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The Association between Neighbourhood Social Capital and Adolescent Self-reported Wellbeing: A Multilevel Analysis

Kaveh Aminzadeh

Abstract

The association between neighbourhood social capital and individual health or wellbeing has been explored mainly by focussing on adult outcomes. The aim of this research is to assess the relationship between neighbourhood social capital and adolescent subjective wellbeing in New Zealand, and its interaction with adolescents’ socioeconomic status.

Data is taken from a random sample of 9107 students who participated in a nationally representative health survey of high school students in New Zealand. Students’ wellbeing is measured by questions on general mood, life satisfaction and WHO-5 Wellbeing Index. Neighbourhood social capital is assessed according to five indicators: neighbourhood social cohesion, facilities, physical disorders, membership in community organisations, and residential stability. All neighbourhood measures are created based on students’ responses aggregated to the neighbourhood level. Neighbourhood is defined as a Census Area Unit, with a median population of 2000 people. Analyses included only neighbourhoods with more than 10 students, and were conducted using cross-classified random intercept multilevel models controlling for students’ age, sex, ethnicity and socioeconomic status, with both schools and neighbourhoods treated as random effects.

A total of 5567 students lived in 262 neighbourhoods with an average self-reported wellbeing score of 3.67 (SE=0.02, range = 0-5). Students living in neighbourhoods characterised by higher levels of social cohesion (b*=0.18, SE=0.055, p=0.0015) and membership in community organisations (b*=0.14, SE=0.055, p=0.0116) reported higher levels of wellbeing. The association between student self-reported wellbeing and neighbourhood membership in community organisations varied according to the individual socioeconomic status of students, with neighbourhood membership showing a stronger protective effect for students who are more socioeconomically disadvantaged (p = 0.06).

Neighbourhoods with a high level of social cohesion, or youth membership in community organisations, are significantly associated with increased adolescent wellbeing.
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Chapter 1. Introduction

This research focuses on the association between neighbourhood social capital and adolescent subjective wellbeing in New Zealand. This chapter presents a brief overview of the aims of the thesis, the background and the rationale for this study, and the structure of the thesis.

1.1. Aims of the Thesis

Whilst the importance of context, particularly that of neighbourhood, for the development of adolescents has been long recognised, there have been very few studies undertaken to explore the association between neighbourhood characteristics and the health or wellbeing of adolescents, particularly in New Zealand (Stevenson, Pearce, Blakely, Ivory, & Witten, 2009). The insufficient research in the field can result in a lack of attention to effective intervention programmes targeting neighbourhoods, on the mere assumption that places do not make any difference to adolescent wellbeing. This research is an attempt to investigate the association between neighbourhood characteristics and adolescent subjective or self-reported wellbeing, using the conceptual framework provided by social capital research. Social capital as a contextual level resource is a multidimensional concept and previous researchers have tended to lump numerous indicators under this title, leading to a lack of clarity in the interpretation of their findings with relation to health outcomes (Harpham, 2008). The aim of this thesis is to examine the independent association of various indicators of neighbourhood social capital with self-reported wellbeing of adolescents in New Zealand, using a multilevel analysis approach. In addition, the interaction between these associations and adolescents’ socioeconomic status is examined.

It is hoped that this study enhances understanding of the inextricable relationship between outside environment and adolescent wellbeing. For as long as we aim to improve the wellbeing of adolescents we cannot ignore the importance of context in which they develop.

1.2. Background of the Study

In order to improve adolescent wellbeing, about which there is much concern in New Zealand, ‘positive youth development’ has been promoted as a framework that encompasses
the important principles for effective interventions targeting this age group (Benson, Scales, Hamilton, & Sesma, 2006; R. M. Lerner, Almerigi, Theokas, & Lerner, 2005; Ministry of Youth Affairs, 2002). This framework emphasises the following points: having a strength-based approach by focusing on positive outcomes as opposed to disorders; strengthening adolescents’ social relationships with people in their surrounding; and improving the context, especially the social environment, in which adolescents develop, thereby helping them to be more resilient in facing the challenges of life.

One of the important environmental assets helping individuals to be more resilient is the extent of social capital in an area (Kawachi, 2010). Social capital in public health research is conceptualised both as an individual and contextual level resource. Since this study is interested in context/individual association, social capital is only conceptualised at an area level, as a contextual level resource.

Previous studies have examined the association between neighbourhood social capital and health related outcomes using ecological analyses (Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997; K. A. Lochner, Kawachi, Brennan, & Buka, 2003). However, ecological studies are prone to error due to the omission of individual level confounders and other biases. Examination of whether or not certain indicators of neighbourhood social capital make any difference to individual wellbeing, over and above individual characteristics, requires a study design that takes into account the multilevel structure of data, i.e. individuals nested within different neighbourhoods with different levels of social capital (Kawachi, Subramanian, & Kim, 2008).

Multilevel analyses allow for the simultaneous control of individual and neighbourhood level characteristics, which as a result provides the methodological armamentarium for investigators who intend to undertake studies at more than one level of aggregation (Diez-Roux, 1998). This makes multilevel analysis an ideal analytical technique for research questions similar to the ones raised in this study.

However, because multilevel studies are more challenging, due to the fact that they require a large number of individuals and neighbourhoods, there is very little research focussed on the association between neighbourhood social capital and adolescent wellbeing, using a multilevel analysis. This study, therefore, intends to contribute towards filling this gap of knowledge in the current state of public health research.
1.3. This Research

The intended contributions of this study are to enhance an understanding of the independent association between different indicators of neighbourhood social capital and the self-reported wellbeing of adolescents in New Zealand, and that of the interaction of such associations with adolescent socioeconomic status.

This research hypothesises that indicators of neighbourhood social capital are independently associated with adolescent self-reported wellbeing, even after controlling for individual characteristics such as age, ethnicity, gender and socioeconomic status. This is expected to be the case based on the understanding that context makes a difference to one’s wellbeing (Macintyre, Maciver, & Sooman, 1993).

This research also hypothesises that there would be an interaction between the abovementioned associations and the socioeconomic status of adolescents. This is because neighbourhood social capital is considered as an asset for youth development, assisting them to be more resilient in facing challenges in life, including challenges caused by the strong negative effects of socioeconomic disadvantage (Kalff et al., 2001).

The study is based on the responses from a nationally representative sample of secondary school students in New Zealand, from a cross-sectional survey carried out in the year 2007. Since the age of the students included in the survey matched a definition of ‘adolescence’ (WHO, 2011a), the terms ‘adolescents’ and ‘students’ are used interchangeably throughout the thesis.

1.4. Thesis Structure

This thesis includes five chapters. Chapter one presents an introduction to the research. Chapter two (Background and Literature Review) contains a review of literature on subjects relevant to this research, describing some of the previous studies with various degrees of similarities to this thesis. Chapter three (Methodology) describes the survey from which the data for this research was collected, defines the variables used in the research, and explains the methods of data analysis. Chapter four (Results) summarises the findings obtained in this research. The final chapter (Discussion) provides a discussion on the main findings of the research, explains important implications, points out the need for future studies,
Chapter 1 – Introduction

acknowledges the limitations and strengths of this study, and provides an overall and brief conclusion.
Chapter 2. Background and Literature Review

In this chapter, the fundamental literature, theories and approaches relevant to the focus of this research are illustrated. First, the importance of studying adolescent wellbeing especially in New Zealand is discussed (section 2.1). Then, the theory of positive youth development and its important characteristics are described (section 2.2), followed by an explanation of the theories of subjective wellbeing and ways of their measurement (section 2.3). The importance of context, particularly that of neighbourhood and its relation to individual health and wellbeing is explained in section 2.4. Next section focuses on the concept of social capital as a neighbourhood characteristic (section 2.5). Its various dimensions and indicators and their relation to individual health or wellbeing are explained (sections 2.5.1 and 2.5.1.1), and some of the important topics with regard to studying social capital are explored briefly (i.e. its relation to social gradient in health (section 2.5.1.2), egalitarianism (section 2.5.1.3), and the role of adolescents (section 2.5.1.4)). Section 2.6 contains some of the methodological issues confronting this research, including a discussion on the intrinsic relevance of the multilevel study approach as the appropriate methodology for this research. Examples of previous relevant research are described in section 2.7, followed by a brief note of conclusion stating how this research contributes to the current gap in the literature (section 2.8).

2.1. Adolescent Wellbeing

Adolescents constitute the immediate future of our societies, and yet there is an enormous level of concern about their health and wellbeing, especially in New Zealand. Some of the current health issues facing New Zealand’s young people have been indicated to be the following (Clinical Trials Research Unit, 2010; Dickson, Sporle, Rimene, & Paul, 2000; Ministry of Health, 2007, 2010; Tin, Ameratunga, & Watson, 2008):

- high rates of suicide and suicide attempts
- alcohol and drug use and abuse
- mental health problems – including increased prevalence of depression and anxiety
- increasing rates of obesity and lower rates of physical activity
- sexual and reproductive health problems – including high teenage pregnancy rates and an increased number of sexually transmitted infections
• high injury rates – including injuries and deaths from motor vehicle accidents

Statistics also point out health inequalities within young people in New Zealand (Ministry of Youth Development, 2008). For instance, young male mortality rates are more than double that of young females. Young males are much more likely to experience a substance abuse disorder or die from suicide, compared to young females. Maori young people are more likely to be smokers and have higher mortality rates than other ethnic groups. Potential hazardous drinking is higher among males, young people, Maori and Pacific peoples, and those in deprived areas (Ministry of Social Development, 2010).

In addition to the above mentioned concerns about the health of young people there are other reasons why focussing on adolescent health is becoming an area of increasing importance, and is developing as a specialist field in New Zealand. Before referring to some of these reasons and pointing out the important elements and principles identified as essential in tackling the concerns, a short note follows regarding the definition of adolescence.

Adolescence, as is widely known in the world today, was a concept barely recognised at the end of the nineteenth century. There was almost no usage of the term ‘adolescence’ in various written materials from the period 1800-1875 (Demos & Demos, 1969). The development of the concept of adolescence, as distinct from childhood and adulthood, started only towards the beginning of the twentieth century following the studies of G. Stanley Hall (1904). Various definitions of adolescence exist according to different fields of knowledge. For instance, according to Muuss (1996) a sociological definition of adolescence is “the transition period from dependent childhood to self-sufficient adulthood”. Psychologically it has been referred to as “a ‘marginal situation’, in which new adjustments have to be made, namely those that distinguish child behaviour from adult behaviour in a given society”. There are also biological definitions of adolescence referring to a span of one’s life between the obvious onset of puberty and the completion of bone growth (Konopka, 1973). Moreover, Konopka (1973) provides a definition in terms of adolescents’ developmental tasks, as “persons with specific qualities and characteristics who have a participatory and responsible role to play, tasks to perform, skills to develop at that particular time of life”. The World Health Organization (WHO) (2011a) refers to adolescents as young people between the ages of 10 and 19 years.

According to WHO (2011a), efforts to improve adolescents’ wellbeing, if carried out in a cohesive manner, can enhance the quality of lives, and in fact save the lives of many in this
age group. Since health of adolescents has intergenerational effects, apart from the direct benefits of effective interventions on adolescents, many others (e.g. children born to adolescent parents) will also benefit from such efforts. Effective interventions would also help adolescents to be better contributors to the wellbeing of their community, both as adolescents and the future generation of adults. Moreover, there are compelling arguments from an economical perspective for addressing the health of adolescents. According to statistics from the year 2006, youth aged 10 to 19 years constitute 15% of New Zealand’s total population (Statistics New Zealand, 2006b). The wellbeing of adolescents now will affect the economic stability and prosperity of the country over the coming decade(s). To safeguard the immense investment dedicated to the education and development of children who have lived to be adolescents is yet another reason that governments are obliged to pay specific attention and fulfil what this age group requires. In addition to all of the above factors, efforts towards the improvement of adolescent wellbeing are in line with the ratification of the Convention on the Rights of the Child (UNICEF, 1989).

2.2. Positive Youth Development

As it has been explained by Catalano et al. (2002), in the past twenty to thirty years the two mainstreams of thought informing the interventions focussed on improving adolescent outcome were either in line with ‘prevention science’, or promoting a ‘positive youth development’ approach. Prevention strategies, which had precedence in their existence, focussed mainly on problem behaviour(s) and their various predictors. Around the 1980s the prevention models were criticised for many reasons, including the failure of prevention models to incorporate individual/environment interactions in attempts to change negative behaviours, focussing only on the prevention of problems rather than the promotion of healthy development, and not acknowledging factors that promote positive youth development (Catalano et al., 2002). This could be considered as the beginning stages of the formation of a new approach, which later came to be known as positive youth development. It is now widely accepted that effective interventions, for addressing adolescents wellbeing, need to encompass the positive youth development framework (Benson et al., 2006; J. V. Lerner, Phelps, Forman, & Bowers, 2009; R. M. Lerner et al., 2005; Pittman, 1991). The New Zealand Government adopted a new strategy in 2002, called “Youth Development Strategy Aotearoa” to guide government and society how to support its young people to develop the skills and attitudes needed to take part positively in the life of their wider
community (Ministry of Youth Affairs, 2002). One of the main aims of this strategy is that government policy and practice reflect a positive youth development approach.

The positive youth development perspective brings a new conception of adolescence. This conception is fundamentally different from the traditional ways of viewing adolescence as a period of storm and stress (Hall, 1904) and as those who are predicted to engage in risky behaviour. From this new perspective youth are no longer considered as problems to be fixed, rather as resources to be developed (J. L. Roth & Brooks-Gunn, 2003). As illustrated by Lerner et al. (2005) the following two broad fields of findings in academic research contributed greatly to the emergence of this new perspective: 1) emphasis on strength, development and competency building (as opposed to following a medical model leading to treatment of diseases); 2) evidence for the possibility of optimising individual and group change by altering bidirectional relations between individuals and their ecologies.

It is now well accepted that the health of individuals or communities is not merely the absence of disease in them. According to the WHO (2011b) “health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity”. The Ottawa Charter for Health Promotion (1986) defines health as “a positive concept emphasising social and personal resources, as well as physical capacities”. Advocates of positive youth development also argue that “problem-free is not fully prepared” (Pittman et al. 1991). Young people who are not facing any particular problem, such as drug use, alcohol use, or depression, might still not be able to carry out their roles and responsibilities in contributing to the betterment of their communities simply because they have not developed the appropriate attitudes and skills in order to do so. Positive youth development calls for a strength-based approach with greater focus on desirable and positive outcomes. For instance, Lerner et al. (2005) argue for conceptualising youth development through the use of Five or Six Cs: confidence (e.g., self worth), connection (e.g., integration and membership), character (e.g., self-control), competence (e.g., growth), caring and contribution.

Positive youth development also points out that one of the most fundamental factors essential in one’s development is the context in which one develops. Following Bronfenbrenner’s (1981) conception of development, it is through the processes of reciprocal interactions between an individual and their environment that human development takes place. According to this view, in addition to one’s individual characteristics, the physical and social settings of various contexts in which adolescents grow up (e.g. family, school and neighbourhood)
influence their development, and hence their current and future wellbeing. As promoted by WHO (2011a) “adolescents depend on their families, their communities, schools, health services and their workplaces to learn a wide range of important skills that can help them to cope with the pressures they face and make the transition from childhood to adulthood successfully”. A key aspect of these contexts is the element of the social relationships that adolescents will form with people in those environments.

Positive youth development fully acknowledges the role and function of relationships that adolescents will have with those around them. Various developmental theories provide the foundation for this understanding. For instance, attachment theory describes how a strong bond with a caregiver can serve as a secure base for a child’s emotional self-regulation, skills building, and the development of various kinds of competence; and that how, in contrast, weak conventional bonds can lead to attachments to deviant peers (Hawkins & Weis, 1985). Other investigators of attachment theory suggested that the purview of bonding needs to be broadened and include adults other than parents (Dolan, Kellam, Brown, & Laudolff, 1989), as that has shown to be a protective factor with positive effects on an adolescent’s resilience to adversity (Resnick et al., 1997). Social learning theory also explains how interpersonal and social factors influence one’s beliefs, and how role models can shape attitudes and outcome expectations (Bandura, 1977). Vygotsky’s sociocultural theory similarly views interaction with peers as an effective way of developing skills and competencies in adolescents (Vygotsky, 1978). Vygotsky points out how young people need adults or older peers to direct and help them in their development (Hogan & Tudge, 1999). Furthermore, Konopka (1973) elaborating on appropriate conditions for youth development, refers to some of the following factors: interacting with peers, and acquiring a sense of belonging; reflecting on self, in relation to others, and discovering self by looking outward as well as inward; participating as citizens, as members of a household, as workers, as responsible members of society; gaining experience in decision making; and discussing conflicting values and formulating their own value system.

Overall, the approach that positive youth development promotes is one with a holistic view of adolescents, emphasising on building their capacities. This stands in contrast to the tendency of research that on one hand takes a fragmented approach of tearing individuals from their social context, disregarding their interaction with others, and on the other hand focusses on identifying problems and needs of populations, neglecting the potentialities of individuals and communities to create and sustain health (Morgan & Ziglio, 2010). An approach in research
that gives attention to protective factors or assets enhancing the capacity of individuals or communities to buffer against life’s stresses is one which is in agreement with positive youth development. An important example of a health asset that supports the healthy development of adolescents, particularly those who are living in difficult circumstances, is the concept of resilience.

2.2.1. Resilience

Studies done by Garmezy and his colleagues were among the first who emphasised the importance of examining factors that could protect an individual or populations at times of risk and adversity (Luthar, 2003). It has been close to thirty years that the protective mechanisms and processes that are likely to foster resilience have been discussed in literature (Garmezy, 1985; Luthar, 2003; Rutter, 1985; Werner & Smith, 1982). Although there is no accepted definition of the concept, studies that focus on resilience typically refer to patterns of positive adaptation, or the ability to maintain or regain health, in the context of past or present adversity (Herrman et al., 2011).

One of the main ambiguities shown in the literature is with regard to operationalising resiliency (Luthar, Cicchetti, & Becker, 2000). Earlier studies tended to view the concept as a personality trait (Werner & Smith, 1982, 2001), explaining the protective processes by focussing on individual or inherent characteristics of a person. More recently though, there has been a shift in our understanding of the concept from one which is individual-focussed to another which is more process-oriented at the level of individual, group or society (McCubbin, Thompson, Thompson, & Futrell, 1999; Rutter, 2005). Focus according to this view would be on processes such as reducing risk impacts and negative chain reactions, establishing and maintaining self-esteem and self-efficacy, and opening up positive opportunities (Rutter, 1987).

In a recent article Ungar (2011) builds on previous resilience research which has emphasised the need for better understanding of the environment in which child development takes place. Ungar highlights the evidences which show that, more than an individual trait, resilience is determined by a child’s social and physical ecology. Among such evidences are the consideration of ‘community cohesiveness’ as one of the identified resiliency factors (Donnon & Hammond, 2007); and acknowledging the role of environment (e.g. neighbourhood related factors) in ensuring better health outcomes in a variety of fields even
as far as neurophysiology (Gunnar, 2007). The point which has been argued is that the existence of environmental resources (e.g. a child day care, or neighbourhood safety), even regardless of whether or not they are used, potentiate the development of resilience and provide possibilities of more positive development. This argument goes against the popular notion that each individual can alone pull him/herself by his/her own bootstraps, and shifts the focus of research to a more comprehensive meaning of resilience which acknowledges the importance of making social and physical environment facilitative, and increasing its capacity to provide for growth and development.

2.3. Subjective Wellbeing

As was mentioned earlier, in much of the existing literature the notion of health has been one which is disease-focussed, in other words one that equates health and wellbeing with merely the absence of disease. In the last few decades many studies focussing on what is now known as ‘subjective wellbeing’ have instead contributed to studying happiness and wellbeing (Diener, Suh, Lucas, & Smith, 1999). Subjective wellbeing literature explores how and why individuals experience their lives in positive ways. Through the measures of subjective wellbeing it became more possible to assess if individuals who are free of mental illness can be considered as mentally healthy, a question the answer to which, according to a growing body of research, seems to be negative (Keyes, 2002, 2005, 2007).

2.3.1. Measurements and Types

As explained by Keyes (2009), a way of looking at the studies of subjective wellbeing is to divide them into two groups according to the underlying philosophical viewpoint on ‘happiness’ that they depend on. One type is based on viewing happiness as feelings of positive emotions (i.e., hedonic), and the other defining happiness as positive functioning (i.e., eudaimonic). Research based on the first perspective is often referred to as subjective emotional wellbeing and it is mainly concerned with individuals’ perception of their own happiness, satisfaction and balance between their positive and negative affects. The second perspective relies on individuals’ perception of the quality of their functioning in life, and it is referred to as subjective psychological wellbeing (Ryff, 1989). The aspect of subjective social wellbeing was also added to the concept, referring to one’s perception of the quality of functioning in the social world (e.g. as neighbours, or citizens) (Keyes, 1998).
According to Diener (2009), the area of subjective wellbeing has three hallmarks. Firstly, it is subjective, meaning that it is all based on an individual’s experience. Therefore, objective conditions such as health or wealth, although considered as potential influences on one’s wellbeing, are not seen as an inherent part of the subjective wellbeing (Kammann & Flett, 1983). Thus, the measurement of subjective wellbeing requires individuals to evaluate and report the quality of their own lives. Secondly, because it is tapping into the underlying constructs of happiness, it includes positive measures. This makes the measures of subjective wellbeing fundamentally different from most measures of mental health which focus on negative factors. Finally, the measures of subjective wellbeing usually include a global assessment of a person’s life. When affect or satisfaction within a particular aspect of a person’s life is assessed, the emphasis is often placed on an integrated judgment of a person considering all aspects of their life. Nonetheless, researchers studying subjective wellbeing may direct questions to cover a range of time frames, from a few weeks to one’s entire life.

