The relationship between standard of living and quality of life for older New Zealanders

A thesis presented in partial fulfilment of the requirements for the degree of

Master of Science

in

Psychology

At Massey University, Wellington

New Zealand

Stewart Edwin Graham

2015

Abstract

The well-being of older people is an increasingly important issue. This is due to both the increasing proportion of older people in the population and rising levels of inequality in New Zealand. What well-being is and what influences well-being is an important question when considering the welfare of older people. Standard of living and quality of life offer two different ways of understanding well-being. It is vital to understand the impact that changing standard of living has on older people's quality of life. The aim of this study was to explore the relationship between standard of living and quality of life and consider the impact of other factors on quality of life for older people in New Zealand. This study is a secondary analysis of data from the 2012 wave of the New Zealand Longitudinal Study of Ageing. This study includes 2984 people aged between 50 and 87 years of age. Bivariate and hierarchical multiple regression analysis was employed to explore the relationship between standard of living, quality of life, health-related variables (physical health, mental health, depression, mobility and loneliness) and demographic variables. Results revealed two main findings. Firstly, that a low standard of living does not preclude a high quality of life, but a high standard of living means a low quality of life is less likely. Secondly, the relationship between standard of living and quality of life is mediated by health-related variables. Psychological health-related variables (mental health, depression and loneliness) mediated the relationship more than physical health-related variables (physical health and mobility). These demonstrate that although a high standard of living is not a prerequisite for a high quality of life, it can potentially provide a buffer against factors which cause poor quality of life such as poor physical and mental health. Increases in standard of living for older people can therefore act to mitigate key factors contributing to poor quality of life. These findings

have important implications for future policy development in relation to the welfare of older New Zealanders.

Acknowledgements

I would like to thank the people who made this thesis possible. Firstly I would like to thank my supervisors Mary Breheny and Polly Yeung. Thank you for your guidance, support and encouragement, which are greatly appreciated. I would also like to thank Brendan Stevenson for his invaluable statistical advice.

To my mother Sue Pullon, thank you for your counsel, encouragement and support during this process, without which this would not have been possible.

To my partner Bianca Clarke, thank you for the never ending support and understanding.

To the rest of my family and friends, you all know who you are, thank you. You have all helped me in your own different ways and it has meant the world to me.

Table of contents

List of tables and figures

Tables

Figures

1. Introduction

1.1. Rationale

New Zealand has an ageing population (Ministry of Social Development, 2010b). The number of people aged over 65 has increased from 511,000 in 2006 to 650,000 in 2014 (Statistics New Zealand., 2014), and is projected to reach one million by the late 2020's, when people aged 65 and over will outnumber children (0-15) (Statistics New Zealand, 2010). The ageing population creates numerous economic, health, living standard and quality of life related challenges and these different challenges are all interrelated. Understanding how quality of life is influenced by other factors is key to developing appropriate policy decisions and funding allocations to improve quality of life. Standard of living is often associated with quality of life and wellbeing. Standard of living is regularly understood in terms of the material situation (Spiers, Matthews, Barker, Jagger, & Hancock, 2005) or capability (Nussbaum, 2003) of a person which can be considered important when looking at quality of life (Ferrans, Zerwic, Wilbur, & Larson, 2005; Jennings, 2002; Sirgy, 2012). Standard of living and quality of life are conceptualised as different types of well-being and both are used to compare achieved levels of wellbeing among different subpopulations. They are also used to decide how resources are allocated across subpopulations. Therefore, the relationship between the two should be clearly understood. Part of the justification for improving quality of life and health is that a healthier, happier population needs fewer resources (Sirgy, 2012). As health is strongly related to both concepts, the impact of health in the relationship between standard of living and quality of life should also be understood. Improving quality of life has both individual and population advantages. Understanding how the conditions of older people's lives may influence quality of life is the first stage of enabling older people to have the highest possible quality of life. To achieve this, it first must be understood what quality of life is and what impact other related variables such as standard of living and health have on quality of life and then utilise this knowledge to implement policy change to the benefit of the population and economy.

1.2. Overview

The terms ‘standard of living’ and ‘quality of life’ are highly contested terms which have many different definitions (Jensen, Spittal, Crichton, Sathiyandra, & Krishnan, 2002; Sirgy, 2012; Steckel & Roderick, 1997; Weich & Lewis, 1998). Standard of living is usually thought of as a type of material and/or economic well-being (Fergusson, Hong, Horwood, Jensen, & Travers, 2001; Jensen et al., 2002). Standard of living is also increasingly being conceptualised in terms of the capability of a person to lead a normal life from Sen’s Capability Approach (Alkire, 2005). This development of the standard of living literature includes the recognition that standard of living goes beyond resources and includes freedoms such as personal and political freedom and personal choice to live how one chooses. Standard of living predominantly focuses on objective external aspects of living conditions in later life such as ownership of objects or resources, income and wealth. In contrast to standard of living, quality of life is generally considered a measure of the overall well-being of a person. There are a large number of different interpretations and many ways to measure quality of life (Brown, Bowling, & Flynn, 2004), and many researchers have indicated that quality of life is also a key concept which relates to positive ageing (Low & Molzahn, 2007; Rowe & Kahn, 1997; Vaillant, 2004). Although standard of living and quality of life have separately, been extensively researched, there is a lack of examination of the relationship between standard of living and quality of life. As both concepts have been used as ways to assess well-being and used to assess the success of interventions to address the challenges of population ageing, it is imperative to understand the relationship between the two concepts.

1.3. Data

The present study was based on 2012 data from the New Zealand Longitudinal Study of Ageing (NZLSA) (http://www.massey.ac.nz/massey/learning/departments/school-of-psychology/research/hart/research-projects.cfm), which is a population level study of people aged 50 and older. The NZLSA survey measures are predominantly international and New Zealand validated measures assessing health, wealth, social support, standard of living, quality of life, employment,

retirement and personal situation (Stevenson, 2014). The NZLSA was initially The Health, Work and Retirement survey for the first two waves of biennial data collection in 2006 and 2008. The following two waves in 2010 and 2012 were part of the NZLSA. The NZLSA is a study of how health, wealth and social needs have impacted on successful ageing. Research from the NZLSA has helped provide context to the issues of standard of living and quality of life in relation to ageing, highlighting the important role of standard of living in understanding variations in health (Dulin, Stephens, Alpass, Hill, & Stevenson, 2011).

1.4. Aims

The overall aim of this study is examine the relationship between standard of living and quality of life. In particular, the research will answer the following three research questions:

- Are standard of living and quality of life related?
- What is the relationship between standard of living and quality of life?
- What role does health and psycho-social support play in the relationship between standard of living and quality of life?

1.5. Approach

The approach taken in this study was a cross-sectional analysis of the 2012 data from the NZLSA. Standard of living, quality of life, physical health, mental health and loneliness were investigated and compared while controlling for demographic variables such as age, gender, ethnicity and income. The relationship between standard of living and quality of life was examined using bivariate correlational analysis, graphical representation, and hierarchical multiple regression to examine the data for both moderation and mediation effects from physical health, mental health and loneliness.

1.6. Thesis outline

Chapter 2 examines the literature on theoretical approaches to standard of living and quality of life. These theoretical underpinnings are linked to the different approaches to measurement. Chapter 2 also

examines the literature on how health and loneliness are related to standard of living and quality of life.

The methods of the research are described in Chapter 3. This includes the demographic profile of the participants and the recruitment procedures. Chapter 3 also describes the demographic, standard of living, quality of life, health and psychosocial support measures used. Following this the analytic methods used to answer the three main questions of this study are considered, which include bivariate and hierarchical multiple regression analysis.

Chapter 4 presents the results of the analyses undertaken to answer the three main research questions. Results indicated that standard of living is a predictor of quality of life and this relationship is mediated by health. It was also found that a high standard of living was not necessary to achieve a high quality of life but a high standard of living makes a low quality of life less likely.

Chapter 5 discusses the main findings of the study and links these findings to the literature, followed by considerations of the limitations of the study, future directions for research and the conclusion.

2. Literature review

2.1. Introduction

An increase in longevity and reduction in fertility over the last century have changed the demographic profile of the population (Christensen, Doblhammer, Rau, & Vaupel, 2009). Although improved health and increased longevity are positive changes, the ageing population creates numerous economic, health, living standard and quality of life related challenges. The ageing population in New Zealand and around the world is of concern (Beard & Bloom, 2015; Christensen et al., 2009; Restrepo & Rozental, 1994; The New Zealand Treasury, 2009). Having a large portion of the population retired puts pressure on working age people to support them (either personally or through taxes) (Beard & Bloom, 2015; Restrepo & Rozental, 1994). The resources needed to support the growing number of older people will either be managed through a reduction in support available or higher taxes for the working population. A reduction in support could include a reduction in financial support for older people, through increasing the retirement age, reducing government superannuation, or reducing other funding and services which are currently available such as aged care facilities and mobility schemes (The New Zealand Treasury, 2009). Ageing in later life is also strongly associated with decreasing health status (Gwozdz & Sousa-Poza, 2009; Teh, 2014), which in turn increases the challenges of caring for an older population because of the increased need for spending on health (Restrepo & Rozental, 1994). Christensen et al. (2009) argues that an increasing proportion of older people does not necessitate increased health spending, as there is an international trend in people living longer with shorter periods of functional limitations. Christensen et al. (2009) argues demographic ageing can be both positive and negative in terms of resource use. Having a healthy functional older population decreases the costs of healthcare, but having a large portion of the population out of the workforce may create a reliance on working age people to support the economy. There are both economic and personal advantages to maintaining the well-being and life satisfaction of an ageing population.

Quality of people's lives is important. Quality of life is often defined as a personal interpretation of subjective well-being (Camfield & Skevington, 2008; Sirgy, 2012; World Health Organization, 1997), which means how good a person thinks their own life is. To have a high quality of life brings many economic and personal benefits. A higher quality of life across a population is associated with better levels of health, economic independence and a more engaged workforce (Camfield & Skevington, 2008; Mathisen et al., 2007; Netuveli & Blane, 2008; Sirgy, 2012; Vaillant, 2004). Improving quality of life also has personal benefits for the older people with increased happiness and life satisfaction (Netuveli & Blane, 2008; World Health Organization, 1995). It is particularly important to protect the quality of life of older people to ensure they remain as independent as possible, because they are a potentially more vulnerable part of the population. The vulnerability of older people is due to declines in physical and mental capabilities, a reliance on superannuation due to not working and isolation due to death of contemporaries and mobility issues. (Netuveli & Blane, 2008). In contrast to quality of life, standard of living is usually based on objective observations or ratings about the material circumstances of a person's life to assess if they have what they need, or the capability to live in a normal way (Sen, 1985; Steckel & Roderick, 1997). Standard of living is often thought of as a contributing factor or even a domain of quality of life (Felce, 1997; Netuveli & Blane, 2008; Sirgy, 2012; Webb, Blane, McMunn, & Netuveli, 2011).

In the rest of this chapter, various approaches to standard of living will be considered, then quality of life and lastly how they are related both directly and indirectly through health.

2.2. Standard of living

There is no universal definition of standard of living. There are many interpretations and uses of the term and these interpretations have changed over time (Easterlin, 2000; Sen, 1985). During the 1940s and 1950s, standard of living was conceptualised in a purely material way such as the goods and services available. This conceptualisation led to the use of national measures such as GDP to assess comparative standard of living (Easterlin, 2000). From this purely material conceptualisation, Easterlin (2000) describes the change during the 1960s and 1970s to a more inclusive definition of

standard of living which encompassed aspects of human development such as average lifespan and education. This change started to address the critiques of the large-scale national income level measures which argued that GDP and other large-scale measures fail to take into account human welfare (Berges, 2007; Easterlin, 2000; Sen, 1985). The critiques of the large-scale measures have led to more of a focus on human development, which included such measures as life expectancy, school enrollment, literacy and democratic freedoms (Easterlin, 2000). This broader human development approach to standard of living was also contested, as there were many different interpretations of what this meant, and also arguments around how to weight different aspects of standard of living (Easterlin, 2000). There are different interpretations of the concept of standard of living based on human development and what it constitutes.

The United Nations (UN) have taken an objective approach to the development of living standard measurement, and have included the measures like GDP per capita but have also expanded it to account for things such as employment, life expectancy, health levels and education. Another way standard of living is currently thought of is in the sense of individual material well-being (Easterlin, 2000). A New Zealand example of this is Jensen et al. (2002) who conceptualises standard of living as the material part of well-being; that is a persons' possessions and what they consume. These are different approaches used to examine the concept of standard of living but in different ways and for different purposes. The UN conceptualisation of standard of living has been developed to be an empirically grounded analysis of major development issues, trends and policies such as policy around political participation, education, healthcare and statistics such as lifespan, infant mortality and lifetime morbidity as well as availability of public facilities such as libraries and recreation facliites (United Nations, 2014). This is in contrast to the approach used by Jensen et al. (2002) which aim to assess the material well-being of people by measuring individuals rather than using broad, area specific trends and policies and making international comparisons such as those made using the approaches of the United Nations (2014). Standard of living has different meanings which are used for different ends, whilst still using the same term. Although the various authors use standard of living

in many different ways, there is consensus it is a term used to describe how well a person can live their life in terms of objective well-being.

2.2.1. Approaches to standard of living

2.2.1.1. Income and wealth approaches

Income and wealth approaches have been used to understand standard of living (Burholt & Windle, 2006). Using this approach, standard of living is the notion that money gives people the ability to access resources which improve the quality of their material circumstances. Conceptualising standard of living in terms of resources available to provide material conditions has advantages. Assessing resources available such as income or wealth is considered an objective and practical way to measure standard of living as it can be standardised within and between countries (Robeyns, 2006). In spite of the objectivity, income and wealth is widely acknowledged as an inadequate approach (Berges, 2007; Sen, 1985). There are practical difficulties with income and wealth measurement, as people are often unwilling or unreliable reporters of their wealth and income (Pfoertner, Andress, & Janssen, 2011; Saunders, Naidoo, & Griffiths, 2008; Sen, 1985). In addition, a central critique of income and wealth approaches to standard of living is that they do not take into account the context of a person's life such as their outgoing expenses, situation in life and their values. Berges (2007) discusses how income, wealth and material approaches to standard of living do not take into account the idea that resources are not valuable in themselves, but that the value of an object or wealth comes from what they enable us to do. Therefore, income approaches to standard of living do not capture how well a person is able to live their life with the means they have.

The limitation in the ability of wealth and income to assess material standards of living is also reflected in the low correlation between income approaches and outcome approaches to standard of living (Jensen et al., 2002; Nolan & Whelan, 1996) with correlations ranging between .025 and 0.40 (Nolan & Whelan, 1996).

