretically have access to all modes of transport. While they made up a small percentage of the sample, this could influence some of the results, such as those related to licensing and driving. It is also important to note that this was a self-report survey, with no sources of validation aside from geographical home address, which could in this case lead to social desirability bias. It is well-documented that social desirability bias affects the self-reporting of diet and physical activity, leading to over- and under-estimation, and it is fair to say this assertion applies to most self-report measures (Brenner & DeLamater, 2014; Haskell, 2012; Masse & de Niet, 2012). Additionally, one 19 year old was included. As ethical approval was only approved for ages 16-18 years initially, amendments to that ethical approval to obtain information from the age group 15-19 years was retroactively submitted and approval was received from the University of Otago Human Ethics Committee.

Online surveys, while a mainstream quantitative data collection method, have some limitations. They have a lower response rate than paper surveys, which are reported as being up to 11% higher (Fan & Zheng, 2010; Hardigan et al., 2012; Sanchez-Fernandez, Munoz-Leiva, & Montoro-Rios, 2012). As Mitra et al. report, a major challenge for web-based surveys is reducing nonresponse bias (Mitra et al., 2008). For example, respondents with no access to the internet to take such surveys are probably significantly different from respondents with internet access (Mitra et al., 2008; Sax, Gilmartin, & Bryant, 2003). The higher potential for invalid completions is also a limitation; with an internet survey, there is no guarantee that the intended recipient is the one completing the survey (Smith, 1997). This brings up the potential for other systemic limitations, such as computer literacy on the part of the respondent, lack of internet access, and the potential for invitation emails to be “lost” by ending up in spam or trash folders (Coomber, 1997; Dillman, 2007; Mertler, 2002; Sax et al., 2003; Sax et al., 2008).
Eight of ten survey respondents provided complete data for all the measures of interest. There were three types of missing data. Some data was missing completely at random, because of students who missed the survey due to staying home from school on the day of the survey due to illness, for example. No bias was introduced in regard to missing completely at random in this case, although power was lost due to reduced sample size (Little, Jorgensen, Lang, & Moore, 2014). Missing values not at random (caused by the subjects’ would-be answer to a question) were unlikely, as this was an inoffensive survey that did not ask negative questions about illegal or discernibly “unhealthy” activities (Little et al., 2014). It is likely that most missing values were simply due to the mechanism of missing at random, due to factors such as gender, age, and survey design, as discussed in this section.

Research shows that the gender gap in response rates is less for online surveys that include email administration, when compared to mail or telephone surveys (Underwood et al., 2000). In the current study, with the exception of five of the measures of interest, female respondents had roughly twice as many missing values than male respondents. This directly contradicts much of the literature, which reports that in addition to having consistently lower response rates, males are also more likely to have missing values in surveys (Mitra et al., 2008; Sax et al., 2008; Underwood et al., 2000). As mentioned previously, the literature reports gender disparities in survey research, but does not offer reason as to why. Future studies are required to investigate what methods might assure the genders are equally represented in survey research. Sixteen-year-old respondents had the most missing values among the questions of interest. It is likely this can be attributed to the fact that 16 year olds represent the largest age group of this study sample. This likelihood is supported by the fact that 17 year olds displayed the second-highest amount of missing values for all questions, and also make up the second largest age group in the study sample.

More completed surveys emerged during the in-class versus the at-home method. Some research shows that completion rates are higher when the survey “sender” is known to the respondent (Brehaut et al., 2006). The in-class method did in fact afford me the opportunity to spend more time with the respondents, answering their questions in real time, thereby giving a “face” to the survey. More missing values resulted from questions offered to respondents later in the survey. This can be explained by survey fatigue, a
Chapter 6 Survey methods and descriptive survey results

phenomenon defined as the “time and effort involved in participating in a survey” (Porter, Whitcomb, & Weitzer, 2004)(page 64). The questions about screen time, PA, distance lived from city centre, and personal income, all resulted in the highest amount of missing values; all of these questions were located within the last seven questions of the survey. It is possible that missing values may exist at least in part because the survey validation was set to “request response” instead of “force response”. The “request response” method was employed for purposes of ethical approval, as well as to encourage survey acceptance by respondents. While it could be argued that the ability to skip what they did not want to answer caused respondents to ignore some questions, it could also be argued that this supported them to continue and finish the survey by empowering them with personal choice. On the other hand, it could be argued that had the survey been set to “force response” it would have guaranteed a better response rate. For reasons of ethics and response rate, setting the online survey to “request response” validation was in fact the most appropriate approach in this study. Finally, one-third of all students in Years 12-13 were not available on the day of the survey due to being absent from school. As the survey was conducted among 12 schools over a six month period, the absences cannot be ascribed to a particular day, season or event. While one can assume that those unavailable students were in the age group of interest, one cannot know their gender or what their survey responses would have been. However, there is no reason to think that these results are not generalisable.

CHAPTER SUMMARY

This chapter successfully addressed the first aim of this thesis, which was to describe transport and well-being among older teenagers in Southland, NZ, by providing information to fill the research gap about this topic, and has set the stage for further statistical investigation of the relationship between transport and well-being as described in the subsequent Chapter 7. The high survey response rate of 71.5% overall, and 81% among the measures of interest, provided sufficient power. The descriptive results are likely generalisable to the Southland province of NZ, because all but one school in the area participated in the survey, and because of the high response rate. Levels of well-being and attachment, while corresponding with the literature, appear to be declining over time. The levels of life satisfaction were high overall, corresponding with the
OECD’s high rating of well-being in NZ. The results in this chapter describe an intriguing mode share in this sample of Southland school students, as it was quite different from overall NZ household survey travel results from 2011-2014. The sample exhibited much higher car and active transport use, and slightly more public transport use. While high car use in a rural area is to be expected, the high rates of active transport are interesting and require more research into the reasons why.

Chapter 7 addresses the main overarching aim of this thesis, to determine which transport practices and/or circumstances support well-being among older teenagers in Southland, New Zealand using multiple linear regression, allowing for associations between variables to be discussed. Based on the results of Chapter 6 that indicate gender differences and associations among many of the variables, in concert with the competing viewpoints in the literature about gender differences among correlates of well-being, the regression models will be run separately by gender.
Chapter 7

ARE TRANSPORT HABITS ASSOCIATED WITH WELL-BEING AMONG OLDER TEENAGERS?

The previous chapter (Chapter 6) has set the stage for more in-depth statistical investigation of the relationship between transport and well-being with the same sample in Southland, NZ by providing in-depth descriptive analysis of survey results. The main objectives of Chapter 7 are to:

1) Assess whether or not there is a relationship between transport and well-being among the target population using multiple linear regression methods

INTRODUCTION

In the current chapter, the association between the outcome variables of life satisfaction and self-perceived strengths, and measures of attachment and access were investigated for associations, to determine which transport practices and/or circumstances support well-being among older teenagers in Southland, NZ. This was accomplished by relating life satisfaction and self-perceived strengths to variables within the groups of attachment and access, using multiple linear regression methods. Models were developed separately for males and females to assess the outcome measures of life satisfaction and self-perceived strengths, because the descriptive data in Chapter 6 provided evidence to
suggest that life satisfaction and strengths were in some ways different between males and females in this sample. It is hoped this modelling decision will add to the debate in the literature about whether or not there are differences in well-being predictors among males and females.

**METHODS: ANALYSING LIFE SATISFACTION AND STRENGTHS**

Multiple linear regressions were used to examine the relationship between measures of attachment and measures of and access, with the well-being outcomes of life satisfaction and self-perceived strengths. This approach of regression is useful when faced with a number of variables that are possible predictors, as is the case in the current study. As defined by Harraway, “[regression] succeeds in measuring the joint influence of the explanatory variables on the dependent variable, and, for each of these explanatory variables, assesses the effect on the outcome variable that is attributable to that explanatory variable alone.” (Harraway, 1995) (page 27). That means each attachment- and access-related measure described in Chapter 6 was first assessed in this chapter individually for an association with the well-being measures, and then the combined influence of all measures were modelled. The scores for life satisfaction and self-perceived strengths were analysed separately. All the analyses were done using Stata 15 (StataCorp Release 15, College Station, TX) (StataCorp, 2017).

**Steps in the analysis of variables associated with life satisfaction and self-perceived strengths**

To build the model for each outcome, a three step process was followed. Univariate analyses were conducted (Step 1), followed by group specific multiple regression analyses (Step 2), in order to arrive at a final combined model (Step 3). These steps are summarised in **Table 7.1 and Figure 7.1**, and then described in detail in the subsequent text. The method of analysis for each step was the same for both males and females, and for each outcome variable of well-being.
Table 7.1 Steps in the analysis of both life satisfaction and self-perceived strengths

<table>
<thead>
<tr>
<th>Variables</th>
<th>Step 1: Univariate analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple linear regression was used to relate individual predictors with</td>
<td>Simple linear regression was used to relate individual predictors with the outcome variables</td>
</tr>
<tr>
<td>the outcome variables</td>
<td>Variables with coefficients with a p-value &lt;0.25 were considered for further analysis</td>
</tr>
<tr>
<td>Step 2: Group specific multiple regression</td>
<td>Variables were grouped according to “attachment” and “access”</td>
</tr>
<tr>
<td></td>
<td>Variables were considered for inclusion in each model if their associated p-value was &lt;0.20 for</td>
</tr>
<tr>
<td></td>
<td>continuous variables, and &lt;0.20 for all categories of categorical variables</td>
</tr>
<tr>
<td></td>
<td>Reduced group models were compared to the full group model using a likelihood ratio test</td>
</tr>
<tr>
<td>Step 3: Combined model</td>
<td>The two final group models from step two were combined as a starting point for the complete model</td>
</tr>
<tr>
<td></td>
<td>Predictors were considered for inclusion in the model if their associated p-value was &lt;0.05 for</td>
</tr>
<tr>
<td></td>
<td>a continuous variable and &lt;0.05 for all categories of a categorical variable</td>
</tr>
<tr>
<td></td>
<td>Reduced models were compared to the full model using a likelihood ratio test</td>
</tr>
</tbody>
</table>

Survey respondents were recruited from secondary schools, so the data was clustered for each outcome. This meant that the observations within each school could not be regarded as independent. To allow for this, each regression model used the clustered sandwich variance estimator from Stata.

**Step 1: Univariate analysis**

The aim of the univariate analysis was to examine the association between each of the attachment and access measures with the well-being outcomes of interest, using simple linear regression; in this way, relevant measures (or variables) could be identified. The variables examined in this analysis were the attachment and access measures described in Chapter 6, and included attachment to peers, attachment to family, sporting activities, cultural activities, social activities, community/civic activities, screen time, physical activity (PA), transport mode use, transport frustration, licensing, distance lived from city centre, and personal income.
Each regression produced a coefficient with a t-score and associated p-value. Those variables with p-values of less than 0.25 were eligible for inclusion in Step 2. This p-value ceiling was chosen based on well-established protocols for selecting multivariable models; if the p-value is too low, variables may be screened out too early, and if the p-value is too generous, variables could remain in a model that are of no importance (Hosmer & Lemeshow, 2000). It can be said that the assumptions of regression are met if random errors are small, and residuals are normally distributed and are randomly spread around ‘0’ with constant-looking variation for each variable (Harraway, 1995).

**Step 2: Group specific multiple regression analysis**

Step 2 was an intermediate step in which the variables included from Step 1 were examined within attachment and access groups. Two initial multiple linear regression equations (one for attachment and one for access) were constructed accordingly. One issue with a univariate analysis is that while a single variable may not be associated with an outcome, it may in fact be associated if combined with others (Hosmer & Lemeshow, 2000). The aim of this group specific multiple regression analysis was to determine the association between each variable in a group of either attachment or access variables with each well-being outcome. This was done by methodically adjusting each variable for every other variable in each group (Hosmer & Lemeshow, 2000). By permitting the simultaneous observation of the impact of several variables on each well-being outcome, this method allowed for a complete picture, of life satisfaction and strengths, and the individual attachment and access variables that were possible predictors, to emerge. In Step 2, variables were considered for inclusion in each starting model if their associated p-value was less than 0.20 for a continuous variable, and less than 0.20 for all categories of a categorical variable. Accordingly, each variable with a p-value of more than 0.20 was removed, one at a time from the starting model, and each reduced model was compared to the starting model using the likelihood ratio test. A similar comparison was made when all such variables were removed at once.

**Step 3: Combined model**

The two final group models from Step 2 were pooled, as a starting point for the combined multivariate model in Step 3. Variables were considered for removal from each model if their associated p-value was more than 0.05 for a continuous variable, and more than
0.05 for all categories of a categorical variable. Reduced models were then compared to the starting model using a likelihood ratio test the same way as in Step 2. The result of this step was a single model containing all statistically relevant variables for both attachment and access for each well-being outcome of life satisfaction and strengths.

The coefficient of determination ($R^2$) was determined for each resulting model. The $R^2$ indicates what percentage of the variation in each wellbeing outcome is due, collectively, to the term in the model (Harraway, 1995). For example, an $R^2$ of 40% would indicate that 40% of the variation in the well-being outcome being assessed could be explained by the combined model.
Chapter 7 Multiple linear regression

Step 1:
Univariate analysis ($p<0.25$)

Step 2:
Group specific multiple regression
Most critical variables associated with each outcome were split into 2 models $p<0.20$

Model 1 – Access
(comparing access to attachment)

Model 2 - Attachment
(comparing attachment to attachment)

Step 3:
Combined model
Combined “grand model” ($p<0.05$)

FINAL MODEL

Note: Dashed lines indicate likelihood ratio tests were conducted

Figure 7.1 Illustration of multiple linear regression used in this thesis
RESULTS

Variables associated with life satisfaction

Results of Step 1: Univariate analysis of life satisfaction

The results from the univariate analysis for males and females are shown in Table 7.2. In all cases, the assumptions for the regression were met. Coefficients and associated p-values are reported for each predictor. In the case of categorical variables, the category with the lowest value is the reference category, following standard practice; this means that all other categories in a variable are evaluated by how they affect the outcome relative to that reference category (Harraway, 1995). For example, the licence question asked respondents to indicate what level of licence they have; the answer “no licence” has a label of zero, and is thus the reference variable, since the other categories are 1 (“learners”), 2 (“restricted”) or 3 (“full”); and these other category levels are assessed compared to “no licence”. Another example is in the case of a yes/no answer, where “no” is labelled zero, and is therefore the reference variable, as “yes” is labelled 1. Reference categories are not included in Table 7.2. As illustrated, some predictors eligible for Step 2 from Step 1 were different for males and females.
Table 7.2 Results from univariate regression (Step 1) analysis for life satisfaction

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males Coefficient</th>
<th>p-value</th>
<th>Females Coefficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attachment to friends</td>
<td>0.590</td>
<td>&lt;0.001†</td>
<td>0.569</td>
<td>&lt;0.001†</td>
</tr>
<tr>
<td>Attachment to family</td>
<td>0.689</td>
<td>&lt;0.001†</td>
<td>0.696</td>
<td>&lt;0.001†</td>
</tr>
<tr>
<td>Sporting activities</td>
<td>0.387</td>
<td>&lt;0.001†</td>
<td>0.353</td>
<td>0.002†</td>
</tr>
<tr>
<td>Cultural activities</td>
<td>0.139</td>
<td>0.229†</td>
<td>0.108</td>
<td>0.319</td>
</tr>
<tr>
<td>Social activities</td>
<td>0.459</td>
<td>0.001†</td>
<td>0.521</td>
<td>0.020†</td>
</tr>
<tr>
<td>Comm/Civic activities</td>
<td>0.505</td>
<td>&lt;0.001†</td>
<td>0.342</td>
<td>0.002†</td>
</tr>
<tr>
<td>Meets screen time guidelines</td>
<td>0.519</td>
<td>0.262</td>
<td>1.543</td>
<td>0.016†</td>
</tr>
<tr>
<td>Meets PA guidelines</td>
<td>1.856</td>
<td>0.003†</td>
<td>1.327</td>
<td>0.031†</td>
</tr>
<tr>
<td>Access</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car (as driver)</td>
<td>0.290</td>
<td>0.613</td>
<td>1.418</td>
<td>0.003†</td>
</tr>
<tr>
<td>Car (as passenger)</td>
<td>0.522</td>
<td>0.588</td>
<td>-0.343</td>
<td>0.678</td>
</tr>
<tr>
<td>Motorbike or scooter</td>
<td>0.851</td>
<td>0.143†</td>
<td>-1.973</td>
<td>0.034†</td>
</tr>
<tr>
<td>School bus</td>
<td>0.115</td>
<td>0.873</td>
<td>0.682</td>
<td>0.213†</td>
</tr>
<tr>
<td>Public bus</td>
<td>1.427</td>
<td>0.103†</td>
<td>-0.174</td>
<td>0.629</td>
</tr>
<tr>
<td>Cycling</td>
<td>0.518</td>
<td>0.339</td>
<td>0.514</td>
<td>0.008†</td>
</tr>
<tr>
<td>Walking</td>
<td>-0.169</td>
<td>0.818</td>
<td>-0.770</td>
<td>0.216†</td>
</tr>
<tr>
<td>Skateboarding</td>
<td>-0.558</td>
<td>0.550</td>
<td>0.547</td>
<td>0.616</td>
</tr>
<tr>
<td>Frustrated with transport</td>
<td>-0.984</td>
<td>0.179†</td>
<td>-1.126</td>
<td>0.232†</td>
</tr>
<tr>
<td>Licensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learners</td>
<td>0.976</td>
<td>0.058†</td>
<td>1.105</td>
<td>0.031†</td>
</tr>
<tr>
<td>Restricted</td>
<td>1.958</td>
<td>&lt;0.001†</td>
<td>2.114</td>
<td>0.009†</td>
</tr>
<tr>
<td>Full</td>
<td>-1.349</td>
<td>0.022†</td>
<td>3.468</td>
<td>0.003†</td>
</tr>
<tr>
<td>Distance to urban centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-12 km</td>
<td>0.464</td>
<td>0.045†</td>
<td>-0.872</td>
<td>0.075†</td>
</tr>
<tr>
<td>≥ 13 km</td>
<td>0.608</td>
<td>0.023†</td>
<td>0.725</td>
<td>0.351</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1-10</td>
<td>0.845</td>
<td>0.622</td>
<td>1.006</td>
<td>0.263</td>
</tr>
<tr>
<td>$11-20</td>
<td>1.510</td>
<td>0.220†</td>
<td>1.671</td>
<td>0.024†</td>
</tr>
<tr>
<td>$21-30</td>
<td>2.949</td>
<td>0.065†</td>
<td>2.213</td>
<td>0.002†</td>
</tr>
<tr>
<td>$31-40</td>
<td>3.727</td>
<td>0.004†</td>
<td>2.782</td>
<td>0.002†</td>
</tr>
<tr>
<td>$41-50</td>
<td>2.471</td>
<td>0.161†</td>
<td>2.870</td>
<td>0.009†</td>
</tr>
<tr>
<td>$51-99</td>
<td>1.752</td>
<td>0.053†</td>
<td>2.753</td>
<td>0.033†</td>
</tr>
<tr>
<td>Over $100</td>
<td>2.370</td>
<td>0.038†</td>
<td>2.757</td>
<td>&lt;0.001†</td>
</tr>
</tbody>
</table>

P-values in bold italics are <0.25
† indicates that variable is eligible for Step 2 of analysis
**Males – Life satisfaction Step 1**

The attachment items for males with a $p$-value of less than 0.25 were attachment to friends, attachment to family, sporting activities, cultural activities, social activities, community/civic activities, total activities, and PA. Thus, screen time was removed from the model at this point. The access items that remained were transport modes (motorbike/scooter and public bus), passive transport score (use of 4 modes), transport frustration, licence status, distance lived from nearest city centre, and personal income. The access items excluded at this point were some transport modes (driver or passenger of car, school bus, cycling, walking, and skateboarding), and the active transport score. These were all excluded because their $p$-values were more than 0.25.