There are two sets of tools used by researchers to measure subjective wellbeing. One set of tools commonly utilises single item scales. They are scales created by one question, requiring an individual to report on a particular aspect of his/her life. Many researchers have found evidences that indicate moderate validity and retest reliability of single item measures (McDowell, 2010). However, subjective wellbeing is composed of different components, and single item measures have difficulty covering all of its aspects. Hence, the second sets of tools are the multi-item scales that seem to capture various aspects of one’s wellbeing more effectively. Several multi-item scales have been used in health research, however, because they specifically refer to age and time of life, their usage is more appropriate among older population as opposed to adolescents (Diener, 2009).

One multi-item scale with support for its validity as an outcome measure, which can be used for assessing the subjective emotional and psychological wellbeing among adolescent respondents, is that of WHO-5 Well-Being Index (Bech, Gudex, & Johansen, 1996; Bech, Olsen, Kjoller, & Rasmussen, 2003; De Wit, Pouwer, Gemke, Delemarre-van de Waal, & Snoek, 2007; McDowell, 2010). WHO-5 Well-Being Index provides a useful survey measure of subjective quality of life by giving a brief assessment of the subjective emotional and psychological wellbeing of respondents over a period of two weeks. The items in this index measure positive mood (good spirit, relaxation), general interests (being interested in things) and vitality (being active and waking up fresh and rested).
2.4. Context of Neighbourhood and Health

In health research there has been a tendency to explain health related patterns solely in terms of individual characteristics (Macintyre et al., 1993). But adhering to the notion that risk or protective factors are only individually determined would lead to an incomplete understanding of the determinants of health (Diez-Roux, 1998). In response to such a shortcoming, many researchers have reconsidered the role of the environment, and have focussed on the association between individuals’ health and the contexts in which they live.

One of the recurring issues in contextual studies is the differentiation between contextual and compositional effects. The issue arises when researchers try to show that the characteristics of places in which people live influence the health of their inhabitants (contextual effect), independent of the characteristics of the inhabitants themselves (compositional effect). Failing to differentiate between these characteristics conflate the genuinely contextual with compositional effects (Moon, Subramanian, Jones, Duncan, & Twigg, 2005), and precludes the possibility of testing heterogeneous contextual effects on different individuals (Kawachi et al., 2008). This differentiation is usually done by using appropriate statistical methodologies to control for certain individual characteristics when looking for contextual effects.

Having used appropriate methodologies, a growing literature has highlighted the fact that individual health tends to vary with context, and that actions at the micro level (e.g. individual) tend to be conditioned by social processes operating at the macro level (e.g. neighbourhood) (Diez-Roux, 1998; C. Duncan, Jones, & Moon, 1996, 1998). These studies confirm that places in which individuals live and grow have an impact on health outcomes of inhabitants independent of individual level demographic attributes such as age, sex and ethnicity.

From the perspective of the psychological development of children and adolescents the importance of context and social environment has been underlined for decades (Bronfenbrenner, 1981). However, only recently there has been an increasing interest in studying contextual influences on adolescent development (R. M. Lerner & Steinberg, 2009). Such studies have assisted in expanding our perception of developmental context beyond the boundaries of one’s household or school and have indicated the importance of the

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1 Referring to multilevel analysis, discussed in section 2.6.3.
2 The level of similarities between such studies and this research determined the level of details included in their
neighbourhood context in understanding development (Aneshensel & Sucoff, 1996; Booth & Crouter, 2001; Steinberg & Morris, 2001).

Figure 2.1 shows the conceptualisation of young people embedded in family, school and their community. This is in line with the framework adopted in Youth Development Strategy Aotearoa (Ministry of Youth Affairs, 2002) and the conceptual framework promoted by Jessor (1992, 1993) depicting an embracing approach of representing adolescents as those who influence and are influenced by their context. In this approach each of the contexts can on one hand be the cause of adversity or on the other provide opportunities for adolescents to experience the positive effects of protective factors that can outweigh risk factors they might face in life.

Despite the recognition of the importance of the context of neighbourhood in providing an asset that predisposes to adolescents’ good mental health, the association between adolescent wellbeing and the characteristics of their neighbourhood has been explored much less than the association between their wellbeing and the contexts of family and school (Eriksson & Lindström, 2010; Morgan et al., 2008; Morgan & Ziglio, 2010; Witney & Koller, 2008).
Although modern life allows us to be members of various communities not defined as geographical units, and there is a strong tendency to believe that the significance of neighbourhoods in people’s social life especially in urban settings is declining (Taub, Surgeon, Lindholm, Otti, & Bridges, 1977; Wellman, 1999), there are important reasons that the context of neighbourhood should be given special attention in relation to adolescent development and wellbeing. These reasons are based on the fact that the lives of adolescents are more spatially circumscribed than adults. It is during this developmental period that an individual grows significantly in independence and autonomy, therefore naturally desires to spend more time with peers, in settings away from family and formal institutions such as school (Allison et al., 1999). At the same time, given general restrictions on adolescents’ mobility, they are likely to spend a considerable proportion of their time in their neighbourhood. Research has also shown that the lagged effects of residential context during adolescence have been observed well into adulthood (Wheaton & Clarke, 2003). Neighbourhood as a context that provides physical and social space in which adolescents function, has also in general been considered as an interesting domain for researchers because it provides an accessible context for easier improvement through policy intervention and community development.

No clarity has yet emerged in literature on the exact mechanisms by which neighbourhoods affect health (Macintyre, Ellaway, & Cummins, 2002). In exploring the association between health related outcomes and neighbourhood characteristics, an important approach for which there is a growing interest is studying neighbourhood social environment as a cause for variation in health, both in adults (Bosma, Dike van de Mheen, Borsboom, & Mackenbach, 2001; Diez-Roux et al., 2001) and in adolescents (Aneshensel & Sucoff, 1996; Brooks-Gunn, Duncan, Klebanov, & Sealant, 1993; Leventhal, Dupéré, & Brooks-Gunn, 2009). Measures of neighbourhood social environment that have shown to contribute to health outcome, include measures of socioeconomic disadvantage (Diez-Roux et al., 2001; Kalff et al., 2001), and more recently, measures of ‘social capital’ (Coleman, 1990; Kawachi, Kennedy, & Glass, 1999). The majority of studies have focussed on the association between neighbourhood socioeconomic disadvantage and various health outcomes in adolescents (Leventhal & Brooks-Gunn, 2003), but limited studies have looked at the association between neighbourhood social capital and adolescent health (De Clercq et al., 2011; Drukker, Kaplan, Feron, & van Os, 2003). This has been the case despite the fact that neighbourhood social
capital has been identified for more than a decade as an important contextual factor in relation to adults’ health (Kawachi, Kennedy, & Wilkinson, 1999).

2.5. Neighbourhood Social Capital

In public health literature, social capital can be considered as a way of describing quantity and quality of social relationships within societies, such as formal and informal social connections and bonds and trusts that exist in a place (Harpham, Grant, & Thomas, 2002; Kawachi & Berkman, 2000). Two distinct conceptions of social capital can be found in literature, one defining it as an individual resource, the other as a collective attribute or resource (Kawachi et al., 2008). The former approach to its definition is often based on the conceptualisation of social capital according to the writings of Bourdieu (1986), differentiating various kinds of resources available to an individual in view of their embeddedness in social networks. Social capital according to this conception is very similar to the concepts of social support and social network which are generally considered as the characteristics of individuals (K. Lochner, Kawachi, & Kennedy, 1999). This is different from a conception of social capital as an ecological characteristic used to measure processes in social environment (Harpham et al., 2002). According to the latter definition, social capital is a collective dimension of society external to the individual actors that live within it. In this research, which is focused on assessing contextual effects of neighbourhood social capital on individual wellbeing, it is the communitarian aspect of social capital that is of interest.

Following the writings of Coleman (1990), it was through the influential work of Robert Putnam (1993, 2000) that more attention was given to the conception of social capital at community level particularly in the field of public health. Although there is still no consensus concerning the definition of this aspect of social capital, in much of health literature social capital at community level has been defined as “those features of social organisations – such as networks of secondary associations, high levels of interpersonal trust and norms of mutual aid and reciprocity – which act as resources for individuals and facilitate collective action” (Kawachi et al., 1997). According to this definition, social capital needs to be considered and measured as a feature of the collective to which an individual belongs, because it inheres in the structure of social relationships. This means that theoretically an individual with a high degree of social network or support (having many friends and relatives) might experience different levels of health outcomes depending on the stock of social capital in the collective (e.g. neighbourhood, state or country) to which he or she belongs. In other words, social
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capital conceptualised at community level refers to how the collective forces external to individuals can influence one’s wellbeing, above and beyond the influence of individual characteristics on one’s wellbeing.

This view of social capital can be considered as a continuation of Emile Durkheim’s original focus, over a century ago, on social integration or social cohesion. According to Durkheim “[t]he group thinks, feels and acts entirely differently from the way its members would if they were isolated. If therefore we begin by studying these members separately, we will understand nothing about what is taking place in the group” (Durkheim, 1982). Focussing on this important point Durkheim demonstrated that cohesive societies with the highest degree of social integration and social bond (referring to characteristics of the context as opposed to individuals) had the lowest rates of suicide; and conversely less cohesive societies experienced higher rates of suicides (Durkheim, 1951).

This is in line with the findings of more recent researchers who have demonstrated the strength of association between social capital and individual wellbeing (De Silva, McKenzie, Harpham, & Huttly, 2005; Kim, Subramanian, & Kawachi, 2008; Sellström & Bremberg, 2006).

2.5.1. Social Capital and Wellbeing

According to the existing literature, neighbourhood social capital influences individual wellbeing through different pathways, some of which have been conceptualised at individual level and others at collective level. At collective level, which is the focus of this study, three of these main pathways are recognised to be ‘collective socialization’, ‘informal social control’ and ‘collective efficacy’ (Kawachi et al., 2008). These pathways to different degrees reflect the processes by which inhabitants in a neighbourhood collectively transform potential resources into desired outcomes conducive to adolescent development. The concept of collective socialization refers to how adults in a community, as role models in addition to an adolescent’s parents, can establish a set of norms that act to either enhance or inhibit the positive development of adolescents, hence impacting their wellbeing. Informal social control is with regard to how a group can build on its capacity to regulate the behaviour of its members, mainly referring to the role of adults in regulating deviant health behaviours of youth. Collective efficacy refers to the global willingness of residents to intervene for the
common good. These processes depend crucially on the presence of interpersonal trust, support and solidarity among neighbours (R.J. Sampson, Raudenbush, & Earls, 1997).

These collective processes, when strengthened, are hypothesised to influence behaviour in both direct and indirect manners. Assumptions are that the presence of a high stock of social capital in places, helps to develop social environments with fewer risks; facilitates the adoption of healthy norms and behaviours; allows the facilitative behaviour of residents to produce social support and safety nets which buffer the negative effects of life events on adolescent health or wellbeing; supports social control over deviant behaviours; enhances access to services and amenities that are linked to adolescent health or wellbeing; assists with more rapid diffusion of health information; provides more effective support for those in need, leading to the inhabitants’ higher self-esteem and self-efficacy; and overall, leads to the creation of an environment more conducive to adolescent positive development (Aneshensel & Sucoff, 1996; Drukker, Buka, Kaplan, McKenzie, & Van Os, 2005; Kawachi & Berkman, 2000; Kawachi, Kennedy, & Wilkinson, 1999).

Literature also includes a series of criticisms directed towards the concept of social capital, some of which call for the recognition of social capital’s downside, just as how any other form of capital (e.g. money) can translate into bad ends. Portes (1998), for instance, has pointed to the following four processes that could be considered as negative consequences of social capital, hence having negative effect on individual wellbeing: a) exclusion of outsiders (how the same in-group solidarity ties which bring benefits to members of a group can bar outsiders from access to resources); b) excess claims on group members (how excessive demands could be put on members of a cohesive group); c) restrictions on individual freedoms (how strong bonds and enforcement of local norms may restrict individual freedom and even lead to intolerance of diversity); and d) downward levelling norms (how norms in a downtrodden group prevent those who are more ambitious to escape from it).

Such criticisms appear to stem significantly from a lack of clarity especially from the earlier definitions of social capital (Hawe & Shiell, 2000; Macinko & Starfield, 2001; Portes, 1998), causing researchers to lump numerous items under the heading of social capital (Harpham, 2008). An important step towards a more careful exploration of the association between social capital and health was distinguishing between its different forms or dimensions.
2.5.1.1. Wellbeing and Social Capital’s Various Dimensions and Indicators

Social capital has been conceptualised to have a number of underlying constructs, and the indicators of these constructs can come from a range of disciplines, each measuring different aspects of the concept (Islam, Merlo, Kawachi, Lindström, & Gerdtham, 2006; K. Lochner et al., 1999). Before explaining some of these dimensions and indicators discussed in the literature and their association with wellbeing, two points need to be emphasised with regard to their measurement. First, the indicators are not claimed to represent the stock of social capital in a complete format, rather they are generally accepted as secondary sources and proxies providing insight into the various dimensions of social capital. Secondly, groups of people living in the same area (e.g. neighbourhood, state or country) could be affected by the stock of social capital which has characterised each of those units. Depending on the level that social capital is explored in a particular study the questions are addressed to that specific geographical space and the individual responses are aggregated to measure the level of social capital for that area. Since this research is exploring social capital as a contextual resource at neighbourhood level based on a quantitative data, the focus here is with regard to the measurement of neighbourhood social capital within health surveys.

Cognitive Components

One of the ways of distinguishing between different constructs of social capital is by breaking it down into its cognitive and structural (or behavioural) components (Harpham et al., 2002; Krishna & Uphoff, 1999; McKenzie, Whitley, & Weich, 2002). What is meant by cognitive social capital is a subjective phenomenon referring to the perceptions of the level of interpersonal trust, availability of mutual aid, reciprocity and psychological sense of community among individuals. In other words, it refers to ‘what people feel’. This aspect of social capital is often measured based on the responses of individuals in an area to questions about whether they think, for instance, people in those areas can be trusted, share the same values, get along with each other or try to be helpful with each other (K. Lochner et al., 1999; R.J. Sampson et al., 1997; Subramanian, Lochner, & Kawachi, 2003). This aspect of social capital can also be measured more objectively through direct observation of social interaction between residents of a neighbourhood (Raudenbush & Sampson, 1999). Cognitive social capital as a contextual level resource for individuals living in an area, is expected to increase feelings of security and self-esteem, shape behavioural norms through control of risk.
behaviour, provide mutual support and informal means of informational exchange and facilitate collective action (Cullen & Whiteford, 2001).

**Structural or Behavioural Components**

Structural social capital, on the other hand, is an objective phenomenon referring to the extent and density of membership and involvement of the inhabitants of an area in a wide variety of voluntary associations (e.g. unions, humanitarian organisations, sport groups, church groups, etc). In other words, it refers to ‘what people do’. Studies aimed to measure through surveys the extent of structural social capital in a geographical area, often do so by asking individuals within those areas about their membership or participation in community organisations (Blakely et al., 2006; Kawachi, Kennedy, & Glass, 1999; Kawachi et al., 1997). A more objective measurement of this aspect of social capital could be through counting the number of civic associations within a neighbourhood (Subramanian et al., 2003). One of the more distinct roles of this dimension of social capital in relation to wellbeing is how it can facilitate access to formal and informal institutions, which have the potential to reduce the negative impact of life events by providing additional support to one’s wellbeing (Cullen & Whiteford, 2001).

**Bonding, Bridging and Linking Components**

Another way of creating a distinction in social capital, leading to additional insight into the multidimensionality of the concept, is dividing it according to what is called bonding, bridging and linking social capital (Szreter & Woolcock, 2004). Bonding social capital refers to resources that are based on strong ties with people in the same community, and can be accessed within social groups whose members are alike in terms of their social identity. Bridging social capital refers to resources that are based on formal and informal links with different communities, and can be accessed through connections that cross boundaries of social identity. Both of these distinct types of social capital represent a horizontal relationship between individuals and are often measured by the extent of background similarity or diversity of the composition of the formal groups in which individuals within a geographical area participate (Iwase et al., 2010; Kim, 2006). Linking social capital represents a vertical, hierarchical or unequal relation referring to links with external sources of power such as local government, and can be measured by rates of various kinds of political participation in geographical areas (K. Sundquist & Yang, 2007).
Availability of Facilities

The availability of facilities such as parks, sport services, and community youth centres in an area has been considered an important aspect of a built environment with strong associations with individual wellbeing (Renalds, Smith, & Hale, 2010). The extent of facilities in an area could also be considered as one of the indicators of the extent of social capital in that area. Inhabitants of places with a high stock of social capital can, through collective action, secure and utilise facilities and services in their possession. Furthermore, the presence of certain facilities could themselves enhance the interaction of the inhabitants of an area leading to opportunities for building on social capital. From a developmental perspective this can be of importance for adolescents since some of the neighbourhood facilities could create additional opportunities for them to have a healthier lifestyle and to meet their developmental needs – for instance, by facilitating their interaction with their surroundings and others, as well as impacting their decisions directly or indirectly with regard to their health or wellbeing.

Physical Disorders

An indicator of the extent of social capital in an area could be the extent of physical disorders in that area. It is expected that in places with a high stock of social capital physical disorders are less present. Physical disorders in an area are expected to impact decisions with regard to an individual’s health or wellbeing – for instance, by inhibiting adolescents from engaging in activities that can be conducive to their wellbeing and development. One important theoretical perspective addressing how a neighbourhood’s physical aspects may be associated with a range of health outcomes is the Broken Window theory (Wilson & Kelling, 1982).

This theory suggests that individual behaviour may be motivated through messages conveyed by the physical appearance of a neighbourhood. Therefore, a disordered neighbourhood characterised by broken windows, abandoned cars or graffiti, etc. may appear as a context where residents are paying little attention to their neighbourhood, so conveying the message that behaviour that is unacceptable elsewhere is permissible or even normative in that setting. Such a conclusion could expose the inhabitants of the neighbourhood to criminal activity or general lack of neighbourhood safety. It has been found that neighbourhood physical conditions are strongly associated with the level of social control and crime in a neighbourhood (Newman, 1996; Ross & Mirowsky, 1999).
Residential Stability

Studying the effect of residential stability in an area on adolescent wellbeing is based on the idea that neighbourhoods in which there are many long-term residents, irrespective of how long an adolescent himself or herself has lived in that neighbourhood, would create a better environment for adolescent development. Neighbourhood studies usually use data from a census to construct measures of residential stability. The outcome of these measures have traditionally been considered as indicators of the compositional attribute of a neighbourhood, used for analysing the structure of a neighbourhood alongside other variables such as poverty (C. R. Shaw & McKay, 1942). It also can be considered as an important element to the emergence of neighbourhood social capital. This is based on prior research indicating that neighbourhoods where there are fewer long-term residents tend to have fewer social ties among its inhabitants (R.J. Sampson, Morenoff, & Earls, 1999), higher levels of residents’ perception of social environmental stress (Schulz et al., 2008), and lower levels of adolescents’ perception of community safety (Aneshensel & Sucoff, 1996).

Previous studies that have employed appropriate methodology have shown significant association between each of the abovementioned aspects of social capital (cognitive components, structural components, binding, bridging and linking components, facilities, physical disorders and residential stability), and health or wellbeing outcomes at individual level. Among them are studies that support the positive association between individual health outcome and structural aspect of social capital (E. R. Weitzman & Kawachi, 2000), cognitive aspect of social capital (Yip et al., 2007) and bonding (Kim, 2006; W. Poortinga, 2006b), bridging (Iwase et al., 2010) and linking social capital (J. Sundquist, Johansson, Yang, & Sundquist, 2006; K. Sundquist & Yang, 2007), neighbourhood facilities (S. C. Duncan, Duncan, Strycker, & Chaumeton, 2004; Wouter Poortinga, Dunstan, & Fone, 2007), neighbourhood physical disorders (Cummins, Stafford, Macintyre, Marmot, & Ellaway, 2005; Wouter Poortinga et al., 2007) and residential stability (Beyers, Bates, Pettit, & Dodge, 2003; R.J. Sampson et al., 1997).

However, there have also been studies that have found no significant association between individual health outcome and structural aspect of social capital (Blakely et al., 2006; W. Poortinga, 2006a), aspects of cognitive social capital (Drukker et al., 2005; W. Poortinga, 2006a), bonding (Iwase et al., 2010), bridging (Kim, 2006) and linking social capital (Kavanagh, Turrell, & Subramanian, 2006), neighbourhood facilities (Coulton, Korbin, & Su,
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1999; Cummins et al., 2005), physical disorders (Molnar, Gortmaker, Bull, & Buka, 2004) and residential stability (Drukker et al., 2003).

2.5.1.2. Social Capital and Social Gradient in Health

Repeated studies have shown a social gradient in health, meaning those of lower socioeconomic status suffer from lower levels of wellbeing (Adler et al., 1994; Keating & Hertzman, 2000; Marmot et al., 1991). In particular, previous studies have pointed to the negative effects of socioeconomic disadvantage on the wellbeing of young people (Kalff et al., 2001; D. S. Shaw, Winslow, Owens, & Hood, 1998; Von Rueden, Gosch, Rajmil, Bisegger, & Ravens-Sieberer, 2006).