The implications of this is that wealth and income are only a weak proxy of standard of living in terms of material conditions of life. This could create a skewed picture of people's lives or geographical areas as income measures have shown to have only weak relationships with material standard of living outcome measures (Jensen et al., 2002; Nolan & Whelan, 1996). Using income and wealth measures are particularly limited when looking at older populations, especially in New Zealand. This is for three main reasons. Firstly because as people retire; income source tends to change as people move from income tied to employment to income from superannuation payments and investments. Secondly, older people tend to have different household arrangements, with fewer dependents and greater likelihood of freehold housing tenure. Finally there is evidence that older people are potentially more sensitive to reporting their income than younger people (Pfoertner et al., 2011).

2.2.1.2. Materialist/economic approach

The materialist view of standard of living stems from the economic idea of utility, in which objects have value which is measured by how useful they are. The utilitarian view of standard of living uses objects as a proxy for standard of living based upon the material conditions of people's lives and the way that these conditions support access to a particular sort of life (Sen, 1985). Jensen et al. (2002) describe the material approach to standard of living as being related to a person's consumption and personal possessions. The materialist approach to standard of living was developed in the 1800s and was based on subsistence, assessing the extent to which people have what they need to survive. Subsistence relates to having just enough goods to physically function to a reasonable capacity (Rio Group, 2006). The materialist approach to standard of living began to be more widely used again in the 1960s to address some of the concerns that the large scale national living standard measures such as GDP ignore the differential ability to transform national resources into a certain standard of living for the individual (Easterlin, 2000). Assessing living standards in this way still plays a major role in policy implications today and is considered to be an objective and practical way of measuring standard of living (Jensen et al., 2002). This materialist view has been heavily criticized for only considering standard of living in terms of physical needs, when many people consider that social needs are also important (Berges, 2007; Nussbaum, 2003; Sen, 1985, 1999). People are social beings

who are expected to be workers, friends and family so to treat people as purely physical beings misses these essential human aspects.

The concept of relative deprivation recognises that what people require depends upon the standards set in each society (Smith, Pettigrew, Pippin, & Bialosiewicz, 2012). This approach contextualises standard of living within a particular society and time frame. Relative deprivation relates to the extent to which people have access to what is expected within the society in which one resides. This takes the definition of standard of living from absolute standards to relative standards as most people in the western world expect more than just enough to physically survive.

The concepts of absolute deprivation in terms of subsistence and relative deprivation have grown into what could now be considered a material approach to standard of living (Easterlin, 2000). Absolute deprivation is about having enough goods to survive whereas relative deprivation takes into account the goods available to a person to enable full participation in society (Walker & Pettigrew, 1984). Combining these approaches results in the modern interpretation of material standard of living. The problems with the materialist approach outlined above led to the creation of measures that not only take into account the relative physical needs but also the social needs of people (Easterlin, 2000).

2.2.1.3. Capability approach

The capability approach to standard of living considers what people can achieve and what freedoms they have (Sen, 1985). It was developed as an alternative to materialist, utilitarian approaches, as a way to think about standard of living which was not reliant on income, wealth and ownership. The capability approach "is mainly an attempt to see development as a process of expanding the real freedoms that people enjoy" (Sen, 1999, p. 36). The capability approach takes account of not only the wealth of a person but also their freedoms and capabilities. This allows for individual preferences in how resources are used and includes freedoms such as; political freedoms, economic facilities, social opportunities, transparency guarantees and protective security (Alkire, 2005; Sen, 1999).

Over the past 20 years the capability approach has become increasingly popular among both academics and policy makers (Alkire, 2005; Berges, 2007; Reader, 2006).This is because of its relevance to distributive justice and its focus on human development rather than economic development (Berges, 2007). One common critique of the capability approach is identified by Reader (2006) who discusses how the capability approach is limited by being too general and having no 'one' accepted list of freedoms and capabilities to assess. Some authors have attempted to address this by publishing lists of freedoms and capabilities (Alkire, 2005; Berges, 2007; Nussbaum, 2003). For example, Nussbaum has elaborated a list of capabilities essential for human flourishing arguing that expanding these capabilities is key to human development. The capability approach considers what people are able to do rather than ownership or wealth. This is particularly relevant for older people because as people age, income and material wealth result in less differentiation across the population (Gwozdz & Sousa-Poza, 2009). In other words, what people are able to do can become a more important factor when assessing standard of living. This makes an important impact when considering standard of living and standard of living measures for older people.

2.2.2. Standard of living for older people

2.2.2.1. Levels of standard of living for older people

As a general trend in New Zealand, levels of standard of living are relatively high for older people (Fergusson et al., 2001; Statistics New Zealand, 2014). In New Zealand the percentage of people who have low standards of living decreases at each age bracket (Perry, 2013). The level of standard of living for older New Zealanders is considered high (Ministry of Health, 2010), with "the great majority of older New Zealanders have sufficient income and assets to provide a reasonable standard of living" (Perry, 2013, p. 6). Older New Zealanders (aged 65+) have the lowest hardship rate (4%) of any age group in New Zealand, compared with 19% for children (0-17 years) (Perry, 2013). Perry (2013) argues this is because New Zealand's superannuation scheme provides all New Zealanders over the age of 65 with a payment tied to the median income of those in employment. Compared to

European countries, New Zealand rates highly in non-income based living standard measures for older people. It is in the top 3% of low hardship rates when compared to European countries (Ministry of Social Development, 2010a; Perry, 2013). In New Zealand, older people not only have the lowest hardship rates they also have the highest average standard of living. Lifetime accumulation of assets (such as house ownership and other goods) among older people may partially explain why older New Zealanders have such high rates of standard of living. In addition, there is a cohort effect where social and economic policy have meant that the current cohort of older people have high standards of living (Ministry of Health, 2010; Ministry of Social Development, 2010a).

2.2.2.2. Factors which influence standard of living in later life

Home ownership is a key reason for older people having high levels of standard of living compared to other age groups. The combination of comparatively cheaper house prices in the past, economic policy support for home ownership and the length of time older people have had to acquire a mortgage-free house has resulted in a high level of mortgage-free home ownership in the over 65 population in New Zealand (Fergusson et al., 2001). In 2003, 65% of older people lived in their own home with no mortgage, compared to 23% of the total population (Statistics New Zealand, 2014). This high level of home ownership results in cheaper accommodation costs which lead to better standard of living (Statistics New Zealand, 2014).

Some other variables which have an impact on older people's standard of living are relationship status and past education. In a study of retirees, Burholt and Windle (2006) found that single people had lower standards of living compared to those in relationships. Burholt and Windle argued that this was a result of shared costs (for assests and consumables for example housing, cars, food, bills and double incomes) over a long period of time. Although older people are more likely to have a high standard of living than younger people due to accumualtion, Burholt and Windle also found that there was a negative relationship between increasing age (from 65 years old) and standard of living which was thought to be from the slow use of resources built up over a lifetime of working which were no longer being replenished. Education also influences standard of living as higher education is correlated with

higher income which is linked with a higher standard of living (Easterlin, 2000). It has also been proposed that education provides people with more cognitive and social resources to deal with more types of situations (Spiers et al., 2005). Age is therefore related to standard of living through effects of lifetime accumulation, shared resources with partners, diminishing resources once out of the workforce and education.

Specific risk factors in New Zealand which are associated with lower living standards are described by Perry (2013). Perry (2013) found older people who had little or no income other than superannuation, pay rent or have a mortgage, and have limited assets or savings are more likely to have a lower standard of living. Any one factor increases the chances of having a low standard of living but having multiple factors greatly increases the risk of having a low standard of living. Secondary factors for older New Zealanders which are shown to increase the chance of having a low standard of living are also identified by Perry (2013). These were such factors as separation, divorce, redundancy, longer-term hospitalisation or unemployment. The closer these occur to age 65 the greater the impact on standard of living. The findings from Perry are consistent with other authors (Burholt & Windle, 2006; Statistics New Zealand, 2014). The factors described above associated with levels of living standards are also affected by cohort effects. Each group of older people have been influenced from the social and historical conditions that have prevailed over their lifetime. These produce particular conditions which influence the whole cohort.

Cohort effects can affect standard of living independently from effects of ageing. For example, before universal superannuation was introduced in 1972 (Carpinter, 2012) there was more deprivation among older people compared to now (Statistics New Zealand, 2006). The social provisions that prevail at each point in time alter the standard of living for older people as they age. Personal expectations are another cohort effect which could have an effect on standard of living. Various measures of standard of living rely on satisfaction with standard of living such as the Economic Living Standards Index (Jensen et al., 2002). Expectations of material goods have changed over time. In the 1970's cell phones, computers and the internet did not exist and were not considered necessary in everyday life, whereas today they are considered basic goods. There is evidence that expectations for the consumer

goods and social participation that is deemed to be sufficient in later life is different for different cohorts (Berthoud, Blekesaune, & Hancock, 2006).

As already mentioned above, the increasing cost of housing creates a cohort effect on mortgage free homeownership which is closely tied with standard of living (Perry, 2013). Over time this is likely to result in a lower percentage of older people owning their own home, in turn leading to lower levels of standard of living in later life. Advances in healthcare and medicine creates a cohort effect on the current population of older people (Fries, 2002). These advances are leading people living longer (Fries, 2002) whilst relying on their life savings. Older people will need to spread their spending over a longer period of time which could lower the standard of living for the older population.

Standard of living is the broad concept of how well a person can live their life. There are many different interpretations about what this actually means and how to conceptualise it. The main approaches are; the broad scale national economic and developmental conceptualisation with measurements such as GDP and the UNs developmental measures; the income and wealth approaches; the material well-being approaches; and the individual capability approaches. All of these different approaches try to measure how well a person can live but in different ways, and they all have varying outcomes and implications for judging standard of living. Just like standard of living, quality of life also has many interpretations and conceptualisations.

2.3. Quality of life

Quality of life is often conceptualised as subjective well-being (Camfield & Skevington, 2008; Sirgy, 2012; World Health Organization, 1997). Although there is general consensus as to what quality of life is, there is no one accepted definition, theory or measurement of it (Brown et al., 2004; Hyde, Wiggins, Higgs, & Blane, 2003; Moons, Budts, & De Geest, 2006). The following World Health Organisation definition of quality of life is one of the more widely used:

> An individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.

> It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of their environment. (World Health Organization, 1997, p. 1)

In contrast to standard of living, quality of life is closely linked and almost synonymous with well-being, often referred to as 'general well-being'. Quality of life and general wellbeing are often used interchangeably. Other terms used in place of quality of life include 'a good life' (Bowling & Windsor, 2001), 'well-being' (World Health Organization, 1997) and, 'subjective well-being' (Muldoon, Barger, Flory, & Manuck, 1998). There are many more terms that generally make reference to the wider quality, satisfaction and well-being of life as a whole. In this review all these terms will be treated as the same concept and 'quality of life' will be used to refer to the broad concept of the general well-being of a person, which encompasses many aspects of their lives.

The modern concept of a subjective quality of life gained prominence in the 1960's (Ganglmair-Wooliscroft & Lawson, 2008). During the 1960's standard of living and quality of life were considered to be similar, with both concepts understood in terms of macroeconomic understandings such as GDP (Ganglmair-Wooliscroft & Lawson, 2008). This shift away from macroeconomic national wealth indicators like gross domestic product came about through dissatisfaction with their inability to measure human welfare and development (Sen, 1985; Wilkie & Moore, 1999). This change in conceptualisation and measurement led to the array of theories and measures of quality of life we have today.

2.3.1. Different approaches to quality of life

There are many different approaches to quality of life and different authors conceptualise these in different ways. Moons et al. (2006) discuss three types of subjective quality of life: happiness, satisfaction and achievement of goals. Quality of life based on happiness is focused on the emotional state of people with how happy or unhappy people say they are (Sirgy, 2012). Satisfaction of life is centred on the personal subjective assessment of the satisfaction of their own life (Sirgy, 2012). The 'achievement of goals' is described as the discrepancy between an individual's actual status and what

they want, with their quality of life reflecting relative proximity to goal attainment (Moons et al., 2006). In contrast, Ventegodt, Merrick, and Andersen (2003) consider that quality of life can be thought of in three other ways: subjective quality of life, existential quality of life and objective quality of life. Subjective quality of life is described as a person's own interpretation of how good of a life they lead, this can include some of the ideas above such as happiness or satisfaction. An existential quality of life involves what is needed for the fulfilment of the inner self, such as ideals and morals. The last type of quality of life identified by Ventegodt et al. (2003) is an objective quality of life. This is what people judge the quality of life of others to be in terms of what degree they fit into and function in society.

Depending on which approach is used, people's quality of life could be interpreted very differently. For example the objective quality of life from Ventegodt et al. (2003) would lead someone to assume an unemployed homeless person to have a very low quality of life, as it appears they do not fit into society and have none of the indicators of doing well. In comparison, if happiness or satisfaction approaches are used (Moons et al., 2006), the homeless person was either exceedingly happy or very satisfied in life, then the homeless person would have a very high quality of life. This example shows that although all the approaches conceptualise the quality of a person's life, they each have their own interpretation which can affect perceived outcomes.

Yet another example of how quality of life is conceptualised is a four domain model with quality of life at the centre. The four domains are: physical well-being and symptoms, psychological well-being, social wellbeing and spiritual well-being (Ferrell, Hassey Dow, & Grant, 1995). Of relevance in New Zealand this four domain model is similar to Te Whare Tapa Whā, a Māori approach to health which represents health as a house with four pillars (Rochford, 2004). The four pillars represent psychological health, physical health, spiritual health and family health. The "house" needs all four pillars to stand. Holistic models of health such as Te Whare Tapa Whā that conceptualise health as broader than physical health understand health to reflect several interlinked domains that overlap with conceptualisations of overall quality of life. Although the prevailing model of quality of life consists of only four domains, there are more complex models which take into account many more domains

and conceptualise quality of life as part of a feedback system where each domain effects the other domains and quality of life is also able to feedback onto the other domains. These more complex models usually build on the model developed by Wilson and Cleary (1995). Adapted models include those developed by Ferrans et al. (2005) and Mathisen et al. (2007). These more complex models were developed to explain the relationships within and between the different domains of quality of life, rather than purely relying on independent predictors to create an understanding of quality of life.

A different type on conceptualisation of quality of life is the capability approach. The capability approach was developed from economic assessments of welfare and consequently contributed to understanding standard of living. Capability has also been used to conceptualise quality of life (Sen & Nussbaum, 1993). Although there are significant overlaps between capability as applied to standard of living and quality of life, the key difference is in the capability to lead a life with sufficient resources (standard of living) (Robeyns, 2006) compared to the capability to lead a life which increases well-being (quality of life) (Alkire, 2008). The capability approach to quality of life can be applied to the various conceptual frameworks outlined above. For example, the capability approach applied to happiness (Sirgy, 2012) would consider a person's capability to be happy, whereas the capability approach applied to satisfaction is the capability to be satisfied with life. These different approaches using the capability approaches could lead to different conclusions based on the criteria used to asses each type of quality of life as a person can be happy but not satisfied, satisfied but not happy, both or neither.