The regression coefficients in Table 7.2 describe the influence that each variable had on the life satisfaction score for males and females. In the case of categorical variables, all levels were included in Step 2 of the analysis, even if only one of the categories within the variable has a $p$-value of less than 0.25. The coefficient represented the mean change in the outcome compared to the reference variable. As an example, for males with a full licence, it appeared in this univariate analysis that their life satisfaction score was lower than those without a licence by 1.349, as the coefficient is negative. For continuous predictors, the regression coefficient reported in the Table 7.2 represented the mean change in the outcome variable for one unit of change in the predictor. As an example, for males the coefficient of attachment to friends suggested that for each incremental increase in attachment to friends, the life satisfaction score increased (on average) by 0.59.

**Females – Life satisfaction Step 1**

The attachment items for females with a $p$-value of less than 0.25 were attachment to friends, attachment to family, sporting activities, social activities, community/civic activities, total activities, screen time, and PA. Cultural activities were excluded at this point. The access items that remained were transport modes (drive, school bus, cycle, walk, and motorbike/scooter), transport frustration, licence status, distance lived from nearest city centre, and personal income. The access items excluded at this point were some transport modes (passenger of car, skateboarding, and public bus). These were all excluded because their $p$-values were more than 0.25.
Results of Step 2: Group specific multiple regression analysis of life satisfaction

Group specific multiple regression coefficients represent the mean change in the outcome variable for one unit of change in the covariate while holding other predictors in the attachment and access models constant, in order to isolate the role of one variable from all of the others within each model (Hosmer & Lemeshow, 2000). In all cases, the assumptions for using a linear regression appear to have been met. As set out in the Methods section, Step 2 is an intermediary step, and the eligible predictors were put into two initial multiple linear regression equations – one modelling attachment and one modelling access. The continuous variables in these models that had a $p$-value of more than 0.20 were investigated to see if they could be dropped from the model. The categorical variables where all categories had a $p$-value of more than 0.20 were also considered for exclusion. During the process, relationships between the variables were investigated, through correlations and chi-square tests, to check for associations (Harraway, 1995). The endpoint of this step are two reduced (from the start of Step 2) models – one for attachment and one for access.

Males – Life satisfaction Step 2

For males, the items included in the attachment model for Step 2 were attachment to friends, attachment to family, sporting activities, cultural activities, social activities, community/civic activities, and PA. For access, the items included in Step 2 were transport mode (motorcycle/scooter and public bus), transport frustration, licence status, distance lived from nearest city centre, and personal income. These all remained included initially because their $p$-values were less than 0.20.

The likelihood ratio test allows for a richer assessment of the contribution of certain variables in a model by closely scrutinising the resulting model without these variables included, against the model created at the beginning, and is a standard way to compare nested models (Hosmer & Lemeshow, 2000). For example, when the initial access model was assessed with and without the “distance lived from city centre” variable using the likelihood ratio test, the evidence pointed to still needing it, as the value of the likelihood ratio test statistic changed significantly. This means that it would not be reasonable to remove “distance from city centre”. Conversely, when the access model was assessed with and without the “motorcycle/scooter” transport mode variable, the test statistic did
not change significantly; this means that “motorcycle/scooter” could reasonably be removed as a covariate from the initial model. With regard to attachment, when the model was compared with or without the “cultural activities” variable, the evidence from the likelihood ratio test pointed to not needing it. The only variables assessed in this way were those with a $p$-value of more than 0.20.

As a consequence initial models were reduced in Step 2 to the intermediate models for access and attachment. The model for attachment resulting from Step 2 for males included attachment to friends, attachment to family, sporting activities, community/civic activities, and PA. The model for access resulting from Step 2 for males included transport mode (public bus), transport frustration, licence status, distance lived from city centre, and personal income. These two models were the starting point for Step 3 for males in the analysis.

**Females – Life satisfaction Step 2**

For females, the items included in the attachment model were attachment to friends, attachment to family, sporting activities, social activities, community/civic activities, screen time, and PA. For access, the items included in Step 2 were transport modes (drive, school bus, cycle, walk, and motorbike/scooter), transport frustration, licence status, distance lived from nearest city centre, and personal income. These all remained included initially because their $p$-values were less than 0.20.

The likelihood ratio test was used, as described above with the models for males, to see if the reduced models were of similar quality to the initial model. The attachment items “sporting activities”, “social activities”, and “screen time” were considered for exclusion at Step 2 ($p$-values >0.20), and after assessing them via the likelihood ratio test, the evidence pointed to not needing them. The access items of transport modes “drive”, “school bus”, and “walk” were also eligible for exclusion at Step 2 ($p$-values >0.20), and when the models were compared with or without each of these items using the likelihood ratio test, the result indicated that they in fact were not needed. The same was true of “transport frustration”.

Therefore, for females, the model for attachment resulting from Step 2 for females included attachment to friends, attachment to family, community/civic activities, and PA.
The model for access resulting from Step 2 for females included transport mode (cycling and motorcycle/scooter), licence status, distance lived from city centre, and personal income. These two models were the starting point for Step 3 of the analysis for females.

**Results of Step 3: Combined multivariate model of life satisfaction**

The final models for life satisfaction are shown in Table 7.3 for males and Table 7.4 for females. The items for males and females that were eligible for Step 3 from the final models in Step 2 were combined first, as a starting point for the complete model. At this stage, items were considered for removal from each model if their associated $p$-value was more than 0.05 for a continuous variable, and more than 0.05 for all categories of a categorical variable. Reduced models were compared to the full model using a likelihood ratio test.

**Males – Life satisfaction Step 3**

The starting point for the modelling in Step 3 for males included attachment to friends, attachment to family, sporting activities, community/civic activities, PA, transport mode (public bus), transport frustration, licence status, distance lived from city centre, and personal income. For males, the items initially considered for removal were sporting activities, community/civic activities, and personal income. The likelihood ratio tests suggested that these variables did not add significantly to the prediction of life satisfaction. When considering the resulting reduced model, it appeared that “public bus” and “distance lived from city centre” could be omitted from the final model because of their $p$-values (both $>0.05$) and indeed, on testing, they were. The final model for males, as seen in Table 7.3, contained attachment to friends, attachment to family, community/civic activities, transport frustration, and licensing.
Table 7.3 Final results (Step 3) of analysis of life satisfaction for males

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate Model</th>
<th>Combined Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coeff 95% CI</td>
<td>coeff 95% CI</td>
</tr>
<tr>
<td>Attachment to friends</td>
<td>0.590 (0.403, 0.778)</td>
<td>0.408 (0.169, 0.646)</td>
</tr>
<tr>
<td>Attachment to family</td>
<td>0.689 (0.493, 0.885)</td>
<td>0.459 (0.323, 0.595)</td>
</tr>
<tr>
<td>Comm/Civic activities</td>
<td>0.505 (0.340, 0.669)</td>
<td>0.394 (0.188, 0.599)</td>
</tr>
<tr>
<td>Frustration with transport</td>
<td>-0.984 (-2.493, 0.524)</td>
<td>-1.166 (-2.021, 0.310)</td>
</tr>
<tr>
<td>Licensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learners</td>
<td>0.976 (-0.038, 1.990)</td>
<td>0.512 (-0.252, 1.276)</td>
</tr>
<tr>
<td>Restricted</td>
<td>1.958 (1.149, 2.767)</td>
<td>1.104 (-0.207, 2.416)</td>
</tr>
<tr>
<td>Full</td>
<td>-1.349 (-2.461, -0.237)</td>
<td>-2.536 (-4.882, -0.190)</td>
</tr>
</tbody>
</table>

As stated earlier, the coefficient of determination ($R^2$) indicates what percentage of the variation in the wellbeing outcome is due, collectively, to the term in the model (Harraway, 1995). For males, the $R^2$ of the life satisfaction model was 36%, which means that 36% of the variation in the life satisfaction score could be explained by the combined model in Step 3.

**Females – Life satisfaction Step 3**

The starting point for the modelling in Step 3 for females included attachment to friends, attachment to family, community/civic activities, PA, transport mode (cycling and motorcycle/scooter), licence status, distance lived from city centre, and personal income.

For females, the items initially considered for removal were community/civic activities, licensing, distance lived from city centre, and personal income. The likelihood ratio tests for community/civic activities, licensing, and personal income suggested that these variables were not needed. There was no significant difference between being able to cycle, or needing to use passive transport (driving, being driven, or taking a bus), to access the city centre, compared to being able to walk to town (reference category). However, there was a significant difference in life satisfaction between females who lived close and those who lived farther from the city centre. The coefficient for the difference between living close enough to town where cycling was possible to reach the city centre, when compared to needing passive transport, was -1.575, (95% CI: -2.304, -0.846). Therefore, “distance lived from city centre” was deemed important and remained in the model. The final model for females, as seen in Table 7.4, contained attachment to
friends, attachment to family, PA, cycling, motorcycle/scooter, and distance lived from city centre.

Table 7.4 Final results (Step 3) of analysis of life satisfaction for females

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate Model</th>
<th>Combined Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coeff</td>
<td>95% CI</td>
</tr>
<tr>
<td>Attachment to friends</td>
<td>0.569</td>
<td>0.439</td>
</tr>
<tr>
<td>Attachment to family</td>
<td>0.696</td>
<td>0.578</td>
</tr>
<tr>
<td>Meets guidelines for physical activity</td>
<td>1.327</td>
<td>0.148</td>
</tr>
<tr>
<td>Cycling</td>
<td>0.514</td>
<td>0.167</td>
</tr>
<tr>
<td>Motorbike or scooter</td>
<td>-1.973</td>
<td>-3.770</td>
</tr>
<tr>
<td>Distance to urban centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-12 km</td>
<td>-0.872</td>
<td>-1.851</td>
</tr>
<tr>
<td>≥ 13 km</td>
<td>0.725</td>
<td>-0.928</td>
</tr>
</tbody>
</table>

In this case, the $R^2$ for females for life satisfaction was 39%, illustrating that 39% of the variation in the score could be explained by the combined model.

Variables associated with self-perceived strengths

Results of Step 1: Univariate analysis of strengths

The results from the univariate analysis for self-perceived strengths for males and females are shown in Table 7.5. In all cases, the assumptions for the regression were met. Coefficients and associated $p$-values are reported for each variable. As described previously in Step 1 results of life satisfaction, the category of a variable with the lowest value label is the reference category, and as is standard practice, reference categories are not included in Table 7.5 (Harraway, 1995). Some variables eligible for Step 2 were different for males and females.
Table 7.5 Results from univariate regression (Step 1) analysis for self-perceived strengths

<table>
<thead>
<tr>
<th>Variables</th>
<th>Males Coefficient</th>
<th>p-value</th>
<th>Females Coefficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attachment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attachment to friends</td>
<td>0.084</td>
<td>0.574</td>
<td>0.131</td>
<td>0.043†</td>
</tr>
<tr>
<td>Attachment to family</td>
<td>0.072</td>
<td>0.546</td>
<td>&lt;0.001</td>
<td>0.997</td>
</tr>
<tr>
<td>Sporting Activities</td>
<td>0.679</td>
<td>&lt;0.001†</td>
<td>0.261</td>
<td>0.041†</td>
</tr>
<tr>
<td>Cultural Activities</td>
<td>0.240</td>
<td>0.138†</td>
<td>0.377</td>
<td>0.026†</td>
</tr>
<tr>
<td>Social Actitives</td>
<td>1.136</td>
<td>&lt;0.001†</td>
<td>0.441</td>
<td>0.003†</td>
</tr>
<tr>
<td>Comm/Civic Activities</td>
<td>0.762</td>
<td>&lt;0.001†</td>
<td>0.501</td>
<td>0.016†</td>
</tr>
<tr>
<td>Meets screen time guidelines</td>
<td>1.710</td>
<td>0.039†</td>
<td>-0.890</td>
<td>0.313</td>
</tr>
<tr>
<td>Meets PA guidelines</td>
<td>2.025</td>
<td>0.020†</td>
<td>1.727</td>
<td>0.002†</td>
</tr>
<tr>
<td><strong>Access</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car (as driver)</td>
<td>3.237</td>
<td>0.004†</td>
<td>1.455</td>
<td>0.025†</td>
</tr>
<tr>
<td>Car (as passenger)</td>
<td>1.541</td>
<td>0.068†</td>
<td>1.329</td>
<td>0.160†</td>
</tr>
<tr>
<td>Motorbike or scooter</td>
<td>0.790</td>
<td>0.415</td>
<td>1.743</td>
<td>0.311</td>
</tr>
<tr>
<td>School bus</td>
<td>0.510</td>
<td>0.634</td>
<td>0.056</td>
<td>0.883</td>
</tr>
<tr>
<td>Public bus</td>
<td>1.107</td>
<td>0.295</td>
<td>0.054</td>
<td>0.897</td>
</tr>
<tr>
<td>Cycling</td>
<td>0.520</td>
<td>0.623</td>
<td>0.949</td>
<td>0.076†</td>
</tr>
<tr>
<td>Walking</td>
<td>0.756</td>
<td>0.365</td>
<td>0.718</td>
<td>0.284</td>
</tr>
<tr>
<td>Skateboarding</td>
<td>3.097</td>
<td>0.008†</td>
<td>3.072</td>
<td>0.079†</td>
</tr>
<tr>
<td>Frustrated with transport</td>
<td>1.489</td>
<td>0.043†</td>
<td>0.118</td>
<td>0.798</td>
</tr>
<tr>
<td>Licensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learners</td>
<td>1.627</td>
<td>0.067†</td>
<td>0.233</td>
<td>0.705</td>
</tr>
<tr>
<td>Restricted</td>
<td>3.286</td>
<td>0.006†</td>
<td>1.937</td>
<td>0.012†</td>
</tr>
<tr>
<td>Full</td>
<td>4.254</td>
<td>0.007†</td>
<td>1.163</td>
<td>0.492</td>
</tr>
<tr>
<td>Distance to urban centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-12 km</td>
<td>-0.663</td>
<td>0.046†</td>
<td>0.659</td>
<td>0.275</td>
</tr>
<tr>
<td>≥ 13 km</td>
<td>1.554</td>
<td>0.076†</td>
<td>1.011</td>
<td>0.131†</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1-10</td>
<td>2.112</td>
<td>0.040†</td>
<td>-2.241</td>
<td>0.015†</td>
</tr>
<tr>
<td>$11-20</td>
<td>1.979</td>
<td>0.356</td>
<td>-2.176</td>
<td>0.001†</td>
</tr>
<tr>
<td>$21-30</td>
<td>2.540</td>
<td>0.024†</td>
<td>-0.906</td>
<td>0.197†</td>
</tr>
<tr>
<td>$31-40</td>
<td>3.617</td>
<td>0.027†</td>
<td>-0.185</td>
<td>0.854</td>
</tr>
<tr>
<td>$41-50</td>
<td>2.884</td>
<td>0.164†</td>
<td>-2.948</td>
<td>0.059†</td>
</tr>
<tr>
<td>$51-99</td>
<td>4.250</td>
<td>0.018†</td>
<td>-0.648</td>
<td>0.402</td>
</tr>
<tr>
<td>Over $100</td>
<td>4.050</td>
<td>0.009†</td>
<td>-1.111</td>
<td>0.165†</td>
</tr>
</tbody>
</table>

*P*-values in **bold italics** are <0.25
† indicates that variable is eligible for Step 2 of analysis

**Males – Strengths Step 1**

The attachment items for males with a p-value of less than 0.25 were sporting activities, cultural activities, social activities, community/civic activities, screen time and PA.
Attachment to friends and family were not considered for inclusion at this point, due to high \( p \)-values. The access items that remained were some transport modes (driving, car as passenger, and skateboarding), transport frustration, licence status, distance lived from nearest city centre, and personal income. The access items excluded at this point were the remaining transport modes (cycling, walking, motorcycle/scooter, school bus and public bus). These were excluded due to \( p \)-values more than 0.25.

**Females – Strengths Step 1**

The attachment items for females with a \( p \)-value of less than 0.25 were attachment to friends, sporting activities, cultural activities, social activities, community/civic activities, and physical activity. Attachment to family, and screen time, were not considered for inclusion at this point, due to high \( p \)-values. The access items that remained were some transport modes (driving, car as passenger, cycling, and skateboarding), licence status, distance lived from nearest city centre, and personal income. The access items excluded at this point were some transport modes (walking, school bus, public bus, and motorcycle/scooter), and transport frustration. These were excluded because their \( p \)-values were more than 0.25.

The regression coefficients in Table 7.5 describe the influence that each variable had on the strength score for males and females. In the case of categorical variables, all levels are included in Step 2 of the analysis, even if only one of the categories within the variable had a \( p \)-value of less than 0.25. The coefficient represents the mean change in the outcome compared to the reference variable. As an example, for females with a restricted licence, it appears in this simple analysis that their Strength score is higher on average than those without a licence by 1.937, as the coefficient is positive. For each continuous variable, the regression coefficient reported in the Table 7.5 represents the mean change in the outcome variable for one unit of change in the predictor. As an example, for females the coefficient of attachment to friends suggested that for each incremental increase in attachment to friends, the strength score increased (on average) by 0.131.
Results of Step 2: Group specific multiple regression analysis of self-perceived strengths

In this intermediate step, continuous and categorical variables with p-values of more than 0.20 were considered for exclusion, as was done in the previous life satisfaction analysis. In all cases, the assumptions for using a linear regression appear to have been met. During the process, relationships between variables were investigated through correlations and chi-square tests, to check for collinearity, a phenomenon where associated variables in a model can be linearly predicted from the other variables in the model (Harraway, 1995). Any relationships found are further detailed in the discussion section of this chapter. The endpoint of this step were two reduced models – one for attachment and one for access.

Males – Strengths Step 2
For males, the items included in the attachment model for Step 2, following the criteria set out in Step 1, were sporting activities, cultural activities, social activities, community/civic activities, screen time and PA. For the access model, the items included in Step 2, following the criteria set out in Step 1, were some transport modes (driving, car as passenger, and skateboarding), transport frustration, licence status, distance lived from nearest city centre, and personal income. These were initially included because their p-values were less than 0.20.

Associations between the measures were examined, and while there were some relationships between the variables, it did not cause any problems with collinearity within the models. Variables with p-values over 0.20 were removed, one at a time and then all together. The effect of this on the starting model was examined each time using the likelihood ratio test and resulted in two models: one for attachment and one for access. The model for attachment resulting from Step 2 for males included sporting activities, social activities, and screen time. The model for access resulting from Step 2 for males included transport mode (driving), transport frustration, licence status, distance lived from city centre, and personal income.

Females – Strengths Step 2
For females, the items included in the attachment model for Step 2, following the criteria set out in Step 1, were attachment to friends, sporting PA. For the access model, the
items included in Step 2 were some transport modes (driving, car as passenger, cycling, and skateboarding), licence status, distance lived from nearest city centre, and personal income. These were initially included because their $p$-values were less than 0.20.

Associations between the measures were examined, and while there were some relationships between the variables, it did not cause any problems with the models. Variables with $p$-values over 0.20 were removed, one at a time and then all together. The effect of this on the starting model was examined each time using the likelihood ratio test and resulted in two models: one for attachment and one for access. The model for attachment resulting from Step 2 for females included attachment to friends and physical activity. The model for access resulting from Step 2 for females included transport mode (being a passenger, and cycling), licence status, and personal income.