Despite the findings of the above studies on one hand, and the acknowledgement of the importance of neighbourhood social capital in the wellbeing of young people on the other, there is limited evidence on the association between neighbourhood social capital and the social gradient in adolescent wellbeing. In a recent study De Clercq et al. (2011) found a statistically significant interaction effect – that the social gradient in perceived health and wellbeing of adolescents was flattened in Flemish neighbourhoods with a high level of social capital. Understanding the complex interaction between social gradient of adolescent wellbeing and various dimensions of neighbourhood social capital, however, requires numerous future studies carried out in different settings.

In interpreting the results of studies that investigate the relationship between social capital and wellbeing outcomes, two important factors discussed in literature need to be given careful consideration. The first point is related to the larger context of country, particularly the degree of economic egalitarianism in a country where the study is carried out. The second point is related to the conceptualisation of the role of adolescents in the formation of social capital, manifested in the way the different dimensions of the concept are measured in a study. Brief explanations on these points are provided below.

2.5.1.3. Egalitarianism and Social Capital

In a thorough study, Islam et al. (2006) reviewed empirical literature on the association between social capital and health across countries, and compared the study conclusions according to the country’s degree of economic egalitarianism. Although it was found that a positive association existed between social capital and better health irrespective of the
countries’ degree of egalitarianism, findings indicated that the between-area variance in health tends to be lower in countries that are more egalitarian. It was therefore concluded that communitarian social capital may be less salient in explaining health differences across places within egalitarian countries, due to safety nets and adequate provisions of public good which tend to be more visible in egalitarian societies in contrast to societies that are segregated and unequal. The result of the New Zealand based study of Blakely et al. (2006) which found no association between neighbourhood volunteerism with adult mortality was also interpreted in light of the above hypothesis (Kawachi, 2006).

2.5.1.4. Adolescents and Social Capital

A cursory review of literature indicates that in measuring social capital what seems to have been a common practice among researchers is to rely fully on the data that comes from adults with little or no focus on the experience and voice of young people.

This issue has been raised by many researchers who have not adopted an adult-centred approach in their exploration of social capital (Goodwin & Armstrong-Esther, 2004; Holland, Reynolds, & Weller, 2007; Leonard, 2005; Morrow, 1999; Morrow, 2001; Schaefer-McDaniel, 2004; Weller & Bruegel, 2009). It is argued that the root of neglecting the voice of young people in measuring social capital, goes back to the work of its dominant theorists, such as Coleman and Putnam, whose regard for children has been limited by considering them as only those who passively draw on and benefit from their parents’ social capital. For instance, in the existing literature young people’s activities in civic networks are considered important largely because they are the ‘next generation of adults’. Similarly, the association between social capital and adolescent outcomes has been discussed generally by focussing on factors such as the degree of adult neighbours intervening in young people’s antisocial behaviour. There is no doubt that the role of adults in the operationalisation of neighbourhood informal social control or social capital is significant; however, the current conceptualisation of adolescents in social capital theory and related empirical research neglects the fact that adolescents also have the potential to be active social agents who can influence and shape their surrounding structures and processes (James & Prout, 1990; Mayall, 1998).

Adolescents’ capacity to act as social agents can be observed in the involvement of many young adults in marginal economic activities, having part-time jobs, spending a large amount of their time outside of home, being members of different clubs and even coming into contact with local authority services (Morrow, 2005).
2.6. Methodological Considerations

Studies that are aimed to examine the association between individual wellbeing and neighbourhood context are confronted with a set of important methodological issues, including those with regard to definitions of neighbourhood, selection problems and appropriate methods of data analysis.

2.6.1. Neighbourhood Definition

In studies exploring the association between adolescent wellbeing and neighbourhood context, different strategies have been used to define the neighbourhood unit of analysis. The most prevalent approach is to employ data collected from census. Leventhal et al. (2009) writing about neighbourhood studies in United States, mention that two common ways in which neighbourhoods are typically defined are either as a ‘census tract’ (containing approximately 3000 to 8000 people) or a ‘block group’ (containing approximately 600 to 3000 people). These measurements and definitions, however, are different in various countries and studies. In New Zealand, a ‘meshblock’ is considered the smallest geographic unit for which statistical data is collected by Statistics New Zealand (2006a) and contains a median population of approximately 100 people; and a ‘census area unit’ which is an aggregation of adjacent meshblocks, contains a median population of approximately 2000 people. 1,927 census area units cover all of New Zealand, according to the boundaries set at 2009 (Statistics New Zealand, 2010).

2.6.2. Selection Bias

Researchers use either experimental or non-experimental approaches in studying neighbourhood effects on adolescent development. In experimental studies individuals or families are randomly assigned to reside in particular types of neighbourhoods. In non-experimental studies, which constitute the majority of neighbourhood studies, although a large range of individuals or families is included in the sample size, the selection process does not take place (Leventhal & Brooks-Gunn, 2000; Leventhal et al., 2009).

Therefore, a common criticism of neighbourhood studies, particularly with non-experimental designs, is the selection or omitted variable bias, also referred to as endogeneity of neighbourhood choice. This bias refers to the role of residential preference in accounting for neighbourhood variations in wellbeing. This is related to the idea that neighbourhood effects
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are not independent (exogenous) from the people who live in the neighbourhoods. Explaining neighbourhood variation due to differences in the people who live in the same neighbourhood is referred to as ‘compositional explanation’. According to this explanation, based on the assumption that individuals have some choice as to which neighbourhood they live in, it might well be that the unmeasured variables associated with their choice of neighbourhood might account for neighbourhood variations in health (G. J. Duncan, Connell, & Klebanov, 1997; Manski, 1993).

Although there is validity in the above mentioned criticism, in order to avoid overestimating the problem of selection in neighbourhood studies it is important to acknowledge the complex interdependencies that exist between the effects of social environment on individual choice. In many cases it is the context that largely determines people’s choices and life conditions. Explaining neighbourhood variation due to differences between neighbourhoods themselves is referred to as ‘contextual explanation’. In many cases controlling for what has become generally accepted as confounding variables might underestimate true contextual effects of a neighbourhood (Kawachi & Berkman, 2003).

In response to these criticisms, researchers have employed methodologies that allow them to account for a wide range of demographic characteristics, either at individual level (e.g. gender and ethnicity) or at area level (e.g. neighbourhood characteristics). It can be argued that because there are always many unmeasured variables that cannot be included in the model, this approach is not intended to eliminate the selection bias entirely, but to minimise it. But, it is generally accepted that controlling for key characteristics such as socioeconomic status and individual demographics would be sufficient for achieving reasonable estimates of neighbourhood effects on a wide range of adolescent health outcomes (Leventhal et al., 2009). At the same time it is argued that controlling for individual socioeconomic status in a neighbourhood study of health outcome might overlook the fact that the neighbourhood in which one lives can affect both the quality of one’s education and access to well paid jobs which would obviously directly affect one’s socioeconomic status (Macintyre & Ellaway, 2003).

2.6.3. Multilevel Analysis

When studying the effect of group characteristics on individual outcome one of the challenges faced by researchers is that of ‘ecological fallacy’ (Robinson, 1950). This problem
occurs in studies where all variables are measured for groups, and inferences are drawn regarding individual level association based on group level data. A methodology that employs such an approach conflates the contextual effects with compositional effects due to the unavailability of information on the cross-classification of individual level characteristics and outcomes within groups. Also, this approach does not take into account that associations at the group and individual level may differ at times due to group variable and individual variable tapping into different constructs (Diez-Roux, 2003).

To be able to ascertain the presence of contextual effects of a neighbourhood on any individual outcome a type of methodology is needed which allows for controlling individual factors that reflect the composition of a neighbourhood. In order to do that the methodology should permit a simultaneous analysis of neighbourhoods and individuals within them (Diez-Roux, 1998). This is essential because only then the variability at both neighbourhood and individual level could be examined and the role of neighbourhood and individual level constructs in explaining variation among individual and neighbourhoods could be investigated.

Multilevel analysis as a relatively new but well established analytic strategy in many fields including public health provides the most appropriate methodology for researchers to deal with the micro level of individuals and the macro level of neighbourhoods simultaneously (C. Duncan et al., 1998; Snijders & Bosker, 1999). This approach of analysis provides estimates of variation in outcomes both within and between neighbourhoods, yielding more reliable estimates of neighbourhood effects on individual outcomes. The extent of variation between neighbourhoods also provides the researcher with an indication of the influence of neighbourhood context in influencing health patterns. These statistical models assist in establishing whether the neighbourhood differences in health are due to factors related to the neighbourhoods themselves or the people who live in them (Diez-Roux, 2003). Another important advantage of multilevel approaches in studies of neighbourhood effects on individual wellbeing is that they allow the researcher to test explicitly for cross-level interactions between a neighbourhood and an individual characteristic (Kawachi et al., 2008).

Neighbourhood effect in multilevel models can be treated through either a fixed-effect approach or a random-effect approach. The fixed-effect approach treats neighbourhoods as any categorical variable in the fixed part of a single level regression model. Because the fixed-effects of each neighbourhood are entirely confounded, a typical multilevel analysis
intended to estimate the effect of neighbourhood level exposure on individual outcome does not use a fixed-effect approach, unless neighbourhood differences are considered as nuisance (Kawachi et al., 2008). The random-effect approach, however, treats neighbourhoods as a random sample from a population of neighbourhoods, so that inferences could be made about the variation between neighbourhoods. This multilevel statistical approach is used when neighbourhood differences represent important processes that predict individual outcomes. This approach applies directly to this research, as social capital indicators are conceptualised here as neighbourhood characteristics, hypothesised to be independently associated with adolescent wellbeing.

More complex multilevel models not only allow for neighbourhoods to be treated as random effects but also allow for conceptualising individuals nested in additional contexts (Fielding & Goldstein, 2006). For instance, in the case of wellbeing outcomes, adolescents’ wellbeing status may be influenced both by where they live and where they go to school. Models that integrate such a degree of complexity and allow for adolescents being nested in different levels (e.g. neighbourhoods and schools) at the same time are called cross-classified multilevel models. Figure 2.2 represents the structure of such a model. This model improves our understanding of neighbourhood effects in this study, as it allows simultaneously for both neighbourhoods and schools to be treated as random effects.

Figure 2.2. Cross-classified Multilevel Structure of Adolescents Nested within Neighbourhoods and Schools.
2.7. Previous Research

It has been suggested by De Silva et al. (2005) that future research, specifically that intended to explore the contextual effect of neighbourhood social capital on individual health, needs to use a level of aggregation that reflects respondents’ perception of their neighbourhood, and use multilevel modelling. Due to the intrinsic relevance of this approach for social capital and health research (Kawachi et al., 2008) previous studies that have not used a level of aggregation, and have not analysed the data by using multilevel modelling, have not been the focus of the literature review for this research. Examples of such studies are those of Boyce et al. (2008), Morgan and Haglund (2009) and Borges et al. (2010).

After reviewing the relevant literature with the abovementioned focus, no study was found that had examined the association between social capital as a contextual effect at neighbourhood level and adolescent self-reported wellbeing, having used an appropriate methodology by aggregating data to neighbourhood level and using cross-classified multilevel modelling when linking social capital indicators to individual outcomes. Previous studies have been limited in various ways, for instance by not having used appropriate methodology, looking at outcomes other than adolescent self-reported wellbeing or focussing on one or limited indicators of neighbourhood social capital. A number of studies were found, however, that were similar to this research in various aspects. A few examples of such studies are briefly described below.

In a very recent study, De Clercq et al. (2011) using data from the 2005-2006 Flemish (Belgium) Health Behaviour among School-aged Children survey (601 local communities, n = 10,915 between 9 and 18 years old) investigated whether community social capital is an independent determinant of adolescents’ perceived health and wellbeing after taking account of individual compositional characteristics (i.e. gender, age, family affluence and individual social capital). Adolescent wellbeing was measured by a 10-item index: “Thinking about last week...Have you felt fit and well? Have you felt full of energy? Have you felt sad? Have you felt lonely? Have you had enough time for yourself? Have you been able to do the things that you want to do in your free time? Have your parent(s) treated you fairly? Have you had fun with your friends? Have you got on well at school? Have you been able to pay attention?”

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2 The level of similarities between such studies and this research determined the level of details included in their brief description.

3 A part of the international Health Behaviour in School-Aged Children (HBSC) survey, which is a WHO Collaborative Cross-National Study.
Social capital was measured both subjectively and objectively. Subjective measures were based on students’ responses to the following questions: “People say ‘hello’ and often stop to talk to each other in the street; it is safe for younger children to play outside during the day; you can trust people around here; there are good places to spend your free time; I could ask for help or a favour from neighbours”. The objective measure consisted of three items of voluntary association, religious participation and property crimes, based on a sample of respondents (n = 2080) representing the population of the Flemish region. However, due to the fact that the objective data were collected on a larger scale than those of subjective measures, these two sets of data could not be matched, implying complexities in the interpretation of the results of objective measures. The findings of the multilevel statistical procedures showed that community level social capital predicted health better than individual social capital. The results also pointed out a complex interaction effect – that the social gradient in adolescent wellbeing was flattened in communities with a high level of community social capital. Among the final remarks of the researchers behind this study was that “[f]uture research should use more complex multilevel models. The hierarchical scenario of individuals nested in neighborhoods is too simplistic. In the case of health outcomes, individuals’ health status may be influenced both by where they live and where they go to school”. The authors therefore recommended the usage of cross-classified multilevel models.

In a study carried out by Drukker et al. (2003), neighbourhood social capital and socioeconomic indicators were examined in relation to adolescents’ health related quality of life. Social capital was assessed by asking approximately 200 adult inhabitants aged 20 to 65 years, randomly selected from each of 36 neighbourhoods (each with a population of 300 to 8500 inhabitants) in Maastricht, one of the cities in Netherland. Adults were asked to respond to a questionnaire measuring two scales of informal social control and social cohesion and trust. Only 48% of inhabitants responded to the social capital questionnaire. Other neighbourhood variables used in the study were residential instability and neighbourhood socioeconomic deprivation, which were both measured according to objective neighbourhood data from the city and national statistics datasets. For measuring the outcome variable, all adolescents living in that city and attending one level of the Dutch educational system (for those aged approximately 11 or 12 years old), as well as their parents were asked

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4 This scale measured the respondents’ perception of their neighbourhood, by asking whether they think their neighbours would be willing to intervene in hypothetical situations (e.g. if children are fighting with each other).

5 This scale measured bonds and trust among the residents of the neighbourhoods (e.g. if people in a neighbourhood do not get along with each other).
to fill in Child Health Questionnaires. Questions were focussed on adolescents’ general health, satisfaction, mental health, self-esteem and behaviour. The response rate varied considerably between schools (20-85%), resulting in around 500 students being included in the final sample. The confounders entered in the multilevel model for analysing association between neighbourhood variables and adolescents’ quality of life were the following: family occupational status, family welfare recipient status, family educational status, single parent family status, child’s gender and grade retention. The data were grouped according to neighbourhood and were part of a multilevel structure. Neighbourhood variables were first entered in separate models, then entered jointly to one model. After controlling for individual confounders, and before entering all the neighbourhood variables jointly into the model, various positive significant associations were observed with different aspects of health outcomes (e.g. between informal social control and behaviour; and between social cohesion and trust and satisfaction). All the associations indicated that adolescents living in neighbourhoods with high social capital had better general health, mental health, behaviour, or satisfaction. However, once all the neighbourhood variables were jointly entered to the model, the only significant association visible was between informal social control and mental health and behaviour. Some of the limitations of this study were the following: being adult-centred in measuring social capital; not including neighbourhood characteristics such as membership in community organisations, neighbourhood physical disorders and neighbourhood facilities; including a small range of age groups of adolescents; and not being nationally representative.

Poortinga et al. (2007) examined whether the neighbourhood aspects of access to amenities, neighbourhood quality, neighbourhood disorder, and neighbourhood social cohesion are associated with people’s self-rated health. In this study the responses of 10,892 people of under 75 years of age were geocoded to 325 geographically defined neighbourhoods of Caerphilly (of south Wales), and were analysed using a multilevel modelling, controlling for individual socio-demographic variables and neighbourhood deprivation. The outcome variable was created based on the respondent’s rating of their own health. Neighbourhood scales measured the extent of neighbourhood quality, neighbourhood disorder, access to amenities, and level of social cohesion in the respondents’ neighbourhoods. The study found that neighbourhood disorder, poor access to amenities, poor quality and lack of social

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6 Because the study concerned adolescents attending the same grade, researchers controlled for whether or not adolescents repeated a grade.
cohesion were all associated with the reporting of poor health. None of the measures used in the study, however, tapped into the extent of neighbourhood structural social capital.

In a multilevel study, Weitzman and Kawachi (2000) examined whether structural dimension of social capital as a contextual resource in college campuses, protected against individual risks of binge drinking among young adults. They used a dataset from the Harvard School of Public Health 1993 College Alcohol Study which included around 17,500 students enrolled at 140 colleges. Social capital was operationalised as the individual’s average time committed to volunteering in the past month aggregated to the campus level. The model controlled for age, sex, race, a measure of parents’ education, individual volunteering as well as several college characteristics related to the campus’s geographic region and public or private status. Results showed that individuals from campuses with higher than average levels of social capital had a 26% lower individual risk for binge drinking ($p < 0.001$) than students at other colleges. The results of such research which is based on data from United States cannot be, however, generalised to other countries particularly New Zealand.

Blakely et al. (2006) in a large multilevel study tested the association of a structural measure of neighbourhood social capital in New Zealand with adult (25 – 74 years old) mortality during 1996 – 99 period. Sex, age, marital status, ethnicity and individual and neighbourhood level socioeconomic status variables were included in all analyses as likely confounders. Neighbourhoods were defined by census area units, and the neighbourhood structural social capital was measured based on the questions in the 1996 census regarding unpaid voluntary activities of respondents outside of their home. Respondents were aged 15 years or older. This study found no statistically significant independent association of the structural measure of neighbourhood social capital with mortality. Assuming that social features of neighbourhoods are important determinants of health it was suggested by the author that future studies should examine other features of neighbourhood environment and other outcomes.

2.8. Conclusion

This chapter looked at the literature on adolescent wellbeing and neighbourhood social capital. The levels of concern for adolescent wellbeing especially in New Zealand was pointed out and the relevance and importance of different elements of a positive youth development approach were reviewed. Literature acknowledges the importance of the context
of neighbourhood for individual health and wellbeing particularly for adolescents, and strongly supports the intrinsic relevance of multilevel study approach for analysing the association between contextual level characteristics and individual health outcomes. There is a growing body of research supporting the association between individual wellbeing and their neighbourhood’s social environment, particularly the extent of social capital in neighbourhoods. The nature of the association between neighbourhood social capital and individual health outcome may differ according to the particular aspect of social capital explored in a study as well as the level of egalitarianism of the country in which a study is carried out. The current state of literature is limited by a lack of sufficient studies that are focussed on adolescent outcome, and those that measure neighbourhood social capital by asking young people directly about their perception of neighbourhood characteristics and their involvement in community affairs.

This study, therefore, aims to examine the association between adolescent wellbeing and their neighbourhood social capital. It employs a cross-classified multilevel approach which allows the examination of the independent association of different aspects of neighbourhood social capital as a multidimensional concept, with adolescent wellbeing, as well as their interaction with social gradient in adolescent health. This research conceptualises adolescents as active social agents, and measures neighbourhood social capital according to a dataset based on the responses of a nationally representative sample of secondary school students in New Zealand. It also focusses on positive outcomes to contribute to the body of knowledge that promotes a strength-based approach in adolescent development.

The hypothesis is that each of the indicators of neighbourhood social capital as a contextual level resource will be associated with adolescent wellbeing, and that an interaction would exist between them and the socioeconomic status of adolescents.
Chapter 3. Methodology

The aim of the research is to explore the association between the wellbeing of adolescents in New Zealand and some of the characteristics of their neighbourhoods which can be considered as the indicators of the extent of social capital in those areas. To achieve this aim according to the conceptual framework explained in the previous chapter, an appropriate methodology is employed in order to analyse a large and nationally representative dataset which provides rich information about adolescent wellbeing and their perception of neighbourhood characteristics. In order to present the quantitative methodologies employed in this research, what follows in the first section of this chapter is a description of the Youth’07 survey (section 3.1.1) and its preliminary and data collection procedures (sections 3.1.2 to 3.1.4). The next section contains an explanation of the study population (section 3.2) and the final sample size used in the study (section 3.2.1). The measures used in the study are introduced in sections 3.3 (individual level measures, including the outcome variable and its psychometrics) and 3.4 (neighbourhood level measures and their psychometrics). At the end of this chapter the methods of data analysis utilised in this research are explained (section 3.5).

3.1. Youth’07 Survey

This research drew upon the data available from the Youth’07 survey (Adolescent Health Research Group, 2008), which provides a recent and appropriate dataset for an exploration of questions raised in this thesis. More information on this survey is provided below.

3.1.1. Background

In 1997, the Adolescent Health Research Group (AHRG) was established at the University of Auckland, with the goal of providing accurate and timely national data on the health and wellbeing of New Zealand’s young people. AHRG initiated a number of surveys as part of its project named Youth2000. Youth2000 cross-sectional national surveys of the health and wellbeing of secondary school students in New Zealand are the largest surveys of young people in New Zealand, and are known to be of importance for the purposes of planning and programme development for communities, schools and policy-makers in their efforts to promote youth health and positive development. The advantage of this dataset is that in
addition to providing rich information about the health and wellbeing of young people in New Zealand it contains data regarding the area in which students reside, including students’ perception of the built and social environment of their neighbourhoods. Youth’07 is the second national survey; it was carried out by the AHRG between March and October 2007, following the initial national survey in 2001 (Adolescent Health Research Group, 2011).