2.3.1.1. Health-related approach to quality of life

Another conception of quality of life is 'health-related' quality of life. The defining feature of this approach is that it is largely based on the health status of a person: health status usually includes disabilities, illness and disease symptoms or functional limitations (Bakas et al., 2012; Ferrans et al., 2005). The notion of health-related quality of life was created to focus on the "effects of health, illness, and treatment on quality of life" (Ferrans et al., 2005, p. 336). Within this approach to quality of life, indicators such as: health status, physical functioning, symptoms of illness and psychosocial

adjustment have been included. This excludes cultural, political, or societal attributes. Examples of the factors not generally included are the environment, public safety, education, transportation, political freedom and cultural amenities This approach emphasises a model of physical functioning which most healthcare approaches utilise (Ferrans et al., 2005).

Within the health-related approach to quality of life there are three main conceptualisations of quality of life: normal life, social utility, and natural capacities (Moons et al., 2006). These three health-related types of objective quality of life outlined in Moons et al. (2006) use limitations of functionality to assess quality of life. The normal life perspective is conceptualised as a person's ability to lead a normal life in terms of functional abilities, mental status and a regular length of life (Carr & Higginson, 2001). Social utility is based on how useful someone can be for the wider society. This perspective includes what that individual can do, not just for themselves but also as part of a wider community. This is usually based on productivity and employment which is in turn is linked to functional ability (Moons et al., 2006). The notion of natural capacity is based on fundamental needs such as breathing or being able to interact with the environment (Addington-Hall & Kalra, 2001). All three of these approaches are based on and restricted to limitations of physical functioning, in contrast to the more general quality of life models. These different interpretations of health-related quality of life present a different picture when considering a person's quality of life. These measures of functional limitation would rate a physically healthy person to have near perfect quality of life, even if they are unhappy or unsatisfied.

One of the reasons that health-related quality of life measures should not be treated as general quality of life measures is the disability paradox. The disability paradox occurs because people with even severe disability often still rate their quality of life highly (Albrecht & Devlieger, 1999; Kutner et al., 2003). There are many possible explanations for this effect. One prevalent explanation is that disability does not prevent people from leading satisfying and rewarding lives (Albrecht & Devlieger, 1999; Fellinghauer, Reinhardt, Stucki, & Bickenbach, 2012). Albrecht and Devlieger (1999) state that people with disabilities who have a low quality of life do not have the resources including the knowledge and social contacts to achieve well-being in their lives. Many authors argue that health

status in terms of functionality is not a good approach to understanding quality of life (Albrecht & Devlieger, 1999; Fellinghauer et al., 2012; Kutner et al., 2003). Although health-related quality of life heavily relies on functional status, there are a number of measures which also incorporate broader domains such as social wellbeing and spiritual wellbeing (Bakas et al., 2012). Measures which incorporate broader domains result in a more complete understanding of quality of life because they are not limited to an individual's physical functioning.

Different approaches to quality of life inevitably lead to different sets of measures (or models) of quality of life. In a comprehensive review of the literature by Brown et al. (2004), the main models of quality of life identified were: objective indicators, subjective indicators, satisfaction of human needs, psychological models, health and functioning models, social health models, social cohesion and social capital models, environmental models and lastly ideographic models. Brown et al. (2004) concludes that these models suggest quality of life is made up of "psychological characteristics, health and functioning, social activities, neighbourhood, as well as perceived financial circumstances and independence, and influenced by social comparisons and expectations" (Brown et al., 2004, p. 9). With the numerous approaches to quality of life it is important to understand them in the context of older people.

2.3.2. Quality of life for older people

The following section discusses the trends of quality of life as people age, the factors which influence quality of life and how this changes as people age. Cohort effects on quality of life are also considered.

2.3.2.1. Changes in Quality of life as people age

There is a well-established U-shaped trend in life satisfaction as people age, with the young and old experiencing the most satisfaction in life and the lowest level of quality of life experienced in the mid 30's to 40's (Blanchflower & Oswald, 2004; Frey & Stutzer, 2002). This U shape trend of life satisfaction has been shown to be independent of cohort effects (Blanchflower & Oswald, 2004,

2008). The U shape trend does not, however, keep rising as age increases, and it starts to decline between 75-85 years of age (Frey & Stutzer, 2002; Gwozdz & Sousa-Poza, 2009). Although age is associated with changes in quality of life, it is other factors associated with ageing which produce quality of life changes. The biggest factors associated with lower quality of life in older age are health status (mental and physical) and social isolation (Gwozdz & Sousa-Poza, 2009; Netuveli & Blane, 2008; Sirgy, 2012).

Many authors suggest that if other factors are accounted for then old age per se is no longer an influencing factor on quality of life, at least until the oldest old age of 85+ (Gwozdz & Sousa-Poza, 2009; Netuveli & Blane, 2008). According to Netuveli and Blane (2008), people 65-75 years old had a higher quality of life, but those aged over 75 had a significantly lower quality of life compared to younger groups. This was thought to be from individual variations in factors influencing quality of life increased with age, and 75 years old was a tipping point. Netuveli and Blane (2008) showed that if other variables are accounted for, quality of life from the age of 50 actually increased with a peak at 68, and quality of life only dropped below that of 50 year olds at the age of 86.

The New Zealand General Social Survey found that the age group with the highest proportion of people who were satisfied with their well-being was the age group 65+ (91% of age group were satisfied with their life) (Statistics New Zealand, 2013). This was thought to be a reflection of life position with less pressure from work and family responsibilities as people move through life. The stages in life thought to negatively influence life satisfaction most were raising children, buying a home, entering and leaving the workforce, and the experience of ageing (Statistics New Zealand, 2013). This shows how life events and personal situation can influence quality of life and why the quality of life is often so high for older people as most of these stressful life events have passed.

2.3.2.2. Factors which influence quality of life in later life

The main factors associated with a reduction in quality of life for older people include lower levels of physical health, mental health, social isolation and social support (Netuveli, Wiggins, Hildon, Montgomery, & Blane, 2006; Webb et al., 2011; Wiggins, Netuveli, Hyde, Higgs, & Blane, 2008).

These factors are often but not inevitably associated with ageing because as the body ages it becomes more worn, frail and prone to damage (Flaskerud & Winslow, 1998). Mental health is affected through a complex combination of health and psycho-social factors such as quality of social support, disabilities and lack of normal functions, (such as sleep, bowel movements and other normal functions) (Weber et al., 2015).

As people age friends tend to pass away and the input of family can become increasingly important (Gwozdz & Sousa-Poza, 2009; Weber et al., 2015). As well as losing social support from friends, Helgeson (2003) argues that not being part of the workforce reduces social interactions. Older people can also lack social support if mobility declines (Metz, 2000; Shinkai et al., 1999). Weber et al. (2015) found the maintenance of good quality of life in older aged is enabled by the avoidance of depression, maintenance of physical function, good neighbourhood standards, family relationships and financial circumstances. A high quality of life is part of the definition of successful ageing (Andrews, Clark, & Luszcz, 2002). Successful ageing or ageing well is a concept which has multiple definitions and is also operationalised in many different ways (Netuveli & Blane, 2008). Andrews et al. (2002) discusses how successful ageing includes better physical, mental and social functioning than those who do not age as successfully. A widely used and accepted definition of successful ageing is from Rowe & Kahn (1997) which contains the three components of low risk of disease and disability, high mental and physical function, and active engagement with life.

Although older people are more susceptible to many of the factors associated with difficulty ageing successfully, Bowling (2011) found that the main influences of quality of life were similar in all age groups. Regardless of age, the main predictors of quality of life were self-rated health status, presence or absence of mental health symptoms, and presence or absence of long-standing illness, and level of social support. Although Bowling presents the argument that quality of life is independent of age, if health systematically declines with age and health affects quality of life, then age could be viewed as part of the system which affects quality of life indirectly.

2.3.2.3. Cohort effects on quality of life

The factors affecting quality of life vary over time. Cohort effects on quality of life can include longevity, resources available and societal contexts such as wars, economic situation and changes in social policy. Increasing life expectancy, paired with better healthcare generally improves levels of quality of life for older people (Fries, 2002). The continuing development of healthcare, technology and medicines is increasing the quality of life of a large number of people who would have been sick without the new interventions (Cutler & McClellan, 2001). Changes in people's lives due to interventions are often referred to as quality-adjusted life years (QALYs), which is an econometric measure which takes into account both the quantity and quality of life added (Weinstein, Torrance, & McGuire, 2009). Although there is general consensus that technology is improving older people's lives especially in healthcare (Cutler & McClellan, 2001) the ways in which it is measured are widely varied and contested (Wisloff et al., 2014). Technology could also potentially be decreasing the quality of life for some people, as they could live longer with declining health but due to varying methodologies it is hard to come to a definitive answer (Wisloff et al., 2014). The gains or losses due to intervention can vary greatly between the different approaches to the quality of life, such as utilising a quality of life approach which assumes normal health and normal functioning or symptoms such as the health-related quality of life approaches described by Moons et al. (2006) and Ferrans et al. (2005) will potentially lead to much greater gains compared with more satisfaction and general well-being approaches. But even with the varied methodology of examining QALYs the technology and healthcare available to people creates a cohort effect.

Another reason the particular cohort matters when examining quality of life for older people is that the social welfare system has changed over the past 40 years. As mentioned in relation to standard of living, non-means tested superannuation was introduced in the late 1970's (Statistics New Zealand, 2006). This resulted in a change from the previously means tested superannuation, and one which resulted in every New Zealand citizen aged over 60 years old receiving superannuation (the age of eligibility gradually increased to the age of 65) (Statistics New Zealand, 2006).

The life events of different cohorts also have an impact on quality of life. There are now fewer older people who have gone to war and experienced hardships such as the great depression of the 1930's. These life experiences had varying effects on how people rate their quality of life (Blanchflower & Oswald, 2004; Easterlin, 2000). An example of a cohort effect is discussed in Blanchflower and Oswald (2008) who found that Germans born between 1930 and 1960 have lower levels of life satisfaction compared to comparable western nations. This deviation from the norm was thought to be a result of Germany's unique post war history. New Zealanders are likely to have very different cohort effects during the same period as New Zealand went through a rich and prosperous period during the 50's and 60's which could have resulted in a unique cohort effect on people growing up during this time.

In summary, there are cohort effects which influence quality of life. There is clear evidence that age alone does not directly affect quality of life, but other factors associated with ageing such as physical and mental health, bodily functioning and social support do (Hyde et al., 2003; Netuveli et al., 2006).

2.4. Standard of living and quality of life

It is a common assumption that standard of living is part of measuring quality of life, although the role varies greatly according to different research and different contexts. Some quality of life models utilise the concept of standard of living to help measure quality of life (Felce, 1997; Lawton, 1983; Netuveli & Blane, 2008; Webb et al., 2011), while others have almost nothing in common with standard of living such as the health-related approaches (Centers for Disease Control and Prevention, 2000; Sousa & Kwok, 2006).

One popular model of quality of life of older people which includes standard of living is described by Lawton (1983). Lawton's model suggests quality of life is made up of four areas: behavioural and social competence; perceptions of quality of life; psychological well-being; and the external, objective, physical environment. The external, objective, physical environment represents standard of living from a materialist approach. Standard of living is a contributing factor but not more important

than any other. Many other models of quality of life for older people which similarly include but do not solely rely on standard of living have been proposed (Diener, Ng, Harter, & Arora, 2010; Diener & Suh, 1997; Ferrans et al., 2005; Lynch, Smith, Kaplan, & House, 2000; Smith, Langa, Kabeto, & Ubel, 2005). All these authors have found standard of living to be an important part of quality of life but it is still one of many areas which impact on quality of life. Many researchers have shown that a better standard of living affects quality of life in a positive direction (Diener et al., 2010; Smith et al., 2005). Blanchflower and Oswald (2004) show that high levels of material well-being and wealth have a strong positive correlation with quality of life. They conclude that money and material well-being do in fact "buy" quality of life which aligns with other authors' findings (Diener et al., 2010; Smith et al., 2005).

An especially comprehensive model of overall quality of life which accounts for a wide range of factors such as personal experience has been developed by Felce (1997). He reviewed the literature on quality of life to incorporate all necessary aspects of quality of life. Felce (1997) created six separate models of six different types of well-being: physical, material, social, productive, emotional and civic well-being. He argued that these six models cover most of the possible different areas of quality of life which other authors have proposed. He admits that the models are overlapping and lack specificity, but believes that all the areas are comprehensively covered. Felce (1997) thus proposed an overarching model for quality of life which includes a type of standard of living called 'objective life conditions'. The objective life conditions have an effect on subjective feelings of wellbeing which then affects personal values and aspirations, which in turn affects overall quality of life. As well as objective life conditions being mediated by these other variables, they also have a weaker direct effect on quality of life, as well as being effected by external conditions, aspirations and subjective feelings (Felce, 1997). This type of complex, multidimensional, multidirectional model of quality of life is becoming more common, as the concept of quality of life is becoming more holistic (Ferrans et al., 2005; Halleröd & Seldén, 2013; Netuveli et al., 2006; Weber et al., 2015) .This complex holistic approach is necessary if quality of life is to be fully understood, because to omit one variable from a model could be excluding an entire range of interactions and effects which play an important role in

the final outcome of overall quality of life (Halleröd & Seldén, 2013). One important component of quality of life which is inherent in a number of approaches to quality of life is health.

2.4.1. Health, social support, standard of living and quality of life

Standard of living and quality of life are both strongly linked with health (Mathisen et al., 2007; World Health Organization, 2008). Health in this sense is considered to be both mental and physical health as both have been shown to be affected by standard of living for older people (Fergusson et al., 2001; Ministry of Social Development, 2010b) and to have an effect on quality of life for older people (Low & Molzahn, 2007). It has also been shown that the relationships between standard of living, quality of life and health are dynamic as the relationships between all of them are multidirectional (Bakas et al., 2012; Felce, 1997; Mathisen et al., 2007).

In New Zealand and around the world, lower standard of living leads to lower levels of health (Ministry of Health, 2010; World Health Organization, 2008). This relationship is present at both population and individual levels of standard of living (Fergusson et al., 2001; Ministry of Health, 2010; Ministry of Social Development, 2010b). The main way the relationship between standard of living and health for older people is conceptualised is that standard of living effects health status (Goli, Singh, Jain, & Pou, 2014; Ministry of Health, 2010). There is also the reciprocal idea that health can also affect standard of living (Ramsey et al., 2013), although this is not considered to have as strong of an effect in New Zealand due to the free or subsidised health system (Ministry of Health, 2010). It is not just on the individual level that standard of living can affect health but also at the population level. Kawachi and Kennedy (1999) discuss how material equality within a society greatly influences levels of health through mechanisms such as public education, social infrastructure and social cohesion.