**Results of Step 3: Combined multivariate model of self-perceived strengths**

The final models for self-perceived strengths are reported in Table 7.6 and Table 7.7, for males and females, respectively. The items that were eligible for Step 3 from the final models in Step 2 were combined first, as a starting point for the complete model. Items were considered for removal if their associated $p$-value was more than 0.05. Reduced models were compared to the full model using a likelihood ratio test.

**Males – Strengths Step 3**

The starting point for the modelling in Step 3 for males included sporting activities, social activities, screen time, transport mode (driving), transport frustration, licence status, distance lived from city centre, and personal income. Upon first consideration, the items “screen time” and “personal income” were considered for removal, and likelihood ratio tests suggested these variables, either separately or together, were not needed. After considering the model at the removal of these, it appeared that “licence status” and “transport frustration” were also not needed, and indeed, upon testing, they were not. The final model for males contained sporting activities, social activities, transport mode (driving), and distance lived from city centre. The coefficient for the difference between living close enough to town that cycling was possible to reach the city centre, when compared to needing passive transport, was -2.360 (95% CI: -3.808, -0.911), evidence of a significant difference.
For strengths among the males in the sample, the $R^2$ value was 24%, demonstrating that 24% of the variation in the score could be explained by the combined model.

**Females – Strengths Step 3**

The starting point for the modelling strengths Step 3 for females included attachment to friends, PA, transport modes (being a passenger, and cycling), licence status, and personal income. Upon first consideration, the items “attachment to friends” and “cycling” were both considered for removal due to their $p$-values, and likelihood ratio tests suggested these variables, either separately or together, could be omitted from the model. The final model for females included the items of physical activity, transport mode (being a passenger), licence status, and personal income. Results of the combined model for females, as well as the initial univariate results for females, can be found in **Table 7.7**.

---

**Table 7.6 Final results (Step 3) of self-perceived strengths for males**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate Model 95% CI</th>
<th>Combined Model 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coeff</td>
<td>lower</td>
</tr>
<tr>
<td>Sporting activities</td>
<td>0.679</td>
<td>0.421</td>
</tr>
<tr>
<td>Social activities</td>
<td>1.136</td>
<td>0.812</td>
</tr>
<tr>
<td>Car (as driver)</td>
<td>3.237</td>
<td>1.273</td>
</tr>
<tr>
<td>Distance to urban centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$4-12 \text{ km}$</td>
<td>-0.663</td>
<td>-1.311</td>
</tr>
<tr>
<td>$\geq 13 \text{ km}$</td>
<td>1.554</td>
<td>-0.194</td>
</tr>
</tbody>
</table>
Table 7.7 Final results (Step 3) of self-perceived strengths for females

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate Model</th>
<th>Combined Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coeff 95% CI</td>
<td>coeff 95% CI</td>
</tr>
<tr>
<td>Meets physical activity guidelines</td>
<td>1.727 0.810 2.644</td>
<td>1.385 0.211 2.559</td>
</tr>
<tr>
<td>Car (as passenger) Licensing</td>
<td>1.329 -0.620 3.278</td>
<td>2.217 0.020 4.415</td>
</tr>
<tr>
<td>Learners</td>
<td>0.233 -1.098 1.564</td>
<td>0.184 -1.347 1.716</td>
</tr>
<tr>
<td>Restricted</td>
<td>1.937 0.530 3.343</td>
<td>1.970 -0.030 3.970</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1-10</td>
<td>-2.241 -3.942 -0.539</td>
<td>-2.329 -3.913 -0.745</td>
</tr>
<tr>
<td>$11-20</td>
<td>-2.176 -3.166 -1.186</td>
<td>-2.527 -3.700 -1.355</td>
</tr>
<tr>
<td>$21-30</td>
<td>-0.906 -2.365 0.553</td>
<td>-1.251 -2.993 0.490</td>
</tr>
<tr>
<td>$31-40</td>
<td>-0.185 -2.368 1.999</td>
<td>-0.900 -3.213 1.413</td>
</tr>
<tr>
<td>$41-50</td>
<td>-2.948 -6.039 0.142</td>
<td>-3.502 -6.576 -0.428</td>
</tr>
<tr>
<td>$51-99</td>
<td>-0.648 -2.298 1.002</td>
<td>-1.390 -3.247 0.466</td>
</tr>
<tr>
<td>Over $100</td>
<td>-1.111 -2.764 0.542</td>
<td>-1.449 -3.132 0.235</td>
</tr>
</tbody>
</table>

For females, the R² for strengths was 11%, demonstrating that 11% of the variation in the score could be explained by the combined model.

**DISCUSSION**

This research has made it possible to investigate the extent to which attachment and access were involved with transport and associated with well-being, and to draw conclusions about relationships between them. This could be considered especially appropriate in this situation, where a new area of research is being described, and assistance is necessary to choose future directions of study. Findings of the current study suggest that transport is indeed associated with the well-being determinants of life satisfaction and self-perceived strengths among this sample of older adolescents.

**Life satisfaction**

Results for both males and females showed significant associations between life satisfaction and attachment and access. For males, life satisfaction was associated with
attachment to friends and family, community/civic activities, transport frustration, and licence status. For females, life satisfaction was associated with attachment to friends and family, meeting PA guidelines, cycling, motorcycle/scooter use, and proximity to city centre. All other things remaining equal, an increase in attachment to both friends and family were associated with increased life satisfaction among both males and females, after adjusting for the other variables in each model. This finding is expected and was supported by the literature review in Chapter 2 (Ben-Zur, 2003; Gorrese & Ruggieri, 2013; Lambert et al., 2014; Raja et al., 1992; Rubin et al., 2006; Sirard et al., 2013; Veiga et al., 2014). The fact that both peer attachment and family attachment were associated with life satisfaction for both males and females suggest that, as hypothesized, transport-related access issues are facilitated by attachment. This agrees with results by Vella-Brodrick and Stanley who found that transport mobility predicted subjective well-being through the mediating variables of positive relations with others (Vella-Brodrick & Stanley, 2013). It also agrees with Long et al., who found that cycling and walking were both affected by peer and parental attachment among 15 year olds (Long et al., 2015).

**Discussion of findings for life satisfaction for males**

Regression analysis found that community/civic activities (such as leadership roles in clubs, or participation in charity organisation, church groups, or having paid employment) were associated with increased male life satisfaction, after adjusting for other attachment and access variables. This is a new finding. Several studies found that involvement in activities strengthened attachment (Madgin et al., 2016; Matz-Costa et al., 2014; Reardon & Abdallah, 2013; Seaman & McLaughlin, 2013), and Eime et al. and Williams and McGee found that sporting activities in particular supported psychological health and helped to improve teenagers’ views of themselves (Eime et al., 2013; Williams & McGee, 1991).

After adjusting for the other variables, both transport frustration and licence status were associated with reduced life satisfaction amongst males. These are also new findings, as frustration with transport had not yet been identified or studied in the context of life satisfaction, nor has licence status among older adolescents been investigated in the context of life satisfaction. The notion that well-being is supported by the freedom and autonomy provided by having access to transport or a vehicle is supported in recent
studies by several authors (Deka, 2017; Delbosc & Vella-Brodrick, 2015; Verhoeven, Simons, Van Cauwenberg, et al., 2016). The fact that licence status was associated with reduced life satisfaction in the current study is in direct contrast with Deka’s recent findings that access to a car among older adults was inversely related to depression in a longitudinal sample (Deka, 2017). Verhoeven found male drivers drove with psychosocial purpose, such as independence, in mind (Scott-Parker et al., 2015). While it is intuitive that frustration with one’s transport choices would reduce overall life satisfaction scores in this study, the licence findings are less so and rather compelling. Is it possible that having a full licence (compared to having no licence) reduces life satisfaction because of the added responsibility that comes with licensing, or the increased risks involved with driving, or the increased costs associated with car ownership and driving? Or, is it the consequences that cause one to obtain their full licence (living far from town, having to be a chauffeur for family and friends, or simply being old enough to qualify for it) that decreases life satisfaction among this male sample? This finding brings up numerous questions about the various effects of having a full licence, as well as the other stages of licensing (none, learners and restricted), and how licence status affects other factors of well-being, and recommends further investigation.

**Discussion of findings for life satisfaction for females**

Regular PA has been consistently found to be positively associated with well-being (Spiridon, 2011). In this study, meeting PA guidelines was associated with increased life satisfaction for females, after adjusting for other attachment and access variables. Valois et al. also found that meeting exercise guidelines was related to life satisfaction, among 4,758 public high school students in South Carolina, USA (Valois, Zullig, Huebner, & Drane, 2004). They reported that life satisfaction increased among females who played on organised sports teams at school, and reported that it could be the social support and friendship involved with team sports that increased the life satisfaction in this sample; this was also found for males, in that it was the physical exercise itself, and not the team aspect, that was related to life satisfaction (Valois et al., 2004). Biddle et al. also found, in their review of the literature, gender differences among the correlates of PA with regard to well-being, such as positive body image and the existence of barriers to PA (Biddle, Atkin, Cavill, & Foster, 2011); in other words, Biddle et al. found different
factors played a role in encouraging PA between males and females. In the current study, the measure was one of simply meeting guidelines for recommended levels of physical activity. It is interesting that this PA measure was associated with life satisfaction for females in this sample, but not males, as that contradicts other literature in Chapter 2. It may point to different correlates of PA for males and females in this specific age group, or in this specific region.

Cycling was also associated with increased life satisfaction amongst females. It is generally agreed upon in the literature that active transport affects health and well-being. Ettema et al. studied travel mode and subjective well-being, and found that “Whereas car driving is evaluated as stressful, and public transport use as boring, cycling and walking are found to be exciting and pleasurable” (Ettema et al., 2016)(page 138). Their finding is in context with “domain specific” life satisfaction, which is more about satisfaction with one’s travel experiences, and less about global life satisfaction, as addressed in the current study (Ettema et al., 2016; Ettema et al., 2011). Other studies that look at commute-related (domain specific) well-being have found that the main issue that seems to increase satisfaction is connectivity – can respondents get from point A to point B satisfactorily? – among adult samples (Abou-Zeid & Ben-Akiva, 2014; Chng, White, Abraham, & Skippon, 2016; Cutler, 1975; Olsson et al., 2013). The finding in the current study that among older adolescent females cycling is positively associated with the measure of life satisfaction is new.

Among females in the current study, it was found that using a motorcycle or scooter was associated with reduced life satisfaction when compared to not using a motorcycle or scooter, after adjusting for the other variables in the model. This is a new finding, as there is no literature regarding this mode of transport and well-being. It was not an often-used mode of transport within the study sample (n=39 for males; n=16 for females), but it is worth considering this mode of transport in future research.

Living a “cycle-able” distance from town (12 km or less) was associated with reduced life satisfaction for females, after adjusting for the other variables in the model, while living far enough away from town that using passive transport was necessary (more than 12 km) was associated with an increase in life satisfaction. Results show evidence of a significant difference between the two levels. This is a geographic determinate, and well-
Chapter 7 Multiple linear regression

being has been considered within the framework of spatial variations in recent studies (Bergstad et al., 2011; Choi, Coughlin, & D’Ambrosio, 2013; Nordbakke, 2013; Wong & Wang, 2016). In Chapter 3, findings of the photovoice project illustrated that geographically, living far from the city centre was associated with lower levels of well-being (Ward et al., 2015), which is in contrast to the literature and the current chapter findings, which reports that rural living is related to higher levels of well-being (Morrison, 2011) (Berry & Okulicz-Kozaryn, 2011). For example, Morrison found that the average level of life satisfaction in Auckland (NZ’s largest city) was the lowest when compared to other cities in NZ (Morrison, 2011). Thus in this thesis, while the findings of the quantitative online survey are in direct contrast to the qualitative finding of the photovoice project in Chapter 3 with regard to geographic determinants of well-being among older adolescents, the survey findings are in line with the literature as discussed in Chapter 2.

It would be worth investigating the specific transport-related reasons behind rural living and well-being, as living further from the city centre would entail longer transit times and reliance on others, or owning or having access to a vehicle. It is possible, for example, that there is a social component to being a passenger in a car with family and friends, which would make sense in the context of this study, because peer and family attachment were also found to be associated with life satisfaction, after being adjusted for other variables in the model. It could also be possible that the independence provided by driving one’s self has an effect on one’s life satisfaction, as supported in the literature review in Chapter 2. Or, as Goetzke and Rave found in their study of automobile access and happiness, it could be that peer comparisons are playing a part in these results; if peers are in the same situation, then well-being is supported (Goetzke & Rave, 2015). Thus it could be that in the present study, females living farther from the city centre display more life satisfaction because their friends are in the same situation. It could also be that they are taking advantage of the transport options available to them, as how young people use transport sometimes leads to factors related to exclusion; in the case of this sample, they are avoiding being excluded and therefore supporting their life satisfaction (Schwanen et al., 2015).
**Self-perceived strengths**

Results for both males and females show significant associations between self-perceived strengths and attachment and access. For males, self-perceived strengths were associated with sporting activities, social activities, car use, and proximity to city centre. For females, self-perceived strengths were associated with meeting PA guidelines, car use (as passenger), licence status, and income. All other things remaining equal, attachment to both friends and family were not associated with self-perceived strengths among both males and females in the current study and are absent from the final models. This is in contrast to Armsden and Greenberg, Raja et al., and McGee et al., who found that higher peer and parental attachment scores were linked to more self-perceived strengths among similar aged adolescents (16-20 years of age, and 15 years of age, respectively) (Armsden & Greenberg, 1987; McGee et al., 2011; Raja et al., 1992). However, McGee et al. did find in a later study that there was a marked reduction in peer and parental attachment among the same sample from the Dunedin Multidisciplinary Health and Development Study longitudinal study, and in their 2011 paper, the change was attributed to significant increases in screen time (McGee et al., 2011). It is possible, then, that as screen time has played an increasingly larger role in daily life among older adolescents, that it has increased to the extent that dramatic effects on attachment to peers and family are exhibited. Both Zabinski et al. and McGee et al. reported that screen time may be replacing PA, and thus may have an effect on well-being because PA is strongly linked to well-being (McGee et al., 2011; Spiridon, 2011; Zabinski et al., 2007).

**Discussion of findings for self-perceived strengths for males**

Once again, other attachment and access variables were different between the genders with regard to strengths. Males showed significant associations between activities and strengths. Specifically, an increase in sporting and social activities were each associated with increased male strengths scores, when compared to those not participating in those activities after adjusting for other access and attachment variables. This has been well-reported elsewhere, as shown by the literature review in Chapter 2. Driving as a mode of transport was found to be associated with self-perceived strengths among males in the current study, after adjusting for other variables in the model. This is a new finding, as highlighted by the literature review in this thesis. The fact that driving is associated with
strengths for males makes sense when considering that sporting and social activities are also supportive of self-perceived strengths – in order to participate, one must be able to get there. In Chapter 3, driving was related to loneliness in the photovoice project (Ward et al., 2015); however, it was also positively associated with the ability to access key destinations, particularly sporting activities, supported by the following quotes from both genders from Chapter 3 (Ward et al., 2015):

“...it’s easier to get to practices [by driving] and easier to organise their day and don’t have to bother mum and dad. Even if buses ran frequently rugby gear isn’t allowed on the bus.”

“I got my licence right away because I’m a swimmer and I have early and afternoon training. I do netball too – so I have freedom to get there and don’t have to bother my mum.”

It is fair to say that driving increases independence among males in this sample, and that it is this independence that is associated with self-perceived strengths.

Living 4-12 km from the the city centre was associated with fewer self-perceived strengths for males, compared to both living a walkable distance from the city centre, and living over 12 km from the city centre, after adjusting for other access and attachment variables. Living far enough away to need to use some sort of passive transport was associated with more self-perceived strengths, when compared to living close enough to walk to town, after adjusting for the other variables in the model. There was evidence of a significant difference between the two levels. This is a new finding. While there is a great deal of literature relating access to economic and health issues, as described in Chapter 2, there is nothing relating self-perceived strengths to access issues or geographic variables among older adolescents. This finding suggests there was value attached to either driving or catching a lift to town, or living rurally, and agrees with the previously discussed findings that self-perceived strengths were associated with participation in sporting and social activities, and driving, among this sample of males.
Discussion of findings for self-perceived strengths for females

For the females in this sample, meeting PA guidelines was associated with increased self-perceived strengths, when compared to not meeting these guidelines, after adjusting for the other access and attachment variables. In their review, Babic et al. found that generally, the literature supports the notion that PA was supportive of self-concept among youth, which is comparable to self-perceived strengths (Babic et al., 2014), thus this is not a new finding. However, from the perspective of transport, PA should be explored as a determinate of self-perceived strengths, with regard to being able to access a gym, or other opportunity for PA. Putting this finding in context, it is likely that the attachment that is provided by the activities done while endeavouring to meet PA guidelines are supportive of well-being, specifically self-perceived strengths. It may be that simply that being able to access whatever exercise activity one is participating in is what links transport to well-being from this perspective.

With regard to access, among females in the current study, using the transport mode of “car as passenger” was associated with self-perceived strengths after adjusting for the other variables. “Car as passenger” was the most often used mode of transport for this entire sample. As reported in Chapter 6, over three-quarters of respondents indicated they had travelled in a car as a passenger during the previous week, and there was a significant gender difference, with females using this mode more often than males. It is fair to assume that this mode of transport is common among this age group generally, regardless of country or region, and is a key portion of the trip chain described earlier in this thesis. It may be a “means to an end”, a way to complete key daily journeys. Keeping this in mind, it is surprising that there is no research of the passenger experience, outside of being a passenger on a bus or on a train. In the present study, all levels of licensing were associated with increased self-perceived strengths among females, when compared to not having a licence, after adjusting for other variables in the model. This is a new finding, as licence status among older adolescents has not been investigated in the context of self-perceived strengths, or overall well-being. Whether they use their licence to drive or not, having a licence does provide an additional option for accessing key destinations. But, to date no research investigates this phenomenon.
Income was included in the current study as a measure of access – it was hypothesised that higher levels of income would support activities and access to those activities. All levels of income were associated with reduced self-perceived strengths among females, when compared to not having any money, after adjusting for other variables. Intuitively, it seems that as income increases, so should well-being, and this is supported by the literature, up to a point (Boyce, Brown, & Moore, 2010; Easterlin, Mcvey, Switek, Sawangfa, & Zweig, 2010; Ferrer-i-Carbonell, 2005; Frey & Stutzer, 2002; Yu & Chen, 2016). Yu and Chen investigated the paradox of income and happiness via a single self-report life satisfaction query among a Chinese sample (Yu & Chen, 2016). While China is a specific culture and environment in which to study the effect of income on well-being, their conclusions could have meaning for interpreting the findings in the current research with regard to income. Yu and Chen discuss that social comparison may be the mechanism at the core of understanding the relationship between income and well-being. In other words, individuals tend to compare their income with others, and it is this relative comparison, not absolute income, that affects overall well-being and happiness (Yu & Chen, 2016). This relative comparison effect is further supported by the literature reporting that happiness with regard to the commute and vehicle ownership is largely dependent on comparison to peers (Abou-Zeid & Ben-Akiva, 2011; Goetzke & Rave, 2015). Applied to the current research, this could mean that self-perceived strengths were negatively affected by income because the females in the sample were comparing the money they had with the income of others, and were unhappy with the comparison to a point that it affected their self-perceived strengths. In this context, income may not have any bearing on issues regarding transport, but instead be solely related to self-perceived strengths.