Youth’07 received funding from the Health Research Council of New Zealand (grant 05/216), and eight government agencies: the Department of Labour, the Families Commission, the Accident Compensation Corporation, Sport and Recreation New Zealand, the Alcohol Advisory Council of New Zealand and the Ministries of Youth Development, Justice, and Health.

3.1.2. Ethical Procedure

Ethical consent for this study was granted by the University of Auckland Human Subject Ethics Committee. The principal of each school involved in the survey also gave written consent on behalf of its Board of Trustees. Students were randomly selected to take part in the survey. In order to inform the parents and students about the survey, its voluntary and confidential nature, and its purpose, a brochure was sent to parents a few weeks before the day of the survey and to students a week before the date. At the beginning of the questionnaire students were asked to give their consent to participate. Those who gave their consent could continue with the survey questions. Students who declined to participate could either use other features on the internet tablets used for the survey, or return to class. Students could also withdraw from the survey at any time.

3.1.3. The Survey Equipment and Questionnaire

The Youth’07 survey was carried out using hand-held computers referred to as ‘internet tablets’. By using these devices it was possible to have an audio-visual format of the questionnaire. Questions as well as the selected responses were read out through headphones. Students could skip any question or part of the survey at any point. In a study carried out by Denny et al. (2008) it has been demonstrated that using wi-fi enabled hand-held internet tablets is a feasible methodology for school-based surveys especially when asking about sensitive information, as students find them more private and confidential.
Chapter 3 – Methodology

The Student Health and Wellbeing Questionnaire used in the Youth’07 survey was developed from the 2001 survey questionnaire. New items for inclusion were developed in consultation with stakeholders, advisory groups and academic researchers. Focus groups were undertaken with groups of young people to ensure comprehension and face validity of questionnaire items.

The questionnaire contained 622 questions. Initial screening questions were designed to direct students with experience in a particular issue or behaviour to more in-depth questions. This limited the extent of exposure to sensitive questions for students with no direct experience in those behaviours. Due to this branching design, students answered fewer questions than the above-mentioned number.

The majority of students reported that they enjoyed answering the survey a lot or that they thought it was okay. The average time taken to complete the survey was 73 minutes. Students from more socioeconomically deprived neighbourhoods took longer on average to complete the survey than students from neighbourhoods with lower levels of deprivation.

3.1.4. Geocoding Procedure

Students were asked to give permission for their residential address to be entered into a Geocode software programme in order to ascertain their census meshblock number. Meshblock is the smallest geographic unit for which statistical data is collected by Statistics New Zealand (2006a). Students who lived in two or more homes were asked to provide the address of the home where they spend most of their time. In order to ensure that the student’s anonymity was maintained they were shown how their address would get deleted once the meshblock number was obtained from their response. The meshblock number for each student was matched with the number in a Concordance File available from Otago University Wellington School of Medicine (Salmond et al. 2006). Through this procedure the additional data in the Concordance File could be merged with each student’s data. The New Zealand Deprivation Index Decile (NZDep2006), which is an area based socioeconomic deprivation index that assesses various dimensions of deprivation using 2006 New Zealand census data, was derived for each student through the same process, based on the meshblocks where the students lived. Using the same procedure it was also possible to identify if students lived in urban or rural areas.

7 NZDep2006 will be described further in section 3.4.
3.2. Study Population

A target sample size was calculated from Youth2000 data at a level which would ensure reasonable precision of estimates among the major ethnic groupings for indicators relating to a range of domains. From these power calculations, it was aimed to survey 10,000 randomly selected students from 100 randomly selected schools. Participating students were randomly selected through a two stage clustered sampling design.

In 2006, there were 389 eligible secondary schools with more than 50 students enrolled in years 9 to 13. 115 schools were randomly selected and invited to participate in the survey. Of these, 96 schools throughout New Zealand (84% of the randomly selected schools) took part in the survey. From the 19 schools invited, that chose not to participate in the survey, 17 (90%) were large schools, 14 (74%) were in the large centres of Auckland, Wellington or Hamilton, 13 (68%) were co-educational and 11 (58%) were state schools. A comparison of the participating schools with all eligible schools in New Zealand showed that girl’s schools and schools from most deprived areas were slightly under-represented in the survey sample.

If a participating school had more than 166 students, 18% of its eligible students were randomly selected from the school roll and invited to participate. If a school was among the 10 which had fewer students than 166 on the school roll, 30 students were randomly selected and invited to participate. This was done in order to reduce the risk of identification of individual students when reporting results back to the smaller schools. In total, 12,355 students were selected and invited to participate in the survey. Of these, 9,107 students, who make up 74% of selected students and 3.4% of the total 2007 New Zealand secondary school roll, took part in the survey. The remaining 3,248 students selected did not complete the survey due to reasons such as being absent from school, being unavailable, or declining to take part.

3.2.1. Final Sample Size

To select the final sample size for this research, students’ responses were aggregated to neighbourhood level. Neighbourhood in this study was defined according to Census Area Unit (CAU) which is a unit constructed by Statistics New Zealand with a median population of 2000 people (Statistics New Zealand, 2010). The next levels of aggregation, ‘urban area’ or ‘territorial authority’ would have been too large for this research as they would have captured large parts of cities (if not the whole of them), and mixed rural and urban zones. On
the other hand aggregation on the level of ‘meshblock’ would have been too small as they would have captured only streets or some of its parts with approximately 100 people. Youth’07 collected data from students residing in 1187 Census Area Units. That is 62% of the total number of CAUs throughout New Zealand. Because this study was intended to explore the association between neighbourhood characteristics and students outcome, neighbourhoods from which 10 or fewer students were participating in the survey were dropped from the analysis. This was done to ensure the reliability of neighbourhood level measures (Raudenbush & Sampson, 1999).

Dropping CAUs that contained 10 or fewer students resulted in having the final sample of 5567 students residing in 262 CAUs. On average, 21 students lived in each of the 262 CAUs (median 18, range 11 – 76). Table 3.1 shows the demographics of the students, by gender, age, area deprivation, ethnicity and geography, in three categories – neighbourhoods with more than 10 students, neighbourhoods with 10 or fewer students, and all students regardless of their neighbourhood. Students who were dropped from the analysis (those in neighbourhoods with 10 or fewer students) were more likely to be from rural areas (23% vs. 11%) and European (58% vs. 50%) and less likely to be Asian (10% vs. 14%), compared with students coming from neighbourhoods with more than 10 students. The demographics of these groups did not differ considerably, by age, gender or area deprivation.
### Table 3.1. Demographics of Sample Students.

<table>
<thead>
<tr>
<th></th>
<th>Sample students in CAUs with more than 10 students</th>
<th>Sample students in CAUs with 10 or fewer students</th>
<th>All students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5567</td>
<td>100</td>
<td>3273</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2944</td>
<td>53.0</td>
<td>1839</td>
</tr>
<tr>
<td>Female</td>
<td>2618</td>
<td>47.0</td>
<td>1432</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 or younger</td>
<td>1132</td>
<td>20.3</td>
<td>660</td>
</tr>
<tr>
<td>14</td>
<td>1293</td>
<td>23.2</td>
<td>745</td>
</tr>
<tr>
<td>15</td>
<td>1208</td>
<td>21.7</td>
<td>723</td>
</tr>
<tr>
<td>16</td>
<td>1051</td>
<td>18.9</td>
<td>645</td>
</tr>
<tr>
<td>17 or older</td>
<td>878</td>
<td>15.8</td>
<td>498</td>
</tr>
<tr>
<td><strong>Deprivation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1989</td>
<td>35.8</td>
<td>1206</td>
</tr>
<tr>
<td>Medium</td>
<td>2104</td>
<td>37.7</td>
<td>1290</td>
</tr>
<tr>
<td>High</td>
<td>1473</td>
<td>26.4</td>
<td>776</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>790</td>
<td>14.3</td>
<td>308</td>
</tr>
<tr>
<td>European</td>
<td>2777</td>
<td>49.9</td>
<td>1891</td>
</tr>
<tr>
<td>Maori</td>
<td>1055</td>
<td>19.0</td>
<td>596</td>
</tr>
<tr>
<td>Pacific</td>
<td>598</td>
<td>10.8</td>
<td>294</td>
</tr>
<tr>
<td>Other</td>
<td>335</td>
<td>6.1</td>
<td>180</td>
</tr>
<tr>
<td><strong>Geography</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Urban</td>
<td>4058</td>
<td>73.2</td>
<td>2166</td>
</tr>
<tr>
<td>Secondary Urban</td>
<td>870</td>
<td>15.5</td>
<td>338</td>
</tr>
<tr>
<td>Rural</td>
<td>639</td>
<td>11.4</td>
<td>769</td>
</tr>
</tbody>
</table>

### 3.3. Individual Level Measures

The identification of gender, age and ethnicity was based on student self-report. Each student’s age was categorised into one of five groups (13 or younger, 14, 15, 16, or 17 or older). Questions on ethnicity were developed from the 2001 survey with guidance from the Maori, Pacific and Asian advisory groups, academics, as well as community and youth representatives. Students were asked “Which ethnic group do you belong to?”. This item was based on the standard ethnicity question developed for the New Zealand census (Statistics New Zealand, 2005). Students were given the option of choosing more than one response from a list of 23 options derived from level 2 groupings of ethnicity (Ministry of Health, 2004). Forty percent of students identified themselves with more than one ethnic group. Using the Statistics New Zealand ethnicity prioritisation method (Lang, 2002), in order to
facilitate the analysis, level 1 groupings were created, according to which students were assigned to one of the following five ethnic groups: Asian, European, Maori, Other ethnicity and Pacific (Ministry of Health, 2004).

The three different categories of areas used in this study consisted of Main Urban Areas with a minimum population of 30,000, Secondary Urban Areas with a population of 10,000–29,999, and Rural Areas with a population under 1000 people. After dropping neighbourhoods with 10 or fewer students from the analysis, which meant the removal of many rural neighbourhoods from the final sample, it was decided to rename the Rural Areas category as Minor Urban Areas.

A student’s socioeconomic status was measured by the following criteria (including questions and response options): “Do your parents, or the people who act as your parents, ever worry about not having enough money to buy food?” [never, occasionally, sometimes, often, all the time, I don’t know]; “In your home how many of the following things are there?” ‘A car that goes’, ‘a telephone that works’, ‘a mobile phone’, ‘a computer/laptop’, ‘a television’ [none, one, two, three or more]; “What places are used as bedrooms in your home?” [living room, garage, caravan, other rooms that aren’t bedrooms, none of these]; “In the past year, how many times have you moved homes?” [I haven’t moved, I have moved once, I have moved 2 times, I have moved 3 or more times]; and the NZDep2006. These questions are in line with more recent studies that suggest the use of measures that reflect material circumstances over more traditional measures such as parental occupation (Emerson, Graham, & Hatton, 2006; L. K. Koivusilta, Rimpelä, & Kautiainen, 2006), particularly with regard to adolescents from whom it can be more difficult to collect data on family affluence (C. Currie et al., 2008; C. E. Currie, Elton, Todd, & Platt, 1997). The responses to these questions were all standardised by setting their mean to 0 and standard deviation to 1. The final indicator of a student’s socioeconomic status was created by taking an average of the above scores.

3.3.1. Outcome Variable

The wellbeing of students was measured by questions on general mood, life satisfaction and WHO-5 Wellbeing Index. These questions attempt to capture aspects of wellbeing – both an individual’s perception of positive affect (general mood and life satisfaction) and the individual’s perception of quality of functioning (Diener, 2009; Keyes, 2009).
General mood was assessed with a single item, “In general, how have you been feeling?” Students could respond, ‘in a good mood’, ‘my moods go up and down’, or ‘in a bad mood’. Life satisfaction was also assessed with a single item, “Are you happy or satisfied with your life?”. Students could choose any of the following four responses: ‘very happy/satisfied’, ‘it’s okay’, ‘not very happy or satisfied’ or ‘not at all happy or satisfied’. Such scales are similar to indicators of one’s self-reported health or wellbeing used in previous research (Bjorner, Fayers, & Idler, 2005; Gilman & Huebner, 2000; L. Koivusilta, Arja, & Andres, 2003; Oberle, Schonert-Reichl, & Zumbo, 2011). The WHO-5 Wellbeing Index has been developed by the World Health Organization to measure wellbeing, and is considered a validated measure in health literature (Bech et al., 1996; Bech et al., 2003). The WHO-5 Wellbeing Index included the following five items: Whether over the last two weeks “I have felt cheerful and in good spirits”, “I have felt calm and relaxed”, “I have felt active and vigorous”, “I woke up feeling fresh and rested”, “my daily life has been filled with things that interest me”. The response alternatives were ‘all of the time’, ‘most of the time’, ‘more than half of the time’, ‘less than half of the time’, ‘some of the time’ or ‘at no time’. Responses generated a value from 6 to 1 for each individual answer, respectively. A mean value of all the responses to the five items ($\alpha = 0.89$) constituted the WHO-5 Wellbeing Index score. In order to combine these three scales (as will be explained further in section 3.3.2), all of them were re-scaled to show a response value between 0 to 5, representing the lowest and highest level of wellbeing, respectively, according to each scale.

Table 3.2, Table 3.3, and Table 3.4 show the demographics of student responses according to the three scales of general mood, life satisfaction and WHO-5 Wellbeing Index, respectively. As it can be seen from the Tables, the overall pattern of students’ responses to these three scales did not differ considerably by any of the demographics. Results from all the scales show that there is a statistically significant age difference among students’ responses, with male students reporting higher levels of general mood, life satisfaction and WHO-5 Wellbeing Index score compared with female students ($p < 0.001$). Among students between the ages of 13 or younger to 15 or 16 years old, there appears to be a decreasing trend of self-reported general mood ($p = 0.008$), life satisfaction ($p < 0.001$) and WHO-5 Wellbeing Index score ($p < 0.001$) for older students. This trend, however, levels off among students who were 16 or older. Students from different ethnicities reported different levels of general mood ($p < 0.036$), life satisfaction ($< 0.001$) and WHO-5 Wellbeing Index score ($p < 0.001$), with Pacific students appearing to be among those scoring higher in all the three scales, and Asian
students scoring lower, most visibly in life satisfaction scale and WHO-5 Wellbeing Index. There are also similarities in the demographics of all the three scales with regard to the variation of student responses by geography. Although none of the scales showed a statistically significant difference between the responses of students coming from the three categories of main urban, secondary urban or minor urban areas, it appears that a higher percentage of students from minor urban areas reported to be very happy and satisfied, in a good mood, or scored higher in the WHO-5 Wellbeing Index. Finally, considering the overlapping values of 95% confidence intervals in the results, no major and significant difference was observed in the demographics of the scales with regard to the variation of student responses by the deprivation level of the area in which they were living (measured by NZDep2006).
### General Mood

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>In a good mood (95% CI)</th>
<th>Moods go up and down (95% CI)</th>
<th>In a bad mood (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>5500</td>
<td>54.0 (51.7-56.2)</td>
<td>42.8 (40.6-45.0)</td>
<td>3.2 (2.7-3.7)</td>
<td></td>
</tr>
<tr>
<td><strong>By Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2899</td>
<td>65.3 (63.1-67.5)</td>
<td>32.0 (29.8-34.1)</td>
<td>2.7 (2.1-3.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Female</td>
<td>2601</td>
<td>41.3 (39.2-43.4)</td>
<td>55.0 (43.4-52.9)</td>
<td>3.7 (3.0-4.4)</td>
<td></td>
</tr>
<tr>
<td><strong>By Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 or younger</td>
<td>1118</td>
<td>58.0 (54.7-61.4)</td>
<td>39.5 (36.2-42.7)</td>
<td>2.5 (1.7-3.3)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1283</td>
<td>55.5 (51.8-59.1)</td>
<td>41.2 (37.7-44.7)</td>
<td>3.4 (2.2-4.5)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1189</td>
<td>53.2 (50.1-56.4)</td>
<td>42.9 (39.7-46.0)</td>
<td>3.9 (2.9-4.9)</td>
<td>0.008</td>
</tr>
<tr>
<td>16</td>
<td>1042</td>
<td>49.4 (46.2-52.7)</td>
<td>47.6 (44.4-50.7)</td>
<td>3.0 (1.9-4.1)</td>
<td></td>
</tr>
<tr>
<td>17 or older</td>
<td>868</td>
<td>53.0 (48.7-57.4)</td>
<td>43.8 (39.8-47.9)</td>
<td>3.1 (1.8-4.4)</td>
<td></td>
</tr>
<tr>
<td><strong>By NZDep 2006</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1976</td>
<td>54.6 (51.4-57.8)</td>
<td>42.5 (39.2-45.8)</td>
<td>2.9 (2.2-3.6)</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>2083</td>
<td>53.3 (50.4-56.2)</td>
<td>43.5 (40.6-46.4)</td>
<td>3.2 (2.4-4.0)</td>
<td>0.816</td>
</tr>
<tr>
<td>High</td>
<td>1440</td>
<td>54.1 (50.3-58.0)</td>
<td>42.3 (38.9-45.7)</td>
<td>3.6 (2.6-4.6)</td>
<td></td>
</tr>
<tr>
<td><strong>By Geography</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Urban</td>
<td>4003</td>
<td>53.1 (50.4-55.9)</td>
<td>43.6 (40.9-46.3)</td>
<td>3.2 (2.7-3.8)</td>
<td></td>
</tr>
<tr>
<td>Secondary Urban</td>
<td>861</td>
<td>54.7 (50.9-58.4)</td>
<td>42.5 (38.9-46.2)</td>
<td>2.8 (1.7-4.0)</td>
<td>0.157</td>
</tr>
<tr>
<td>Minor Urban</td>
<td>636</td>
<td>58.3 (55.0-61.7)</td>
<td>38.2 (34.7-41.7)</td>
<td>3.5 (2.0-5.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>785</td>
<td>52.1 (47.7-56.5)</td>
<td>43.8 (39.6-48.0)</td>
<td>4.1 (3.2-5.0)</td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>2760</td>
<td>54.6 (51.9-57.4)</td>
<td>42.5 (39.7-45.2)</td>
<td>2.9 (2.2-3.5)</td>
<td></td>
</tr>
<tr>
<td>Maori</td>
<td>1041</td>
<td>51.2 (47.7-54.6)</td>
<td>45.5 (42.1-48.9)</td>
<td>3.4 (2.3-4.4)</td>
<td>0.036</td>
</tr>
<tr>
<td>Pacific</td>
<td>576</td>
<td>58.5 (52.6-64.4)</td>
<td>39.6 (34.2-44.9)</td>
<td>1.9 (0.7-3.1)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>332</td>
<td>54.5 (48.0-60.9)</td>
<td>40.4 (34.9-45.9)</td>
<td>5.1 (2.6-7.6)</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.3. Demographics of Students According to the Life Satisfaction Scale.

<table>
<thead>
<tr>
<th>Life Satisfaction</th>
<th>%</th>
<th>(95% CI)</th>
<th>n</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very happy/satisfied</td>
<td>44.9</td>
<td>(43.2-46.6)</td>
<td>Total 5498</td>
<td></td>
</tr>
<tr>
<td>It's okay</td>
<td>46.8</td>
<td>(45.3-48.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not very happy/satisfied</td>
<td>6.5</td>
<td>(5.9-7.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all happy/satisfied</td>
<td>1.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>%</th>
<th>(95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>2896</td>
<td>51.0</td>
<td>(48.5-53.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Female</td>
<td>2602</td>
<td>38.1</td>
<td>(36.0-40.2)</td>
<td></td>
</tr>
</tbody>
</table>

By Age

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>%</th>
<th>(95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 or younger</td>
<td>1120</td>
<td>49.7</td>
<td>(46.3-53.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>14</td>
<td>1281</td>
<td>47.3</td>
<td>(43.7-50.9)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1189</td>
<td>41.7</td>
<td>(38.5-44.8)</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>1040</td>
<td>42.8</td>
<td>(39.9-45.7)</td>
<td></td>
</tr>
<tr>
<td>17 or older</td>
<td>868</td>
<td>48.8</td>
<td>(46.0-51.7)</td>
<td></td>
</tr>
</tbody>
</table>

By NZDep 2006

<table>
<thead>
<tr>
<th>NZDep Level</th>
<th>n</th>
<th>%</th>
<th>(95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1976</td>
<td>47.1</td>
<td>(44.9-49.3)</td>
<td>0.11</td>
</tr>
<tr>
<td>Medium</td>
<td>2083</td>
<td>43.4</td>
<td>(41.1-45.7)</td>
<td>0.069</td>
</tr>
<tr>
<td>High</td>
<td>1438</td>
<td>44.2</td>
<td>(40.5-47.8)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

By Geography

<table>
<thead>
<tr>
<th>Geography</th>
<th>n</th>
<th>%</th>
<th>(95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Urban</td>
<td>4002</td>
<td>44.1</td>
<td>(42.1-46.0)</td>
<td>1.3-2.3</td>
</tr>
<tr>
<td>Secondary Urban</td>
<td>860</td>
<td>45.2</td>
<td>(41.8-48.6)</td>
<td>1.2-2.5</td>
</tr>
<tr>
<td>Minor Urban</td>
<td>636</td>
<td>50.1</td>
<td>(46.6-53.7)</td>
<td>0.2-1.9</td>
</tr>
</tbody>
</table>

By Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>%</th>
<th>(95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>785</td>
<td>35.6</td>
<td>(32.2-39.1)</td>
<td>1.2-2.9</td>
</tr>
<tr>
<td>European</td>
<td>2759</td>
<td>48.9</td>
<td>(46.9-50.9)</td>
<td>1.6</td>
</tr>
<tr>
<td>Maori</td>
<td>1039</td>
<td>40.5</td>
<td>(37.2-43.7)</td>
<td>1.2-2.1</td>
</tr>
<tr>
<td>Pacific</td>
<td>577</td>
<td>48.7</td>
<td>(43.5-53.9)</td>
<td>0.5-2.6</td>
</tr>
<tr>
<td>Other</td>
<td>332</td>
<td>41.6</td>
<td>(36.2-46.9)</td>
<td>2.7</td>
</tr>
</tbody>
</table>
Table 3.4. Demographics of Students According to the WHO-5 Wellbeing Index.