Standard of living can have a more pronounced effect on older people's health compared to younger people. This is because older people are often more frail and prone to sickness (Wilkinson et al., 2004). This difference means that older people living in poor conditions are even more likely to fall ill (Howden-Chapman, Signal, & Crane, 1999; Wilkinson et al., 2004; Wilkinson, 2002). Howden-

Chapman et al. (1999) discuss how standard of living affects the older population in New Zealand much more than younger age groups particularly because of New Zealand's older housing stock. Older housing is harder to heat and keep dry which increases the chances of sickness due to cold temperatures and mould. Older people with limited resources are more susceptible to falling ill due to these problems. Although the majority of older people in New Zealand have high standards of living, those that do not often lack not only the resources for heating but also the financial and physical ability to fix these problems. Because of this, older people are more vulnerable to respiratory diseases and the effects of fluctuating temperatures which highlights how important a reasonable standard of living is for maintaining a good level of health (Howden-Chapman et al., 1999).

Standard of living has been shown to affect health and consequently mortality in older populations (Wilkinson et al., 2004), and health is inherent in many of the approaches to quality of life (Bakas et al., 2012; Brown et al., 2004; Felce, 1997). Health is especially prevalent in the objective quality of life approaches such as the health-related quality of life as discussed in section 2.3.1.1, but also more general approaches to quality of life (Bakas et al., 2012; Ferrans et al., 2005; Moons et al., 2006). Even if health is not an inherent part of an approach to quality of life, it is generally understood that it will have an impact on the quality of life approaches of satisfaction, goal achievement and happiness (Ferrans et al., 2005). The relationship between quality of life and health is often conceptualised in a unidirectional way where health effects quality of life, but other models consider it a multidirectional relationship where they each affect each other (Mathisen et al., 2007). The relationships between health, standard of living, and quality of life are therefore complex dynamic relationship; some examples of how they interact with each other in terms of mental health, physical health and social support are outlined below.

2.4.1.1. Mental Health

There is a strong relationship between standard of living and mental health (Bellani, 2011; Ministry of Health, 2010; Murali & Oyebode, 2004). Studies show people with a low standard of living are much more likely to experience psychological distress, even while taking into account a wide range of

potential confounders (Ministry of Health, 2010; Murali & Oyebode, 2004). One of the main reasons there is such a strong relationship between standard of living and mental health is that a low standard of living can be potentially very isolating, limiting social support and leading to an increased chance of mental illness (Bellani, 2011). Other potential pathways from low standard of living to poor mental health for older people are through the limitations in ability to contribute to the community or society for those with low standards of living, as well as comparisons with others leading to negative self-evaluation (Murali & Oyebode, 2004; Weich & Lewis, 1998).

It is clear that mental health affects quality of life but many studies also show that quality of life can be affected by mental health issues such as emotional well-being and stress, particularly in older people (Bowling & Windsor, 2001; S. Cohen & Wills, 1985; Mathisen et al., 2007; Netuveli et al., 2006; Patel et al., 2010). In these studies there is a clear correlation showing the lower a person's mental health the lower their quality of life is likely to be (Bowling & Windsor, 2001; Mathisen et al., 2007; Ministry of Health, 2010; Netuveli et al., 2006).

2.4.1.2. Physical Health

Many studies have shown that low standard of living is a risk factor for poor health (Dulin et al., 2011; Jensen et al., 2002; Ministry of Health, 2010; Perry, 2013). The Ministry of Health (2010) found that after controlling for a range of variables, people with a lower standard of were much more likely to have medicated asthma, arthritis, coronary heart disease, diabetes and obesity. People with lower living standards were also more likely to have an unmet need for seeing a doctor. Dulin et al. (2011) found that standard of living was the strongest predictor of health status for older Māori and numerous other studies have shown that material well-being is a significant predictor of health status (Borrell, Muntaner, Benach, & Artazcoz, 2004; Lynch et al., 2000; Perry, 2013). An international review by Lynch et al. (2000) looks at the impact that income inequality and standard of living has on mortality. They conclude that low living standards impact on physical health leading to an increase in mortality. The overall finding from reviewing the literature on standard of living and physical health was that low standard of living has a negative influence on health, especially for older people.

Physical health also impacts quality of life among older people. Gwozdz and Sousa-Poza (2009) found that the large decline in quality of life of the "old old" (over the age of 75) is strongly associated with a rapid decline in physical and mental health. Quality of life has also been shown to effect health; the more satisfied people are in general, the longer they live and the healthier they are (Kesebir & Diener, 2008; Sirgy, 2012). Considerable evidence suggests that a high quality of life can have positive effects on an individual's mental and physical health (Sirgy, 2012).

2.4.1.3. Psycho-social support

Social support has also been shown to relate to quality of life. Like physical and mental health, the lower the level of social support the lower the quality of life is likely to be. Cohen & Wills (1985) suggested that there is a buffering relationship between social support and quality of life. Social support provides a buffer from the negative effects which stressors might have on quality of life (Helgeson, 2003). Social support is a complex construct and can be considered using, structural and functional measures of support. Structural social support refers to the presence of relationships and the interconnectedness of the person with others. Measurable examples of this are relationship status and number of close friends and family. Functional refers to the level of emotional, instrumental and informational support (Helgeson, 2003). Emotional support is the most important type of support when predicting quality of life (Cohen & Wills, 1985; Helgeson, 2003). Although there are two ways of looking at social support (structural and functional) Ekwall, Sivberg, and Hallberg (2005) found that they are linked and that the less structural support a person has the more lonely they are likely to be. Ekwall et al. (2005) also found that the combination of low structural support (not having many people around) and feelings of loneliness was the strongest predictor of a low quality of life for older people. Psycho-social support has been found to be a strong predictor of quality of life (S. Cohen & Wills, 1985; Ekwall et al., 2005; Helgeson, 2003) which shows that it is an important component in a person's well-being.

2.5. Conclusion

Standard of living and quality of life are two related concepts referring to different aspects of well-being. Neither standard of living nor quality of life have agreed upon or clear definitions. Standard of living is generally based around ‘objective material well-being’. Quality of life is usually based around subjective well-being and life satisfaction, including a number of different approaches. The levels of both standard of living and quality of life change as people age. The quality of life of older people is generally high from the age of 65 to 75 with rapid declines thereafter strongly associated with falling levels of health. The ambiguity of definitions and conceptualisations of standard of living and quality of life make drawing strong conclusions difficult. There are relationships between standard of living, quality of life, health and psycho-social support which are complex and interconnected. This chapter has considered current literature describing and defining both standard of living and quality of life, and described the evolution of a number of models and associated measures. The ways standard of living and quality of life are related are complex. This project aims to advance understandings of the relationship between standard of living and health-related variables on quality of life for older New Zealanders.

3. Method

3.1. Research design

To examine the relationship between standard of living and quality of life in older adults this research used data from the 2012 wave of the New Zealand Longitudinal Study of Ageing (NZLSA). The NZLSA is a study of how health, wealth and social needs impact on successful ageing (Towers & Stevenson, 2014). The 2012 wave of the NZLSA was a postal survey which explored five main areas (health; whānau/family and friends; employment and retirement; financial wellbeing; personal situation). The health section of the survey included measures of physical and mental health, quality of life, smoking, alcohol, and physical activity levels. The whānau family and friends section included measures of loneliness, discrimination and faith. The employment and retirement section included measures of work status and job satisfaction. The financial wellbeing section included measures of income, debt, asset worth, financial position, material standard of living. Lastly the personal situation section included measures of demographic information such as age, gender, education, and ethnicity. This project utilised measures from all five areas in the NZLSA, with a particular focus on standard of living, quality of life and health.

3.2. Participants

Participants in the NZLSA were randomly selected from the electoral roll of those aged 54-70 in 2006 additional participant recruitment with a wider age range of 50-84 was carried out during the subsequent recruitment waves in 2008, 2010 and 2012. Longitudinal study participants were retained from the original cross sectional survey resulting in an age range of 50-87 in this sample. Māori were oversampled using the Māori descent indicator in the electoral roll in order to increase the Māori subsample. From the population sample of 3923 people, 3756 questionnaires were received and a total of 2984 (79% response rate) were returned in 2012, with a 90% retention rate from the previous waves of data collection.

Table 3.1 illustrates the demographic characteristics of the sample. Over 75% of the sample was between 60-79 years of age. Survey responses indicated that 55% of participants were female, 38% were of Māori descent, 72% were in a relationship, 55% had some form of post-secondary qualification, mean income was $28,600 and 60% had assets worth between $50,000 and $1,000,000.

Table 3.1

Demographic data of the 2012 NZLSA

Measure		*N*	Valid %	Mean (*SD*)
Age (in 2012, 50-87)				66.3 (7.8)
	50-59	553	18.4	
	60-69	1389	46.3	
	70-79	889	29.9	
	80-89	163	4.3	
Gender	Male	1583	44.9	
	Female	1943	55.1	
Descent	Māori	1372	38.2	
	Non-Māori	2215	61.8	
Relationship	Partner	2106	72.7	
	No partner	791	27.3	
Qualification less	High school or	1338	45.1	
	Post-high school	1631	54.9	
Asset worth				$250K-$500K
	Loss-$50K	634	25.4	
	$50K-$1 M	1504	60.2	
	$1M +	360	14.4	
		Mean	$28,600 ($23,400)	
Income range		Median	$20,000 - $29,999	
		Mode	$10,000 - $19,999	

Note. *N* = number of participants. *SD* = standard deviation, K = thousand, M = million, N total = 3756, Ns will vary due to missing data

3.3. Measures

For this study, 19 measures from the 2012 NZLSA data wave were used to examine the relationship between standard of living and quality of life. The mean, standard deviation, range and Cronbach's

alpha for the standard of living, quality of life and health related measures in this study can be found in Table 3.2.

3.3.1. Demographic variables

The eight demographic measures included were: age, gender, Māori descent, income, asset worth, education, relationship status and retirement status. Age was measured in years as of 2012. Māori descent was self-reported via completion of the Māori ancestry section. Gender was self-reported as either male or female. Coding for education ranged from 1-3 (1 = no qualifications, 2 = secondary school (achievement of school certificate or any level of NCEA), 3 = post-secondary/trade to tertiary. Relationship status was assessed via seven specific responses to the relationship question. All responses which indicated the participant had a current partner of any kind classified respondents as 'in a relationship'. Retirement status was assessed by asking if the participant was in paid employment. Asset worth was assessed with the question "Overall, and not counting the value of your family home, what do you think these assets would be worth after subtracting mortgages owing, loans and unpaid bills?" The range of response options were broad, but skewed with the first seven response options being below $100,000. Estimated income was assessed with a question on how much the participant made before tax in bands of $10,000; coding was 1-11, indicating between $10,000 and $110,000+.

3.3.2. Standard of living measures

The two standard of living measures were the Economic Standard of Living Index (ELSI) and the Living Standards Capability for Elders (LSCAPE). These measures are based on two distinct theoretical approaches to the assessment of standard of living.

3.3.2.1. The Economic Living Standard Index (ELSI) short form

The ELSI is a measure of economic living standards developed in New Zealand by the Ministry of Social Development in 2002 (Jensen et al., 2002). Items include questions on ownership (e.g.,

telephone), activities (e.g., having a night out for entertainment or socialising at least once a month), restrictions (e.g., not picked up prescription because of cost) and overall ratings of material well-being. Official scoring for the ELSI is zeroed then truncated at 10 which results in scores ranging between 0-31 (0 = lowest, 31 = highest standard of living) Jensen, Spittal, & Krishnan (2005). The spread of scores in this study is comparable to other studies such as the New Zealand Health Survey (Ministry of Health, 2010). In this study, the score was not truncated to allow for more differentiation of low standard of living participants resulting in a range of 0-41. Cronbach's alpha based on standardised items for the ELSI within the NZLSA is 0.91 which indicates very good internal consistency. This is consistent with the validation conducted by Jensen et al. (2002) which found composite reliability (analogous to Cronbach's alpha) of 0.79 in a population aged 65+ (Jensen et al., 2002).

3.3.2.2. The Living Standards Capability for Elders (LSCAPE) 25

The LSCAPE is a measure of standard of living based on the capability approach (Breheny et al., 2014). Items include questions on health care (e.g., I can afford everything that I need to be healthy), social integration (e.g., I am able to go on special outings), contribution (e.g., I can provide for others when I wish), enjoyment (e.g., I am able to follow my interests), security (e.g., I expect to have enough money to last my lifetime) and restriction (e.g., I have to be careful with spending). The LSCAPE has 25 items which are scored on a scale of 1-5, from "not true for me at all" (1) to "definitely true for me" (5). Scores for questions with negative wording are reversed and final scores are zeroed. Scores range from 0-100 (0 = lowest, 100 = highest standard of living). The LSCAPE has very high internal reliability for older populations (Cronbach alpha = 0.96 in sample aged 65 and older) (Breheny et al., 2013) which is consistent with the current study (Cronbach's alpha = 0.91).

3.3.3. Quality of life measures

The three quality of life measures were the: Control, Autonomy, Self-realisation and Pleasure (CASP-12), the European Health Interview Survey – Quality of Life (EUROHIS-QOL) and the Investigating Choice Experiments Capability Measure for Adults (ICECAP-A).

3.3.3.1. The Control, Autonomy, Self-realisation and Pleasure (CASP)-12

The CASP is based on a needs satisfaction model of quality of life (Hyde et al., 2003). Items include questions on: participant's control (e.g., I can do the things I want to do), autonomy (e.g., I look forward to each day), self-realisation (e.g., I feel the future looks good for me) and pleasure (e.g., I enjoy the things that I do). The CASP is a 12 item measure, each item is scored on a four point scale ranging from 0-3 (0 = never, 3 = often), scores range from 0-36 (0= lowest quality of life, 36= highest quality of life). Negatively worded questions' are reversed scored (Hyde et al., 2003). The CASP is considered a valid measure around the world and for older populations (Sexton, King-Kallimanis, Conroy, & Hickey, 2013; Wu et al., 2013) with good internal reliability as demonstrated by the Cronbach alpha = 0.78 (Wiggins et al., 2008). In this study the Cronbach alpha based on standardised items for the CASP was 0.86.