**Potential limitations**

As mentioned earlier in the chapter, the coefficient of determination (R-squared, or $R^2$) indicates the percentage of the variation in the well-being outcome is, collectively, due to the term in the model (Harraway, 1995). The $R^2$ values for the male and female models of life satisfaction, which were 36% and 39%, respectively, are moderately strong. The $R^2$ for the self-perceived strengths model for males and females was 24% and 11%, respectively. The female $R^2$ value for strengths was particularly low, meaning that only
11% of the variation in the self-perceived strengths score could be explained by the combined model. This instability is in keeping with past use of the self-perceived strength scale among an adolescent sample by Williams and McGee in 1991, whose models at that time had similar $R^2$ values of 25% for males, and 11% for females (Williams & Mcgee, 1991). However, they found significant differences in both the nature of perceived strengths reported between boys and girls, as well as the predictors of those strengths (Williams & Mcgee, 1991). Williams and McGee postulated that it may simply be more difficult to predict self-perceived strengths among adolescent girls (Williams & Mcgee, 1991). It is important to note, though, that even if an $R^2$ value is low, with the presence of statistically significant predictors, one can still draw important conclusions about how changes in the predictor values are associated with changes in the response value (Harraway, 1995). Regardless of the $R^2$ value, the significant coefficients still represent the mean change in the response for one unit of change in the predictor while holding other predictors in the model constant, and this type of information is still extremely valuable (Harraway, 1995). These $R^2$ values, accompanied by the final models discussed in this chapter, provide recommendations for future research about well-being and transport. There was little consistency between the final regression results for males and females. This can probably be contributed to the fact that the measures chosen, life satisfaction and self-perceived strengths, are in fact measuring fundamentally different things (hedonic and eudemonic well-being, respectively). Thus, it could be that self-perceived strengths is not an adequate measure of well-being with regard to transportation modal choice.

Associations between the measures were examined via chi-square tests and correlations during the intermediate Step 2 of the regression analysis for both life satisfaction and self-perceived strengths, to consider whether there would be a problem with collinearity in the models. While there were some statistically significant relationships between variables, it did not cause any problems with the developed models. Looking at these interactions is a normal part of regression analysis. For this thesis, the decision was purposely made not to include extensive analysis of these potential interactions between variables. While there may be some value in investigating these interactions, it was deemed beyond the scope of this thesis. The purpose of the current research was to look at associations between the well-being outcome variables and effects of access and
attachment. Delving more deeply into the associations between variables and the associated interactions and their interpretation is something for future research to address.

**CHAPTER SUMMARY**

The regression analysis reported in this chapter examined the strength of associations between the two well-being outcomes of life satisfaction and self-perceived strengths, and the variables of interest. Figure 7.1 and Figure 7.2 are coded by well-being outcome (red for life satisfaction, and blue for self-perceived strengths) for males and females.

![Figure 7.2 Variables associated with well-being for males](image)
These findings show that well-being measures are associated with transport issues for both males and females. Peer and parental attachment were associated with life satisfaction for both genders, but not with self-perceived strengths. Findings clearly differed between genders, pointing to the fact that the well-being determinates of life satisfaction and self-perceived strengths should be considered separately.
In the next and final chapter, the thesis chapters are summarised, implementations are discussed, along with recommendations for future research and policy. Additions to the literature are highlighted, and concluding remarks are offered.
Chapter 8

TRANSPORT AND WELL-BEING AMONG OLDER ADOLESCENTS:

CONCLUSIONS AND RECOMMENDATIONS

The main objectives of Chapter 8 are to:

2) Provide a summary of the thesis by chapter,
3) Discuss implications of findings, and
4) Provide recommendations

THESIS SUMMARY AND MAIN FINDINGS

Summary

Chapter 1 of this thesis, the introduction, presented out the research topic, the overarching aim and objectives of the work, provided background on the conceptual framework the doctoral programme was based on, and provided information about supervision and outputs. Most importantly, Chapter 1 laid out the exploratory mixed methods design of the thesis, as well as the proposed methods, making evident the importance of each separate study conducted in this thesis.
Chapter 2 of this thesis, the literature review, provided a comprehensive look at the literature with regard to both transport and subjective well-being, and confirmed the research gap between the two for older adolescents. This suggested qualitative research would be a good starting point, prior to launching a large-scale quantitative survey, in order to provide context and preliminary data.

Chapter 3 described the qualitative photovoice study, which demonstrated how a group from the target age range used various modes of transport to access a variety of destinations, and how these choices affected their well-being. A strong feature of the study was that it allowed for the examination of the “research terrain” of transport and well-being, a topic that has been relatively unexplored in NZ, and identified areas of focus for the subsequent online survey. Four main themes emerged: financial costs; social and mental well-being; safety; and barriers to choice, and these were examined via the survey. Objectives laid out in Chapter 3 were attained; relationships with secondary schools were built, and findings of the photovoice project informed the writing of the measurement tool, the online survey. Qualitative project data collection, analysis and results were successful, as advised by the exploratory mixed method design. Chapter 3 was published in a peer-reviewed journal.

Chapter 4 reported on the pilot study that was developed and implemented, to test the feasibility of a final online survey, prior to a large-scale dissemination of the survey. The purpose of the pilot study was to assess the methods used to implement the survey. A strong feature of this pilot study was that it successfully advised the final survey tool and its dissemination. Results of the pilot study work confirmed a web-based survey was an effective way to survey older adolescents, and recommended that in-class dissemination was superior to a “take-home” method of survey distribution. The pilot study also recommended the most suitable way to approach invitations and reminders via email, in order to maximize response rate. Feedback from pilot survey respondents allowed for important amendments to the final survey, which resulted in more meaningful data collection. The pilot project allowed for the full development of the measurement tool, thus meeting the goal of the exploratory mixed method design introduced in Chapter 1. Chapter 4 was published in a peer-reviewed journal.
Chapter 5 described engagement with a wharekura in order to translate the survey into *te reo* Māori. The methods used helped to improve engagement by allowing the opportunity to consult with community stakeholders in a different cultural environment, regarding better ways to genuinely include Māori youth, and allowed for the inclusion of an additional group of respondents. Chapter 5 was published in a peer-reviewed journal.

Chapter 6 described the methods and procedures of the final survey, and descriptive results. The response rate for the survey was 71.5% overall and 81% among the variables of interest, a major strength of the survey. The modal share was striking in its difference to NZ national statistics. Findings also showed that there is relatively high life satisfaction among the sample, and comparatively high self-perceived strengths. There were, however, clear differences between the genders, suggesting that the determinants of life satisfaction and self-perceived strengths differ between males and females in this age group. Objectives laid out in Chapter 6 were attained; engagement with 12 of 13 secondary schools was successful, and the online survey allowed for comprehensive description of transport and well-being among a large representative sample of older teenagers in Southland, NZ. This fulfilled goals laid out in the exploratory mixed method research design of this thesis, as quantitative project data collection, analysis and results were accomplished.

The regression analysis in Chapter 7 reported associations between the two well-being outcomes of life satisfaction and self-perceived strengths, and the attachment and access variables of interest, suggesting a meaningful link between two distinct adolescent health research literature bases: the transport and the well-being literature. The practices and/or circumstances that support well-being among this sample differed by gender, and Figures 7.1 7.2 illustrated the overall findings emerging from the regression analysis. The implications and future recommendations based on those findings are considered in the following pages. Chapter 7 assessed whether or not there was a relationship between transport and well-being among the target population using multiple linear regression methods, as laid out in the aims and objective in Chapter 1. Chapter 7 also demonstrated the results of the culmination of the steps in the exploratory mixed method research design of this thesis, by laying out the final interpretation of results based on qualitative methods and findings informing quantitative methods and findings.
Chapter 8 Conclusions and recommendations

Main findings

In the current study, among males, factors associated with well-being are as follows:

- Peer and parental attachment were associated with increased life satisfaction
- Participating in community/civic activities was associated with increased life satisfaction
- Licensing was associated with decreased life satisfaction
- Transport frustration was associated with decreased life satisfaction
- Sporting and social activities were associated with more self-perceived strengths
- Driving a car was associated with more self-perceived strengths
- Geographic location (living rurally) was associated with more self-perceived strengths

Among females, factors associated with well-being are as follows:

- Peer and parental attachment were associated with higher life satisfaction
- Meeting physical activity guidelines was associated with both higher life satisfaction as well as more self-perceived strengths
- Cycling was associated with increased life satisfaction
- Riding a motorbike or scooter was associated with less life satisfaction
- Traveling as a passenger in a car was associated with more self-perceived strengths
- Licensing was associated with more self-perceived strengths
- Income was associated with less self-perceived strengths
- Geographic location (living rurally) was associated with more life satisfaction


Chapter 8 Conclusions and recommendations

IMPLICATIONS OF FINDINGS

Well-being among this sample

The current study used the Positive Youth Development approach to investigate the subjective well-being of older adolescents in Southland, NZ, and found their life satisfaction and self-perceived strengths to be relatively high, which agrees with the OECD’s ranking of NZ (Cordero et al., 2017). The study also found that external factors play a substantial role in health outcomes for young people, which is what the PYD approach acknowledges. This has been described by various other researchers, and was in keeping with the ecological framework of this thesis (Benson et al., 1998; Blum, 1998; Roth et al., 1998; Roth & Brooks-Gunn, 2003). Benson et al. found that youth development is bi-directional and is affected by the surrounding environment, and the results reported in Chapter 6 and Chapter 7 show that in fact, the environment in which a young person lives played a large role in their levels of well-being, and is also influenced by numerous factors. It seems the current research found that well-being is mostly influenced by individual and external factors. This is evidenced by higher self-perceived strengths among males who lived rurally, and higher life satisfaction among females who lived rurally. In their review, Coulton and Spilsbury found a complex dynamic with regard to individuals and their geographic location (Coulton & Spilsbury, 2014). This is confirmed by other literature, which reports multifaceted interactions between health and place (Benson et al., 1998; Lapalme et al., 2013; McCullough et al., 2000; Savage et al., 2014). Thus, the findings in this thesis add to that body of literature. Lambert et al. found that good connections with family and friends support happiness and well-being (Lambert et al., 2014), and the current research seems to reinforce that. However, self-perceived strengths did not appear to be as heavily influenced by peer and family attachments as life satisfaction in this study, and this finding also adds to the literature.

Activities and hobbies among this sample

Among older teenagers, participation in sport has been positively associated with psychological health (Eime et al., 2013), and this appears to be the case with males in the
current study. Taking part in community and civic activities, such as volunteering, working for a charity, or having a job, was associated with increased life satisfaction among males in this sample. This is a new finding. Sporting and social activities were associated with increased self-perceived strengths among males as well. Meeting physical activity (PA) guidelines in the current research was found to be associated with both higher life satisfaction and increased self-perceived strengths among females. Key activities seem to therefore support factors related to well-being among older teenagers in this study. Findings suggest that, in the context of transport, attachment associated with these activities is important, and supports the hypothesis that transport-related issues are facilitated by attachment, and therefore being able to access them is essential and supportive of well-being.

Transport among this sample

Recent studies show that licensing rates are steadily decreasing among young people in high-income countries; Schoettle and Sivak have been following this trend since 2011 (Schoettle & Sivak, 2014; Sivak, 2013; Sivak & Schoettle, 2011; Sivak & Schoettle, 2012, 2013). New Zealand is among those countries with decreasing licensing among young people (Ministry of Transport, 2015a). In the current study, only about half of respondents had some sort of licence, and slightly more females had a licence than males. In comparison, upwards of two-thirds of those aged 16-19 years have some sort of licence in Australia (Charting Transport, 2017). Licensing was associated with decreased life satisfaction for males, and increased self-perceived strengths among females in this study. Delbosc and Vella-Brodrick postulated that having access to transport supported autonomy, and by extension, well-being (Delbosc & Vella-Brodrick, 2015), but to the best of my knowledge this is the first time licence levels have been associated with measures of life satisfaction and self-perceived strengths, and the first time licensing has been found to negatively affect life satisfaction, specifically. Therefore, this adds to the international literature, and to the exploration of what reduced licensing may mean for independence among this age group internationally.

This study found a fascinating modal split in this sample from Southland, NZ. The most common form of transport was as a passenger in a car, and over three-quarters of the
sample travelled regularly in this fashion. Currently, car passengers are only discussed in the research literature with respect to how they affect the safety of the driver. In this sample, traveling as a passenger in a car was associated with more self-perceived strengths for females, a new and interesting finding. The second most common form of transport was walking, and indeed this sample exhibited a high rate of active transport. This may be due to the fact that active transport is often part of a more elaborate trip chain among this age group (Giles-Corti et al., 2010), or the fact that Southland is predominantly flat. However, the rate of active transport is higher when compared to the rest of NZ (Ministry of Transport, 2015a), as well as the United States and Australia (American Association of State Highway and Transportation Officials, 2013; Charting Transport, 2017). LaRoche and Saunders have both shown that active transport positively affects health (Larouche, 2014; Larouche, Saunders, et al., 2014; Saunders et al., 2013), and while this could be extrapolated to include well-being, few if any studies report on well-being and active transport, outside of general happiness among children (Ramanathan et al., 2014; Waygood et al., 2017). Therefore, the high rate of active transport found among this older adolescent sample may be supportive of their relatively high rates of life satisfaction and self-perceived strengths, and is a new finding that adds to the literature.

Cycling was found to be associated with increased life satisfaction among females. This is an intriguing finding, and adds to the literature, as females are often considered an “indicator species” when it comes to cycling (Baker, 2009; Pucher et al., 2010). This refers to the fact that if a large number of females are cycling, it means that a city’s infrastructure is supportive of cycling in general. The finding is also interesting from the standpoint that over 90% of the females in the current study wore uniforms to school, and the photovoice study in Chapter 3 suggested that the skirt required as part of the school uniform limited cycling (Ward et al., 2015). The fact that cycling is supportive of life satisfaction in this sample of females agrees with Long et al.’s findings (Long et al., 2015), and suggests that cycling infrastructure might support well-being among older adolescents in the region.

Driving was associated with increased self-perceived strengths among males in the current study. As evidenced by the literature review in Chapter 2, several studies describe relationships between autonomy and access to transport. These could be generalised to
include driving; however, no studies deal directly with driving’s relationship with self-perceived strengths. It could be that peer perceptions played a role in this finding. Riding on a motorcycle or scooter was associated with more self-perceived strengths among females, but the use of this type of transport among the females in this sample was low. The fact that transport frustration among males was associated with reduced life satisfaction is a new finding. Delbosc and Vella-Brodrick analysed transport independence scale factors to determine if adults were able to get where they needed to go, and found that it did not directly affect well-being (Delbosc & Vella-Brodrick, 2015). These findings with regard to driving therefore add to the literature with regard to the importance of access to transport as it relates to well-being, be it by car, public transport, or active transport. While not directly related to transport access, income was found in the present study to be associated with fewer self-perceived strengths among females. As discussed in the previous chapter, this is thought to be related to comparison with peers (Yu & Chen, 2016).

RECOMMENDATIONS FOR FUTURE RESEARCH

Peer attachment and family attachment were associated with life satisfaction for both males and females. However, aside from attachment to peers and parents, the factors associated with well-being in this study differed between the genders. It may be important, therefore, to tease out the various factors under the umbrella of subjective well-being when assessing it among older adolescents in future work.

Some specific activities were found to positively affect well-being among males in this thesis, particularly with regard to community and civic activities. Future research should therefore separate out the types of community and civic activities participated in, and how respondents access these activities, within this age group. Having a paid job was included as a community activity, and it would be interesting to explore older adolescent employment, and how it relates to transport and well-being, as it is reported that having a driving licence decreases one’s likelihood to use active transport to get to school or work (Kar, Li, Haynie, & Simons-Morton, 2017). It warrants further research to investigate the reasons why females aged 15-19 years engage in regular physical activity, as it was associated with both higher life satisfaction and self-perceived strengths for females in
this research, to inform interventions with other groups. In fact, physical activity was the only variable found to influence both life satisfaction and self-perceived strengths among one of the genders. Screen time was high among this sample, which is not unusual. However, it has been suggested elsewhere that screen time is replacing physical activity, and while this investigation did not directly address screen time, the high use of screen time among this sample suggests it is replacing something. Future well-being research should focus on screen time and the part it plays in life satisfaction and self-perceived strengths. Screen time should also be investigated in order to determine its effect (if any) on transport modal choice.

This study found that living rurally was associated with high self-perceived strengths and life satisfaction for males and females, respectively. In the context of transport, living far from the city centre suggests that some form of passive transport (bus or car) is necessary for travel, and therefore involves a more long and complicated trip chain. Research shows that the use of active transport is inversely associated with the distance of a trip (Stewart et al., 2015). When one also considers that bus use is included as active transport because of the walking necessary on each end of the trip, more research is needed to separate out the transport choices among those who live rurally, untangling them from the other geographic determinates of well-being to discover how traveling long distances daily affects well-being.

There are other opportunities for future in-depth study. For example, there is little research on the impact of school uniforms on travel mode. The photovoice project in Chapter 3 found that females did not cycle for exercise, which suggested that the school uniform is a barrier for young women to getting into the habit of cycling (Ward et al., 2015). These findings suggest that future interventions should make cycling more accessible for females. Frater et al. found that in order to support cycling to school among secondary school students it is necessary to address social needs and perceived capabilities (Frater et al., 2017). This is supported by Mandic et al., who recently determined from their survey that cycle-friendly school uniforms would encourage students to cycle to school (Mandic et al., 2017). Schools in NZ are currently considering a gender-neutral uniform, and as this will most likely sway in favour of shorts and pants, it should be encouraged, in NZ and elsewhere. Future research should also focus on the car passenger experience, to determine what factors, outside of not having a licence, play
a role in using this mode of transport internationally. Current findings show a high passenger mode share among this sample, and while the findings with regard to mode share cannot be generalised outside of NZ, it does highlight a topic that needs to be addressed. There are many public health implications of being a passenger, such as the obvious physical health issues surrounding crash risk, risk behaviours, and safety. Beyond that, there are other health implications regarding this transport mode as it relates to attachment and well-being, such as the parent-child relationship, or the peer-to-peer relationship, as the time spent in a car during a commute allows for time to chat. Also, over a third of the current sample lived rurally; this suggests limitations with regard to available transport options to reach key destinations and activities. It would be interesting for future research to examine the experience of car passengers from these perspectives, given the prevalence of this travel mode among this sample.

It is unclear whether or not the delayed licensure among this age group is a situational or a permanent change. Over one-third of the participants in this study had not yet initiated the licensing process, meaning they have had no formal traffic safety education. As this is a worldwide trend, future international research should explore the possibility of a shift in the focus of driver safety education to include all modes of transport, not just driving a car. Further studies could also explore the immediate, mid- and long-term future intentions of this group with regard to transport. The new findings that licensure was associated with self-perceived strengths among females, and that driving was associated with decreased life satisfaction among males, indicate more research is needed into the various determinants of well-being with regard to transport and licensing among this age group, as internationally this is still largely unknown.

There were some interesting patterns of response rate and missing data among the genders during the current study, which requires more research in order to address properly. Males typically exhibit lower response rates and more missing values. However, in the present research, these blanket statements do not apply. Response rate by gender varied depending on the survey delivery method, and females in fact displayed more missing values than males in the final survey. This points to research needed with regard to survey delivery methods and gender among older adolescents.
RECOMMENDATIONS FOR POLICY AND PRACTICE

Peer and family attachment were both associated with subjective well-being in this study, for both genders. This has implications for how transport interventions (in the context of well-being) are implemented in the future; for example, the transport attitudes of parents and peers need to be taken into account when planning transport interventions or transport-related public health messages. Other findings, however, show gender differences with regard to both life satisfaction and self-perceived strengths, suggesting that future subjective well-being interventions should be separately tailored for males and females of this age group. For example, physical activity was the only variable found to influence both life satisfaction and self-perceived strengths among one of the genders (females). This proposes that physical activity is a strong correlate of well-being for females in this age group, demonstrating that interventions to promote physical activity for teenagers should be specified by gender. Geographical location emerged as a potential predictor of life satisfaction and self-perceived strengths. In the context of transport, living far from any city centre suggests that some form of passive transport (bus or car) is necessary for travel, and therefore involves a more long and complicated trip chain. This supports the notion of subsidised or free public transport being supportive of well-being for teenagers, as was found by Jones et al. (Jones et al., 2012). As this research found that getting to activities enhanced well-being, the cost of free or subsidised transport might be saved in lower health costs.