<table>
<thead>
<tr>
<th>WHO-5 Wellbeing Index</th>
<th>n</th>
<th>Mean (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>5464</td>
<td>3.31 (3.27-3.35)</td>
<td></td>
</tr>
<tr>
<td>By Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2874</td>
<td>3.49 (3.43-3.55)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Female</td>
<td>2590</td>
<td>3.11 (3.05-3.16)</td>
<td></td>
</tr>
<tr>
<td>13 or younger</td>
<td>1118</td>
<td>3.52 (3.45-3.60)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1266</td>
<td>3.36 (3.29-3.43)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1179</td>
<td>3.22 (3.15-3.29)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>16</td>
<td>1035</td>
<td>3.22 (3.14-3.31)</td>
<td></td>
</tr>
<tr>
<td>17 or older</td>
<td>866</td>
<td>3.19 (3.07-3.30)</td>
<td></td>
</tr>
<tr>
<td>By NZDep 2006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1971</td>
<td>3.29 (3.24-3.35)</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>2073</td>
<td>3.28 (3.23-3.33)</td>
<td>0.160</td>
</tr>
<tr>
<td>High</td>
<td>1419</td>
<td>3.37 (3.29-3.46)</td>
<td></td>
</tr>
<tr>
<td>By Geography</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Urban</td>
<td>3974</td>
<td>3.30 (3.24-3.35)</td>
<td></td>
</tr>
<tr>
<td>Secondary Urban</td>
<td>855</td>
<td>3.32 (3.26-3.38)</td>
<td>0.189</td>
</tr>
<tr>
<td>Minor Urban</td>
<td>635</td>
<td>3.38 (3.29-3.47)</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>781</td>
<td>3.13 (3.02-3.23)</td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>2754</td>
<td>3.30 (3.25-3.35)</td>
<td></td>
</tr>
<tr>
<td>Maori</td>
<td>1026</td>
<td>3.34 (3.28-3.41)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pacific</td>
<td>566</td>
<td>3.61 (3.50-3.72)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>332</td>
<td>3.23 (3.08-3.38)</td>
<td></td>
</tr>
</tbody>
</table>
3.3.2. Outcome Variable’s Psychometrics

To understand the relationship between the three scales of general mood, life satisfaction and WHO-5 Wellbeing Index, the correlation between all of them were measured, and the results can be seen in Table 3.5.

Table 3.5. Correlation between Scales of General Mood, Life Satisfaction and WHO-5 Wellbeing Index.

<table>
<thead>
<tr>
<th>Pearson Correlation Coefficients, N = 8689</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Mood</td>
</tr>
<tr>
<td>General Mood</td>
</tr>
<tr>
<td>Life Satisfaction</td>
</tr>
<tr>
<td>WHO-5 Wellbeing Index</td>
</tr>
</tbody>
</table>

Although averaging indicators of subjective wellbeing creates limitations in how the results could be discussed (Morrow, 2010), due to the high correlation between the three scales, the similarities in the demographics of student responses according to each of the scales, and the support of the theories of subjective wellbeing with regard to the connection between the underlying constructs which each of the scales tap into (Diener, 2009; Keyes, 2009), it was decided to merge the three scales to create one overall scale of ‘self-reported wellbeing’. This was considered the final outcome variable in the research and was calculated by taking an average score of the three subscales of general mood, life satisfaction and WHO-5 Wellbeing Index (range 0-5). Table 3.6 presents the results of the psychometrics for the new scale of self-reported wellbeing.

Table 3.6. Psychometrics for the Scale of Self-reported Wellbeing.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number of items</th>
<th>N</th>
<th>Mean</th>
<th>SE</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-reported Wellbeing</td>
<td>3</td>
<td>8855</td>
<td>3.67</td>
<td>0.02</td>
<td>0.78</td>
</tr>
</tbody>
</table>

3.4. Neighbourhood Level Measures

NZDep2006, referred to earlier in this chapter, was used to determine socioeconomic deprivation (Salmond, Crampton, Sutton, & Atkinson, 2007). It is composed of nine variables from the 2006 census which applies to areas (rather than individuals) and reflects the
following dimensions of deprivation: Owned home [people not living in own home]; Support [people aged <85 living in a single parent family]; Employment [people aged 18-64 unemployed]; Qualification [people aged 18-64 without any qualifications]; Living Space [people living in equivalised households below a bedroom occupancy]; Communication [people with no access to a telephone]; Transport [people with no access to a car]; Income [people aged 18-64 receiving a means tested benefit; people living in equivalised households with income below an income threshold]. NZDep2006 Index Decile is a scale of 1-10 and according to its Index score New Zealand population can be divided into equal tenths. Areas with the least deprived score are represented by a decile of 1, and areas with the most deprived score are represented by a decile of 10. In this study the levels of deprivation determined by this scale were categorised as low (1-3), medium (4-7) and high (8-10).

The meshblocks in which students lived were matched to the Deprivation Index, except for those students who were identified with outdated meshblock codes due to the fact that the survey used codes based on 2001 census meshblocks, and 4,591 meshblocks (11%) had been split into smaller areas in 2006, resulting in a change in meshblock number. As a result the recorded meshblock number of 1,157 students matched to an obsolete 2001 meshblock. For these cases a NZDep2006 score and decile was derived employing recommended methodology (Salmond et al. 2007) which calculates a weighted average NZDep2006 score across the defined region, weighted by Usual Residential population counts for each meshblock within it. After calculating a NZDep2006 score, a NZDep2006 decile could be derived.

To enrich the descriptive statistics of the results a new scale of ‘neighbourhood socioeconomic status’ was used which was based on CAU, as opposed to meshblocks in the case of NZDep2006. The neighbourhood socioeconomic status scale was created by aggregating the individual level measures of socioeconomic status to a neighbourhood level.

3.4.1. Neighbourhood Social Capital

In order to measure neighbourhood social capital seven scales were initially created. The names and definitions of the scales, their related question(s), alternative response options and values generated by responses are all presented in Table 3.7. All of the scales except that of membership in community organisations were treated as continuous variables. The responses

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8 Equivalence: Methods used to control for household composition (Salmond et al. 2007).
to all continuous variables were averaged and possible scores ranged between 1 and 4 for
reciprocity ($\alpha = 0.96$), psychological sense of community ($\alpha = 0.87$), residential stability and
safety perception of neighbourhood, and ranged between 0 and 1 for neighbourhood facilities
($\alpha = 0.76$) and neighbourhood physical disorders ($\alpha = 0.63$). The dichotomous variable of
membership in community organisations was created based on whether or not students
reported that they volunteered in any of the following options: a church group; a sports team
or group; a cultural group; an environmental organisation such as Greenpeace; a volunteer
group who help people with disabilities or in hospital; a volunteer group involved with young
people such as Youthline; or another type of group or club.

The responses of students to these questions were standardised by setting their mean to 0 and
standard deviation to 1. All responses were aggregated to the neighbourhood level, according
to the CAU in which students resided. This step was required as it allowed the scales to be
considered as indicators of neighbourhood social capital conceptualised as a contextual level
resource. Aggregating level-1 data (i.e. representing individuals) to level-2 data (i.e. representing
neighbourhoods) is a common procedure in social research with two-level data, and the simplest
way to carry this out is to work with the averages for each level-2 unit (Snijders & Bosker, 1999).

There were high correlations between reciprocity and psychological sense of community ($r =
0.8$, $p < 0.001$), reciprocity and safety perception of neighbourhood ($r = 0.5$, $p < 0.001$), and
psychological sense of community and safety perception of neighbourhood ($r = 0.6$, $p <
0.001$). Hence, it was decided to consider these three measurements as subscales and combine
them all to form a single scale of ‘social cohesion’. The high correlation between the
subscales and the decision to merge them was conceptually acceptable in the sense that in a
neighbourhood with high level of social cohesion one would expect that people would be
more friendly and helpful to each other; and that its adolescents would like and trust their
neighbours, and feel that they belonged to and felt safer in their neighbourhood.
Table 3.7. Names and Definitions of Scales Used to Assess Neighbourhood Social Capital.

<table>
<thead>
<tr>
<th>Scale Name</th>
<th>Items [options]</th>
<th>Responses</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reciprocity</td>
<td>- Do the people in your neighbourhood help each other?</td>
<td>All the time / Sometimes / Not often / Never</td>
<td>1 – 4</td>
</tr>
<tr>
<td></td>
<td>- Are people in your neighbourhood friendly?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological Sense of Community</td>
<td>- Do you trust the people in your neighbourhood?</td>
<td>All the time / Sometimes / Not often / Never</td>
<td>1 – 4</td>
</tr>
<tr>
<td></td>
<td>- Do you feel you really belong in your neighbourhood?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Do you like your neighbourhood?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Do you like the people in your neighbourhood?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Membership in Community Organisations</td>
<td>- Do you belong to a group, club or team which is not run by your school?</td>
<td>Yes / No</td>
<td>0 – 1</td>
</tr>
<tr>
<td>Neighbourhood Facilities</td>
<td>- What things are there to do in the area where you live that you can walk to from home? [A park; a youth centre; the movies; a skateboard ramp; a basketball court or hoop; a sports field; a swimming pool or place to go swimming; a gym; a bike track; a place to play video games; other]</td>
<td>Yes / No</td>
<td>Mean of 11 items</td>
</tr>
<tr>
<td>Neighbourhood Physical Disorders</td>
<td>- What are the bad things about the area where you live? [there are not enough footpaths; footpaths are rough and broken; there is too much traffic; there are steep hills; there is not enough street lighting; there's no-one around; no-one cares about how this place looks; there are not enough bike lanes; there are too many dogs; rubbish and mess]</td>
<td>Yes / No</td>
<td>Mean of 10 items</td>
</tr>
<tr>
<td>Residential Stability</td>
<td>- In the past year, how many times have you moved homes?</td>
<td>I haven’t moved / I have moved once / I have moved 2 times / I have moved 3 or more times</td>
<td>1 – 4</td>
</tr>
<tr>
<td>Safety Perception of Neighbourhood</td>
<td>- Do you feel safe in your neighbourhood?</td>
<td>Yes, all the time / Yes, most of the time / Sometimes / No, mostly not</td>
<td>1 – 4</td>
</tr>
</tbody>
</table>

As it can be seen from Table 3.8, among the newly created neighbourhood level scales, the highest correlation was between neighbourhood social cohesion and residential stability ($r = 0.4$). Neighbourhood social cohesion and neighbourhood physical disorders were inversely correlated ($r = -0.3$). Interestingly, neighbourhood facilities had an inverse correlation with neighbourhood social cohesion and residential stability ($r = -0.2$).
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Table 3.8. Pearson Correlation Coefficients between Neighbourhood Measures.

<table>
<thead>
<tr>
<th>Pearson Correlation Coefficients, N = 262</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighbourhood Social Cohesion</td>
</tr>
<tr>
<td>Neighbourhood Social Cohesion</td>
</tr>
<tr>
<td>Membership in Community Organisations</td>
</tr>
<tr>
<td>Neighbourhood Facilities</td>
</tr>
<tr>
<td>Neighbourhood Physical Disorders</td>
</tr>
<tr>
<td>Residential Stability</td>
</tr>
</tbody>
</table>

3.4.2. Neighbourhood Measures’ Psychometrics

For assessing the scale reliability at the neighbourhood level, the interrater agreement was measured by an intraclass correlation coefficient (ICC). ICC is a basic measure for the degree of dependency in clustered observation. It is therefore defined by a ratio of between-neighbourhood variance to the sum of within and between-neighbourhood variance (Raudenbush & Sampson, 1999). The reliability of an aggregated variable depends, among others, on the number of level-1 units (i.e. students) in a level-2 unit (i.e. neighbourhood). The ICC and reliability of each of the scales were calculated according to the formulae below (Snijders & Bosker, 1999):

Formula for calculating ICC:

$$ICC = \frac{\text{Variance between Neighbourhoods}}{\text{Total Variance (individual, school and neighbourhood variance)}}$$

Because the sampling method used by Youth’07 survey was school based, school variance is included in the denominator of the above formula. This means the level-2 units are a combination of particular schools and neighbourhoods.

Formula for calculating reliability:
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\[
Reliability = \frac{\text{Neighbourhood variance}}{\text{Neighbourhood variance} + (\text{individual variance} / \text{group size})}
\]

For the neighbourhood scale of membership in community organisations which was a dichotomous variable, as explained by Snijder and Bosker (1999) the individual variance in the above formulae was defined as equivalent to the value of \( \pi^2 / 3 \) with the assumption that the level-1 residuals or errors are normally distributed with the same variance. As it can be observed from Table 3.9, which shows the psychometrics of neighbourhood level measures, the higher ICC values are associated with higher reliability. While the degree of variability at the neighbourhood level as a proportion of the total variability is small, the reliabilities are reasonable. For instance although the degree of resemblance between the perception of neighbourhood social cohesion among students belonging to the same neighbourhood is expressed by an ICC value of 7%, the reliability of neighbourhood social cohesion scale is 0.6. The lower reliability of the membership in community organisations and residential stability indicate that these two scales are tapping into neighbourhood constructs where there is less degree of similarity between students of same neighbourhoods.

Table 3.9. Psychometrics for Neighbourhood Measures.

<table>
<thead>
<tr>
<th>Scales</th>
<th>Number of neighbourhoods</th>
<th>Number of items</th>
<th>Mean</th>
<th>SE</th>
<th>ICC (%)</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighbourhood Social Cohesion</td>
<td>262</td>
<td>7</td>
<td>-0.04</td>
<td>0.02</td>
<td>7.11</td>
<td>0.59</td>
</tr>
<tr>
<td>Neighbourhood Facilities</td>
<td>262</td>
<td>11</td>
<td>0.00</td>
<td>0.02</td>
<td>17.58</td>
<td>0.80</td>
</tr>
<tr>
<td>Neighbourhood Physical Disorders</td>
<td>262</td>
<td>10</td>
<td>0.02</td>
<td>0.01</td>
<td>3.81</td>
<td>0.44</td>
</tr>
<tr>
<td>Membership in Community Organisations</td>
<td>262</td>
<td>1</td>
<td>-0.02</td>
<td>0.02</td>
<td>1.34</td>
<td>0.22</td>
</tr>
<tr>
<td>Residential Stability</td>
<td>262</td>
<td>1</td>
<td>-0.02</td>
<td>0.02</td>
<td>1.47</td>
<td>0.24</td>
</tr>
</tbody>
</table>

### 3.5. Analysis

All analyses were conducted using a statistical software package called Statistical Analysis System (SAS Version 9.2 series released in 2008 by the SAS Institute Inc. North Carolina, USA).

Missing values in the data caused by students not present on the day of the survey, or students not responding to all or parts of the survey, were accepted as part of the limitations of the
data, with no attempt made to impute them. In order to deal with missing data within scales, the ‘person mean substitution’ procedure was carried out. According to this procedure a variable with missing data is derived from the non-missing items for the case, by averaging over all items. Person mean substitution has been recommended over other existing procedures that deal with missing data within scales (Hawthorne & Elliott, 2005; P. L. Roth, Switzer, & Switzer, 1999).

Descriptive statistics were generated at the student level by using the survey procedure to account for the clustering and weighting of the dataset. PROC UNIVARIATE procedures were used for assessing the bivariate association between students’ reports of their wellbeing and neighbourhood characteristics. To get a better understanding of the neighbourhood scales, it was decided to explore the association between the five neighbourhood scales and neighbourhood socioeconomic status.

PROC MIXED with the default REML estimation procedure was used for carrying out a multilevel analysis for assessing the relationship between students’ report of their wellbeing and indicators of their neighbourhood social capital. The reason that a multilevel model was used in this study is that data are hierarchically structured, i.e. the students in a neighbourhood are in some respects more alike than students from other neighbourhoods. Multilevel analysis allows identifying variability of the outcome on both individual and neighbourhood levels. Because the outcome in this study (i.e. self-reported wellbeing) is continuous, a linear random intercept model is needed. This model can be described by the following two equations:

$$\begin{align*}
Y_{ij} &= \beta_{0j} + \beta_{1}X_{1ij} + \cdots + \beta_{p}X_{pij} + e_{ij} \\
\beta_{0j} &= \gamma_{00} + \gamma_{01}Z_{1j} + \cdots + \gamma_{0q}Z_{qj} + u_{0j}
\end{align*}$$

Where $Y_{ij}$ is the value on the outcome (i.e. self-reported wellbeing) of $i$th student in the $j$th neighbourhood; $\beta_{0j}$ is the overall constant (intercept) and $\beta_{1}X_{1ij} + \cdots + \beta_{p}X_{pij}$ are the effects of individual level variables on student outcome; $e_{ij}$ is the variation in self-reported wellbeing on individual level.

$\gamma_{00}$ is the average value of students’ self-reported wellbeing across all neighbourhoods and $\gamma_{01}Z_{1j} + \cdots + \gamma_{0q}Z_{qj}$ are the effects of neighbourhood level variables; $u_{0j}$ is the residual variation on the neighbourhood level.
Chapter 3 – Methodology

In this analysis 5567 students (at level 1) nested within 262 neighbourhoods (at level 2) made up the multilevel data structure. Because the Youth’07 dataset was formed based on a random selection of students from randomly selected schools, in the analysis both school and neighbourhood were treated as random effects. This made the structure of the multilevel data used in the analysis as ‘cross-classified random intercept’ model (Fielding & Goldstein, 2006). Multilevel analysis was conducted using the following four models which were sequentially developed:

Model 1: A two-level empty model of individuals (level 1) nested within neighbourhoods (level 2) with no predictor variables in the fixed and the random parts of the model. The empty model provides the basic partition of the variability in the data between individual and neighbourhood level, which is equivalent to ICC. By using the parameters from this model we determine whether there was between-neighbourhood variation in students’ report of their wellbeing estimated in subsequent models.

Model 2: The same as model 1, but with all the individual level predictors (age, sex, ethnicity and socioeconomic status) added in the fixed part of the model in order to explore the proportion of the neighbourhood variation that is attributable to an individual’s characteristics.

Model 3: The same as model 2, but with all the neighbourhood social capital indicators jointly added in the fixed part of the model. This model was used for finding the independent main effects at neighbourhood level, having controlled for individual level predictors.

Model 4: The same as model 3, but with cross-level interactions between individual socioeconomic disadvantage and neighbourhood measures with significant main effects found in the above model.
Chapter 4. Results

This chapter summarises the results obtained from questions of Youth’07 national survey, looking at the wellbeing of adolescents in New Zealand and the indicators of their neighbourhood social capital. Section 4.1 shows the results of students’ self-reported wellbeing by different demographic groups. The results obtained from the bivariate analysis of students’ self-reported wellbeing according to their perception of the indicators of their neighbourhood social capital are outlined in section 4.2. To further understand the neighbourhood level measures, the association between neighbourhood measures and neighbourhood socioeconomic status are explained in section 4.3. Finally, the results of the multilevel analysis are presented in section 4.4 for all of the models included in the analysis, showing the independent association between students’ self-reported wellbeing and each of the indicators of their neighbourhood social capital.

4.1. Students’ Self-reported Wellbeing

Table 4.1 presents the results of the wellbeing scale for the sample of 5508 students who lived in neighbourhoods with more than 10 students. The average wellbeing score of students was 3.67, in a scale from 0 to 5 representing the lowest to the highest level of wellbeing, respectively. Male students reported higher level of wellbeing (3.87) compared to female students (3.44) (p < 0.001). Among students between the ages of 13 or younger to 15 years old, there appears to be a decreasing trend of self-reported wellbeing for older students (p < 0.001). This trend, however, levels off among students older than 15. Results also show that there are no differences between the self-reported wellbeing of students who came from areas with different levels of deprivation (p = 0.410). With regard to the association between sizes of urban areas where students came from and their self-reported wellbeing, students from smaller urban areas report higher levels of wellbeing (p = 0.013). Students from different ethnicities also report different levels of wellbeing, with Pacific students reporting the highest level of wellbeing (3.85), followed by European (3.70), Maori (3.64), Other (3.58) and Asian students (3.51) (p < 0.001).
Table 4.1. Self-reported Wellbeing of Sample Students by Demographics.