3.3.3.2. The European Health Index Survey – Quality of Life (EUROHIS-QOL)

The EUROHIS-QOL is a measure of personal perception of quality of life (Schmidt, Mühlan, & Power, 2006). Items include questions of satisfaction with overall quality of life, health, the individual, relationships, living conditions, energy levels and money. The EUROHIS-QOL is an eight item measure, each item is coded 1-5 (1= very poor) 5= (very good), scores range from 8-40. In this study scores were zeroed for ease of comparison resulting in a range between 0-32 (0= lowest, 32= highest quality of life). The EUROHIS-QOL has high internal consistency with a Cronbach Alpha of 0.80 (Schmidt et al., 2006). In the present study Cronbach's alpha = 0.88.

3.3.3.3. The Investigating Choice Experiments Capability Measure for Adults (ICECAP-A)

The ICECAP-A is based on a capability approach to quality of life and assesses each person's capability to achieve varying levels of quality of life. This approach differs from the CASP and EUROHIS-QOL which are based on needs satisfaction and personal perception of quality of life. Items include questions on feeling settled and secure; love, friendship and support; being independent; achievement and progress; enjoyment and pleasure. The ICECAP-A is a five item measure, each item is scored between 1-4. Scores range from 5-20 with a high score indicating greater quality of life. In this study scores were zeroed resulting in a range between 0-15. Internal reliability for the ICECAP-A is high with Cronbach's alpha values range between 0.80-0.87 (Hareth Al-Janabi et al., 2013; Coast et al., 2008; Coast, Peters, Natarajan, Sproston, & Flynn, 2008; Flynn et al., 2013). In this study the Cronbach alpha based on standardised items for the ICECAP-A was 0.80, indicating good internal consistency.

3.3.4. Health-related measures

The six health-related measures were mental health and physical health component scores from the Short Form Health Survey Version 2 (SF12), the Centre for Epidemiological Studies Depression Scale (CES-D 10), number of chronic conditions, a measure of ability to get around, and the De Jong Gierveld Loneliness scale. Although loneliness is not usually considered a health variable it has been included here as one of the psychological health-related variables. The health-related measures were split into physical health measures (SF12 physical, ability to get around and number of chronic conditions) and psychological health measures (SF12 mental, CES-D and Loneliness).

3.3.4.1. Short Form Health Survey 12 version 2 (SF12) - Mental and Physical

The SF12 was used in this study to calculate a mental health score and a physical health score. The SF12 was designed by the World Health Organisation. It is a 12 item measure designed to assess physical and mental health in relation to eight health scales: physical functioning, role limitations due

to physical problems, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems and mental health (Montazeri et al., 2011). Scoring is based on weights given to each response for each area measured. Scores are standardised on a scale between 0-100 where the mean score from the local population is 50 with a standard deviation of 10 (Gandek et al., 1998). For this study, means were based on the HWR 2006 sample (Budge, Stephens, & Stichbury, 2014) which was consistent with the sample used (current study physical health score mean= 49.41 SD = 10.86, mental health score mean = 49.30 SD = 8.00.) The SF12 is suitable for cross-country comparison because differences between western countries are minimal (Gandek et al., 1998; Kontodimopoulos, Pappa, Niakas, & Tountas, 2007; Sanderson & Andrews, 2002). Internal reliability of the SF12 measure is high with a Cronbach alpha between 0.85-0.95 (Sanderson & Andrews, 2002). Analyses in this study showed similar internal consistency (Cronbach alpha = 0.91).

3.3.4.2. Number of chronic conditions

Number and type of chronic conditions was assessed by asking participants if a doctor had ever told them they had any of the health conditions listed. The list of 14 conditions included 13 specified conditions such as diabetes, heart disease, mental illness and cancer and one unspecified option i.e., other. The number of responses ticked as 'yes' were reported as a summed score.

3.3.4.3. Ability to get around

Ability to get around was based on the single question designed for the NZLSA: "In the last four weeks how well were you able to get around?" Responses ranged from 1-5 (1= very poorly, 5= very well), the mean and standard deviation = 4.44(0.86) indicating a high level of mobility. This high level of mobility is similar to other comparatively aged populations such as in Shinkai et al. (1999) where between 78-86% of respondents aged 60-84 where able to walk over one kilometre without any difficulty, indicating a high level of mobility.

3.3.4.4. Centre for Epidemiological Studies Depression Scale (CES-D 10)

The CES-D 10 is a10 item measure used to screen for depression. Items include questions on depression, irritability, attention, hope, fear, happiness, loneliness and motivation. Each item has four possible responses indicating how often the respondent felt a certain way. Responses ranged from: 'rarely/not at all' to 'all of the time'. The measure is zeroed, and following this the range is between 0-30 (0= not depressed, 30= severely depressed). The CES-D 10 is an internationally validated measure (Björgvinsson, Kertz, Bigda-Peyton, McCoy, & Aderka, 2013) and has also been validated for use in the older population (Irwin, Artin, & Oxman (1999). The internal reliability of the CES-D 10 is high with a Cronbach alpha of 0.92 (Irwin et al., 1999). In this study, there was also an acceptable level of internal consistency (Cronbach alpha = 0.82).

3.3.4.5. De Jong Gierveld Loneliness Scale

The De Jong Gierveld Loneliness scale is an 11 item measure to assess loneliness. Items include questions on having someone to talk to, missing others, feelings of emptiness, trust and rejection. Responses range between 1-3 and indicate how much the participant agrees with each item (1 = yes, 2 = more or less and 3 = no). After zeroing the scores the total scores range between 0-11(0-2= not lonely, 11= very severely lonely) (De Jong Gierveld & Tilburg, 1999). The loneliness scale has been validated for use on paper, face to face, over the phone or on the computer (Tilburg & Leeuw, 1991). The Cronbach alpha is typically between 0.80-0.90 (De Jong Gierveld & Tilburg, 1999) which is consistent with what was found in the NZLSA (Cronbach alpha of 0.88).

Table 3.2

Number, range, mean, standard deviation and Cronbach alpha of measures from current study

Measure	*N*	Range	Mean	*SD*	Cronbach alpha
SF 12 Physical	2631	0-100	49.41	10.85	0.91
SF 12 Mental	2631	0-100	49.3	8.00	
CESD10	2851	0-30	6.6	4.94	0.84
Loneliness	2777	0-11	3.2	3.21	0.88
Ability to get around	2909	1-5	4.44	0.86	N/A
Chronic conditions	2571[a]	1-12	2.33	1.51	N/A
CASP-12	2885	0-36	28.24	5.52	0.86
ICECAP	2844	0-15	11.54	2.40	0.80
EUROHIS-QOL	2915	0-32	24.79	5.33	0.88
ELSI41	2614	0-41	34.01	6.30	0.91
LSCAPE25	2573	0-100	58.93	22.73	0.89

Note. *N* = number, *SD* = standard deviation, Cronbach alpha based on standardised items, N/A = not applicable due to single question

[a] Actual *N* for Chronic conditions is unknown, numbers are based on participant having at least one condition

3.4. Data analysis

All analyses in this study were performed using IBM SPSS Statistics 22 (SPSS Inc, 2013) computer software. The add on to SPSS called Process by Andrew F Hayes from Field (2007) was used for moderation and mediation analysis.

3.4.1. Data screening

The data was screened for missing values, normality, outliers, collinearity, multicollinearity, linearity, independence of residuals and homoscedasticity. Missing data from all measures was assessed to check if it was missing completely at random by using Little's MCAR test. Normality of each measure was assessed by examining histograms, Q-Q plots and the Shapiro Wilks test. Outliers were screened in: ELSI, LSCAPE, CASP-12, EUROHIS-QOL ICECAP-A, SF12 physical, SF12 mental and the CES-D. The range of all other measures was too limited to allow for outliers. Outliers were considered scores more than two standard deviations away from the mean. The impact of outliers was

tested by running a *t*-test comparing the original mean of measures with the five percent trimmed mean (the mean calculated after removing the top and bottom five percent of responses).

3.5. Screening and assumption checking

3.5.1. Missing data

Missing data was assessed for in several ways. Measures had between 16 and 30 percent missing values except for Māori descent and gender which had 0.7% and 2.4% missing respectively. To deal with missing data in calculations, pairwise deletion was used. Little's MCAR test indicated that the data was missing in some systematic way (χ^2 (19, N = 3526) = 1388.973, p < .001) which limits the validity of the statistical tests used. Comparing the missing values between variables resulted in no systematic pattern to the missing data being found. As the pattern of missing data could not be discerned and the sample size was large enough to meet statistical assumptions without the missing data no further action was taken to address this limitation.

3.5.2. Normality

Normality of the continuous variables was assessed by examining frequency histograms and Shapiro Wilks statistic. All measures were found to be significantly non-normally distributed (Shapiro Wilks = 0.794-0.985, $p < 0.001$). This is not unexpected as the sample size used is large, increasing the chances of finding a significant difference from a normal distribution. From examining the histograms and Q-Q plots the measures which appeared to have close to normal distribution ranges were: age, asset worth and the LSCAPE. The measures which had too small a range to allow for a normal distribution were 'ability to get around' and 'education'. Nothing was done to address this as variables of this nature are commonly used in multiple regressions and are considered robust if the sample size is large enough (Cohen, 1988). The remaining measures were all either positively or negatively skewed to varying degrees. The measures with a positive skew were: depression, income, loneliness, and chronic conditions. The measures with a negative skew were the: SF12 physical, SF12 mental,

CASP, ICECAP, EUROHIS-QOL, ELSI and ability to get around. Although a number of measures were considered non-normal the only deviation from normality was in the skew of the distributions. No measures had split distributions (distribution with more than one distinct peak). Multiple regression is considered reasonably robust against skews in distributions, especially with large sample sizes (Field, 2007). For this reason no further action was taken to address the issue of normality.

3.5.3. Outliers

The effects of outliers on the means were assessed with t-tests. No significant differences between original means and five percent trimmed means were found in a paired sample *t*-test. No deletion or transformation of outliers occurred because their effect on the sample was considered minimal and to remove them from the sample would be omitting a normal part of the population.

3.5.4. Collinearity

Collinearity was assessed with correlational analysis. No Spearman's rho or Pearson's r correlations > 0.9 between any measures was found. The highest correlations found were between the ELSI and the LSCAPE (Spearman's rho (2341) = .813, $p < 0.001$). This high correlation was not an issue as only one standard of living measure was used in each regression model (either the LSCAPE or the ELSI) and no other correlations were this high. There was a theoretical overlap between three measures identified. The number of chronic conditions and the SF12 physical were determined to be too conceptually similar; it was thought that the number of chronic conditions would be a direct reflection of a person's physical health. Through inspection of the measures, chronic conditions and the CES-D overlapped as chronic conditions included a question on having had mental illness. Those scoring highly on the CES-D would likely meet the criteria for depression as assessed through the list of chronic conditions. The number of chronic conditions measure was removed from further analysis in favour of the SF12, as the SF12 was more normally distributed in the sample. The reason the CES-D was retained was because it provided a range of depression ratings.

3.5.5. Multicollinearity

Tolerance was used to assess the multicollinearity of the variables in the models. In this study a conservative level of tolerance > 0.2 (Field, 2007) was used as the threshold for. No variables in any of the regression models had tolerance values below 0.2. This indicates that the measures used in each regression did not have a high level of overlap.

3.5.6. Linearity

Linearity was assessed by examining the P-P plots. The data in the regression models used was not always linear. The two regression models predicting ICECAP scores while using either the LSCAPE and the ELSI as the standard of living measure did show a linear relationship while the other four (the two EUROHIS-QOL models and the two CASP models) showed a slight variation from linearity. The variation from the expected pattern was considered small enough to ignore as the pattern appeared linear but the predictability of the model varied at different levels of the dependent variable.

3.5.7. Independence of residuals

Independence of residuals was assessed with the Durbin-Watson statistic. There was no concern either theoretically or statistically that the residuals were linked together. This was confirmed by the Durbin-Watson statistic being very close to two for each regression model (Durbin -Watson = 1.936 to 2.075), which indicates that the residuals are not correlated (Pallant, 2013).

3.5.8. Homoscedasticity

Homoscedasticity was assessed using scatterplots of the observed residuals vs the predicted residuals and Levene's statistic. The scatterplots and Levene's statistics showed that the

relationship between standard of living and quality of life is heteroscedastic, which is a violation of the assumption of homoscedasticity within the data; this reduces the robustness of the analysis. This violation of the homoscedasticity assumption can result in the *p* values being less reliable. To account for this, acceptable *p*-values for this study have been set at $p < 0.001$ which is lower than the standard $p < 0.05$.

3.6. Bivariate analyses

3.6.1. Correlations

Correlation analysis was performed on all measures to look for shared variance. In this study all correlations are Spearman's rho. Spearman's rho was used because it is more robust when examining non-normal data (Field, 2007) such as in this study. Although Spearman's rho is not the ideal correlation analysis for categorical variables, it is still considered robust when a large sample size is used (Agresti, 2007). The correlations between the domains of each standard of living and quality of life measure were calculated to determine if particular domains accounted for the correlation between the whole measures. Correlations between a) demographic and health related variables and b) standard of living and quality of life were calculated to investigate other variables involved in the relationship between standard of living and quality of life.

3.6.2. Boxplots

Boxplots of quality of life and standard of living scores were created to examine the relationship found from the correlation analysis. The range of quality of life scores was used on the y axis and categories of standard of living scores or population percentages was on the x axis of the boxplot graphs. Standard of living was split in two ways. As the majority of participants had medium to high standard of living scores, this resulted in small numbers in the lower standard of living score categories. To address this, standard of living scores and population based categories were created:

ten categories of ten percent of scores and ten categories of ten percent of the population were used for the LSCAPE; and seven official score categories and ten categories of ten percent of the population were used for the ELSI.

3.6.3. *T*-tests

Paired sample *t*-tests were used to assess the significance of the difference between quality of life scores based on dichotomised demographic and health related variables. This provided a general understanding of what variables influenced quality of life scores. The *t*-test was used to assess the significance of the differences between the variables dichotomous groups. The variables used were: age, Māori descent, gender, relationship status, education, estimated income, asset worth, retirement status, SF12 physical, SF12 mental, number of chronic conditions, ability to get around, Loneliness and the CES-D depression scale. Non-dichotomous variables were dichotomised by splitting the population down the middle as close as possible. This was done to examine the effect size of the variables for large portions of the population (top half compared to bottom half) so a general effect could be examined to estimate the variables which might be important in the multivariate models.

3.7. Multivariate analysis

3.7.1. Assumptions

The assumptions of collinearity, multicollinearity, singularity, linearity, independence of residuals and homoscedasticity were tested to check the robustness of the multivariate analysis. Collinearity was checked between all independent variables used in the regression model. The indicator of collinearity used was a very high correlation of rho > 0.9 as suggested by Pallant (2013). Multicollinearity was checked by looking at the tolerance values in the regression models. The tolerance value indicates how much variance is shared with other variables. A conservative level of tolerance suggested by Menard (2002) was used (tolerance < 0.2 indicates multicollinearity).