Findings of the current study indicate that continued investment in safe cycle ways is warranted, to encourage teenagers to cycle more, be it as transport or as an activity in itself. Aside from increasing access as a transport mode, cycling infrastructure has a positive impact on overall health; a recent study in NZ found that those who walk or cycle as transport are 76% more likely to achieve NZ physical activity recommendations (Shaw, Keall, & Guiney, 2017). Specifically, future interventions should aim to make cycling more accessible for females in this age group, because cycling supported life satisfaction among females in this study. As school uniforms have been found to deter cycling among females in this study and elsewhere in NZ (Mandic et al., 2017; Ward et al., 2015), this suggests that the school uniform is a barrier for young women getting into the habit of cycling. Therefore, school uniform policies may be unknowingly reducing
well-being by restricting access to cycling among females, by requiring them to wear a skirt and flat non-athletic shoes. Implementing gender-neutral uniforms in schools (or doing away with them all together) should be a policy goal in NZ.

The finding that license status was associated with decreased life satisfaction for males, and increased self-perceived strengths for females, indicates licensing and transportation interventions should consider the various determinants of well-being among this age group when planning interventions. For example, it may be advisable, based the combination of these findings, and in the face of peak car, to revisit the idea of traditional driver’s education, as currently less than 1% of the curriculum (in the U.S.) covers interaction with public transit, pedestrians, and cyclists (Carroll, Cornish, Culp, Levinger, & Ketcherside, 2007). It has been suggested by some transport professionals that driver’s education be replaced by “mobility education”, incorporating multi-modal training to capture all transport modes available, and to make future drivers aware of vulnerable road users such as cyclists and pedestrians (Carroll et al., 2007).

Finally, there was little consistency between the predictors of well-being for males and females. This can probably be contributed to the fact that the measures chosen, life satisfaction and self-perceived strengths, are measuring fundamentally different things (hedonic and eudemonic well-being, respectively). Thus, it could be that self-perceived strengths is not an adequate measure of well-being with regard to transportation modal choice. Future research along this line may be better informed to use hedonic measures.

**CONCLUDING REMARKS**

This thesis adds to the emerging transport and well-being literature. Transport mode and availability, facilitated by attachment to peers and parents in some cases, are associated with well-being among this age group in Southland, NZ. Key activities seem to support factors related to well-being among older teenagers, therefore having the necessary transport to be able to access these activities, be it active or passive, affects well-being. Measures of crash risk and licence status may not present a comprehensive image of health status with regard to well-being among older teenagers. Local governments should ensure they engage with older adolescents, as well as with other groups within the
community, when planning for transport infrastructure changes and community programmes. This will safeguard transport availability, walkability and overall liveability, thus addressing and supporting the well-being of all road users.
Chapter 9

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Chapter 10

APPENDICES

Appendix 1 Photovoice project questionnaire.................................2366
Appendix 2 Photovoice evaluation form for participants........................242
Appendix 3 Example of certificate of appreciation distributed to participants ......243
Appendix 4 Pilot survey ..................................................................................................................2444
Appendix 5 Final survey, English version.................................................................2444
Appendix 6 Final survey, Māori version ...............................................Error! Bookmark not defined.6
Appendix 7 Survey invitation letter to school principals ...........................................2446
Appendix 8 Example of survey results report to schools .........................2447
APPENDIX 1 PHOTOVOICE PROJECT QUESTIONNAIRE

1) Participant school
Please enter your participant code word to make your submission valid.
Address: ____________________________

Note: this info only used for geographical reasons, not to identify you

2a) Age
☐ 16
☐ 17
☐ 18
☐ 19
☐ 20
☐ 21
☐ 22
☐ 23
☐ 24

2b) Ethnicity
☐ New Zealand European
☐ Maori [please name iwi in 2c) below]
☐ Samoan
☐ Cook Island Maori
☐ Tongan
☐ Niuean
☐ Chinese
☐ Indian
☐ Other (such as Dutch, Japanese, Tokelauan)

2c) If Maori, please name iwi: ____________________________

2d) If "Other", please describe (such as Dutch, Japanese, Tokelauan)

3) Gender
☐ female
☐ male

4) Licensing status
☐ I don't have my licence (skip to question 4c)
I have my Learners
O I have my Restricted
O I have my Full Licence

4a) How many days per week do you drive?______________

4b) How many kilometres do you think you drive per week?__________

4c) Why don’t you have your licence? (Mark as many that are relevant)
O Too expensive to drive
O Too expensive to get a licence
O I can usually get a ride with someone (parent, sibling, friend, etc)
O I take the bus where I need to go
O I walk where I need to go
O I cycle where I need to go
O Don’t want to drive/ Don’t feel ready to drive
O I use the internet to socialize
O Other reasons: ______________________________________

4d) At what age did you (or do you expect to) get your Learners?
O 16
O 17
O 18
O 19
O 20+

4e) At what age did you (or do you expect to) get your full drivers licence?
O 16
O 17
O 18
O 19
O 20+

5) Do you have a bike?
O yes I own a bike
O no, but I have access to someone else's bike
O no I don't have access to a bike

6) Can you ride a bike?
O yes
O no

7) Do you have a current bus pass?
O yes, I have a school bus pass
Appendices

- yes, I have a public transport bus pass
- yes, I have both a school and a public transport bus pass
- no, I do not have a bus pass

8) What is the nearest public transport route to your home?

List route # & name. If you don’t know, feel free to leave this question blank.

9) Can you typically count on getting a ride (or having access to a car if you are driving) to the places you need to go?
- yes, almost always
- yes, usually
- yes, sometimes
- no, almost never

10) How many vehicles are there in your household? *

- none
- 1
- 2
- 3
- 4
- 5 or more

Note: if you live with more than one parent, include the total number of vehicles from each home.

11) How many licenced drivers are there in your household? *

Note: if you live with more than one parent, include the total number of licenced drivers in each home - but count yourself only once.

12) How long have you lived in your current home?
- less than 6 months
- more than 6 months

If you live with more than one parent, choose the home where you travel to and from school most often.

13a) How do you typically travel TO school?
- walk
- bike
- public transport
- car, as driver
- car, as passenger

Choose your most frequent travel mode

13b) How do you typically travel FROM school?
- walk
- bike
- public transport
Choose your most frequent travel mode

14) How do you typically travel to/from work?
☐ walk
☐ bike
☐ public transport
☐ car, as driver
☐ car, as passenger
☐ not applicable

15) How do you typically travel to/from a friend's home?
☐ walk
☐ bike
☐ public transport
☐ car, as driver
☐ car, as passenger
☐ not applicable

16) How do you typically travel to/from sports/gym?
☐ walk
☐ bike
☐ public transport
☐ car, as driver
☐ car, as passenger
☐ not applicable

17) How do you typically travel to/from the library?
☐ walk
☐ bike
☐ public transport
☐ car, as driver
☐ car, as passenger
☐ not applicable

19) How do you typically travel to/from shopping?
☐ walk
☐ bike
☐ public transport
Appendices

20) What other places do you visit?
Place 1: __________________________
- walk
- bike
- public transport
- car, as driver
- car, as passenger
- not applicable

Choose as many as are applicable to your situation, but indicate most frequent mode

Place 2: __________________________
- walk
- bike
- public transport
- car, as driver
- car, as passenger
- not applicable

Choose as many as are applicable to your situation, but indicate most frequent mode

Place 3: __________________________
- walk
- bike
- public transport
- car, as driver
- car, as passenger
- not applicable

Choose as many as are applicable to your situation, but indicate most frequent mode

21) If you were looking for a part-time job, how would your travel choices affect where you looked for a job?

Are they any comments you’d like to make about your travel habits, or would you like to mention something we’ve forgotten?

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
For those without a driver’s licence: What are your future intentions regarding driving or getting your licence?
# Appendix 2 Photovoice Evaluation Form for Participants

## Photovoice Evaluation

<table>
<thead>
<tr>
<th>This project was….</th>
<th>A waste of my time</th>
<th>Well worth my time</th>
<th>Boring</th>
<th>Interesting</th>
<th>Old news</th>
<th>News to me!</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>At the start of the project, I felt …</td>
<td>Uncomfortable</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Uncomfortable</td>
<td>2</td>
</tr>
<tr>
<td>By the END of the project I felt …</td>
<td>Uncomfortable</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Comfortable</td>
<td>2</td>
</tr>
<tr>
<td>This project made me think about transport in a way I hadn’t thought of before</td>
<td>Strongly agree</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Strongly disagree</td>
<td>2</td>
</tr>
<tr>
<td>My friends influence my decision to get a license and drive</td>
<td>Strongly agree</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Strongly disagree</td>
<td>2</td>
</tr>
<tr>
<td>My current choice of transport makes me happy</td>
<td>Strongly agree</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Strongly disagree</td>
<td>2</td>
</tr>
<tr>
<td>After I graduate, I plan to …</td>
<td>Get my full licence ASAP</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Wait and see what happens</td>
<td>2</td>
</tr>
<tr>
<td>I think having a car is …</td>
<td>100% necessary</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Not necessary</td>
<td>2</td>
</tr>
</tbody>
</table>

THANK YOU for your participation! Use back of sheet for additional comments
APPENDIX 3 EXAMPLE OF CERTIFICATE OF APPRECIATION DISTRIBUTED TO PARTICIPANTS

CERTIFICATE OF EXCELLENCE

AWARDED TO

Miss Jane Doe

For outstanding participation in the University of Otago’s Southland photovoice project

Awarded this 12th day of August, 2014

Professor Rob McGee, PhD Supervisor
University of Otago
Department of Preventive and Social Medicine

Aimee Ward, MPH, BSc
PhD Candidate
University of Otago

A/P Claire Freeman, PhD Supervisor
University of Otago
Department of Geography
Appendices

APPENDIX 4 PILOT SURVEY

Pilot Survey

Default Question Block

Q1 Welcome! Thank you for clicking through to our survey; it should take you around 10-20 minutes to complete. The survey is being conducted by researchers from the University of Otago. Statement of Confidentiality Before we start, please be assured that this survey is confidential and completely voluntary. If you have any questions about the research, please feel free to email or call/text Aimee Ward, the lead researcher (aimee.ward@otago.ac.nz – 022 673 1278). If you lose your connection to the Internet or this survey at any point, please click the link provided in the invitation email you received and it will take you back to the point where you left off. By completing this survey, you are giving your consent.

Q2 First, I’d like to give you some information about the survey you will be taking. Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

Participant selection and purpose of study

You are invited to participate in this on-line survey of transport behaviour and well-being. This project is being undertaken as part of the requirements for Ms Aimee Ward’s PhD in Public Health. You were selected as a possible participant in this study because you volunteered and are a secondary student in Year 12 or 13. This survey should take 10-20 minutes. All participants that complete the survey will be entered in a draw for a $25 voucher. The prize winner will be contacted via email by 1 November.

Data/Information to be collected

Information gathered will be used only for the purpose of research, and will not identify you. The results of the project may be published and made available in the University of Otago Library (Dunedin, NZ) but your anonymity will be preserved. Those who will have access to the data or information include Ms Aimee Ward (PhD student) and her supervisors. Data obtained as a result of the research will be retained for at least 5 years in secure storage. You will be provided with study results if you wish. If you have any questions about this project, please feel free to contact:
Appendices

Contact information
Aimee Ward  
aimee.ward@otago.ac.nz  
Professor Rob McGee  
rob.mcgee@otago.ac.nz
This study has been approved by the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479 8256 or email gary.witte@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

[Reference Number: 14/163]
[22 September 2014]

Q3 Let's Start with Some Basic Questions About You ... Are you male or female?
Male (1)
Female (2)

Q4 How old are you?
15 (1)
16 (2)
17 (3)
18 (4)
19 (5)

Q5 What year at school are you?
Year 12 (1)
Year 13 (2)

Q6 You, Your Friends, and Your Family ... To get started, I'd like to ask you some questions about you and how you see yourself. Which of the following words describe you? Please choose as many or as few as fit you
Friendly (1)
Trustworthy (2)
Good with pets/animals (4)
Healthy (5)
Reliable (6)
Good sense of humour (7)
Helpful (8)
Easy going (9)
Kind (10)
Careful (11)
Independent (12)
Lively (13)
Lots of common sense (14)
Good at sports (15)
Confident (16)
Outgoing (17)
Popular (18)
Affectionate (19)
Lots of interests and hobbies (20)
Appendices

Creative (21)
Good at music/art (22)
Attractive (23)

Q7 Now I’d like to ask you about you and your friends.
   Yes (1) No (2)
   Most of my friends live near me (1)
   There is a friend or friends I am unable to visit because they live too far away (2)
   I am able to visit my friends whenever I want to (3)

Q8 By your best guess, how far away does your best friend live?
   Less than 1 km away (1)
   1-2 km away (2)
   2-3 km away (3)
   More than 3 km away (4)
   I don't have a best friend (5)

Q9 How well do the following statements describe your relationship with your friends?

<table>
<thead>
<tr>
<th>Always true/Almost always true (1)</th>
<th>Often true (2)</th>
<th>Sometimes true (3)</th>
<th>Never true/Almost never true (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>My friends listen to what I have to say</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like to get my friends' point of view on things I'm concerned about</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My friends are concerned about my well-being</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I'm angry about something, my friends try to be understanding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I tell my friends about my problems and troubles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I get upset a lot more than my friends know about</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel my friends are good friends</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My relationships with my friends influence my decisions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q10 Now I’d like to know how you feel about your life in general. In general, how do you feel about ....

<table>
<thead>
<tr>
<th>Very Happy (1)</th>
<th>Happy (2)</th>
<th>Unhappy (3)</th>
<th>Very Unhappy (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your life as a whole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The future</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your standard of living</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The people you go to school with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your independence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your social life</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The money you have to spend on things</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your ability to get on with people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your spare time activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your school</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q11 How well do the following statements describe your relationship with your family/whanau?

<table>
<thead>
<tr>
<th>Always true/Almost always true (1)</th>
<th>Often true (2)</th>
<th>Sometimes true (3)</th>
<th>Never true/Almost never true (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like to spend free time with my family/whanau</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We can easily think of things to do together as a family/whanau</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendices

My family/whanau ask each other for help
My relationships with my parents are good
My relationship with my family/whanau influences my decisions

Q12 Your Hobbies and Activities ... Now I’d like to ask you about the things you do and the places you go. In the last month, how often did you do the following sport-related activities? Tick as many as apply to you.

I did this 4 or more times in the last month (1)
I did this 1-3 times in the last month (2)
I didn't do this in the last month (3)

- Sporting event
- Sports team
- Skateboard
- Go to the velodrome
- Go to the gym
- Surfing
- Cycling
- Hunting
- Tramping
- A sports-related activity not mentioned
- Jogging
- The Stadium
- Horse riding

Q13 In the last month, how often did you do the following cultural activities? Tick as many as apply to you.

I did this 4 or more times in the last month (1)
I did this 1-3 times in the last month (2)
I didn't do this in the last month (3)

- Played music
- Attended a concert or music event
- Sang alone or with a group
- Performed in a kapa haka
- Visited a place of worship
- Attended the theatre
- Visited an art show or gallery
- Visited a marae
- A cultural activity not mentioned above

Q14 In the last month, how often did you take part in the following social/leisure activities? Tick as many as apply to you.

I did this 4 or more times in the last month (1)
I did this 1-3 times in the last month (2)
I didn't do this in the last month (3)

- Went to the movies
- Went to the park
- Went dancing
- Went to the beach
- Went shopping
- Hung out with friends at home/mall/coffee shop
- Went to a party
- Went to the public library
A social or leisure activity not mentioned above
Q15 In the last month, how often were you involved in any of the following groups/organisations?   Tick as many as apply to you.

<table>
<thead>
<tr>
<th>I did this 4 or more times in the last month (1)</th>
<th>I did this 1-3 times in the last month (2)</th>
<th>I didn't do this in the last month (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A volunteer or charity organisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A church group</td>
<td></td>
<td></td>
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<tr>
<td>A leadership role at school</td>
<td></td>
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<tr>
<td>A leadership role outside of school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A paid job</td>
<td></td>
<td></td>
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<tr>
<td>A dog agility club</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boy or Girl Scouts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girl Guides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A group or organisation not mentioned above</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q16 Your Transportation Habits .... Do you have any of the following transport modes readily available to you?   Tick as many as apply to you.

- Bike (1)
- Your own car (2)
- Access to a car when you need to drive it (6)
- Skateboard or non-motorised scooter (3)
- Motorbike (4)
- Bus (10)
- A ride with someone else (parent/sibling/friend) (5)

Q17 Which of these transport modes of transport do you ever use?   Please tick all that apply.

- Car (as driver) (1)
- Car (as passenger) (2)
- Bus (3)
- Bike (5)
- Skateboard or non-motorised scooter (6)
- Walking (7)
- Motorbike (9)

Q18 Please tick all transport options that apply for each activity you chose in the previous questions (for example: if you walked to the public bus and then rode the bus to the movies, tick "I walked there" and "By public bus")   Referring to transportation, how did you get to ....

- Bus (1)
- Car as driver (2)
- Car as passenger (3)
- Cycled (4)
- Walked (5)
- Skateboard (7)

[Respondent’s list of activity choices here]
Q19 Which of these activities didn't you do because you didn't have reliable transport? Please think about the last month, and tick all the activities and destinations that you could not do or get to because of lack of transport.