<table>
<thead>
<tr>
<th>Students’ Self-reported Wellbeing</th>
<th>n</th>
<th>Mean</th>
<th>SE</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>5508</td>
<td>3.67</td>
<td>0.02</td>
<td>(3.62 – 3.71)</td>
<td></td>
</tr>
<tr>
<td><strong>By Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Male</td>
<td>2905</td>
<td>3.87</td>
<td>0.03</td>
<td>(3.82 – 3.92)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2603</td>
<td>3.44</td>
<td>0.02</td>
<td>(3.39 – 3.48)</td>
<td></td>
</tr>
<tr>
<td><strong>By Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>13 or younger</td>
<td>1121</td>
<td>3.83</td>
<td>0.03</td>
<td>(3.76 – 3.89)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1248</td>
<td>3.70</td>
<td>0.04</td>
<td>(3.62 – 3.78)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1192</td>
<td>3.59</td>
<td>0.03</td>
<td>(3.53 – 3.66)</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>1042</td>
<td>3.58</td>
<td>0.04</td>
<td>(3.51 – 3.66)</td>
<td></td>
</tr>
<tr>
<td>17 or older</td>
<td>869</td>
<td>3.61</td>
<td>0.04</td>
<td>(3.52 – 3.70)</td>
<td></td>
</tr>
<tr>
<td><strong>By Deprivation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.410</td>
</tr>
<tr>
<td>Low</td>
<td>1978</td>
<td>3.69</td>
<td>0.03</td>
<td>(3.64 – 3.74)</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>2086</td>
<td>3.64</td>
<td>0.03</td>
<td>(3.59 – 3.70)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>1443</td>
<td>3.67</td>
<td>0.04</td>
<td>(3.58 – 3.76)</td>
<td></td>
</tr>
<tr>
<td><strong>By Geography</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.013</td>
</tr>
<tr>
<td>Main Urban</td>
<td>4009</td>
<td>3.65</td>
<td>0.02</td>
<td>(3.60 – 3.70)</td>
<td></td>
</tr>
<tr>
<td>Secondary Urban</td>
<td>863</td>
<td>3.68</td>
<td>0.03</td>
<td>(3.62 – 3.74)</td>
<td></td>
</tr>
<tr>
<td>Minor Urban</td>
<td>636</td>
<td>3.77</td>
<td>0.04</td>
<td>(3.69 – 3.84)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Asian</td>
<td>785</td>
<td>3.51</td>
<td>0.05</td>
<td>(3.41 – 3.60)</td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>2763</td>
<td>3.70</td>
<td>0.02</td>
<td>(3.65 – 3.74)</td>
<td></td>
</tr>
<tr>
<td>Maori</td>
<td>1044</td>
<td>3.64</td>
<td>0.03</td>
<td>(3.57 – 3.70)</td>
<td></td>
</tr>
<tr>
<td>Pacific</td>
<td>578</td>
<td>3.85</td>
<td>0.06</td>
<td>(3.74 – 3.97)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>332</td>
<td>3.58</td>
<td>0.08</td>
<td>(3.43 – 3.74)</td>
<td></td>
</tr>
</tbody>
</table>
4.2. Bivariate Associations

Table 4.2 presents the results of the bivariate analysis between students’ self-reported wellbeing and the different indicators of neighbourhood social capital measured according to the aggregated report of students living in them. Results show a significant positive association between students’ self-reported wellbeing and the level of their neighbourhood social cohesion (p < 0.001) and the level of membership in community organisations (p = 0.004). In other words, students who came from neighbourhoods with higher levels of social cohesion or youth membership in community organisations reported higher wellbeing, than students who came from neighbourhoods with lower levels of social cohesion or youth membership in community organisations.

The bivariate analysis did not show any significant association between students’ self-reported wellbeing and the level of their neighbourhood facilities (p = 0.56), neighbourhood physical disorders (p = 0.55), or residential stability (p = 0.11).

Table 4.2. The Association between Different Levels of Neighbourhood Scales and Students' Self-reported Wellbeing.

<table>
<thead>
<tr>
<th>Neighbourhood scales</th>
<th>n</th>
<th>Wellbeing Mean (SE)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighbourhood social cohesion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>87</td>
<td>3.778 (0.023)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Med</td>
<td>89</td>
<td>3.617 (0.029)</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>86</td>
<td>3.583 (0.033)</td>
<td></td>
</tr>
<tr>
<td>Membership in community organisations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>87</td>
<td>3.715 (0.032)</td>
<td></td>
</tr>
<tr>
<td>Med</td>
<td>89</td>
<td>3.682 (0.027)</td>
<td>0.004</td>
</tr>
<tr>
<td>Low</td>
<td>86</td>
<td>3.579 (0.030)</td>
<td></td>
</tr>
<tr>
<td>Neighbourhood physical disorders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>87</td>
<td>3.636 (0.035)</td>
<td></td>
</tr>
<tr>
<td>Med</td>
<td>88</td>
<td>3.683 (0.026)</td>
<td>0.55</td>
</tr>
<tr>
<td>Low</td>
<td>87</td>
<td>3.660 (0.028)</td>
<td></td>
</tr>
<tr>
<td>Neighbourhood facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>86</td>
<td>3.671 (0.032)</td>
<td></td>
</tr>
<tr>
<td>Med</td>
<td>89</td>
<td>3.634 (0.028)</td>
<td>0.56</td>
</tr>
<tr>
<td>Low</td>
<td>87</td>
<td>3.673 (0.031)</td>
<td></td>
</tr>
<tr>
<td>Residential stability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>84</td>
<td>3.700 (0.028)</td>
<td></td>
</tr>
<tr>
<td>Med</td>
<td>92</td>
<td>3.672 (0.027)</td>
<td>0.11</td>
</tr>
<tr>
<td>Low</td>
<td>86</td>
<td>3.607 (0.034)</td>
<td></td>
</tr>
</tbody>
</table>
4.3. Socioeconomic Deprivation and Neighbourhood Measures

Table 4.3 and Figure 4.1 display the association between neighbourhood measures, and neighbourhood socioeconomic deprivation level calculated based on the aggregation of socioeconomic status of students living in those neighbourhoods. The neighbourhood variables have been standardised to have a mean of 0 and standard deviation of 1.

There is an association between neighbourhood social cohesion and neighbourhood socioeconomic deprivation (p < 0.001). Neighbourhoods with higher levels of social cohesion are the ones with lower levels of deprivation. A consistent and sharp drop in the level of neighbourhood social cohesion can be observed for neighbourhoods that are more socioeconomically deprived. A very similar relationship can be seen between neighbourhood residential stability and neighbourhood socioeconomic deprivation (p < 0.001). More socioeconomically deprived neighbourhoods were associated with neighbourhoods in which students had moved their home more often.

The association between neighbourhood socioeconomic deprivation and neighbourhood membership in community organisations is not statistically significant as presented in Table 4.3 (p = 0.21). However, as is shown in Figure 4.1, the highest levels of youth membership in community organisations appear to be in neighbourhoods that have the lowest levels of socioeconomic deprivation. The Figure also shows that as the level of neighbourhood deprivation increases from very low to medium, neighbourhood youth membership in community organisations drops sharply; however, the level of neighbourhood membership seems to stay the same (below the standardised mean), in neighbourhoods with high or very high deprivation levels.

The highest levels of neighbourhood physical disorders are associated with neighbourhoods that are most socioeconomically deprived (p < 0.001). As the level of neighbourhood deprivation decreases from very high to medium the level of neighbourhood physical disorders drops consistently; however, the level of neighbourhood physical disorders appears to stay almost the same (below the standardised mean), in neighbourhoods with low or very low deprivation levels. Looking at the association between neighbourhood facilities and neighbourhood deprivation in Figure 4.1, there seems to be a gradual increasing trend in the level of neighbourhood facilities in more deprived neighbourhoods, but according to the data in Table 4.3 this finding is not statistically significant (p = 0.09).
Chapter 4 – Results

Table 4.3. The Association between Neighbourhood Measures and Neighbourhood Deprivation Level.

<table>
<thead>
<tr>
<th>Neighbourhood scales</th>
<th>Socioeconomic Deprivation level</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very low</td>
<td>Low</td>
</tr>
<tr>
<td>Neighbourhood social cohesion</td>
<td>0.16 (0.03)</td>
<td>0.09 (0.04)</td>
</tr>
<tr>
<td>Membership in community organisations</td>
<td>0.26 (0.04)</td>
<td>0.03 (0.04)</td>
</tr>
<tr>
<td>Neighbourhood physical disorders</td>
<td>0.00 (0.02)</td>
<td>-0.04 (0.02)</td>
</tr>
<tr>
<td>Neighbourhood facilities</td>
<td>-0.07 (0.04)</td>
<td>-0.01 (0.04)</td>
</tr>
<tr>
<td>Residential stability</td>
<td>0.19 (0.03)</td>
<td>0.09 (0.03)</td>
</tr>
</tbody>
</table>

Figure 4.1. The Association between Neighbourhood Measures and Neighbourhood Deprivation Level.
4.4. Multilevel Analysis

Table 4.4 presents the results of the multilevel models according to the order in which they were developed. In all of the models the dependent variable is students’ self-reported wellbeing, with schools and neighbourhoods treated as random effects. The first column (Model 1) shows the empty model with no predictor. The mean of 3.66 is the expected value of self-reported wellbeing for a random student in a randomly drawn school and neighbourhood. This is almost identical to the raw mean of wellbeing presented in Table 4.1. The empty model allows for partitioning the total variance in students’ self-reported wellbeing to variance at the student level, variance that occurs between schools, and finally variance that occurs between neighbourhoods. While, most of the variation is at the student level (i.e. between students from the same school and neighbourhood) (1.041), there was more variation in self-reported wellbeing between neighbourhoods (0.012) than the variation between schools (0.0015). These estimates yield an intraclass correlation coefficient (ICC) of 1.16% at neighbourhood level compared to 0.14% at school level. This means that 0.14% of the variance in students’ self-reported wellbeing was between schools, and 1.16% of the variance was between neighbourhoods.

The results of Model 2 includes all the individual level predictors (age, gender, ethnicity and socioeconomic status) and show that compared to 17 years old or older students, students who were 14 years old ($b^* = 0.09$) or 13 or younger ($b^* = 0.21$) were associated with higher levels of self-reported wellbeing, while those 15 ($b^* = -0.03$) or 16 years old ($b^* = -0.04$) were more similar in terms of their self-reported wellbeing to 17 years old or older students ($p < 0.001$). In terms of the differences related to students’ ethnicity, being Pacific ($b^* = 0.31$) compared with being New Zealand European was associated with higher levels of self-reported wellbeing, while being Asian ($b^* = -0.11$) was associated with lower levels of students’ self-reported wellbeing ($p < 0.001$). Students who were Maori ($b^* = 0.04$) or from other ethnicity ($b^* = -0.05$) reported levels of wellbeing more similar to those who were New Zealand European. Being female ($b^* = -0.42$) compared to male was associated with lower levels of self-reported wellbeing ($p < 0.001$). Being socioeconomically disadvantaged ($b^* = -0.27$) was also associated with lower levels of self-reported wellbeing ($p < 0.001$). Data from Model 2 with regard to gender, age and ethnicity differences in students’ self-reported wellbeing are similar to the relevant bivariate results in Table 4.1.
Comparison of the estimate of neighbourhood variation between Models 1 and 2 indicates that individual level predictors account for almost half of the similarities of students within a neighbourhood, as the estimate of variation between neighbourhoods dropped from 0.0122 to 0.0064. The ICC at neighbourhood level also decreased to 0.65%, but still shows a higher value compared with the ICC at school level (0.16%), meaning that more of the variance in students’ self-reported wellbeing was between neighbourhoods than between schools.

Model 3 of Table 4.4 shows the independent association between each of the indicators of neighbourhood social capital and students’ self-reported wellbeing, adjusted for individual level predictors added in Model 2. Living in neighbourhoods in which students reported higher levels of social cohesion \((b^* = 0.18; \ p < 0.05)\), and membership in community organisations \((b^* = 0.14; \ p < 0.05)\), were significantly related to higher levels of self-reported wellbeing. No significant differences were found between the self-reported wellbeing of students coming from neighbourhoods with different levels of facilities \((p = 0.68)\), physical disorders \((p = 0.64)\) or residential stability \((p = 0.70)\). A comparison of data from Model 3 with the results in Table 4.2 indicates that the association between students’ self-reported wellbeing and the indicators of neighbourhood social capital remained, even after correction for individual level confounders and controlling for other neighbourhood variables.

Model 4 included the cross-level interaction between students’ socioeconomic status and both of the main effects found in Model 3 (neighbourhood social cohesion and membership in community organisations). According to the results of the cross-level interaction (not shown in Table 4.4), among students who came from neighbourhoods with various levels of social cohesion, there were no significant differences in their self-reported wellbeing, depending on their socioeconomic status \((b^* = -0.04; \ p = 0.69)\). However, the interaction between a student’s socioeconomic status and neighbourhood membership in community organisations was apparent in the results \((b^* = 0.20; \ p = 0.06)\), suggesting that the association of membership in community organisations with student wellbeing varied by socioeconomic status of the students.

As it can be observed from Figure 4.2 the interaction suggests that among students who were more socioeconomically disadvantaged, those who came from neighbourhoods with higher levels of membership in community organisations reported higher levels of wellbeing compared to students coming from neighbourhoods with lower levels of membership. In other words, the relationship between membership in community organisations and student
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wellbeing appears to be more important for those with lower socioeconomic status. For students with higher socioeconomic status there appears to be fewer differences between their self-reported wellbeing whether or not they came from neighbourhoods with high or low levels of membership in community organisations.

It was examined post-hoc that when neighbourhood variables were not entered jointly in the model, rather each entered into separate models, the same relationship was observed between each of the indicators of neighbourhood social capital and adolescent wellbeing. The only difference between the results was that the associations of the main effects (neighbourhood social cohesion and membership in community organisations on wellbeing), as well as the interaction between individual socioeconomic status and membership in community organisations, were greater when each neighbourhood variable was entered to a separate model.

Figure 4.2. The Interaction between Students’ Socioeconomic Disadvantage and Neighbourhood Membership in Community Organisations in the Context of Students’ Self-reported Wellbeing.
Table 4.4. Fixed Effects Estimates (Top) and Variance-Covariance Estimates (Bottom) for Models of the Predictors of Students’ Self-reported Wellbeing.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>3.66 (0.02)</td>
<td>3.80 (0.04)</td>
<td>3.79 (0.04)</td>
</tr>
<tr>
<td>Level 1 (student)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (13 or younger vs. 17 or older)</td>
<td>0.21 (0.05)</td>
<td>0.22 (0.05)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Age (14 vs. 17 or older)</td>
<td>0.09 (0.04)</td>
<td>&lt; 0.001</td>
<td>0.09 (0.04)</td>
</tr>
<tr>
<td>Age (15 vs. 17 or older)</td>
<td>-0.03 (0.04)</td>
<td>&lt; 0.001</td>
<td>-0.03 (0.04)</td>
</tr>
<tr>
<td>Age (16 vs. 17 or older)</td>
<td>-0.04 (0.05)</td>
<td>&lt; 0.001</td>
<td>-0.03 (0.05)</td>
</tr>
<tr>
<td>Sex (Female vs. Male)</td>
<td>-0.42 (0.03)</td>
<td>&lt; 0.001</td>
<td>-0.42 (0.03)</td>
</tr>
<tr>
<td>Ethnicity (Asian vs. NZE)</td>
<td>-0.11 (0.04)</td>
<td>&lt; 0.001</td>
<td>-0.10 (0.04)</td>
</tr>
<tr>
<td>Ethnicity (Maori vs. NZE)</td>
<td>0.04 (0.04)</td>
<td>0.06 (0.04)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Ethnicity (Other vs. NZE)</td>
<td>-0.05 (0.06)</td>
<td>&lt; 0.001</td>
<td>-0.04 (0.06)</td>
</tr>
<tr>
<td>Ethnicity (Pacific vs. NZE)</td>
<td>0.31 (0.05)</td>
<td>0.32 (0.05)</td>
<td>0.31 (0.05)</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>-0.27 (0.03)</td>
<td>&lt; 0.001</td>
<td>-0.25 (0.03)</td>
</tr>
<tr>
<td>Level 2 (neighbourhood)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighbourhood Cohesion</td>
<td>0.18 (0.05)</td>
<td>&lt; 0.05</td>
<td></td>
</tr>
<tr>
<td>Membership in Community Organisations</td>
<td>0.14 (0.06)</td>
<td>&lt; 0.05</td>
<td></td>
</tr>
<tr>
<td>Neighbourhood Facilities</td>
<td>0.02 (0.06)</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>Neighbourhood Physical Disorders</td>
<td>0.04 (0.09)</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Residential Stability</td>
<td>-0.02 (0.06)</td>
<td>0.70</td>
<td></td>
</tr>
</tbody>
</table>

| Random Parameters | | | |
| Level 2 | | | |
| Intercept | | | |
| School | 0.0015 | 0.0016 | 0.0008 |
| Neighbourhood | 0.0122 | 0.0064 | 0.0040 |
| Level 1 | | | |
| Intercept | 1.0406 | 0.9695 | 0.9698 |

*Note.* Standard errors are in parentheses. Intraclass Correlation Coefficient (ICC) percentage at school level for Models 1, 2 and 3 are 0.14, 0.16 and 0.08, respectively. ICC percentage at neighbourhood level for Models 1, 2 and 3 are 1.16, 0.65 and 0.41, respectively.
Chapter 5. Discussion

The purpose of this research was to examine the association between adolescent self-reported wellbeing and their neighbourhood social capital as a contextual level resource, using data from a nationally representative sample of secondary school students in New Zealand. Data was aggregated to neighbourhood level and a cross-classified multilevel analysis was used with both schools and neighbourhoods treated as random effects. This methodology was used to determine the association between adolescent self-reported wellbeing and the independent effect of each of the indicators of neighbourhood social capital. Results showed a significant association between adolescent self-reported wellbeing and their neighbourhood cognitive and structural social capital. Further exploration of the interaction between neighbourhood main effects and students’ socioeconomic status revealed that youth membership in community organisations as a neighbourhood characteristic act as a buffer against the negative effects of socioeconomic disadvantage.

This chapter contains seven main sections. In the first two sections (5.1 and 5.2) the main findings of this study are discussed in light of the results of selected similar studies. The third section (5.3) contains a discussion on the subject of neighbourhood variation. Section 5.4 focusses on possible implications of the findings in this study. Section 5.5 discusses the study’s limitations, followed by section 5.6 emphasising some of the strengths of this study. The final section (5.7) contains a brief conclusion of this research.

5.1. Neighbourhood Social Capital and Wellbeing

This study explored the independent association between adolescent self-reported wellbeing and five indicators of neighbourhood social capital. This section starts with a discussion of two indicators of neighbourhood social capital that were shown to have a significant association with adolescent self-reported wellbeing (sections 5.1.1 and 5.1.2). The findings with regard to the other three indicators of social capital that did not show any association with adolescent self-reported wellbeing will be discussed subsequently (sections 5.1.3 to 5.1.5).

It needs to be mentioned that although there is some conceptual overlap with the very few existing studies that have looked at the association between adolescent wellbeing and aspects
of neighbourhood social capital, there are several obstacles in comparing the findings of this study with them. Some of these important obstacles are the lack of identical study designs, methodological approaches, measures of neighbourhood social capital, measures of outcome variables and confounding variables that have been controlled for in these studies. In the absence of studies that can be closely compared to this research, the approach throughout this chapter is to discuss the findings here through general comparisons with selected aspects of some of the similar studies.

5.1.1. Neighbourhood Social Cohesion

The first major finding of this study was that living in neighbourhoods where students reported higher levels of social cohesion was significantly associated with higher levels of students’ self-reported wellbeing. The measurement of neighbourhood social cohesion, as defined in this study, is analogous to the cognitive aspect of social capital as a contextual level resource. It is an indication of the stock of social capital based on the values and perceptions of people in a neighbourhood, referring to concepts such as levels of reciprocity, mutual trust, sense of community, and safety among the inhabitants of a neighbourhood.

It is important to note that the finding here points out to the fact that the association between social cohesion in a neighbourhood with adolescent wellbeing persists even after adjusting for individual confounders, and other neighbourhood variables explored in the study. This finding suggests, therefore, that regardless of an individual’s ethnicity, age, gender, socioeconomic status and the independent effect of other indicators of neighbourhood social capital, adolescents who lived in neighbourhoods where the general perception of the level of mutual trust, reciprocity, sense of community and safety was higher, reported a higher level of wellbeing, compared with adolescents who came from neighbourhoods where the perception of social cohesion was lower. This finding supports the hypothesis of the study, and is evidence that the larger context in which adolescents live, particularly the psychosocial characteristic of their neighbourhood, can make a difference to their wellbeing.

A few studies to date have employed appropriate methodology (i.e. aggregating data and using multilevel analysis) to investigate the association between cognitive aspects of neighbourhood social capital and individual wellbeing (De Silva et al., 2005; Kim et al., 2008; Sellström & Bremberg, 2006). Among them, two studies with a fair level of similarities to this research (i.e. looking at adolescent positive health outcome and conceptualising social
capital at a community level hence aggregating data at that level) allowing them to be compared with the abovementioned findings, are those of Drukker et al. (2003) and De Clercq et al. (2011).