Singularity is the assumption that one measure is not a part of another; this was assessed by examining the measures and checking if one measure or item made up a part of another. Independence of residuals was checked by examining the Durbin-Watson statistic in the hierarchical multiple regressions. Linearity of the relationship between predicted residuals and observed residuals was checked for with probability- probability (P-P) plots.

Homoscedasticity was examined in each quality of life (CASP, ICECAP and EUROHIS-QOL) and standard of living measure (ELSI and LSCAPE) using Levene's statistic. A further check for homoscedasticity was undertaken with scatterplots of standard error residuals vs the standardised predicted value. When a distribution is homoscedastic the scatterplot should look like a rectangle along the zero axis of the residuals (Pallant, 2013), because if the distribution was homoscedastic then the models errors will be consistent at different levels of different variables.

In this study the number of cases available ranged from 2498-3003 depending on the measures used. The number of participants was well above conservative guidelines proposed for multivariate analyses (Pallant, 2013; Tabachnick & Fidell, 2012).

3.7.2. Hierarchical multiple regression analysis

Hierarchical multiple regression analysis was used to answer all three key research questions. It was used to assess the unique contribution of different independent variables (age, gender, Māori descent, relationship status, retirement status, income, asset worth, standard of living (ELSI or LSCAPE), SF12 physical, SF12 mental, ability to get around, CES-D depression and loneliness) when predicting the dependent variable of quality of life (CASP, ICECAP or EUROHIS-QOL).

The first step in the hierarchical multiple regression analysis was to add the demographic variables (age, gender, Māori descent, relationship status, retirement status, income and asset worth) to assess the predictive value of demographic variables before examining the relationship between standard of living, health and quality of life. The second step in the model was the addition of a standard of living measure (either the ELSI or LSCAPE). Standard of living was added following the demographic

variable to see what additional variance standard of living contributed over the impact of demographic variables. This was further compared to the level of variance explained after the health related variables were added so the direct and indirect contributions of standard of living could be examined. The third step in the model was adding the physical health variables (SF12 physical score and ability to get around). The last step in the model involved adding the mental health and loneliness variables (SF12 metal, CES-D and Loneliness). The physical health variables were added independently from the mental health and loneliness variables so the impact that each variable type had on the relationship between standard of living and quality of life could be examined separately. Standardised Beta weights with corresponding P-values were used to assess the contribution of each variable in the model at each step.

3.7.3. Moderation analysis

Bivariate analysis indicated that the relationship between standard of living and quality of life could be moderated by a third variable. As the variance of quality of life scores differed at different levels of standard of living it was hypothesised that there may be a third variable, moderating the relationship. The literature suggests that health is related to both standard of living and quality of life, and bivariate analysis showed that the health related variables were correlated to both standard of living and quality of life. As health was the most feasible variable, hierarchical multiple regression analyses were used to test if health related variables were moderating the relationship between standard of living and quality of life. The Baron and Kenny (1986) approach was used to assess moderation with the help of Process (Field, 2007). The hierarchical multiple regressions had three steps to predict quality of life scores. Six different models were created to predict the CASP, ICECAP and EUROHIS-QOL. Each quality of life measure had two models (each model included either the ELSI or the LSCAPE).

Step one was the same as step one in the hierarchical multiple regression analysis described earlier (3.7.2). Step two was the addition of the centred variables of either the ELSI or LSCAPE, and the health related measures (SF12 physical, ability to get around, SF12 metal, CES-D depression and

loneliness). Step three constituted the addition of five interaction variables of standard of living multiplied by each of the health related measures. Standardised Beta weights with corresponding P-values were used to assess the contribution of each variable in the model at the different steps.

3.7.4. Mediation analysis

Results of the test for moderation indicated that the relationship between standard of living and quality of life might not be moderated by health and may be better explained as mediated by health. The mediation analysis utilised the approach from Baron and Kenny (1986) and used Process (Field, 2007) to complete another hierarchical multiple regression analysis. Standard of living (either ELSI or LSCAPE) was the independent variable and quality of life was the dependent variable (either CASP, ICECAP or EUROHIS-QOL) and there were five health variables (SF12 physical, ability to get around, SF12 mental, CESD depression and Loneliness) tested as potential mediators. This resulted in six different analyses with each standard of living measure having an analysis with each quality of life measure (3x2). The results were then used to assess the level of mediation from the variables. The degree to which the standard of living measures contribution changed after adding the health related variables was used to assess the level of mediation.

3.8. Conclusion

This first part of this chapter described the research design, participants and measures used in the analysis. This was followed by a description of the data screening and assumption checking, such as examining the data for missing values, normality and outliers. These techniques were used to address the aims of this study. The following chapter describes the results of these techniques, with the aim of answering the research questions.

4. Results

4.1. Introduction

Results will be presented in relation to the three key research questions. These are 1. Are standard of living and quality of life related? 2. What is the relationship between standard of living and quality of life? 3. How does health and social support affect the relationship between standard of living and quality of life?

4.2. Are standard of living and quality of life related (Question 1)?

To address the first question "Are standard of living and quality of life related?" bivariate analyses were conducted to assess the degree of simple association between the standard of living and quality of life measures. Hierarchical multiple regression was used to account for the role of other variables.

4.2.1. Association between standard of living and quality of life

Spearman's rho (ρ) correlations were calculated between the two measures of standard of living and three measures of quality of life. The Spearman correlations between standard of living measures (ELSI and LSCAPE) and quality of life measures (CASP, ICECAP and EUROHIS-QOL) are presented in Table 4.1. All correlations were medium to strong in a positive direction ranging between $\rho(2319) = .432$, $p<0.001$ and $\rho(2339) = .556$, $p<0.001$. This indicates that a participant with a high standard of living score is also likely to have a high quality of life score. Correlation coefficients of this magnitude indicate that standard of living explains between 19-31% of the variance in quality of life scores. The levels of association between standard of living and quality of life were similar across all measures.

Table 4.1

Spearman's rho correlations of CASP, ICECAP, EUROHIS-QOL, ELSI and LSCAPE

Measure	CASP	ICECAP	EUROHIS-QOL	ELSI	LSCAPE
CASP	1				
ICECAP	.630***	1			
EUROHIS-QOL	.687***	.672***	1		
ELSI	.500***	.432***	.553***	1	
LSCAPE	.521***	.461***	.556***	.813***	1

Note. *** $p<0.01$ (2-tailed).

4.2.2. Correlations between measure domains

To assess if the correlations between standard of living and quality of life in Table 4.1 were restricted to specific domains, the correlations between all the standard of living and quality of life domains were calculated.

Table 4.2 displays the correlations of the LSCAPE and CASP measures domains, correlations for the LSCAPE domains with the whole CASP measure range between $\rho(2511) = 0.521$, $p<0.001$ and $\rho(2721) = 0.374$, $p<0.001$. Correlations between the CASP domains and the total LSCAPE score range between $\rho(2414) = 0.592$, $p<0.001$ and $\rho(2633) = 0.306$, $p<0.001$. This indicates that all LSCAPE domains were responsible for the whole measure correlations with the CASP rather than one domain being responsible. Although the correlations in

Table 4.2 between domains vary, all domains were significantly correlated to one another and no single domain accounted for the overall correlation. Although not shown in the thesis the same pattern

was also present and consistent when comparing the other measures domains (ELSI, ICECAP and EUROHIS-QOL).

Table 4.2

Spearman's rho correlations between the LSCAPE domains and the CASP domains

Measure domain	CASP total	CASP control	CASP autonomy	CASP Self-realisation	CASP pleasure
LSCAPE25 total	.521***	.374***	.592***	.306***	.383***
LSCAPE health	.435***	.333***	.482***	.254***	.312***
LSCAPE social integration	.511***	.400***	.529***	.324***	.373***
LSCAPE contribution	.422***	.298***	.467***	.258***	.335***
LSCAPE enjoyment	.516***	.389***	.545***	.322***	.401***
LSCAPE security	.418***	.276***	.515***	.229***	.305***
LSCAPE restriction reversed	.374***	.236***	.477***	.192***	.251***

Note. *** $p<0.001$.

4.2.3. Accounting for other variables

To examine if the relationship between standard of living and quality of life still existed after accounting for other variables, hierarchical multiple regression analysis was undertaken. Standard of living still had a significant relationship with quality of life even after accounting for various demographic and health related variables such as age, gender, education, relationship status, Māori

descent, income, asset worth, retirement status, physical health, ability to get around, mental health, depression and loneliness.

Depression, loneliness and mental health were the biggest predictors of quality of life, followed by standard of living then physical health and ability to get around, with contributions ranging between β = -.293, $t(1751) = -10.72$, $p < .001$ and $\beta = .097$, $t(1751) = 3.926$, $p < .001$.The addition of these various health variables attenuated the relationship between standard of living and quality of life. In Table 4.3 the ELSI in model 2 before health variables were added was $\beta = .482$, $t(1756) = 19.679$, $p < .001$, but the addition of the health variables in models three and four reduced the ELSI's contribution to $\beta = .151$, $t(1751) = 7.341$, $p < .001$. Model 4 in Table 4.3 shows that standard of living is still a significant predictor of quality of life even after accounting for the other variables with $\beta = .151$, $t(1751) = 7.341$, $p < .001$. This shows that standard of living in this example (ELSI score) accounts for close to 15% of the variance in quality of life (CASP score).

In the analysis involving the CASP and ELSI shown in Table 4.3, the variables of Māori descent and relationship status were small but significant predictors at $p < .01$ level. In the other analyses Māori descent was significant at $p < .01$ in the CASP, LSCAPE analysis and at $p < .05$ in the ICECAP, ELSI and ICECAP, LSCAPE analysis, gender was also a significant predictor in the ICECAP, LSCAPE analysis at $p < .05$. The biggest of these contributions was Māori descent ($\beta = -.049$, $t(1756) = -3.073$, $p < .01$) and relationship status ($\beta = .049$, $t(1756) = 2.965$, $p < .01$) in the CASP, ELSI analysis. Although these values indicate that Māori descent and relationship status may contribute some unique predictive ability in the model they did not reach the minimum P-value set for this study ($p<0.001$).

Table 4.3 shows the model involving the relationship between the ELSI and the CASP. The other hierarchical multiple regression models which involved the ELSI and the EUROHIS-QOL or ICECAP as well the LSCAPE and the three quality of life measures not shown in the thesis showed very similar results. The differences between these models were in terms of the ordering of the contribution of the health variables made. The spread of the contribution of all measures on the whole as well as adjusted R^2 values all showed the same pattern with similar values. In each analysis adding

the health variables greatly reduced the predictive capability of the standard of living measure but standard of living remained a significant predictor. In all models, mental health, depression and loneliness were always the largest predictors of quality of life.

Table 4.3

Summary of hierarchical regression analysis testing contribution of demographics, standard of living (ELSI) and health on quality of life (CASP)

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Age	.076***	.022	.107***	-.008	.020	-.011	.024	.019	.034	-.004	.015	-.006
Gender	-.740***	.259	-.069***	-.490	.235*	-.046	-.308	.217	-.029	-.187	.177	-.017
Relationship status	-.141	.106	-.032	.064	.096	.015	.135	.089	.031	.215**	.073	.049**
Highest education level	.182	.119	.036	.221	.108*	.044	.174	.100	.035	.063	.082	.013
Estimated income bands	.297***	.061	.136***	.020	.057	.009	-.005	.053	-.002	.032	.043	.015
Total worth of assets	.354***	.049	.178***	.017	.048	.008	.017	.044	.009	.059	.036	.030
Receiving Work Income	1.412***	.345	.127***	.898**	.314	.081**	.271	.294	.024	.090	.239	.008
Maori Descent	-.437	.270	-.038	-.855	.245	-0.073	-.903***	.227	-.077***	-.572**	.186	-.049**
ELSI41				.44***	.022	.482***	.338***	.022	.37***	.138***	.019	.151***
SF 12 Physical Score							.035**	.015	.069**	.072***	.013	.142***
Ability to get around							2.022***	.186	.31***	.631***	.161	.097***
SF 12 Mental Score										.112***	.018	.16***
Depression Scale Score										-.333***	.031	-.293***
Loneliness Total										-.348***	.031	-.208***
R		.298			.504			.600			.761	
R^2		.089			.254			.361			.579	
Adjusted R^2		.085			.250			.357			.575	

Note *p<0.05, **p<0.01, *** p<0.001

4.3. Nature of the relationship between standard of living and quality of life (Question 2)

Section 4.2 established that standard of living and quality of life are related, so to address the next question of "What is the relationship between standard of living and quality of life?" a series of boxplots were created followed by hierarchical multiple regression analyses. Boxplots were created to examine the dispersion of quality of life scores at different levels of standard of living. Hierarchical multiple regression was also used to account for the role of other variables.

Figure 4.1 and *Figure 4.2* show the relationship between standard of living and quality of life at different levels of standard of living scores (each box and whisker on each graph accounts for the spread of participants quality of life scores in that score decile or category). There was a small positive relationship between standard of living and quality of life as can be seen in the rise in means from left to right. The variance of quality of life scores at the lower end of standard of living scale is very large and at the higher end of standard of living the variance in quality of life is much smaller. This difference in variance was confirmed by Levene's statistic which was significant at $p<0.001$ for all models.

This pattern shows a ceiling effect where no matter what a person's standard of living, they are potentially able to have a very high quality of life score. This is shown by the top whisker of the boxplots all being at or near the maximum quality of life score. The bottom whiskers of the graph demonstrate that if a person has a high standard of living it is unlikely that they will have a low quality of life. *Figure 4.1* and *Figure 4.2* show this relationship is also present with both the ELSI and LSCAPE measures. Although *Figure 4.1* and *Figure 4.2* only represent the CASP quality of life measure, the same pattern was also present when examining the ICECAP and EUROHIS-QOL quality of life measures.

*Figure 4.1*and *Figure 4.2* show outliers at the higher end of the standard of living scores. To check if these outliers affect the dominant pattern, the means and standard deviations were recalculated with the upper and lower five percent of scores removed. After this recalculation the same pattern emerged.

To test whether this pattern was due to the negatively skewed spread of the population causing a higher variance at the lower standard of living end, population deciles were used for standard of living as opposed to scores. This resulted in each box and whisker representing ten percent of the sample population and negates any effect that a variable population spread will have on the pattern present in the graphs. The narrowing pattern of quality of life as standard of living increases was not due to the population spread, and was still present when graphed by population decile.

The consistency of the narrowing pattern demonstrating the spread of quality of life changes at different levels of standard of living could indicate that standard of living is being moderated by other variable/s. This in turn could explain why the variation of quality of life changes at different levels of standard of living.