[Respondent’s list of activity NOT chosen choices here]

Display This Question if bus Is Selected Q16

Q20 You mentioned that you take the bus to get places. Why do you take the bus? Tick as many as apply to you
   It is my main mode of transportation (1)
   I ride the bus so I can socialise with my friends (2)
   It's not expensive (3)
   The departure/arrival times are convenient for me (4)
   I like to ride the bus alone so I can think/read/listen to music (5)
   Other reason (6) ____________________________________________________

Display This Question if bus Is Not Selected Q16

Q21 I noticed you do not take the bus to get places. Why do you not take the bus, or take it more? Tick as many as apply to you
   It's too expensive (2)
   The departure/arrival times are inconvenient for me (3)
   It's not available in my part of town (5)
   The pick-up locations are not convenient (6)
   Other reason (10) ____________________________________________________

Display This Question if any active transport is selected Q16

Q22 You mentioned that you get around by walking, cycling, skateboarding, or other active forms of transport. Why do you choose to travel so actively? Tick as many as apply to you
   It is my main mode of transportation (1)
   It's a good time to socialise with friends (2)
   It's my exercise (5)
   It's my time alone to think (6)
   I live very close to town/school (12)
   Can't afford to drive (14)
   Other modes of transport are either inconvenient or non-existent (15)
   Can't afford the bus (16)
   Other reason (7) ____________________________________________________

Display This Question if no active transport modes are selected Q16

Q23 I noticed you do not walk, cycle, or skateboard/scooter to get to places. Why do you not use active modes of travel? Tick as many as apply to you
   The weather makes it hard (1)
   My school uniform is restrictive (2)
   I don't have a bike (3)
   I don't have a skateboard/scooter (6)
   The environment where I live makes it difficult - too far, too hilly, etc (8)
   Can't be bothered (9)
   I only walk to/from the bus/car (10)
Appendices

Other (14)

Q24 How often in the last month did you feel frustrated because you didn't have transport when you wanted to go somewhere?
   - More than 6 times in the last month (6)
   - 4-6 times in the last month (7)
   - 1-3 times in the past month (4)
   - Never - I can always get transport (8)

Q25 If you had your choice, what would be your preferred mode of transportation? Please chose only one.
   - Driving yourself (1)
   - Being a passenger in a car (2)
   - Cycling (3)
   - Walking (4)
   - Taking the bus (5)
   - Skateboarding or non-motorised scooter (6)
   - Motorbike (8)

Q26 Licensure and Driving... What is your driver's licence status?
   - I don't have my licence (1)
   - I have my learner's permit (2)
   - I have my restricted licence (3)
   - I have my full licence (4)

Display This Question if anything but full licence selected
Q27 At what age do you think you will get your full licence?
   - 17 (1)
   - 18 (2)
   - 19 (3)
   - 20+ (4)
   - Don't know (5)
   - Have no plans to get a licence anytime soon (6)

Display This Question if driving is selected Q16
Q28 You said you have access to a car that's not your own - who's car do you drive?
   - Parent's car (1)
   - Sibling's car (2)
   - Friend's car (3)
   - I don't drive (4)

Display This Question if driving is selected Q16
Q29 How often do you drive?
   - Never (1)
   - Less than once a month (2)
   - Once a month (3)
   - 2-3 times a month (4)
   - Once a week (5)
   - 2-3 times a week (6)
   - Daily (7)
Display This Question if driving not selected Q16
Q30 What are the reasons why you don't drive, or don't drive more than you already do? Please choose as many as you like.
   I don't have a licence (1)
   Too expensive to drive/maintain a vehicle (2)
   Too expensive to get a licence (3)
   I'm concerned about how driving impacts on the environment (4)
   I have a disability, medical problem or vision problem (5)
   I can usually get a ride with someone (parent, sibling, friend) (6)
   I take the public bus where I need to go (7)
   I walk where I need to go (8)
   I cycle where I need to go (9)
   Don't want to drive/don't feel ready to drive (10)
   I use the Internet to socialise (11)
   Too busy to be bothered with driving (12)
   I take the school bus where I need to go (13)
   I don't drive (14)
   I ride a scooter (15)
   I skateboard (16)
   Other (17) ________________________________________________

Display This Question if don't have my licence is selected:
Q31 You said you don't have your licence. Why not? Please tick as many as you like.
   Too expensive to drive/maintain a vehicle (1)
   Too expensive to get a licence (2)
   I'm concerned about how driving impacts on the environment (3)
   Disability, medical problem or vision problem (4)
   I can usually get a ride with someone (parent, sibling, friend) (5)
   I take the bus where I need to go (6)
   I walk where I need to go (7)
   I cycle where I need to go (8)
   Don't want to drive/don't feel ready to drive (9)
   I use the Internet to socialise (10)
   Too busy to be bothered with driving (11)
   I'm not old enough to sit my learners exam (12)
   I skateboard (13)
   Other (14) ________________________________________________
Q32 Now I'd like to ask you how you got to and from school last week. For each day last week, please tell me how you got TO school. If you use more than one way to get to school each day, tick as many as apply for each day - for example, if you were driven to the bus stop on Monday, tick both "was a passenger in a car" and "school bus".

<table>
<thead>
<tr>
<th></th>
<th>Mon (1)</th>
<th>Tues (2)</th>
<th>Wed (3)</th>
<th>Thurs (4)</th>
<th>Fri (5)</th>
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</thead>
<tbody>
<tr>
<td>Public bus</td>
<td>(1)</td>
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<tr>
<td>School bus</td>
<td>(2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Walked</td>
<td>(3)</td>
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<tr>
<td>Cycled</td>
<td>(4)</td>
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<tr>
<td>Skateboarded</td>
<td>(5)</td>
<td></td>
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<td></td>
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<tr>
<td>Drove</td>
<td>(6)</td>
<td></td>
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<td></td>
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<tr>
<td>Was a passenger in a car</td>
<td>(7)</td>
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<tr>
<td>Didn't go to school</td>
<td>(8)</td>
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</tbody>
</table>

Q33 For each day last week, please tell me how you got home FROM school. If you use more than one way to get home each day, tick as many as apply for each day - for example, if you take the bus and then walk home on Monday, tick both "school bus" and "walked".

<table>
<thead>
<tr>
<th></th>
<th>Mon (1)</th>
<th>Tues (2)</th>
<th>Wed (3)</th>
<th>Thurs (4)</th>
<th>Fri (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public bus</td>
<td>(1)</td>
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<td></td>
</tr>
<tr>
<td>School bus</td>
<td>(2)</td>
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</tr>
<tr>
<td>Walked</td>
<td>(3)</td>
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<tr>
<td>Cycled</td>
<td>(4)</td>
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<tr>
<td>Skateboarded</td>
<td>(5)</td>
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<td></td>
</tr>
<tr>
<td>Drove</td>
<td>(6)</td>
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</tr>
<tr>
<td>Was a passenger in a car</td>
<td>(7)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Didn't go to school</td>
<td>(8)</td>
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</tbody>
</table>

Q34 Just a few more easy questions, almost finished! Do you wear a uniform to school?

- Yes (1)
- No (2)
- Sometimes (3)

Display This Question if If Do you wear a uniform to school? Yes Is Selected

Q35 Does wearing a uniform affect what transport mode you choose to get around during the week?

- No (1)
- If yes, why is this? (2) ________________________________

Q36 What is your home address? Please type your street address here. (Note: I only want to know how far you live from the closest town centre - your address will NOT be used to identify you!)

Q37 Which of the following ethnic groups do you identify with? Tick as many as apply to you.

- New Zealander/Kiwi/New Zealander of European descent (1)
- Maori/New Zealander of Maori descent (2)
- European (3)
Appendices

Pacific Islander (4)
Chinese (5)
Indian (6)
Other Asian (7)
Other (8)

Q38 How many vehicles are in your household? (if you live in more than one household, include the total from all homes)
0 (5)
1 (1)
2 (2)
3 (3)
4 or more (4)

Q39 How many hours PER DAY do you spend on the Internet? Please enter a number between 0-24.

Q40 How many hours PER DAY do you spend watching television? Please enter a number between 0-24.

Q41 In the past 7 days, how much money did you get or earn for yourself?
I did not get/earn any money (1)
$1-10 (2)
$11-20 (3)
$21-30 (4)
$31-40 (5)
$40-50 (6)
Over $50 (7)

Q42 And Finally ... When you think about the future, how important do you think having a car of your own will be? Tick the ONE that is closest to your view on the subject.
It will be a necessity (1)
It will be a luxury (2)
It would be nice to have a car, but I wouldn't use it all the time (3)
It would depend on where I live and what other transport options are available to me (4)
If I lived somewhere with good public transport, I'd use it instead of a car (5)
If I lived somewhere where it was easy to walk or bike to get where I needed to go, I'd do that instead of drive (6)
Other reason (7) ________________________________________________

Q43 If there is anything you would like to say about this survey or the topics it covers, such as additional comments or if you'd like to mention something I've forgotten, please write this here. Otherwise, please click on the >> button to submit your survey.
APPENDIX 5 FINAL SURVEY, ENGLISH VERSION

Final survey (English version)

Default Question Block

Q1 Welcome! This survey should take you around 15-20 minutes to complete. The survey is being conducted by researchers from the University of Otago. On the next page, there is more information. Statement of Confidentiality Before we start, please be assured that this survey is confidential and voluntary. If you have any questions about the research, please feel free to email or call/text Aimee Ward, the lead researcher (aimee.ward@otago.ac.nz – 022 673 1278). If you lose your connection to the Internet or this survey at any point, please click the link provided in the invitation email you received and it will take you back to the point where you left off. By starting this survey, you are giving your consent to participate.

Q2 First, I’d like to give you a bit more information about the survey you will be taking.

Participant selection and purpose of study

You are invited to participate in this on-line survey of transport behaviour and well-being. This project is being undertaken as part of the requirements for Ms Aimee Ward’s PhD in Public Health. You were selected as a possible participant in this study because you volunteered and are a secondary school student in Year 12 or 13. This survey should take 15-20 minutes. All participants who complete the survey will be offered the chance to enter their email address into a draw for TWO prizes - one for a voucher of the winner's choice (worth $25), and one for a grand prize (worth $250). The prize winners will be contacted via email in March 2015.

Data/Information to be collected

Information gathered will be used only for the purpose of research, and will be kept confidential. The results of the project may be published but your anonymity will be preserved. Those who will have access to the data or information include Ms Aimee Ward (PhD student) and her supervisors. Data obtained as a result of the research will be retained for at least 5 years in secure storage. You will be provided with study...
Appendices

results if you wish. If you have any questions about this project, please feel free to contact:

Aimee Ward
aimee.ward@otago.ac.nz

Professor Rob McGee
rob.mcgee@otago.ac.nz

This study has been approved by the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479 8256 or email gary.witte@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

[Reference Number: 14/163]
[22 September 2014]

Q3 Let's Start with Some Basic Questions About You ... Are you male or female?
- Male
- Female

Q4 How old are you?
- 15
- 16
- 17
- 18
- 19

Q5 What year at school are you?
- Year 12
- Year 13

Q6 What school do you go to?
- Apamira
- Aurora
- CSC
- Fiordland College
- Gore HS
- James Hargest
- Menzies College
- NSC
- St Peters Gore
- SBHS
- SGHS
- Te Wharekura
- Verdon

Q7 Currently, how many types of transport do you have access to? Tick as many as apply to you
- I can take a school bus
- I can take a public bus
- I have a bicycle
Q8 In the last month, which of these have you used to get to places? Tick as many as apply to you
- School bus
- Public bus
- Walking
- Cycling
- Skateboarding
- Car (as driver)
- Car (as passenger)
- Motorbike or scooter

Q9 You, Your Friends, and Your Family ... Now I'd like to ask you some questions about you and how you see yourself. Which of the following words describe you? Please choose as many or as few as fit you
- Friendly
- Trustworthy
- Good with pets/animals
- Healthy
- Reliable
- Good sense of humour
- Helpful
- Easy going
- Kind
- Careful
- Independent
- Lively
- Lots of common sense
- Good at sports
- Confident
- Outgoing
- Popular
- Affectionate
- Lots of interests and hobbies
- Creative
- Good at music/art
- Attractive

Q10 Now I'd like to ask some questions about you about you and your friends. By your best guess, how far away does your best friend live?
- Less than 1 km away
- 1-2 km away
- 2-3 km away
o More than 3 km away
o I don't have a best friend

Q11 How well do the following statements describe your relationship with your friends?

- **Always true/ Almost always true**
- **Often true**
- **Sometimes true**
- **Never true/ Almost never true**

My friends listen to what I have to say
I like to get my friends' point of view on things I'm concerned about
My friends are concerned about my well-being
When I’m angry about something, my friends try to be understanding
I tell my friends about my problems and troubles
I get upset a lot more than my friends know about
I feel my friends are good friends
My relationships with my friends influence my transport decisions

Q12 Now I'd like to know how you feel about your life. Right now, how do you feel about ....

- **Very Happy**
- **Happy**
- **Unhappy**
- **Very Unhappy**

Your school
The people you go to school with
Your independence
Your social life
The money you have to spend on things
Your ability to get on with people
Your spare time activities
Your standard of living
The future
Your transport choices
Your overall safety
Your life as a whole

Q13 Overall, how happy do you feel? Please imagine your general feelings of happiness - for example, over the past year, not just today - on a scale of 0 to 10 (0=very unhappy and 10=very happy). Please click on and drag the slider to what number best describes your overall feeling of happiness

Overall level of happiness

Q14 How well do the following statements describe your relationship with your family/whanau?

- **Always true/ Almost always true**
- **Often true**
- **Sometimes true**
- **Never true/ Almost never true**

I like to spend free time with my family/whanau
We can easily think of things to do together as a family/whanau
My family/whanau ask each other for help
My relationships with my parents are good
My relationship with my family/whanau influences my transport decisions
Q15 Your Hobbies and Activities ... Now I’d like to ask you about the things you do and the places you go. In the last month, how often did you participate in or attend the following sport-related or outdoor activities?

I did this 4 or more times in the last month, I did this 1-3 times in the last month, I did not do this

Any team sport (game or match)
Any team practice
Sporting event (for example at stadium or velodrome)
Athletics (weight lifting, cycling or running)
Skateboarding
Tramping
Ice sports (curling, skating, hockey)
Water sports (rowing, kayaking, surfing, swimming, etc)
Hunting/shooting
Equestrian activities
Racquet sports (tennis, badminton, etc)
Martial arts

Q16 In the last month, how often did you participate in or attend the following cultural activities?

I did this 4 or more times in the last month, I did this 1-3 times in the last month, I did not do this

Singing (in a band, choir, etc)
Dancing
A concert/music/dance event
An art or theatre event
Painting, sculpting or drawing
Played an instrument
Performed in a kapa haka
Visited a place of worship
Visited a marae

Q17 In the last month, how often did you take part in the following social/leisure activities?

I did this 4 or more times in the last month, I did this 1-3 times in the last month, I did not do this

Went to the movies
Visited a beach
Visited a park
Went shopping
Went somewhere with a group of friends
Attended a party
Went to the public library

Q18 In the last month, how often were you involved in any of the following?

I did this 4 or more times in the last month I did this 1-3 times in the last month I did not do this

Club or leadership role at school
Volunteer or charity organisation
Appendices

Church group  o  o  o
Club outside of school  o  o  o
Leadership role outside of school  o  o  o  o
Scouts/Guides/Brigade  o  o  o
A paid job  o  o  o

Q19 How You Get Around .... Following are the activities you said you participated in during the past month. Please tick all the kinds of transport you used to get to each activity you chose. (For example: if you walked to the public bus and rode the bus to the movies, tick "Walk" and "Public bus") Referring to transportation, how did you get to ....

<table>
<thead>
<tr>
<th>School bus</th>
<th>Public bus</th>
<th>Car (driver)</th>
<th>Car (passenger)</th>
<th>Walk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle</td>
<td>Skateboard</td>
<td>Motorbike/scooter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[list of respondent’s reported activities from previous questions listed here]

Q20 Are there any activities or hobbies that you participate in that I forgot to mention? If so, please type them in below

Q21 In the past month, were there any hobbies or activities that you were unable to participate in because you didn’t have reliable transport?

| No |
| Yes - please list or describe in the space below |

Q22 You mentioned that in the last month, you have taken the school bus or the public bus to get places. Why do you take the bus? Tick as many as apply to you

☐ It is my main mode of transportation
☐ I ride the bus so I can socialise with my friends
☐ It’s not expensive
☐ The departure/arrival times are convenient for me
☐ I like to ride the bus alone so I can think/read/listen to music
☐ I don't have access to a car
☐ I don't have a licence
☐ Where I want to go is too far away to walk/bike
☐ I feel encouraged/supported to ride the bus
☐ I feel safe taking the bus
☐ Other reasons? Please list below

Q23 I noticed in the last month, you did not take the public bus to get places. Why do you not take the public bus? Tick as many as apply to you

☐ It’s too expensive
☐ The departure/arrival times are inconvenient for me
☐ It’s not available in my part of town
☐ The pick-up locations are not convenient
☐ I drive myself
☐ I walk instead
☐ I get a ride with someone
☐ I don't feel encouraged/supported to ride the public bus
☐ I don't feel safe taking the public bus
☐ I don't know how the public bus works
☐ I skateboard instead
☐ I bike instead
☐ Other reason? Please list below

Q24 You mentioned that in the last month, you got around either by bus, car or motorbike/scooter. Why do you not go by walking, cycling, or skateboard? Tick as many as apply to you
☐ I actually do walk, cycle and/or skateboard
☐ The weather makes it too hard
☐ My school uniform is restrictive
☐ I don't have a bike
☐ I don't have a skateboard
☐ The environment where I live makes it too difficult - too far, too hilly, etc
☐ I drive myself
☐ I get a ride with somebody
☐ When I arrive at my destination, there are no facilities for my bike or skateboard
☐ My skateboard isn’t allowed on the bus or school grounds
☐ I don't feel encouraged/supported to walk, cycle or skateboard
☐ I don't feel safe enough to walk, cycle or skateboard
☐ Other reasons? Please list below

Q25 You mentioned that in the last month, you got around by either walking, cycling, or skateboarding. Why do you choose to travel so actively? Tick as many as apply to you
☐ It is my main mode of transportation
☐ It's safe and easy
☐ It's a good time to socialise with friends
☐ It's my exercise
☐ It's my time alone to think
☐ I live very close to town/school
☐ Other modes of transport are either inconvenient or non-existent
☐ I don't have a licence
☐ I don't have access to a car
☐ When I arrive at my destination, there are good facilities for storing my bike/skateboard/scooter
☐ I feel encouraged/supported to walk, cycle or skateboard
☐ I can't get a ride with someone
☐ Other reasons? Please list below

Q26 You mentioned that in the last month, you were a passenger in a car. How well do the following statements describe how you feel as a car passenger?

Always true/Almost always true, Often true, Sometimes true, Never true/Almost never true

I feel safe when someone my age is driving
I feel safe when someone older than me is driving
I feel safe when a parent is driving
My own driving habits are affected by how others drive when I'm with them

Q27 Think about your experiences with transportation in the last month. In general, how often have you felt safe? In each situation that applies to you below, please
drag the slider to indicate how often you feel safe. If a situation does not apply to you, please leave the slider at 0.