Drukker et al. (2003), as described earlier, have found that adolescents living in neighbourhoods with a high stock of social capital had better general health, mental health, behaviour, or life satisfaction. Such findings agree with the results of this research. However, further analysis in that study showed that the statistical significance of most of these associations, including all those with regard to social cohesion and trust, disappeared after all the neighbourhood variables were controlled for in the multilevel model. This is different from the results found in this research. Considering that the scales of ‘social cohesion and trust’ in Drukker et al.’s study, and ‘social cohesion’ in this research, were fairly similar in their constructs, their different associations with adolescent health outcomes could be attributed to the range of other neighbourhood level measures included in these studies. Another underlying factor contributing to the difference in results could be that, unlike this research, Drukker et al.’s study was adult-centred in its approach of measuring social capital. Despite the lack of association of adolescent wellbeing and ‘social cohesion and trust’ after controlling for all neighbourhood variables, Drukker et al.’s study still showed that ‘informal social control’ was associated with adolescent mental health and behaviour. Although ‘informal social control’ is a different scale than social cohesion, it still could be considered as a scale tapping into similar aspects of cognitive social capital.

In the more recent study of De Clercq et al. (2011), as described earlier, one of the scales of neighbourhood social capital, which consisted of many items that tapped into the cognitive aspect of the concept, was found to be significantly associated with adolescent perception of wellbeing. This was the case after controlling for both individual level characteristics (i.e. age, gender and family affluence) and neighbourhood characteristics (i.e. neighbourhood socioeconomic status, and a scale including indicators of structural social capital) in the multilevel analysis. That study, however, was limited by not having used a cross-classified multilevel model. That is to say, although the dataset in that study was formed based on a random selection of students from randomly selected schools, in their analysis only neighbourhoods were treated as a random effect.

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9 Section 2.7.
Regardless of differences in the results, both of the abovementioned studies provide evidence that aspects of cognitive social capital in a neighbourhood can be important for adolescent wellbeing.

5.1.2. Neighbourhood Membership in Community Organisations

The second major finding in this study was that living in neighbourhoods, where students reported higher levels of membership in community organisations was significantly related to higher levels of students’ self-reported wellbeing. The measurement of membership in community organisations is analogous to the theoretical construct of *structural* social capital as a contextual level resource. It is an indication of the stock of social capital in a context measured indirectly by the behaviours and activities of individuals, in this case, the extent to which in a neighbourhood adolescents were members of various groups or clubs. These clubs or groups include those of a cultural, sporting, religious or altruistic nature. These measures could be not only an indication of the level of adolescents’ participation in the affairs of their community, but could reasonably be considered as the level of adults’ volunteering and membership in community organisations as well. This is the case because such activities are often run by adults of that community and therefore their participation is a requirement.

Similar to the above finding, this significant association represents an independent relationship between a neighbourhood characteristic and the wellbeing of its adolescent residents, having controlled for individual level confounders and other neighbourhood variables. This finding therefore suggests that regardless of age, gender, ethnicity, socioeconomic status, and the independent effect of other neighbourhood characteristics, adolescents who came from neighbourhoods with higher levels of youth membership in community organisations, reported higher levels of wellbeing, compared with adolescents who came from neighbourhoods with lower levels of youth membership in community organisations. This is in agreement with the hypothesis of the study, and is yet another evidence that factors outside of an individual related to the social environment of the place in which adolescents live, can make a difference to their wellbeing.

In the current literature there are only a small number of studies that have employed appropriate methodology to investigate the relationship between organisational membership at an area level and positive health outcome at individual level (De Silva et al., 2005; Kim et
al., 2008; Sellström & Bremberg, 2006). Two examples of such studies supporting the findings here are described below.

Weitzman and Kawachi (2000), as described earlier, showed that structural dimensions of social capital as a contextual resource in college campuses significantly protected against individual risks of binge drinking among young adults. Although that study controlled for a thorough list of confounders, including individual volunteering, it was limited by how it controlled for the students’ socioeconomic status. It only used a measure of parents’ educational attainment as the proxy for socioeconomic status. This could have contributed to the fact that the structural dimension of social capital at college level was found to be so strongly associated with youth binge drinking.

Another example is the study of De Clercq et al. (2011), referred to earlier. The objective scale of social capital in this study included items that tapped into the structural aspect of the concept, such as voluntary associations. This scale was found to be linearly and positively associated with the wellbeing of adolescent residents of local communities. Two points, however, need to be taken into account with regard to the interpretation of the results of this scale. Firstly, as mentioned earlier, due to limitation in the matching of objective and subjective data the interpretation of the results of the objective measures in that study cannot be as straightforward. Secondly, the scale included an item which was not directly related to the structural aspect of social capital – property crimes.

Overall, although the abovementioned studies are not identical to this research in terms of their scales, context or outcome of interest, they both point to the importance of the structural aspect of social capital as a contextual resource and its association with individual health related outcomes.

### 5.1.3. Neighbourhood Facilities

This study found no significant association between adolescent self-reported wellbeing and neighbourhood facilities as a contextual level resource. More specifically, when the demographics as well as the independent effect of all other neighbourhood characteristics included in the study were controlled for, there was no difference between the self-report of adolescents’ wellbeing whether or not they came from neighbourhoods with high or low levels of facilities.
Chapter 5 – Discussion

Although this finding was not expected, and is inconsistent with the results of many previous researchers (S. C. Duncan et al., 2004; Wouter Poortinga et al., 2007; Renalds et al., 2010), there have been studies which, similarly, have not shown significant association between neighbourhood facilities and individual health outcomes.

For instance, Araya et al. (2006) carried out an exploratory analysis to examine the association between adult mental health and both neighbourhood social and built environments in South Wales. Numerous neighbourhood variables in that study were measured based on questions about facilities and disorders within a neighbourhood, as well as the level of social cohesion, trust and informal social control at neighbourhood level. When the models were adjusted for individual characteristics, only two of the indicators (social cohesion and trust) remained significantly associated with adult mental health, with no sign of significant association between the neighbourhood facilities and physical disorders and the outcome variable.

Further, Cummins et al. (2005) in a multilevel study of close to 14,000 individuals aged 16 or over, having controlled for age, sex, social class and economic activity, found that public recreation facilities as a neighbourhood measure was not significantly associated with self-rated health. Public recreational facilities in that study were constructed by variables such as the number of swimming pools per 100,000 population, or the number of leisure attendances per 1,000 population.

One important factor that must be taken into account for interpreting such findings is the larger context of country in which the study was carried out. New Zealand, compared with non-egalitarian countries, has preserved a much greater degree of robust support for public infrastructure, such as primary health care services and public education (Kawachi, 2006). This characteristic is visible in other egalitarian countries as well, for example Sweden. What this fact indicates is that facilities are more equally distributed in different neighbourhoods of egalitarian countries. In other words, there are fewer variations in physical characteristics of neighbourhoods within such countries compared with neighbourhoods in countries where there are higher levels of inequality.

This is in agreement with previous research which has found that residents in approximately three quarters of neighbourhoods in New Zealand lived within a 2-minute drive to a park and 30-minute drive to a beach (Witten, Hiscock, Pearce, & Blakely, 2008). Also, further research has shown that although individuals in low socioeconomic status neighbourhoods of
United States lack services such as supermarkets (Morland, Wing, Diez Roux, & Poole, 2002; Zenk et al., 2005), in New Zealand travel distances to supermarkets were shorter in more deprived areas (Pearce, Blakely, Witten, & Bartie, 2007; Pearce, Witten, Hiscock, & Blakely, 2007); and in Brisbane, Australia, there were minimal or no socioeconomic differences in food shopping infrastructure (Winkler, Turrell, & Patterson, 2006).

In fact the descriptive statistics presented in section 4.3 could also be considered as a sign of the same reality manifested in the dataset on which this research is based. The descriptive data shows that not only students from more deprived neighbourhoods have not rated their neighbourhood facilities as less than students from less deprived neighbourhoods, there is an indication of an increasing trend in the level of neighbourhood facilities in more deprived neighbourhoods, compared with neighbourhoods that are less deprived.

Despite the points mentioned above which can shed important light in explaining this finding, it needs to be taken into consideration that residents’ self-report of their neighbourhood facilities could display less variation than do objective assessments (Macintyre & Ellaway, 2003). Such findings, therefore, should not lead researchers to conclude falsely that neighbourhood facilities do not matter in terms of explaining between-neighbourhood variation in adolescent wellbeing. The lack of findings here needs to be interpreted in light of the results of future studies that will employ more objective assessment of neighbourhood facilities.

5.1.4. Neighbourhood Physical Disorders

This study did not show an inverse and significant association between neighbourhood physical disorders as a contextual level characteristic and adolescent self-reported wellbeing. That is to say, after adjusting for demographics, and the effect of all the other neighbourhood characteristics, no statistically significant difference was observed between the responses of adolescents’ self-reported wellbeing whether or not they came from neighbourhoods with high or low levels of physical disorders.

Although the results here are not in agreement with the hypothesis and are inconsistent with some prior research (Aneshensel & Sucoff, 1996; Cummins et al., 2005; Wouter Poortinga et al., 2007), relevant literature includes studies leading to similar outcomes, an example of which is described below.
Molnar et al. (2004) carried out a multilevel longitudinal study of families and communities, by analysing data from the Project on Human Development in Chicago Neighbourhoods, to measure the association between neighbourhood characteristics and indicators of adolescents’ physical wellbeing. In that study the individual level data were obtained from 1,378 youth aged 11 to 16 years old, and caregivers living in 80 neighbourhood clusters. Neighbourhood level data were collected from 8,782 community residents and videotapes of 15,141 block faces. That study measured neighbourhood physical disorders by the following ten items which were taken either from direct observations or video tapes: graffiti (tagging, gang or political), graffiti painted over, presence/absence of cigarettes or cigars, empty beer bottles, condoms, needles and syringes. Although the associations found in the study indicated the inverse association between neighbourhood physical disorders and adolescent wellbeing, it did not reach a statistical significance.

It needs to be noted that the above study found no significant association even though it was carried out in the United States, which is not an egalitarian country. It was also based on a very strong set of indicators of neighbourhood physical disorders, as they were objectively measured and tapped into aspects of the neighbourhood’s ambient hazards and the presence of threatening physical conditions, such as abandoned buildings and broken windows in a neighbourhood.

In light of the results of Molnar et al.’s study, the underlying reasons for the lack of any association between neighbourhood physical disorders and adolescent wellbeing in this research are difficult to link to factors such as similarities between neighbourhoods in egalitarian countries, or the absence of robust scales in measuring neighbourhood physical disorders. Future studies are needed to shed light on the reason for such a lack of findings.

5.1.5. Neighbourhood Residential Stability

The present study found that after controlling for demographics and other neighbourhood level characteristics, there was no significant association between residential stability in a neighbourhood and the self-reported wellbeing of its adolescents. Although unexpected, according to the results of many previous research (Aneshensel & Sucoff, 1996; Beyers et al., 2003; Robert J. Sampson & Groves, 1989), such a finding is not isolated in health literature.

Adolescents’ physical activity is referred to as an indicator of adolescents’ physical wellbeing.
For instance, Drukker et al. (2003) in the same study as the one referred to above, found similar results. That study constructed a robust scale called ‘residential instability’ which was based on objective neighbourhood data on variables such as mobility within neighbourhood, total mobility, departure, and settlement. According to the study’s results, no statistically significant associations were found between neighbourhood residential instability and any of the adolescents’ health related quality of life measures.

Another multilevel study based in USA which looked at the association between residential instability and adolescents’ externalising behaviours, found that residing in a neighbourhood with more residential instability was associated with worse behaviour problems only among adolescents whose parents reported relatively low monitoring, but not among adolescents whose parents reported relatively high monitoring (Beyers et al., 2003). In that study, residential instability was estimated by summing standardised scores for the proportion of renter-occupied versus owner-occupied homes and the proportion of householders who had lived in the neighbourhood for less than 5 years.

Clearly, it is not possible to compare precisely the results of previous studies with current findings, but in light of previous research the following points need to be considered in interpreting the non-significant associations found in this study. As mentioned in the Methodology chapter the variable of student socioeconomic status included, as one of its five constructing items, the only question that formed the scale of neighbourhood residential stability. It is therefore possible that adjusting for student socioeconomic status in the multilevel analysis could have over-controlled for the main effects of this particular neighbourhood characteristic. Also, it is likely that residential stability could have been important only for adolescents with particular individual or family characteristics which were not explored in this research. These characteristics could be similar to the one explored in Beyers et al.’s study. The lack of findings here, therefore, needs to be interpreted in light of the results of future studies that will have a more thorough assessment of neighbourhood residential stability and its relation to adolescent wellbeing.

5.2. Neighbourhood Social Capital and Social Gradient in Adolescent Health

This study investigated whether neighbourhood social capital can level the gradient in adolescent wellbeing. The methodology employed in this study allowed for the examination
of the interaction between the indicators of neighbourhood social capital and socioeconomic status. Due to the fact that only the scales of neighbourhood social cohesion and membership in community organisations were found to have statistically significant associations with adolescent wellbeing, they were chosen as the indicators of neighbourhood social capital entered in the interaction model. The exploration of this interaction sheds light on the relationship between adolescent wellbeing and neighbourhood social capital depending on the socioeconomic status of students.

The results of this study showed no evidence of an interaction effect between individual socioeconomic status and the association of neighbourhood social cohesion and adolescent wellbeing. Neighbourhood social cohesion was associated with adolescent self-reported wellbeing in a similar way whether or not the adolescent came from a low or high socioeconomic background. There was, however, a clear interaction effect between the socioeconomic status of adolescents and the association of adolescent wellbeing and the level of membership in community organisations in their neighbourhood. The relationship between membership in community organisations and student self-reported wellbeing appears to be more important for adolescents with lower socioeconomic status, since the social gradient in self-reported wellbeing was reduced in neighbourhoods with higher levels of structural social capital.

A similar interaction was found in the recent study of De Clercq et al. (2011) which explored the association between social gradient in adolescents’ perceived wellbeing and neighbourhood social capital in Flemish communities. It needs to be noted though that the measurement of neighbourhood social capital in that study was not identical to scales and dimensions used in this research. The results of that study showed that in neighbourhoods with high levels of social capital, the social gradient in adolescents’ perceived wellbeing was flattened. This could be considered in support of the findings here, showing the protective role of social capital as a contextual resource.

The fact that in this research it is the association between student wellbeing and the neighbourhood membership in community organisations and not the neighbourhood social cohesion, which appears to have an interaction with individual level socioeconomic status, could be an indication of the difference between the effects of bonding and bridging aspects of social capital on individual wellbeing. Bonding social capital refers to resources that are based on strong ties with people in the same community, and can be accessed within social
groups whose members are alike in terms of their social identity. Bridging social capital refers to resources that are based on formal and informal links with other communities, and can be accessed through connections that cross boundaries of social identity.

Neighbourhood membership in community organisations compared to neighbourhood social cohesion is conceptually closer and more likely to tap into the bridging aspect of social capital. This is the case, due to the fact that the belonging of adolescents to groups, clubs or teams not run by their school is likely to imply adolescents’ association with individuals of different backgrounds, tapping into the bridging social capital.

Previous studies have referred to the distinct roles of bonding and bridging aspects of social capital with relation to health, suggesting that within disadvantaged communities the key to improving health lie in residents’ ability to access resources outside their immediate social milieu (i.e. access to bridging social capital) (Kawachi et al., 2008). Such studies could be considered as supportive to the findings of this research. This is the case because the results here could be an indication that the wellbeing of adolescents from lower levels of socioeconomic status would benefit more from the advantages of access to potential resources from outside their immediate social milieu.

5.3. Neighbourhood Variation

The degree of resemblance between the wellbeing of students belonging to the same neighbourhood unit can be expressed by the intraclass correlation coefficient (ICC). ICC in this study was calculated by taking a ratio of the variance in students’ self-reported wellbeing between neighbourhoods over the sum of the total variance at individual, school and neighbourhood level. A multilevel modelling approach allowed for the partitioning of variation in students’ wellbeing outcome arising at different levels (i.e. individual, school and neighbourhood).

After adjusting for individual level characteristics the ICC at neighbourhood level was found to be 1%. In other words, most of the variation in adolescent self-reported wellbeing was found to be within the neighbourhood at the individual level, with 1% of the variation occurring between neighbourhoods, and even less between schools.

The finding that neighbourhood variation is more than the variation between schools is in line with the results of many previous studies (Bowen & Bowen, 1999; Card & Rothstein, 2007;
Eamon, 2005; Garner & Raudenbush, 1991; Raudenbush, 1993). For instance, multilevel studies of adolescents in Scotland found more variation in educational attainment at the neighbourhood compared to school level (Garner & Raudenbush, 1991).

Previous research has also suggested that in societies with higher degrees of egalitarianism multilevel studies report very small ICCs for health outcomes (1 to 2%), compared to countries which are not egalitarian, where studies have revealed higher ICCs (5 to 10%), implying greater neighbourhood variance in health (Islam et al., 2006). Such studies have attributed the largeness or smallness of ICCs with the degree of safety nets that exist in a country. Considering that the social system in New Zealand is similar to that of other egalitarian countries, it is not a surprise that the ICC in this study was also found to be in the lower range of the scale.

Interpreting such findings is likely to lead to the categorisation of neighbourhoods as a context that play a negligible role in explaining health variations in egalitarian countries, even if some of their aspects, such as physical or psychosocial characteristics, are found to be significantly associated with health. What needs to be taken into consideration, however, is that while these within-neighbourhood correlations for wellbeing outcomes of adolescents may appear modest in egalitarian countries, they equate to large standardised mean differences between neighbourhoods and are therefore important from a population health perspective (G. J. Duncan & Raudenbush, 1999). Therefore, one needs to practise caution in interpreting small ICCs, as effect sizes commonly viewed as large translate into small proportions of variance in individual outcome explained by neighbourhood characteristics (G. J. Duncan & Raudenbush, 2001; Raudenbush & Sampson, 1999).

Another point that needs to be taken into account for interpreting the amount of neighbourhood variance found in this study is related to factors that could have led to the underestimation of neighbourhood variance. One of those factors is that the sample in this study represents only the responses of adolescents who participate in school, and does not represent the responses of adolescents who had dropped out of mainstream schools in New Zealand. Another factor is that students from rural areas were less represented in the final sample size. Each of these factors could contribute to the underestimation of overall neighbourhood effects in this study. For instance, it is not difficult to hypothesise how the neighbourhood effect could be more significant as to the wellbeing of adolescents who have dropped out of school, since they are more likely to spend significantly more time in their
neighbourhood. Similarly, adolescents in more rural areas are more likely to be affected by their neighbourhood characteristics due to differences that might exist in the nature of social life of residents between urban and rural areas, particularly with relation to the role of social capital in their neighbourhoods.

Limitations with regard to the neighbourhood measurements used in the study also could have had its own impact on the level of variations found. For instance, the effects of the previous neighbourhoods or the previous physical or psychosocial characteristics of the same neighbourhood where a student was residing before the time of the survey were not measured in this study. This could have resulted in a reduction of the overall amount of neighbourhood variation with regard to the wellbeing of students.

5.4. Implications of Main Findings

The implications of some of the findings in this study could be important for a wide range of audience, including researchers, communities and policy makers.

5.4.1. Neighbourhood Context and Adolescent Wellbeing

The findings of this study add to the accumulating evidence from around the world that shared social environment, and characteristics of places exerts significance on the wellbeing of people living there, independent of risk or protective factors within each individual. This is in contrast to much of contemporary epidemiological practice, which tends to focus exclusively on the characteristics of individuals, disregarding the importance of risk and protective factors of the context in which one lives (Macintyre et al., 1993).

The findings here shed light more specifically on the importance of the context of neighbourhoods in New Zealand, with regard to its association with adolescents’ subjective wellbeing. The contextual characteristic of neighbourhood that this study focussed on was that of social capital which has generated considerable attention recently with regard to its importance for population health. The results of the significant findings in this research suggest that in New Zealand the wellbeing of adolescents would be different depending on the level of social capital of the neighbourhood in which they live. In neighbourhoods with either higher levels of general perception of the extent of mutual trust, reciprocity, sense of community and safety, or higher levels of youth membership in community organisations,
adolescents report higher levels of wellbeing. This is the case regardless of adolescents’ ethnicity, age, gender or socioeconomic status.

The interaction effect found in this study can be viewed as an indication of an additional aspect of the protective effect of a neighbourhood characteristic on adolescent wellbeing. In this case, the neighbourhood characteristic of youth membership in community organisations resembled the characteristics of a buffer against the strong negative forces of socioeconomic disadvantage, as it showed to be more important for adolescents with lower socioeconomic status. In other words, it can be seen as a contextual factor helping adolescents to be more resilient. Such a finding is consistent with research that aims to direct attentions to the investigation of protective factors outside of individuals; factors contributing to the ability of people, particularly adolescents, in being able to bounce back when faced with adversity (Ungar, 2011).

The presence of such associations as those found in this study’s significant results suggest that there is something about our collectiveness, in this case our collectiveness in the context of our residential neighbourhood, which can be important for the wellbeing of adolescents living in those neighbourhoods.

Implications of this understanding could manifest itself at the levels of individuals, families and communities, policy making, and the direction of academic research.

5.4.2. Individuals, Families and Communities

Statistics from Youth’07 suggest that certain aspects of community life are currently not an apparent feature of the lives of adolescents in New Zealand. For instance only 14% of all students who participated in Youth’07 survey reported that they helped others in their community in the last year, and only half of them reported that they had an adult outside of their family they would feel okay talking to about a serious problem (Adolescent Health Research Group, 2008). The absence of such features of community life among a very large portion of adolescents in New Zealand, could be a sign of the inability of society, and particularly its adults, to create a pattern of all-inclusive community life that incorporates adolescents in its heart, so enabling them to benefit from and contribute to a social context that would be conducive to their development.
The results of this study support the idea that social capital in a neighbourhood could be considered an asset for the wellbeing of the inhabitants of the neighbourhood, particularly its adolescents. Any effort to strengthen the level of social cohesion, and increase the level of membership in community organisations in a neighbourhood requires the active role of individuals, families and various communities within the neighbourhood. For instance, it is difficult to visualise how social capital could be built and strengthened within a neighbourhood without the concerted efforts of individuals who are eager to improve conditions in their surroundings, families who encourage their young children to contribute to the betterment of their neighbourhood, and communities who support collective actions of neighbours.