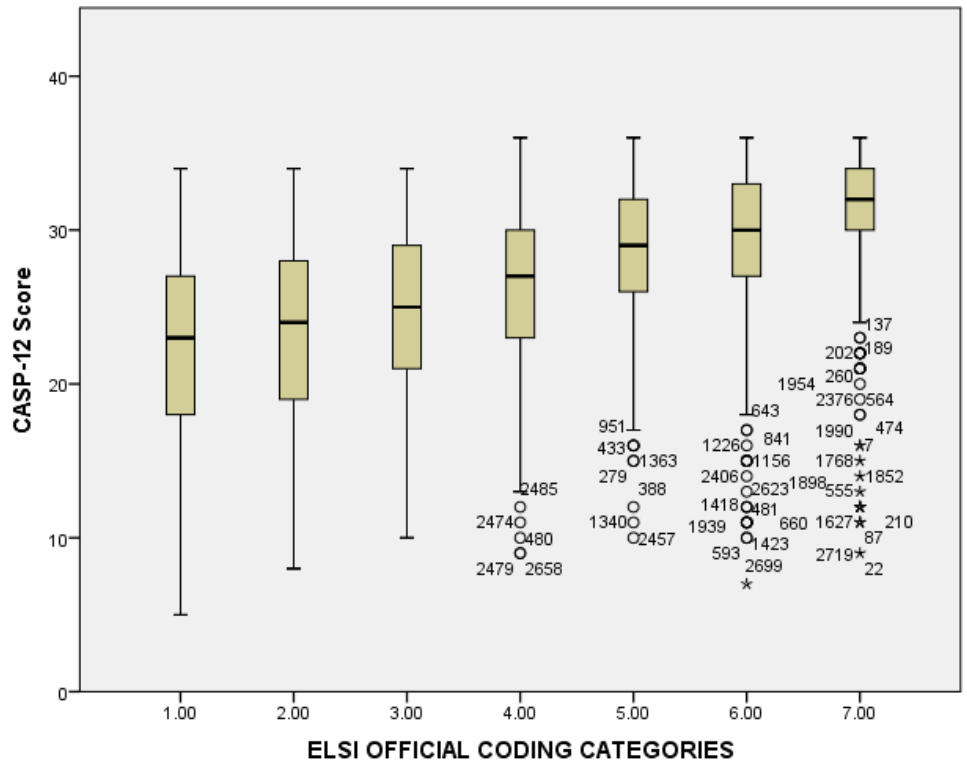

Figure 4.1. CASP score by ELSI category

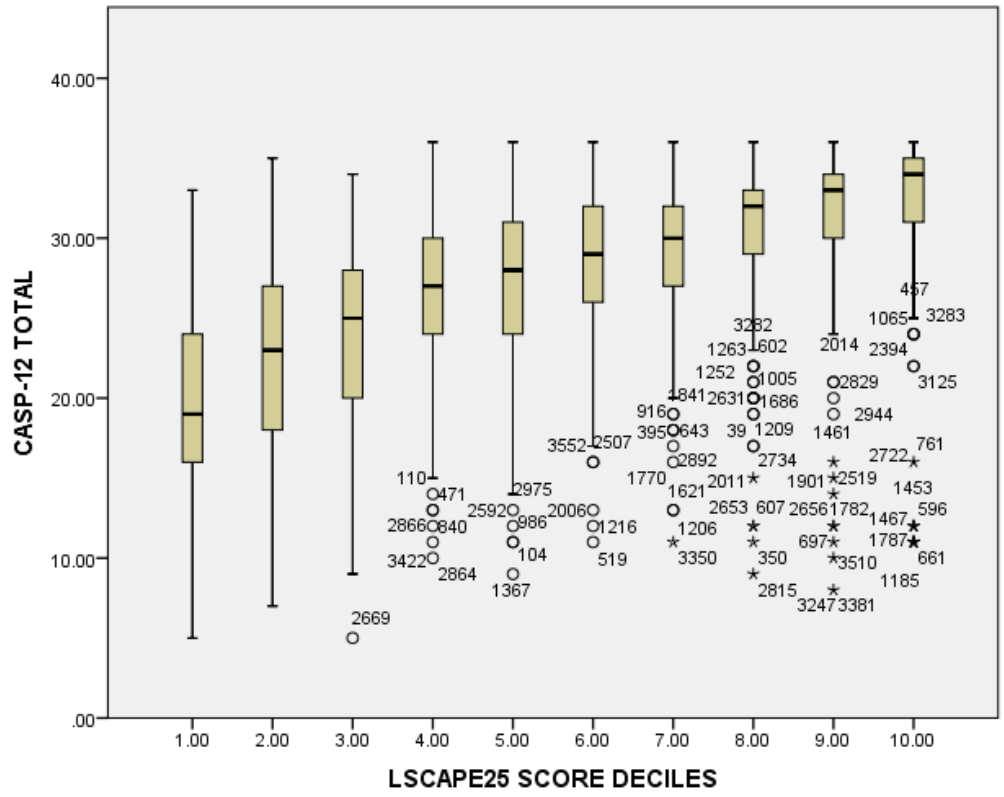

Figure 4.2. CASP score by LSCAPE score deciles

4.4. The role of health and social support (Question 3)

To address the question of "What role does health and social support play in the relationship between standard of living and quality of life?" correlational analysis of standard of living, quality of life and health related variables were completed along with *t*-tests comparing the effect of high and low health related variables on quality of life. A series of hierarchical multiple regression analyses were then carried out, first with a focus on moderation then on mediation. Testing both mediational and moderational analyses demonstrates *how* standard of living influences quality of life in this sample of older adults.

Results from *Figure 4.1* and *Figure 4.2* indicate that there may be other variables influencing the relationship between standard of living and quality of life. From the literature there is strong evidence that mental and physical health and psycho-social support are related to standard of living and quality of life. Therefore measures of health were examined for their association with quality of life and

standard of living as well as their effect sizes on quality of life. This was undertaken to identify variables that are related to both standard of living and quality of life which could be affecting the relationship.

Table 4.4 shows the correlations of various demographic, physical, social and mental health variables with standard of living and quality of life. Māori descent, gender, retirement status and age had the smallest correlations with the standard of living and quality of life measures with *p* values ranging from non-significant to $p<0.001$. All other variables had correlations with $p<0.001$. The health related variable with the highest correlations with the standard of living and quality of life measures was the CES-D depression scale. Correlations between the CES-D and quality of life measures ranged from $\rho(2812) = -0.605$, $p<0.001$ and $\rho(2778) = -0.650$, $p<0.001$ and correlations between the CES-D and the standard of living measures were LSACPE $\rho(2484) = -0.402$, $p<0.001$, ELSI $\rho(2519) = -0.411$, $p<0.001$.

Another indication of the relationship between these variables is the effect size they have on quality of life. Effect sizes were assessed by comparing the quality of life scores for the top and bottom half of the sample for each variable. Results indicated that age, Māori descent, gender, relationship status, retirement status and education either have no direct impact on CASP score or a small impact of < 5% (Table 4.5) Income, asset worth and number of chronic conditions change the CASP score by 5% - 10% and loneliness, physical health, mental health, mobility, and depression all change the CASP score by at least 10%. Although Table 4.5 only shows results from change in CASP scores the same pattern emerged from the ICECAP and EUROHIS-QOL with minor differences. These findings are consistent with the correlational findings of the same measures from Table 4.4 as the measures found to be significantly correlated in Table 4.4 were also found to have significant differences in quality of life scores Table 4.5. The significant correlations (Table 4.4) and effect sizes found (Table 4.5) suggest the variables that could have an effect on the relationship between standard of living and quality of life are: income, asset worth, number of chronic conditions, loneliness, physical health, mental health, ability to get around and depression.

Table 4.4

Correlations between standard of life and quality of life with demographic and health variables

Measure	Maori Descent	Gender	Working or Retired	Age	Marital Status Simplified	Highest Educational Qualification	SF 12 Physical	SF 12 Mental	Depression Scale	Estimated Income Bands	Total Asset Worth	Loneliness	Ability to Get Around	Total Chronic Conditions
CASP-12	.049**	-.028	-.175**	-.067***	.107***	.151***	.401***	.490***	-.650***	.201***	.264***	-.500***	.466***	-.240***
ICECAP	.043*	-.054**	-.112**	-.036	.126***	.096***	.303***	.529***	-.605***	.126***	.197***	-.527***	.427***	-.235***
WHOQOL	.091***	.008	-.199**	-.073***	.153***	.152***	.518***	.493***	-.621***	.252***	.274***	-.469***	.580***	-.278***
ELSI	.162***	.067**	-.154**	.016	.181***	.170***	.307***	.269***	-.411***	.357***	.460***	-.334***	.305***	-.167***
LSCAPE 25	.138***	.033	-.065**	.073**	.125***	.157***	.271***	.279***	-.402***	.268***	.440***	-.337***	.288***	-.181***

Note *p <0.05, **p <0.01, p<0.001

Table 4.5

Effect sizes for difference in CASP scores for dichotomous variables

Measure		CASP score	SD	Percentage change[a] (effect size)
Age	Under 65	28.37	5.63	0.8%
	65and over	28.13	5.434	
Māori descent	Māori descent	27.99	5.419	1.3%
	Not Māori descent	28.38	5.573	
Gender	Male	28.14	5.435	0.7%
	Female	28.35	5.549	
Relationship	In a relationship	28.69	5.19	4.53%***
	Not in a relationship	27.33	6.079	
Education	High school or less	27.61	5.657	3.83%***
	Post-secondary/trade/tertiary	28.76	5.337	
Estimated income	<$30,000	27.42	5.704	6.46%***
	$30,000+	29.36	5.021	
Asset worth	$0-250,000	27.27	5.674	7.53%***
	$250,001+	29.53	5.087	
Retirement	Working	29.12	5.113	4.53%***
	Retired	27.76	5.543	
Loneliness	Not lonely	30.12	4.529	13.83%***
	Moderately to very severely lonely	25.97	5.751	
Physical health	SF12 normed score 0-50	26.11	5.53	12.9%***
	SF12 normed score 51-100	29.98	4.766	
Mental health	SF12 normed score 0-50	25.69	5.738	15.6%***
	SF12 normed score 51-100	30.38	4.199	
Mobility	Neither well nor poorly to very poorly	22.78	6.071	20.9%***
	Well and very well	29.06	4.925	
Chronic conditions	0-2 chronic conditions	28.61	5.215	8.0%***
	≥3 chronic conditions	26.23	5.882	
Depression	Depressed	23.05	5.739	22.4%***
	Not depressed	29.77	4.421	

Note. *** significant at p<0.001, SD = standard deviation,

[a] Percent change is based on percentage of change from a maximum score of 30

4.4.1. Moderation analysis

Having identified a number of variables which could be affecting the relationship between standard of living and quality of life, a three step hierarchical multiple regression analysis was undertaken. This regression analysis looked for any moderation of the effect of standard of living on quality of life. The first step in the model was to assess the impact of the demographic variables of Māori descent, gender, age, marital status, level of education, total asset worth and estimated income on quality of life. The second step in the model involved the addition of a standard of living measure (either ELSI or LSCAPE), SF12 physical health, SF12 mental health, loneliness, and ability to get around. The third step was the addition of interaction variables of the standard of living measure (either ELSI of LSCAPE) multiplied by the variables added in step two. The moderation analysis showed that there was very little interaction between the health variables and the standard of living measures. No interaction terms were significant at $p< 0.001$. The specific interaction effects which were close to significance were the LSCAPE x loneliness in the EUROHIS-QOL model with a standardised β = .052, $t(1837) = 3.069$, $p = .002$ and the ELSI x SF12 physical score in the CASP model with a standardised $\beta = .080$, $t(1835) = 2.927$, $p = .003$. From the large sample size and the number of tests run it is expected some of the terms will reach significance at this level even if there is no meaningful interaction taking place. These standardised β are small so even though they are significant at the $p<0.01$ level, the effect they have on the model is negligible.

The third step (interaction variables) in the models met significance levels of $p< 0.001$ twice (LSCAPE, CASP model and LSCAPE, EUROHIS-QOL), but the biggest change in adjusted R^2 was 0.004 in the LSCAPE, CASP model, indicating a 0.4% increase in the models explanatory power to predict quality of life scores. This was a very small change in adjusted R^2 indicating a very small effect which was considered irrelevant to the model.

When looking for the moderation effect, line graphs of residuals were examined to look for a pattern of interaction. An example of the relationship between the health-related variables and standard of living and quality of life is shown in *Figure 4.3*. This is a line graph of the relationship between the ELSI and the CASP at different levels of depression on the CESD. For there to be a moderating

relationship, the angle of the lines should change at different levels of depression. As can be seen, the angle remains the same for all levels. This pattern is consistent across all physical health, mental health and loneliness variables which were involved in the multiple regressions. *Figure 4.3* indicates that the health variables are not moderating variables. Health variables could be mediators as the same relationship (shown by the angle of the lines in *Figure 4.3*) between standard of living and quality of life occurs at varying levels of depression (as well as physical health, mental health and loneliness).

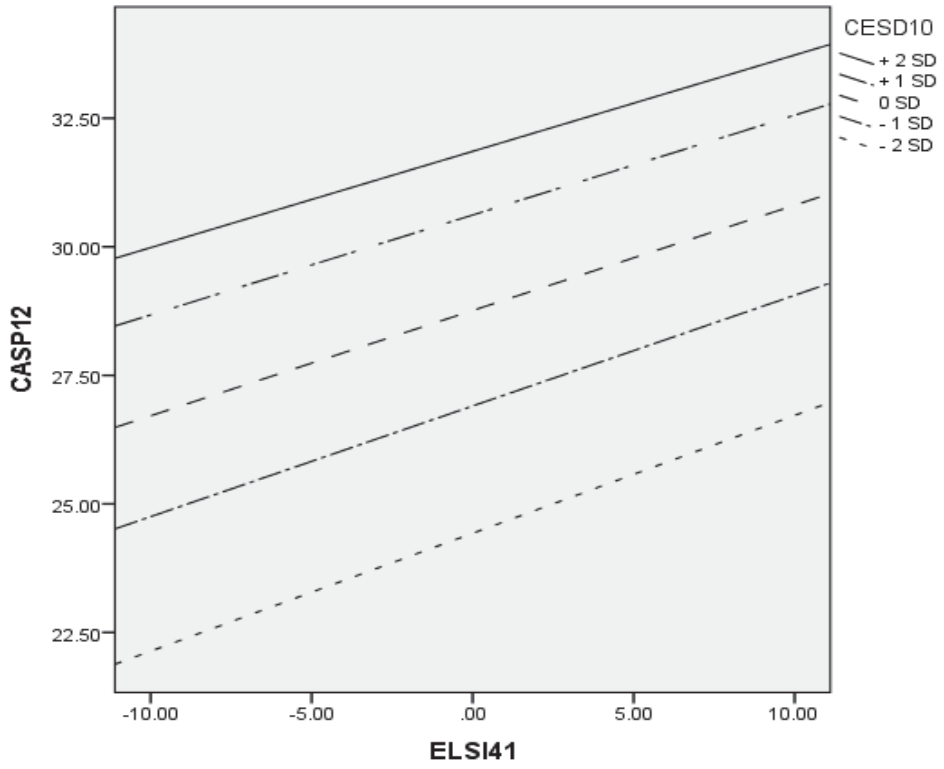

Figure 4.3. CASP score vs ELSI residuals at varying levels of the CESD depression scale.