Driving a car
Riding in a car with someone else driving
As a pedestrian or skateboarder
As a cyclist
Riding on the bus (school bus/van or public bus)

Q28 How often in the last month did you feel frustrated because you didn't have transport when you wanted to go somewhere?
- Never - I can always get transport
- 1-3 times in the past month
- 4-6 times in the last month
- More than 6 times in the last month

Q29 If you had your choice, what would be your preferred mode of transportation? Please click and drag each mode up or down to rank them in order of your preference
- Car, motorbike or scooter (driver or passenger)
- Cycling
- Walking
- Taking the bus or other form of public transport
- Skateboarding

Q30 Now I'd like to ask you how you got to and from school last week. Did you go to school at least one day last week?
- Yes
- No

Q31 Now I'd like to ask you how you got to and from school last week. For each day last week, how did you get TO school? Tick as many as apply for each day - for example, if you were driven to the school bus stop on Monday, tick both "Passenger in a car" and "School bus"

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didn't go to school</td>
<td>School bus</td>
<td>Public bus</td>
<td>Walked</td>
<td>Cycled</td>
</tr>
<tr>
<td>Skateboarded</td>
<td>Drove</td>
<td>Passenger in a car</td>
<td>Motorbike/scooter</td>
<td></td>
</tr>
</tbody>
</table>

Q32 For each day last week that you went to school, how did you get home? Tick as many as apply for each day - for example, if you walk to the public bus stop to get home on Monday, tick both "Walked" and "Public bus"

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>School bus</td>
<td>Public bus</td>
<td>Walked</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendices

Cycled
Skateboarded
Drove
Passenger in a car
Motorbike/scooter

Q33 Driving Licence ... What sort of driver's licence do you have?
○ I don't have any sort of licence
○ I have my learners permit
○ I have my restricted licence
○ I have my full licence

Q34 At what age do you think you will get your full licence?
○ 17
○ 18
○ 19
○ 20+
○ Don't know
○ Have no plans to get a licence anytime soon

Q35 You said you have access to a car that's not your own - whose car do you drive?
○ Parent's car
○ Sibling's car
○ Friend's car
○ I don't drive

Q36 How often do you personally drive a car, either alone or with passengers in the car with you?
○ Never
○ Less than once a month
○ Once a month
○ 2-3 times a month
○ Once a week
○ 2-3 times a week
○ Daily

Q37 When you drive, which of these statements best describes the passenger situation in the car?
○ I always have passengers with me when I drive
○ I sometimes have passengers with me when I drive
○ I always drive alone

Q38 You said you either always or sometimes drive with passengers in the car. Who is it that usually rides with you? Tick as many that apply to you
☐ My friend(s)
☐ My parent(s)
☐ My sibling(s)
☐ None of these
Appendices

Q39 What are the reasons why you don't drive, or don't drive more than you already do? Please choose as many as you like
☐ I don't have a licence
☐ Too expensive to drive/maintain a vehicle
☐ Too expensive to get a licence
☐ I'm concerned about how driving impacts on the environment
☐ I have a disability, medical problem or vision problem that prevents me from driving
☐ I can usually get a ride with someone (parent, sibling, friend)
☐ I walk where I need to go
☐ I cycle where I need to go
☐ Don't want to drive/don't feel ready to drive
☐ I use the Internet to socialise
☐ Too busy to be bothered with learning to drive
☐ I take the bus where I need to go
☐ I ride a motorcycle or scooter
☐ I skateboard
☐ Parking is a problem
☐ I don't have a car or access to one
☐ Other reasons? Please list below

Q40 You said you don't have any form of a drivers licence. Please tick as many as you like
☐ Too expensive to drive/maintain a vehicle
☐ Too expensive to get a licence
☐ I'm concerned about how driving impacts on the environment
☐ I have a disability, medical problem or vision problem that prevents me from driving
☐ I can usually get a ride with someone (parent, sibling, friend)
☐ I take the bus where I need to go
☐ I walk, cycle or skateboard where I need to go
☐ Don't want to drive/don't feel ready to drive
☐ I use the Internet to socialise
☐ Too busy to be bothered with learning to drive
☐ I'm not old enough to sit my learners exam
☐ Other reasons? Please list below

Q41 Just a few more easy questions, almost finished! Do you wear a uniform to school?
☐ Yes
☐ No

Q42 Does wearing a uniform affect what transport mode you choose to get around during the week?
☐ No
☐ Yes - please describe why in the space below

Q43 Which ethnic group do you belong to? Tick all that apply to you
☐ New Zealand European
☐ Māori

263
Appendices

☐ Samoan
☐ Cook Island Māori
☐ Tongan
☐ Niuean
☐ Chinese
☐ Indian
☐ Other, such as Dutch, Japanese, or Tokelauan. Please state below:

Q44 Are any of your parents, grandparents or great-grandparents Māori?
○ Yes
○ No
○ I don't know

Q45 How many households do you live in?
○ 1
○ 2 or more

Q46 How many vehicles are in your MAIN household (where you spend the most time)? If you live in more than one household, please indicate the number of cars only at what you consider to be your primary household.
○ 0
○ 1
○ 2
○ 3
○ 4 or more

Q47 What is your MAIN home address (where you spend the most time)? Please type your street address here. (Note: I only want to know how far you live from the town centre - your address will NOT be used to identify you!)

Q48 In the past week, how much money did you have to spend on yourself and the things you wanted to do?
○ I did not get/earn any money
○ $1-10
○ $11-20
○ $21-30
○ $31-40
○ $41-50
○ $50-99
○ Over $100

Q49 On average, how many HOURS PER DAY would you say you spend on the Internet and watching TV combined? Please enter a number between 0-24 hours per day

Q50 In the past week, on how many DAYS have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate? This may include sport, exercise, and brisk walking or cycling for recreation or to get to and from
places, but should not include physical activity that may be part of your daily routine or part of your job. Please enter a number between 0-7 days per week.

Q51 And Finally ... Think about your future plans, and how you might use transport 10 years from now. Please use the sliders to indicate how likely each of the following situations will be.
- If I lived some place with a good public transport system, I would use it.
- I would walk or cycle if I lived some place where it was easy and safe to do so.
- Driving will be a necessity.
- Having my own car will be very important to me.
- My choice of where I live, work or go to University will depend on the transport modes available there.

Q52 If there are any other issues that you think will affect your transport choices in the future, please list them below.

Q53 If there is anything you would like to say about this survey or the topics it covers, such as additional comments or if you'd like to mention something I've forgotten, please type this below. Also, if you want to be included in the two prize drawings, please enter your preferred email address below! Then, please click on the >> button to submit your survey.
Appendices

APPENDIX 6 FINAL SURVEY, MĀORI VERSION

Final Survey – Māori Version

Default Question Block

Q1 Tēnā, me ngā mihi! He 15-20 mineti pea te roa ki te whakaoti i tēnei uiuinga. Kei te whakahae ngā kairangahau o Te Whare Wānanga o Ōtākou i te uiuinga nei. I runga i te whārangi e whai ake nei he kōrero anō mō tēnei rangahau. Kī Tauraki Matatapu. I mua i te timatatanga, me whakatau ō māharahara mō te tapu o te kōrero o roto mōu. Ka noho tapu āu kōrero katoa, a, eharā i te mea me whakautu i ngā pātai katoa, he mahi tūiao tēnei. Mēnā he pātai āu, he āwangawanga rānei, tēnā whakapā atu ki a Aimee Ward, ā waea nei, ā īmera nei rānei. Ko Aimee te Kairangahau Matua o tēnei rangahau (aimee.ward@otago.ac.nz, 022 673 1278). Mehe mega ka motu tō hononga ki te ipurangi, ki te uiuinga rānei i a koe e mahi ana, tēnā pēhia te mea whakahono i te īmera tono i whiwhi i a koe, a, mā tēnā ka whakahoki atu koe ki taua wāhi tonu i te mahi koe i mua i te motungo o te hononga ki te ipurangi. Ko tō timatatanga ki tēnei rangahau he whakaāe hoki kia uru ai koe ki te rangahau nei.

Q2 Tuatahi, anei ētahi kōrero anō mō te uiuinga nei. Te whiringa kaiuru me te pūtāke o tēnei rangahau He tono tēnei ki a koe kia uru mai ki tēnei rangahau ā-ipurangi e tātai nei ngā whanonga nuku me te oranga o te tangata. He herenga tēnei ō te Tohu Kairangi o Aimee Ward. Kua whiria koe he kaiuru ki te rangahau nei i te mea nau anō tō ringa i tū, he ākonga kura tuarua, kei te tau 12, 13 ranei. He 15-20 mineti te roa ki te whakaoti i tēnei rangahau. Ka tukuna he wā ki ia kaiuru ka oti tika i te rangahau nei kia uru atu ki tētahi rāwhara. E rua ngā parihe ka whiwhi i – Tētahi he kūpane ki tāu e pirangi ai, $25 te uara. Ko tērā atu he paraihe nui ($250 te uara).


Aimee Ward
aimee.ward@otago.ac.nz

Professor Rob McGee
rob.mcgee@otago.ac.nz

Kua whakaāetia tēnei rangahau e te Kōmiti Matatika Tangata o Te Whare Wānanga o Ōtākou. Mēnā he anipā ou i te tikanga whakahere o te rangahau nei me whakapā atu ki te Kaiwhakarite o te Kōmiti Matatika Tangata 03 479 8256, īmera rānei gary.witte@otago.ac.nz. Ka noho matatapu ō mānukanuka, ka āta mātaitia, a, ka whakamōhio atu ki a koe i te putanga mai o ngā kitenga o te
Q3 Me timata ki ētahi pātai māmā mōu ake  He tama, he kōtiro rānei koe?
   - Tama
   - Kōtiro

Q4 He aha tō pakeke?
   - 15
   - 16
   - 17
   - 18
   - 19

Q5 Kei tēhea tau koe ki te kura?
   - Tau 12
   - Tau 13

Q6 E kuraina ana koe ki tēhea kura?
   - Apamira
   - Aurora
   - CSC
   - Fiordland College
   - Gore HS
   - James Hargest
   - Menzies College
   - NSC
   - St Peters Gore
   - SBHS
   - SGHS
   - Te Wharekura
   - Verdon
Q7 I tēnei wā, ko ēhea ngā momo waka e taea e koe? **Tohua atu ērā katoa e tika ana mōu**

- Ka eke pahi kura au
- Ka eke pahi tūmatanui au
- He pahikara tōku
- He papareti tōku
- He motopaika tōku
- Kei a au tōku ake waka
- He waka e wātea ana mōku e hautū ki te hiahia au
- Mā tētahi atu ahau e kawe ki te hiahia au (he mātua/he tuakana-teina-tuahine/he hoa)
- Horekau tētahi o ēnei

Q8 *Te marama kua pahure,* ko ēhea o ēnei i whakamahia kia tae atu ki ngā wāhi e hiahia ana? **Tohua atu ērā katoa e tika ana mōu**

- Pahi kura
- Pahi tūmatanui
- Hikoi
- Eke pahikara
- Eke papareti
- Waka nāu i hautū
- Waka nā tētahi atu i hautū
- Motopaika

Q9 *Ko koe, ko ōu hoa, ko tō whānau...* Ka aro atu ki a koe ināianei me ō whakaaro mōu ake. Ko ēhea ngā kupu e whakaahuria ana koe? **Tohua atu ērā katoa e tika ana mōu**

- Rarata
- Matatika
- Whakarata mōkai/kararehe
- Hauora
- Pou Whirinaki
- Wairua Whakakata
- Ringa āwhina
- Pāroherohe
- Ngākau māhaki
- Ringa maimoa
- Motuhake
- Ngahau
- Atamai
- Whakamārohirohi
- Ngākau Titikaha
- Māhorahora
- Rongonui
- Mateoha
- Pukumahi
- Wairua Auaha
- Kaipūoro pai, kaitoi pai
- Pūrotu
Q10 Ināianei ka uia koe mōu, mō ō hoa hoki. I ō whakaaro i pēhea te roa o te tawhiti e noho ana tō hoa tata nei?

- Iti iho i te 1km te tawhiti
- 1-2 km te tawhiti
- 2-3 km te tawhiti
- Atu i te 3km te tawhiti
- Kāore he hoa tata ōku

Q11 Tohua mai te tika, te hē rānei o te hāngai o ngā tuhinga i raro nei ki tō hononga ki ō hoa.

<table>
<thead>
<tr>
<th>Ka whakarongo ōku hoa ki ahau</th>
<th>Tika rawa/ Tika te rahinga o te wā</th>
<th>Te nuinga o te wā he tika</th>
<th>Ētahi wā he tika</th>
<th>Kore rawa e tika/ Te rahinga o te wā e hē ana</th>
</tr>
</thead>
<tbody>
<tr>
<td>He pai ki a au ki te rongo i ngā whakaaro o ōku hoa mō ngā mea e whakararu mai ana ki ahau</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Kua whai aroha ōku koa mō taku oranga</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I a au e riri ana mō tētahi kaupapa he taringa whakarongo ōku hoa</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Ka whākī atu ōku raru, ōku ānipā ki ōku hoa</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Kāore ōku hoa i te mōhio te nuinga o ngā wā e riri ana au.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Ki a au nei, he hoa pai ōku hoa</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
He take nui ōku hononga ki ōku hoa ki te whakatau te ara waka, te ara kawe rānei e haere ana au

<table>
<thead>
<tr>
<th>Q12  Pēhea tō titiro ki tō oranga?</th>
<th>E pēhea ana koe mō…</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manahau</td>
</tr>
<tr>
<td>Tō kura</td>
<td></td>
</tr>
<tr>
<td>Ō hoa kura</td>
<td></td>
</tr>
<tr>
<td>Tō motuhaketanga</td>
<td></td>
</tr>
<tr>
<td>Tō oranga pāpori</td>
<td></td>
</tr>
<tr>
<td>Te pūtea āu hei hoko mea</td>
<td></td>
</tr>
<tr>
<td>Tō whakahoahoa ki te iwi</td>
<td></td>
</tr>
<tr>
<td>Ngā mahi e mahi ana koe i a koe e wātea ana</td>
<td></td>
</tr>
<tr>
<td>Te āhua o tō noho</td>
<td></td>
</tr>
<tr>
<td>Ngā rā e heke mai ana</td>
<td></td>
</tr>
<tr>
<td>Ō whiringa ara waka</td>
<td></td>
</tr>
<tr>
<td>Tō oranga tonutanga</td>
<td></td>
</tr>
<tr>
<td>Tō oranga</td>
<td></td>
</tr>
</tbody>
</table>
Q13 E pēhea ana te harikoa o tō ngākau? Āta whakaarohia i ō kare-ā-roto uruhau, i te tau kua hori, ehara i tēnei rā anake. Mai i te 0 ki te 10 (ko te 0 he hinapouri, he matapōrehu, ko te 10 he tino hari koa rawa). Tēnā pēhia katahi ka tōngia ai te tohu ki te nama e tika mō ōu manahau

<table>
<thead>
<tr>
<th>E pēhea ana te harikoa o tō ngākau?</th>
</tr>
</thead>
</table>

Q14 Tohua mai te tika, te hē rānei o te hāngai o ngā tuhinga i raro nei ki tō hononga ki tō whānau.

<table>
<thead>
<tr>
<th>I a au e wātea ana, he pai ki ahau ki te noho ki tōku whānau</th>
<th>Tika rawa/ Tika te rahinga o te wā</th>
<th>Te nuinga o te wā he tika</th>
<th>Ētahi wā he tika</th>
<th>Kore rawa e tika/ Te rahinga o te wā e hē ana</th>
</tr>
</thead>
<tbody>
<tr>
<td>He māmā noa ki a mātou te whai mahi ā-whānau mā mātou</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Ka tonoa āwhina mātou e mātou tonu</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>He pai taku hono ki ōku mātua</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Mā tōku whanaungatanga ki tōku whānau āku whakatau mō te ara e haere ana au e tau</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Q15 Ko āu runaruna, ko āu ngangahau… Ka uia koe ināianei mō ngā mahi e mahia ana e koe me ngā wāhi e haere ana koe. I te marama kua pahure, e hia nei ngā wā i whai wāhi ai, i uru ai rānei koe ki ngā mahi hākinakina, ki ngā ngohe o waho rānei?

<table>
<thead>
<tr>
<th>E whā ngā wā i pēnei au i te marama kua hipa</th>
<th>Kotahi tae atu ki te toru ngā wā i pēnei ai au i te marama kua hipa</th>
<th>Kīhai au i mahi tēnei mahi</th>
</tr>
</thead>
<tbody>
<tr>
<td>He kēmu hākinakina ā-tīma, ā-kapa rānei</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>He haratau ā-tīma</td>
<td>He tū mahi häkinakina (kei te whare tāpere (stadium) te whare pahikara (velodrome) rānei</td>
<td>Para (athletics) (Hiki maitai, eke pahikara, oma rānei)</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

Q16 I te marama kua hori, e hia ngā wā i whai wāhi ai koe, i uru ai rānei koe ki ngā mahi ahurea e whai ake nei?

<table>
<thead>
<tr>
<th>Waiata (in a band, choir, etc)</th>
<th>E whā ngā wā i pēnei au i te marama kua hipa</th>
<th>Kotahi tae atu ki te toru ngā wā i pēnei ai au i te marama kua hipa</th>
<th>Kīhai au i mahi tēnei mahi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waiata (in a band, choir, etc)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kanikani</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Question</td>
<td>He konohete</td>
<td>He toi whakaari</td>
<td>Mahi toi (peita, hanga, tuhituhi)</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>-----------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td><strong>Q17</strong></td>
<td>I te marama kua hori, e hia ngā wā i whai wāhi ai koe, i uru ai rānei koe ki ngā mahi haporō e whai ake nei?</td>
<td>E whā ngā wā i pēnei au i te marama kua hipa</td>
<td>Kotahi tae atu ki te toru ngā wā i pēnei ai au i te marama kua hipa</td>
</tr>
<tr>
<td></td>
<td>I haere ki te whare kiriata</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>I peka atu ki tātahi</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>I haere ki tētahi wāhi tākaro</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>I hokohoko mea</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>I haere tahi me ōku hoa</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>I haere ki te pāti, ki te whakangahau</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>I haere ki te whare pukapuka</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Q18 *I te marama kua hori,* e hia ngā wā i whai wāhi ai koe, i uru ai rānei koe ki ngā mahi e whai ake nei?

<table>
<thead>
<tr>
<th>He karapu, he tūnga whai mana ki te kura rānei</th>
<th>E whā ngā wā i pēnei au i te marama kua hipa</th>
<th>Kotahi tae atu ki te toru ngā wā i pēnei ai au i te marama kua hipa</th>
<th>Kīhai au i mahi tēnei mahi</th>
</tr>
</thead>
<tbody>
<tr>
<td>He rōpū tūao, he rōpū hoahoa rānei</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>He rōpū hāhi</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>He karapu kei waho atu i te kura</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>He tūnga whai mana kei waho o te kura</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Scouts/Guides/Brigade</td>
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<tr>
<td>He mahi whai utu</td>
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</table>

Q19 *Tō haere ki ēnei wāhi…* He mahi e whai ake nei, nāu i kī kua mahia e koe i te marama kua hori. *Tēnā tohua ngā momo waka i eke ai koe kia tae ki ia mahi. Hei tauira, mēnā i hikoi koe ki te tauranga pahi, a, i eke pahi ki te whare kiriata, tohua “Hiko” me “Pahi Tūmatanui”. E hāngai ana ki ngā momo waka, mā hea koe i tae ai ki…

<table>
<thead>
<tr>
<th>Pahi kura / We ne kura</th>
<th>Pahi tūmata nui</th>
<th>Wak a (hei haut u)</th>
<th>Wak a (hei pāhihi)</th>
<th>Hiko i</th>
<th>Eke pahika ra</th>
<th>Eke pap a reti</th>
<th>Eke motopai ka</th>
</tr>
</thead>
<tbody>
<tr>
<td>Te wāhi i tākaro ai tō tīma</td>
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<td>Te wāhi i eke papa reti koe</td>
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<td>Te wāhi i haratau ai tō tīma</td>
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<td>Te karapu, te tūnga whai mana o te kura rānei</td>
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<td>Te karapu o waho atu i te kura</td>
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<tr>
<td>Te tūnga whai mana kei waho o te kura</td>
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Q20 Mehemea kua mahue i a au he mahi, he runaruna rānei e mahi ana e koe, tēnā tuhia mai ki raro.
Q21 I te marama kua pahure i mahue i a koe tētahi runaruna, tētahi mahi rānei i te mea kāore he ara mōu kia tae atu?
  
  ○ Kāo
  ○ Āe - Tēnā, tuhia mai ki raro.

Q22 Ko tāu, i te marama kua hori, kua eke atu koe ki te pahi kura, te pahi tūmatanui rānei kia tae atu koe ki tētahi o āu nā mahi. He aha koe i eke ai i te pahi? Tohua ngā mea katoa e tika ana mōu
  
  ✓ Kāore he ara anō mōku
  ✓ Kia taea ai e au te nohotahi me āku hoa
  ✓ Nā te mea he iti te utu
  ✓ He pai ki ahau te wā wehe, te wā tae hoki o te pahi
  ✓ He pai ki ahau kia noho au ki taku kotahi, whakaaro ai, panui pukapuka ai, whakarongo ai rānei ki ētahi waiata
  ✓ Kāore he waka hei kawea ahau
  ✓ Kāore āku raihana
  ✓ He roa rawa ki te hikoi, ki te eke pahikara rānei
  ✓ Kua ākīna pai ahau ki te eke i te pahi
  ✓ Kāore he āwangawanga, he anipā rānei mōku ki te eke pahi
  ✓ He take anō? Tēnā, tuhia mai ki raro nei.