In New Zealand, which has a population with a vast degree of diversity, any such measure needs to ensure the degree of openness and flexibility required for accommodating people from different cultures and backgrounds residing in a neighbourhood. Also, the role of maraes as potential community focal point could be a unique advantage in efforts to increase neighbourhood social capital. All such possibilities could be the focus of future studies that intend to investigate ways of investing in neighbourhood social capital. In doing so, future researchers could also benefit from already made toolkit-like resources that have been carefully prepared and incorporate the principle of community organising (Sander & Lowney, 2005).

5.4.3. Policy Implications

As important as the roles of individuals, families and communities are, efforts must not be stopped at that level. In fact, efforts related to investing in neighbourhood social capital at grass root level should be considered only as a complement to broader structural interventions that have resulted from government policies, not as a replacement for them (Szreter & Woolcock, 2004). Having such an approach would protect a community from being labelled as deficient in certain assets, and blamed for its problems (Muntaner, Lynch, & Smith, 2001).

As explained by Kawachi (2010), in order to ensure the sustainability of results, any social capital investment strategy would require a financial basis to which the government and
private sector\textsuperscript{11} is fully committed. The broader structural interventions mentioned above need to aim at building the capacity of individuals and communities to organise. In doing so, it needs to adopt an approach which goes beyond sole reliance on the voluntary efforts of individuals in a community, in order to ensure the availability of necessary financial resources. Such resources could be used for strengthening grass root community initiatives, supporting local organisations that help with social concerns of people in the neighbourhood, enabling the meaningful interaction of individuals involved in community building activities with civic groups and organisations, which would lead to bridging and linking social capital.

In addition to the fact that investing in adolescent wellbeing and factors that contribute to it has direct influence on the economic stability of the country in the years to come, another compelling economic rationale for governments to actively invest in social capital has to do with the nature of the functioning of social capital as a collective resource that produces benefits which reach beyond the immediate members of the networks (Kawachi, 2010). What could be of particular interest for the policy makers is that the benefits of social capital may even become more visible during a community crisis such as earthquake or other natural disasters, for which New Zealand can be considered vulnerable.

Much of the effort of policy makers at international or national level is also directed towards the elimination or reduction of poverty, especially at a time when no country has been predicted to stay immune of the rising economic crisis in the world (International Monetary Fund, 2012). Considering that, on the one hand there is a strong association between socioeconomic disadvantage and a wide range of negative health outcomes among all age groups, including adolescents (Allison et al., 1999; Brooks-Gunn et al., 1993; Kalff et al., 2001; Reijneveld & Schene, 1998; Sloggett & Joshi, 1994), and on the other hand, the task of the elimination of poverty is immense in magnitude, it is of great importance for policy makers who are interested in improving adolescent wellbeing, to invest in factors that enable younger generations to become more resilient against the strong negative forces of socioeconomic disadvantage.

It is in this light that the final finding of the study gains more importance; the finding that membership in community organisations at neighbourhood level could act as a protective factor for the wellbeing of more socioeconomically disadvantaged adolescents. It is the most

\textsuperscript{11} Communities tend to under-invest in the production of such collective assets, when the financial basis is left in the hands of private initiatives (Kawachi, 2010).
vulnerable adolescents who will benefit most from interventions that increase the level of youth membership and participation in community affairs of a neighbourhood.

Therefore, policies that are intended to ensure the flow of more resources to areas of higher deprivation, aimed at increasing the participation of adolescents in those areas in organisations outside of their school, could have beneficial outcomes for adolescents in a population level. The details of such interventions could be shaped through the results of future research that looks deeper into what kinds of membership or participation will make a greater influence in this regard, and how the level of membership or participation could be increased at the neighbourhood level.

Overall, it is clear that findings here support policies that go beyond focussing on individuals, and address the improvement of the larger environment or places in which adolescents live. With regard to New Zealand specific policies, results here support the implementation of policies that are in line with the Youth Development Strategy Aotearoa, particularly its points related to the characteristics of neighbourhood social environment conducive to positive youth development (Ministry of Youth Affairs, 2002). This strategy states the following factors as the important characteristics of neighbourhoods that aid the positive development of adolescents: “a safe, crime-free environment; housing in good repair with no overcrowding; stable, long-term residents; adequate educational and recreational facilities; neighbours and local people who watch out for young people and provide supervision, informal limit setting and support (this can include local businesses and services such as police, church and youth organisations); local people who provide work opportunities after school and recreational opportunities”. According to the findings of this research, it is suggested that more emphasis on the effective implementation of such policies, particularly those that go beyond improving neighbourhood built environment and address the improvement of the social environment of neighbourhoods, will lead to a better wellbeing outcome for adolescents in New Zealand.

5.4.4. Social Capital and Adolescents

A specific contribution of this study to literature, particularly for researchers interested in the relationship between social capital and adolescent outcome, is that findings here suggest that adolescent membership in community organisations and their perception of neighbourhood social cohesion should not be neglected in social capital research. Social capital, especially
according to its communitarian definition, is conceptualised as contextual level resources available to members of a community. When social capital is measured by enquiring from adults about only *their* level of membership in community organisations and perception of social trust or cohesion within a neighbourhood, this measurement would fail to capture the entirety of the concept as a social resource for *all* individuals living in a neighbourhood. This is not to deny that social capital, when measured by data from adults only, can have relevance to adolescent outcome. But, due to having an adult-centred approach in social capital research, currently the main pathways and mechanisms described in literature explaining the relationship between the communitarian definition of social capital and health outcomes are heavily conceptualised on the role of adults in a community.\(^{12}\)

For instance, the process of ‘collective socialization’ as one of the pathways between social capital and individual wellbeing refers to the role of adults in a community in shaping adolescent development, behaviour and their general health outcomes. ‘Informal social control’ as another pathway, refers to the capacity of a group to regulate the behaviour of its members according to collectively desired goals, mainly discussed in the context of adults regulating deviant behaviours among adolescents or youth. ‘Collective efficacy’ is yet another commonly discussed process, referring to the global willingness of adult residents to intervene on behalf of the common good, giving an indication of their ability to engage in sustained collective action to manage neighbourhood hazards (R.J. Sampson et al., 1997). Not conceptualising these processes as those which allow for the active and meaningful role of younger generations in contributing positively to the social environment in their community, feeds the existing notion that young people are incapable of adopting important roles, eventually leading to the further exclusion of young people from meaningful roles in their community.

The measurement of structural and cognitive aspects of social capital in this study, however, was based on data from *adolescents*, with survey questions that indicate *their* level of participation in community affairs, and *their* perception of neighbourhood social cohesion. Hence the structural or cognitive aspects of social capital measured here could be more than the outcome of the social environment created by the contribution of only adults’ civic engagement, norms and values, and capacity to regulate behaviour and engage in collective action. According to this perspective the findings here are in support of the conceptualisation

\(^{12}\) This could perhaps be due to limited availability of adolescent data in surveys that are often used for research investigating the association between neighbourhood social capital and health outcomes.
of social capital as a contextual level resource which is generated by active participation of adolescents in a neighbourhood, as opposed to the commonly accepted adult-centred notion of the concept which plays down the adolescents’ agency in influencing their social environment. As Morrow (1999) has argued “[a] more active conceptualization of children, drawing on the sociology of childhood…would explore how children themselves actively generate, draw on, or negotiate their own social capital, or indeed make links for their parents, or even provide active support for parents”. Such findings add to the force of the call to realign and re-envision the roles of young people in society, especially at a time of history when it is largely accepted that adolescents have no clear roles in society beyond schooling and forms of leisure (Nightingale & Wolverton, 1993).

Future research could also benefit from employing both quantitative and qualitative approaches, as well as measuring social capital by using data from both adults and adolescents. That would provide a richer source of data which could allow a more comprehensive analysis, taking in to account even the negative dimension of social capital, with regard to adolescent health outcomes. A better understanding of the nature of the links of social capital to adolescent wellbeing, would contribute greatly to gaining more insights into the causal mechanisms linking social capital and health outcomes in general.

5.5. Limitations

This research like any other study has several limitations.

5.5.1. Cross-sectional Survey

The Youth’07 survey was designed to be cross-sectional – the wellbeing of students and their neighbourhood characteristics were measured at a single point in time. Therefore, it is not possible to prove the direction of associations found in the study.

It cannot be verified, therefore, that living in neighbourhoods with higher levels of social cohesion or membership in community organisations positively affects the wellbeing of students, as it could have been the case that students with higher levels of wellbeing had a higher perception of their neighbourhood social cohesion, or that they participated more in the affairs of their communities. It needs to be noted, however, that this issue would have been more of a concern if analysis was carried out at an individual level. The fact that the neighbourhood scales used in the analysis were the result of the aggregation of students living
in each census area unit, increases the likelihood that the direction of the effect is from neighbourhoods to individuals. Moreover, having controlled for the variations caused by individual characteristics as a result of using a multilevel methodology, further reduces the likelihood that the associations found in the study could have been the result of the characteristics of the individual and not the neighbourhood.

In order to have a better understanding of the direction of these associations and provide more clear explanations of the findings a longitudinal study is required.

### 5.5.2. Selection Bias and Sample Size

The data used in this study was based only on the responses of randomly selected adolescents who attended and were present at school on the day of the survey. Considering the likelihood that students who do not attend mainstream school or are absent from school have worse health and wellbeing status than students attending school and participating in health surveys (Bovet, Viswanathan, Faeh, & Warren, 2006; B. Weitzman, Guttmacher, Weinberg, & Kapadia, 2003), there are implications for the application of findings of this study. The selection bias here is towards a ‘healthier’ picture of adolescents in New Zealand, those with higher levels of wellbeing.

Furthermore, to establish the sample size in the study so that the neighbourhood level measures could be more reliable, a large number of neighbourhoods (those containing ten or fewer students) were dropped from the analysis. This led to the formation of a sample size that was not identical to the overall sample of students who participated in the survey, with the main difference of sample size having a lower representation of students from rural areas in New Zealand.

Although the relatively high response rate of the schools (84%) and students (74%) in the survey minimises the selection bias, the above factors clearly add to the implications for the generalisability of the findings in this study to the overall adolescent population in New Zealand.

### 5.5.3. Neighbourhood Definition

For reasons of practicality this study was limited to the use of geographically defined census area units as proxies for neighbourhoods. Whether these units are reasonable approximations of local neighbourhoods is debatable, taking into account that neighbourhood borders are less
likely to be constrained by the administrative boundaries used to define census area units than by cultural, demographic and socioeconomic factors (Macintyre et al., 2002).

Moreover, the fact that social capital in this study is conceptualised at the neighbourhood level, implies that the research here assumes the potential of geographically defined neighbourhoods in taking on some of the functions of a community. This assumption might be criticised by those who promote definitions of community other than the geographically bounded neighbourhoods (Hillery, 1955). Criticism might also come from those who go as far as declaring neighbourhood as a dead entity due to the process of globalisation, particularly with regard to the emergence of virtual communities by the spread of Internet, and the decreasing dependence on local areas for the necessities of life (Naisbet, 1982).

Such criticisms, however, are based largely on an understanding characterised by false dichotomies that might exist in neighbourhood studies (Kawachi & Berkman, 2003). Focus on the neighbourhood is not to deny that modern life gives us the opportunity to belong to communities which are not defined as geographic units, and which offer unique and important channels for the expression of the collective energies of individuals. Yet, geographical units of a manageable size, in which people can live and carry on the activities of social life as a community is an irreplaceable element of social organisation. Such units provide a unique space that neither family nor larger society could replace, and hence would exert influence on the development of human potentialities particularly during the second decade of life (Benson et al., 2006; Fundaec, 2006; Leventhal et al., 2009).

5.5.4. Measurement Issues

No previous research was found that had validated the exact final scales used in this study for both dependent and independent variables. An advantage in the formation of the scales in the present study, however, was that some of their subscales had either been well validated or commonly used in the literature, or that they were conceptually very similar to the previously validated and commonly used measures.

Sections (5.5.4.1 & 5.5.4.2) below contain additional description of the limitations inherent in the main scales used in this study for both dependent and independent variables.
5.5.4.1. Measurement of Outcome Variable

This study is limited by the extent it can discuss the nature of subjective wellbeing of students. Student self-reported wellbeing was the outcome variable in this research, constructed by averaging the responses of students to three subscales: WHO-5 Wellbeing Index, general wellbeing and life satisfaction. However, averaging the indicators create a challenge in interpreting the precise meaning of the outcome variable (Morrow, 2010). Therefore, throughout this research these scores are used only to refer to a general state of student wellbeing, avoiding inference about any particular aspect of their wellbeing, such as students’ perception of their happiness or quality of their functioning in life (Diener, 2009; Keyes, 2009).

5.5.4.2. Measurement of Neighbourhood Characteristics

Due to the limited number of questions in the survey, the perception of neighbourhood characteristics could not have been measured in a more comprehensive way. No doubt, inclusion of additional indicators could have better determined the level of neighbourhood characteristics. For instance, questions on neighbourhood physical disorders could have also asked about the amount of abandoned cars, broken windows or graffiti in a neighbourhood. The scale of neighbourhood facilities could have included questions about the presence of other facilities such as health centres in a neighbourhood. The scale of neighbourhood residential stability, which was created based on the assumption that students reported the number of times they have moved home within the same census area unit, could have been more robust if, for instance, it was based on the percentage of households that had resided in their current home for the last 5 years13. The study could have also benefitted from having a clearer neighbourhood specific question for the scale of membership in community organisations. Currently it cannot be certain if students were members of community organisations within or outside their neighbourhood. However, the fact that the question was asked in the survey alongside other questions that were precisely neighbourhood specific, and also that travelling long distances could be a burden for adolescents or their families, it can be argued that it is likely that students were inclined to be members of organisations within or close to their neighbourhood.

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13 Similar to the scale in the Beyers et al. (2003) study referred to in section 5.5.1.
Moreover, studies that are based on objective measurements of neighbourhood characteristics using direct observation (unlike this research which utilised subjective neighbourhood scales) are generally considered as those that yield more valid and accurate measures of neighbourhood characteristics (Raudenbush & Sampson, 1999). Two points, however, need to be considered in this regard. One is that, clearly, providing an objective description of the physical and social environments of neighbourhoods, especially for a study which is aimed to be nationally representative, is likely to lead to major budgetary constraints. Taking into account the lack of necessary funding on research focusing on the contextual effects on health, it is unlikely that such a rich source of data could be easily available for researchers. The other point is that subjective measurements of neighbourhoods could be of importance in their own merit. Individual perception of certain neighbourhood characteristics has the potential to impact health, independent of what the actual measurement of that neighbourhood characteristic may be (Maddison et al., 2010). An example of this could be the different influences of perceived safety and the objective indicators of safety on the nature of the interaction of an individual with neighbourhood environment (Carver, Timperio, & Crawford, 2008).

One factor that could have helped increase the level of reliability of neighbourhood level measures in this study was to have a greater number of students in each neighbourhood. However, as Raudenbush and Sampson (1999) have explained, in order to achieve reasonably high interrater reliabilities at the neighbourhood level, only a moderate sample size of raters per neighbourhood cluster is required. Comparing the reliability of neighbourhood measures among sample sizes composed of either 10 or 40 raters, Raudenbush and Sampson (1999) have found that the difference between the reliability of the measures of neighbourhood physical characteristics was not as noticeable as the difference between the reliability of the measures of neighbourhood psychosocial characteristics. If a similar trend was to be expected in this study, having more students in each neighbourhood would not have resulted in as much of an increase in the reliability of the measures of physical aspects of neighbourhood as it would have for the reliability of neighbourhood psychosocial measures.

5.5.5. Controlling for Variables

Two of the general underlying reasons for neighbourhood variation in individual wellbeing are often discussed in literature as either being due to differences in the kinds of people who live in the same neighbourhood (a compositional explanation) or due to differences between
the neighbourhoods themselves (a contextual explanation). The cross-classified multilevel model in this study allowed for teasing apart the effect of neighbourhoods (context effect) by controlling for the background characteristics of adolescents (composition), which in this study were the variables of gender, ethnicity, age and socioeconomic status.

There is no agreement in the current state of health literature as to the extent and nature of variables that need to be controlled for in each study. Some studies promote that not having controlled for many family or individual characteristics might lead to the overestimation of neighbourhood effects. Hence they go as far as controlling for individual or family level of motivation, literacy, self-efficacy, emotional health (G. J. Duncan et al., 1997), quality of parent-adolescent relationship (Drukker et al., 2003) or how trusting an individual is (Subramanian, Kim, & Kawachi, 2002). It needs to be noted that not all of these studies show that the effects of neighbourhood variables are confounded by family or other characteristics (Drukker et al., 2003).

Researchers have also argued that the underestimation of neighbourhood effects is equally possible due to factors such as a restricted range of neighbourhoods examined in most studies (Brooks-Gunn, Duncan, Leventhal, & Aber, 1997), and the underlying theoretical processes thought to be important (Macintyre & Ellaway, 2003; Subramanian et al., 2003). This factor could well apply in this study, especially with regard to the fact that the multilevel analysis here controlled for not only a range of individual characteristics and socioeconomic status which tapped into an important family characteristic, but it also controlled for all the neighbourhood characteristics used in the study. This was done to allow for the determination of the independent effect of each neighbourhood variable. But, it could be argued that some of these controlled variables may actually be on the pathways between neighbourhood and wellbeing. For instance, the extent of facilities in a neighbourhood, neighbourhood physical disorders, or even individual socioeconomic status might well be, on one hand, influenced by the stock of social capital in a neighbourhood and, on the other hand, provide the basis for the social interaction between people in a neighbourhood. From that perspective it is remarkable that in this study neighbourhood main effects were observed once all these variables had been entered into the model.
5.6. Strengths

The strengths of this study lie in many aspects, some of which have been referred to earlier. Sections below highlight a few of these aspects with regard to the designing of the survey, employing appropriate methodology for the analysis of data and adopting a positive youth development approach.

5.6.1. Survey Design

This study was advantaged by several factors related to the features of the Youth’07 survey. The survey targeted a large and diverse sample of secondary school students in New Zealand, and its overall response rates for both schools and students were relatively high. As a result the study could be considered nationally representative, a characteristic rarely seen in similar studies carried out around the world.

An essential aspect of the survey was that it used a geocoding procedure and as a result the residential neighbourhood of students could be identified. Due to the overall large sample of students included in the Youth’07 survey and the geocoding procedure, a large number of neighbourhoods were identified and included in the analysis. This is one of the most important requirements of research on neighbourhood effects.

Another aspect of the survey which added to the overall strength of the study was the use of hand-held internet tablets as the means for administering the questionnaire. Denny et al. (2008) has found in a pilot study carried out prior to Youth’07 survey, that among students who expressed a preference between laptop computers or internet tablets, the majority of students found the internet tablets more private, confidential and easier to answer questions truthfully. Therefore, using such tablets has been suggested to be a feasible methodology for school-based surveys.

5.6.2. Appropriate Methodology

The geocoding procedure, and the largeness of the data which resulted in the inclusion of a large number of neighbourhoods in the study, allowed the data analysis to be carried out in a multilevel approach, which is considered the most appropriate methodology for such studies (C. Duncan et al., 1998). Using a multilevel approach proved to be useful in at least two important ways. First, it allowed the exploration of whether or not any of the neighbourhood characteristics has an independent contextual effect on student wellbeing, over and above
students’ individual characteristics. Secondly, it permitted the testing of cross-level interactions between neighbourhood main effects and a student’s socioeconomic status. An additional advantage of the multilevel model used in this study was that it was a cross-classified random intercept multilevel model, allowing for both neighbourhoods and schools to be treated as random effects.

5.6.3. Positive Youth Development Approach

In line with the positive youth development framework, the study focussed on adolescents’ positive outcomes, as opposed to looking at their disorders or diseases, a characteristic of the majority of research on youth health. This is an important point as the study promotes a strength-based approach which is advocated by many as an effective approach in the field of youth development (Benson et al., 2006; J. V. Lerner et al., 2009; R. M. Lerner et al., 2005; Pittman, 1991). Another important aspect of this study was that it gave young people a voice about their neighbourhood and wellbeing and considered them as active social agents who can contribute positively to their social environment.

5.7. Conclusion

In conclusion, the results of this investigation demonstrate that research into the wellbeing of adolescents needs to consider the environment in which they live. Findings point to the importance of neighbourhood social environment, particularly cognitive and structural social capital conceptualised as contextual level resources. Each of these dimensions of neighbourhood social capital is shown to be independently associated with adolescent well-being, with neighbourhood structural social capital additionally resembling the characteristic of a buffer against the socioeconomic disadvantage faced by adolescents.

More generally stated, we cannot consider ourselves as individuals living in isolation, unaffected by the characteristics of our surrounding. This is particularly true among adolescents whose relationship with others in the wider community enhances the development of their latent capacities. Considering the enormous levels of concern that currently exist for the wellbeing of adolescents in New Zealand, it is vital to make effective steps towards the creation of supportive environments conducive to their development. This research could be considered as a small contribution towards that lofty goal.
References


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