Q23 I kite au i ō whakautu mō te marama kua hipa, kīhai koe i eke pahi kia tae ki ngā mahi i te mahi koe. He aha kore ai koe i eke pahi? Tohua te katoa e tika mōu
  
  ✓ He nui rawa te utu
  ✓ Kāore i pai ki ahau ngā wā wehe, ngā wā tae rāne o te pahii
  ✓ E kore e taea i taku pito o te taone
  ✓ Kāore e pai ana ki ahau ngā wāhi o ngā tūranga pahi
  ✓ Nāku kē āhuahui i hautū
  ✓ I haere mā raro kē
  ✓ Nā tētahi atu au i kawe
  ✓ Kāore i ākīna au ki te eke i te pahi tūmatanui
  ✓ Kei te āwangawanga au, kei te anipā au ki te eke i te pahi tūmatanui
  ✓ Kāore au i te mōhio e pēhea ana te eke pahi
  ✓ I eke kē taku papa reti
  ✓ I eke kē taku pahikara
  ✓ He take anō? Tēnā, tuhia mai ki raro nei.

Q24 Ko tāu mō te marama kua pahure, nā runga pahi, nā runga motokā, nā runga motopaike rānei koe i haere ai. He aha kore ai koe i haere nā raro, nā runga pahikara, nā runga papareti rānei? Tohua ngā mea katoa e tika ana mōu
  
  ✓ I hikoi, i eke pahikara, i eke papareti kē ahau
  ✓ He uaua rawa nō te āhua o te huarere
  ✓ He uaua rawa nō āku kākahau kura
  ✓ Kāore āku pahikara
  ✓ Kāore āku papareti
Q25 Ko tāu mō te marama kua pahure, nā raro, nā runga pahikara, nā runga papareti rānei koe i haere ai. He aha koe i whiri ai ērā momo āhuatanga haere whakapakari tinana?  Tohua ngā mea katoa e tika ana mō ērā momo āhuatanga.

Q26 Ko tāu i kī mai mō te marama kua pahure, he pāhihi koe i tētahi waka. E pēhea te hāngai o ngā kōrero o raro nei mōu e noho nei pāhihi.
<table>
<thead>
<tr>
<th>Question</th>
<th>Whakaarohia ōu wheako ki ngā momo āhuatanga haere i te marama kua pahure.</th>
<th>I ia wā e tika ana mōu, tēnā tōngia te tohu kia tohua ai te āhua o tō noho ora mōu</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Hautū waka ana</td>
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<td>E noho koe hei pāhihi i tētahi atu e hautū waka ana</td>
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<td>I a koe e hīkoi ana, e eke papareti ana rānei</td>
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<td>I a koe e eke pahikara ana</td>
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<td></td>
<td>I a koe e eke pahi ana (pahi/wēne kura, pahi tūmatanui rānei)</td>
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**Q27** Whakaarohia ōu wheako ki ngā momo āhuatanga haere i te marama kua pahure. Te nuinga o te wā, inahea koe i noho ora ai? I ia wā e tika ana mōu, tēnā tōngia te tohu kia tohua ai te āhua o tō noho ora mōu.

|          | E kore rawa – E wātea ana he waka, he ara rānei mōku i ngā wā katoa |
|          | 1 ki te 3 ngā wā i te marama kua pahure                           |
|          | 4 ki te 6 ngā wā i te marama kua pahure                           |
|          | Nui ake i te 6 ngā wā i te marama kua pahure                      |

**Q28** E hia ngā wā i hōhā ai koe i te mea kāore he waka hei kawe koe ki te wāhi e hiahia ai.

|          | E kore rawa – E wātea ana he waka, he ara rānei mōku i ngā wā katoa |
|          | 1 ki te 3 ngā wā i te marama kua pahure                           |
|          | 4 ki te 6 ngā wā i te marama kua pahure                           |
|          | Nui ake i te 6 ngā wā i te marama kua pahure                      |

**Q29** Mēnā he whiringa tāu, he aha kē te ara haere e whiria ana e koe? Tēnā, peia, katahi ka tōia a ia momo āhuatanga kia raupapahia tō hiahia mai i te mea e pai ana ki te mea kāore e pai.

| Waka, motopaika (ahakoa kaihautū koe, ahakoa pāhihi koe rānei) |
| Eke pahikara                                                   |
| Hīkoi                                                         |
| Eke pahi, eke tētahi atu āhuatanga haere tūmatanui rānei       |
| Eke papareti                                                   |

279
Q30 Ināianei kei te hiahia au ki te pātai atu ki a koe mōu i tae ki te kura, i hoki ki te kāinga i tērā wiki. I haere koe ki te kura i tērā wiki, ahakoa he kotahi rā anake?

- Āe
- Kāo

Q31 Ināianei ka pātai atu au ki a koe i pēhea koe i tae atu, i hoki atu nō te kura i tērā wiki. Mā ia rā i tērā wiki i pēhea koe i tae atu ai ki te kura? Tohua ngā mea katoa e hāngai ana ki ia rā o te wiki. Hei tauira, mēnā nā tētahi koe i hautū ki te tūranga pahi i te Rā Hina tohua ngā mea e rua, “Pāhihi ki te waka” me “Pahi kura”

<table>
<thead>
<tr>
<th>Kīhai au i haere ki te kura</th>
<th>Rā Hina</th>
<th>Rā Tū</th>
<th>Rā Apa</th>
<th>Rā Pare</th>
<th>Rā Mere</th>
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<tbody>
<tr>
<td>Pahi kura</td>
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<td>Pahi tumatanui</td>
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<td>Eke motopaika</td>
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Q32 Mā ia rā i tērā wiki i pēhea koe i hoki ki te kāinga nō te kura? Tohua ngā mea katoa e hāngai ana ki ia rā o te wiki. Hei tauira, mēnā i hikoi koe ki te tūranga pahi i te Rā Hina tohua ngā mea e rua, “Hīkoi” me “Pahi kura”

<table>
<thead>
<tr>
<th>Pahi kura</th>
<th>Rā Hina</th>
<th>Rā Tū</th>
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</table>
Q33 Raihana Hautū Waka… Ko tēhea momo raihana tāu?

- Kāore oku raihana
- Kei au taku raihana ako.
- Kei au taku raihana here
- Kei au taku raihana matua

Q34 Ki ō whakaaro, kei tēhea pakeke koe ka riro i a koe tō raihana matua?

- 17
- 18
- 19
- 20+
- Kāore au i te mōhio
- Kāore anō au kia whakarite ki te whiwhi i a au taku raihana

Q35 I kī mai koe, ka hautū koe i tētahi waka ehara i a koe. Nō wai te waka e hautū ana koe?

- No ōku mātua
- No ōku tuākana, tēina, tuāhine, tūngane rānei
- Nō tōku hoa
- Kāore au e hautū waka ana

Q36 E hia ngā wā e hautū waka ana koe, ahakoa kei tō kotahi, ahakoa he pāhihi rānei āu?

- Horekau
- Kāore he nui ake i te kōtahi wā a ia marama
- Kotahi te wā a ia marama
- E rua, e toru rānei ngā wā a ia marama
- Kotahi te wā a ia wiki
- E rua, e toru rānei ngā wā a ia wiki
- Ia rā
Q37 I a koe e hautū waka ana, ko tēhea o ngā kōrero o raro e hāngai tika ana ki te tūāhua pāhihi i te waka?

- A ia wā e hautū waka ana ahau, he pāhihi āku
- A ētahi wā e hautū waka ana ahau, he pāhihi āku
- A ia wā e hautū waka ana ahau, horekau he pāhihi

Q38 Hei ko tāu, a ia wā, a ētahi wā rānei i a koe e hautū waka ana he pāhihi āu. Ko wai ērā e haere ana ki a koe te nuinga o te wā?  
Tohua te katoa e tika ana mōu

- Ōku hoa
- Ōku mātua
- Ōku tuakana rānei, ōku tēina, rānei, ōku tuāhine rānei, ōku tūngāne rānei
- Horekau tētahi o ene

Q39 He aha ngā take e kore ai koe e hautū waka ana, e kore rānei koe e hautū waka anō atu i ngā wā kua kōrerohia?  
Tohua ngā mea katoa e tika ana mōu

- Kāore aku raihana
- He nui te utu ki te hautū waka, ki te whakatikatika i te waka rānei
- He nui te utu kia whai raihana
- Kei te āwangwanga au mō te oranga o te tāiao i te hautū waka
- He tangata hauā ahau, he raru ā-rongoā rānei ā-kāpō rānei ōku e āraia nei ahau te hautū waka
- Te nuinga o te wā ka whai tūru ahau ki te waka o tētahi (mātua, hoa, tuakana, teina tuahine, tungan)
- Ka hīkoi noa ahau
- Ka eke pahikara noa ahau
- Kāore au i te hiahia hautū waka, kāore anō au kia rite ki te hautū waka
- Mā te i purangi au e whakahoahoa atu ki ōku hoa
- He nui kē aku mahi, kāore au e wātea ki te ako ki te hautū waka
- Ka eke pahi noa ahau
- Ka eke motopaika noa ahau
- Ka eke papareti noa ahau
- He raru nui te whakatū i taku waka
- Kāore ōku waka, kāore e wātea rānei he waka mōku
- He take anō? Tēnā, tuhia mai ki raro.

Q40 Hei ko tāu kāore ō raihana, he aha kore ai?  
Tēnā, tohua te katoa e tika ana mōu

- He nui te utu ki te hautū, ki te whakatikatika i te waka rānei
- He nui te utu kia whai raihana
- Kei te āwangwanga au mō te oranga o te tāiao i te hautū waka
- He tangata hauā ahau, he raru ā-rongoā rānei ā-kāpō rānei ōku e āraia nei ahau te hautū waka
- Te nuinga o te wā ka whai tūru ahau ki te waka o tētahi atu (mātua, hoa, tuakana, teina, tuahine, tungan)
- Ka eke pahi noa ahau
- Ka hīkoi, ka eke pahikara, ka eke papareti rānei noa ahau
- Kāore au i te hiahia hautū waka, kāore anō au kia rite ki te hautū waka
Mā te ipurangi au e whakahoahoa atu ki ōku hoa
He nui kē aku mahi, kāore au e wātea ki te ako ki te hautū waka
Kāore anō kia tika taku pakeke ki te whakamātautau mō te raihana ako
He take anō? Tēnā, tuhia mai ki raro.

Q41 Kāore he nui ngā pātai e toe ana, kua tata mutu! Ka whakamau kākahu kura ki tō kura?
○ Āe
○ Kāo

Q42 Ka pāwero tō whakatau mō te āhua o tō haere i te wiki nā te whakamau kākahu kura?
○ Kāo
○ Āe, tēnā whakamārama mai ki raro.

Q43 Nō tēhea iwi koe? Tēnā, tohua te katoa e tika ana mōu
○ Ngāti Pākehā
○ Māori
○ Ngāti Hāmoa
○ Ngāti Kuki Airani
○ Ngāti Tonga
○ Ngāti Niue
○ Ngāti Haina
○ Ngāti Inia
○ Tētahi atu, pērā i Ngāti Tiati, Ngāti Niponi, Ngāti Tokelau, tēnā tuhia mai ki raro.

Q44 He Māori tētahi o ōu mātua, oū kaumātua, ōu tūpuna rānei?
○ Āe
○ Kāo
○ Kāore au i te mōhio

Q45 E hia whare e noho ana koe?
○ 1
○ 2 nui ake rānei

Q46 E hia waka kei tō whare matua (te whare e noho ana koe te nuinga o te wā)? Mēnā e nui ake i te kotahi whare e noho ana koe, tēnā tohua noa mai te nui o ngā waka kei te whare, e kīia nei, tō whare matua.
○ 0
Q47 He aha te wāhi noho o tō whare matua (te wāhi matua e noho ana koe)? Tēnā tuhia mai ā wāhi noho ki raro nei. (Kei te hiahia noa au ki te mōhio pēhea te tawhiti o tō whare i te pū o te tāone. Ehara mā tēnei mātou e tautohu atu ko wai koe).

Q48 I te wiki kua pahure, e pēhea te nui o te moni i whakapaua e koe ki a koe anō, ki ō hiahia ake rānei?

- Kāore aku moni
- $1-10
- $11-20
- $21-30
- $31-40
- $41-50
- $50-99
- Nui ake i te $100

Q49 E ai ki a koe, e hia hāora i te rā koe e titiro ana ki te ipurangi, e mātaki hoki ana i te pouaka whakaata? Tēnā, tohua mai tētahi nama i waenga i te 0 ki te 24 hāora o te rangi

Q50 I te wiki kua pahure e hia RĀ i whakapakari tinana ai koe kia roa ake i te 30 mineti, kia kaha ai te ngāngā o tō manawa? Ko ēnei momo mahi ko te hākinakina, ko te whakapakari tinana, ko te hīkoi tere, ko te eke pahikara hei mahi pūangi, hei haere ki ngā wāhi e hiahiatia ana, engari kaua e whakaaro mō te mahi whakapakari tinana e noho hei wāhanga noa o ia rā, o tō mahi rānei. Tēnā tohua mai e hia rā o te wiki mai i te 1 ki te 7

Q51 Kia whakaoti.... Whakaarohia he aha mōu mō ngā rā e heke mai nei, me pēhea koe e rīpoi i te tekau tau e heke mai nei? Tēnā, whakamahia ngā tohu kia tōia te tohu hei tohu atu te tikanga o ia tūāhua mōu

Mēnā ka noho au ki tētahi wāhi e pai ana te pūnaha kawe tangata ka ekengia tērā
Mēnā e noho ana ahau ki tētahi wāhi e māmā, e whai ora hoki, ka hīkoi rānei, ka eke pahikara rānei

E kore e taea te karo i te hautū waka

He mea nui te whai waka mōku ake

Ka whiria e au te wāhi noho mōku, te wāhi mahi, te wāhi e haere a i rānei ki te Whare Wānanga i te painga o ngā kōwhiringa kawe tangata i reira.

Q52 Mēnā he take anō e whakaaawe i o kōwhiringa kawe tangata i ngā rā e heke mai nei, tēnā, tuhia ki raro?

Q53 Mēnā he kōrero anō āu mō te āhuatanga o te uiuinga nei, mō ngā kaupapa i kapia rānei, pērā i ngā kōrero tāpiri, mēnā rānei kua wareware i a au tētahi āhuatanga, tēnā tuhia mai ki raro?  *Ki te hiahia kia uru mai ki te rāwhara, tuhia mai tō īmera ki raro, katahi ka peia te pātana >> kia tuku i ō whakautu.*

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APPENDIX 6 SURVEY INVITATION LETTER TO SCHOOL

Re: Survey of Youth Transport Behaviour and Well-Being in Southland

Hi Ms Doe -

I’d like to invite your 2015 Year 12 and 13 students to take part in my PhD research, via online survey. Eleven other Southland secondary schools have accepted this invitation and are scheduled to participate in February and March 2015.

To test the various survey processes to maximise time effectiveness, I have recently piloted it with students at a secondary school in Dunedin. There are three participation options:

<table>
<thead>
<tr>
<th>Option 1: Consent process and survey conducted during class</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process:</strong> The school sends me a list of student emails. Each student receives a personalised email welcome/invitation that includes a link to the survey. At the allotted class period, students access and complete the survey. (The online survey includes an information page, which states that by beginning the survey, the students give their consent to participate.)</td>
</tr>
<tr>
<td><strong>Total class time needed:</strong> 15-20 minutes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 2: Consent process conducted during class, survey conducted outside of class</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process:</strong> I distribute paper information sheets and consent forms at a Year 12 &amp; 13 level meeting, and collect consents from students who are interested. Each student receives an email welcome/invitation that includes a link to the survey, which they then complete at home.</td>
</tr>
<tr>
<td><strong>Total class time needed:</strong> 15-20 minutes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 3: Both consent and survey process conducted outside of class</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process:</strong> The school sends me a list of student emails. Each student receives an email welcome/invitation that includes a link to the survey, which they then complete at home.</td>
</tr>
<tr>
<td><strong>Total class time needed:</strong> None</td>
</tr>
</tbody>
</table>

The survey has received full ethical endorsement (Reference #14/163) from the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (03 479 8256 or gary.witte@otago.ac.nz). Enclosed, please find a pdf of the online survey for your review.

I am happy to visit you in Invercargill to meet and chat about this in person. Please contact me via email or telephone to schedule a time that suits!

Many thanks and warmest regards,

Aimée L. Ward, MPH, PhD Candidate  
Department of Preventive and Social Medicine  
University of Otago, Dunedin

Office 03 471 6356 • Mobile 022 673 1278 • Email aimee.ward@otago.ac.nz
APPENDIX 7 EXAMPLE OF SURVEY RESULTS REPORT TO SCHOOLS

2015 Southland regional transport and well-being survey: Years 12 and 13
Descriptive survey results for James Hargest College

Following are survey results for James Hargest College, in bold. Below each score for your school, you will find the results for the entire Southland region, in italics.

Demographics
- Respondents: n=112
- Gender: 32% male
  Entire Southland region: n=786; Male = 49%; 85% survey respondents identified as NZ European, and 19.5% identified as Māori.

Well-being questions
James Hargest College students were asked to report how they felt about a variety of aspects of their lives, using the qualifiers “very happy”, “happy”, “unhappy”, or “very unhappy”, with a highest possible score of 40:
- Life Satisfaction - Mean Score: 31.1
  Southland region: 31.6

They were also asked to rank their level of overall happiness, out of a possible 10:
- Overall Happiness – Mean Score: 7.2
  Southland region: 7.4

Students were then asked to identify their own self-perceived strengths and attributes (such as “friendly”, “outgoing”, “kind”, “popular”, “good with pets”, etc), out of a possible 22 attributes:
- Perceived Strengths – Mean Score: 10.4
  Southland region: 11.5

Attachment questions
James Hargest College respondents were asked about their attachment to peers and family, which were scored on scales of 28 and 16, respectively. They ranked comments such as “My friends listen to what I have to say”, “I like to spend free time with my family/whanau”, etc., using the qualifiers “always”, “often”, “sometimes” or “never”:
- Peer attachment – Mean Score: 21.3
  Southland region: 20.9
- Family attachment – Mean Score: 11.4
  Southland region: 11.7

Transport questions
James Hargest College students were asked what transport modes they had used in the last month. They could choose as many as they liked:
Appendices

- Walking: 78%
  Southland region: 70%
- Cycling: 33%
  Southland region: 26%
- Skateboarding: 4%
  Southland region: 7%
- Driving: 46%
  Southland region: 49%
- As a passenger in a car: 91%
  Southland region: 87%
- Motorcycle: 1%
  Southland region: 7%
- School bus: 33%
  Southland region: 43%
- Public bus: 23%
  Southland region: 11%

They were also asked about their current driver’s licence status:
- No licence: 38%
  Southland region: 35%
- Learner licence: 35%
  Southland region: 35%
- Restricted licence: 25%
  Southland region: 27%
- Full licence: 2%
  Southland region: 3%

Activities and hobbies

James Hargest College students were asked to identify the types and number of activities and hobbies in which they participated during the last month:
- Sporting activities – Mean Score: 3.4
  Southland region: 4.0
- Cultural activities – Mean Score: 2.1
  Southland region: 1.8
- Social activities – Mean Score: 5.2
  Southland region: 4.8
- Community activities – Mean Score: 2.1
  Southland region: 2.5
- TOTAL Activities – Mean Score: 15.6
  Southland region: 15.8

Other activity data:
- Screen time use – Mean hours/day: 4.4
  Southland region: 5.0
- Physical activity – Mean days/week*: 3.9
  Southland region: 4.3

*days per week of 30-60 minutes of sustained physical activity

Many thanks for your participation in this doctoral research. If you would like clarification, help with data interpretation, more detailed information, or have any questions at all, please contact Aimee Ward (aimee.ward@otago.ac.nz, or phone/text 022 673 1278).