4.4.2. Mediation analysis

As moderation was found to be negligible and *Figure 4.3* indicated a possible mediating relationship between standard of living, health and quality of life, a mediation analysis was performed. Mediation was assessed using six new hierarchical multiple regression models. The new regression models' independent variables were the SF12 physical, Ability to get around, SF12 mental, CES-D, Loneliness scale and either the LSCAPE or ELSI, the dependent variable was one of the quality of life measures

(CASP, ICECAP or EUROHIS-QOL). Each quality of life measure had two models, one for each of the standard of living measures.

Using the approach from Baron and Kenny (1986) with the help of the software Process (Field, 2007) the mediation of the relationship between standard of living and quality of life by health variables was assessed. Analysis resulted in three models for the three quality of life measures used for dependent variables shown in Figure 4.4, Figure 4.5 and Figure 4.6. R^2 values ranged between 0.5534-0.6830 indicating that the model explains between 55%-68% of the variance of quality of life.

The ELSI was a better predictor of quality of life, both directly and indirectly through the health variables compared to the LSCAPE. This is shown in Table 4.6 by the standardised Beta values being bigger for the ELSI in in all models. An example of this is from Table 4.6 where the total effect of the ELSI was between standardised Beta = 0.1698-0.4854 $p<0.001$, whereas the LSCAPE standardised Beta = 0.0468-0.1231 $p<0.001$, which is lower. The standardised Beta's for the ELSI and the health related variables were also bigger for all variables in all models. This indicates that the LSCAPE has less of a relationship to quality of life although the level of mediation is still similar.

Table 4.6 shows the effect of mediation that the added health variables had on the effect between standard of living and quality of life. In all models the direct effect between standard of living and quality of life decreased by more than half when the other variables were added. This shows that over half of the total effect that standard of living has on quality of life is accounted for by the indirect effect that standard of living has on health which then effects quality of life. The only model which showed only a small relationship between standard of living and quality of life was the ICECAP model with the LSCAPE as the standard of living predictor. After taking into account the other variables in the models the ELSI was the better standard of living predictor of quality of life for all three measures as can be seen in Table 4.6, with direct effects ranging between 0.21-0.05 after accounting for the other variables.

The health related variable which had the biggest impact on quality of life is ability to get around (mobility) range of standardised Beta = .40-1.08 $p<0.001$. This indicates that ability to get around has

between 0.4 and 1.08 of a standard deviation effect on quality of life. The majority of the mediation appears to come from the three psychological variables, the SF12 mental, CES-D (depression) and loneliness, closely followed by the SF12 physical as can be seen in Figure 4.4, Figure 4.5 and Figure 4.6. This is shown by the standardised Betas having a sizable effect from standard of living to the health variables (path A) as well as from the health variables to quality of life (path B).

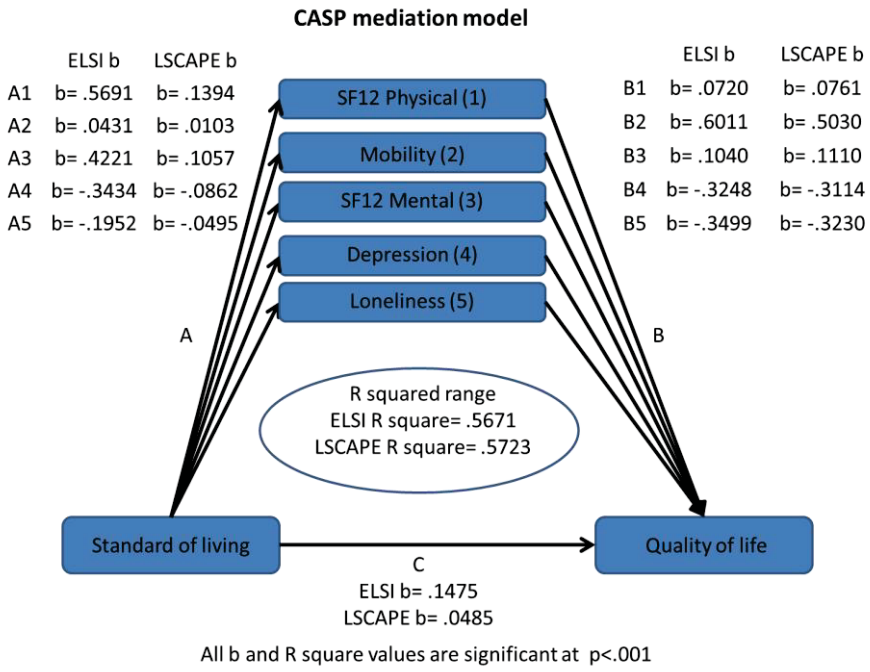

Figure 4.4. Model with coefficients of standard of living and quality of life (CASP) with health mediators

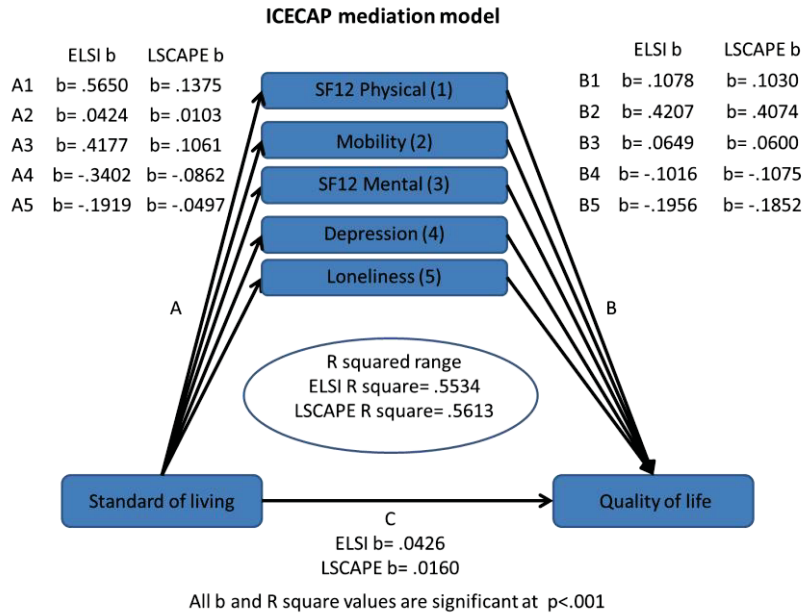

Figure 4.5. Model with coefficients of standard of living and quality of life (ICECAP) with health mediators

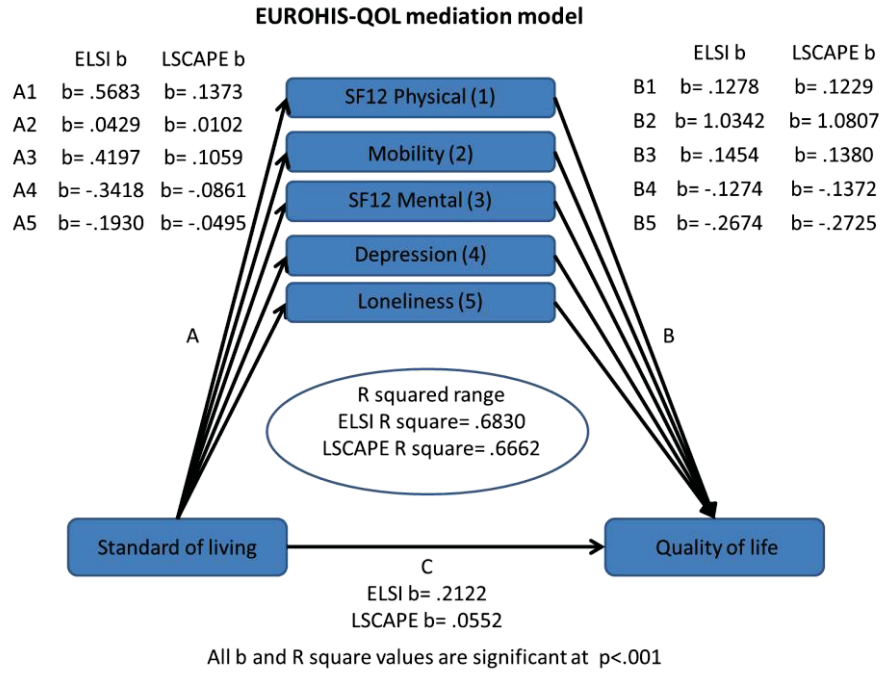

Figure 4.6. Model with coefficients of standard of living and quality of life (EUROHIS-QOL) with health mediators

Table 4.6

Total and direct effects of standard of living on quality of life while accounting for health (SF12 physical, ability to get around, SF12 mental, CESD depression, Loneliness)

Quality of life measure	CASP		ICECAP		EUROHIS-QOL	
Standard of living measure	ELSI	LSCAPE	ELSI	LSCAPE	ELSI	LSCAPE
Direct effect of standard of living on quality of life while controlling for health	0.1475	0.0485	0.0426	0.016	0.2122	0.0552
Total effect of standard of living on quality of life	0.4381	0.1188	0.1698	0.0468	0.4854	0.1231

4.5. Conclusion

In summary, analyses in this study indicate that standard of living is related to quality of life with positive, medium to strong correlations. Furthermore, participants at all levels of standard of living are potentially able to achieve a high quality of life, but participants with a high standard of living are much less likely to have a low quality of life. This relationship is further demonstrated by the role of health-related variables between standard of living and quality of life. Variance of quality of life scores changed at different levels of standard of living. This change in variance was first examined in terms of the moderating effect of health, but analysis showed that moderation effects were negligible. Mediation analysis showed that the psychological health variables (SF12 mental, CES-D and Loneliness) mediated the relationship between standard of living and quality of life followed by the physical health variables (SF12 physical and ability to get around). Standard of living therefore influences health and then health influences quality of life. After accounting for this mediating effect, the direct effect of standard of living was halved. What these results mean and how they relate to wider research is discussed in the following chapter.

5. Discussion

The purpose of this study was to examine the relationship between standard of living and quality of life for older people. There are two main findings from the present study: (1) Low standard of living does not preclude a high quality of life, but a high standard of living means a low quality of life is less likely; and (2) The relationship between standard of living and quality of life is mediated by health-related variables. Psychological health-related variables mediated the relationship more than physical health-related variables. These findings indicate that standard of living affects psychological health, physical health and loneliness, which then affect quality of life. This chapter provides an interpretation of the findings and discusses them in relation to previous research. A number of limitations to this study are discussed, along with future directions for this area of research.

5.1. Standard of living as foundational to quality of life

The idea that a high standard of living can help improve quality of life and even underpin it is a prevalent assumption. The hierarchy of needs proposed by Maslow (1968) includes standard of living, referred to as physiological and safety needs. Maslow proposed that physiological and then safety needs are fundamental and underpin well-being. Physiological needs include housing and clothing while safety needs include financial security, job security and a safety net to protect people from illness, accident or misfortune (Maslow, 1968). Although these do not encompass the entire spectrum of standard of living, they represent key aspects of what an adequate standard of living protects people from. The Ministry of Social Development (2010b) report that a reasonable level of standard of living is essential for quality of life. But this assumption of the foundational role of standard of living is not wholly supported by the present study. The present study found that even people with very low levels of standard of living could achieve a high quality of life, although it was less assured. A possible reason the present study did not concur with Maslow (1968) could be that the majority of the sample had an adequate standard of living. This could be the case due to New Zealands universal superannuation scheme which provides everyone over 65 years with adequate financial resources, and these resources might be enough to build the basis of a high quality of life for most New Zealanders.

This importance of standards of living in providing a foundation for the achievement of quality of life might best be understood by cross national comparisons which include older people with much lower standards of living than are found in New Zealand.

In the present study, standard of living had a small direct effect on quality of life, but results showed it can provide a buffer against those aspects of life which negatively affect quality of life. Research on older people has shown that a low standard of living increases the chance of having poor physical and mental health (Dulin et al., 2011; Lund et al., 2011; Patel et al., 2010). Therefore a high standard of living protects people from poor health and as health is one of the strongest predictors of quality of life (Netuveli et al., 2006), the effect of standard of living on quality of life is mediated by health. As deteriorating health is associated with ageing in later life, it is reasonable to conclude that interventions for improving quality of life should not focus solely on physical health, but instead should focus on psychological health which has been shown to be a stronger predictor of quality of life in the present study and others (Ekwall et al., 2005; Low & Molzahn, 2007; Webb et al., 2011; Weber et al., 2015). These interventions could include improving the standard of living of older people as many studies have shown strong links between the level of standard of living and mental health (Foulds, Wells, & Mulder, 2014; Lynch et al., 2000; Weich & Lewis, 1998).

5.1.1. Health mediates the relationship between standard of living and quality of life

The buffering relationship found can be understood through the mediating effect of health on the relationship between standard of living and quality of life. Health in this context is referring to the holistic idea of health which incorporates physical health, mental health and social relationships. Existing research has already demonstrated that standard of living affects both mental and physical health through factors such as poor housing conditions, limited access to healthcare and other stressful life conditions (Foulds et al., 2014; Spiers et al., 2005; Weich & Lewis, 1998). Researchers have also demonstrated that health affects quality of life (Camfield & Skevington, 2008; Low & Molzahn, 2007). These two findings from other authors: standard of living affects health and health affects

quality of life, align with the present study's finding that the relationship between standard of living and quality of life is mediated by health. The buffering effect of standard of living found in the present study shows that improving the standard of living of older people who have lower levels of standard of living would be an effective way of making low quality of life less likely for these people. This would produce a direct effect of increasing mental and physical health which in turn increases quality of life, as well as producing a small direct effect on quality of life.

There is a large amount of robust research indicating that low living standards lead to an increased prevalence of physical health problems (Lynch et al., 2000; Ministry of Health, 2010; Ministry of Social Development, 2010b; Smith et al., 2005) and mental health problems (Foulds et al., 2014; Lund et al., 2011; Patel et al., 2010; Saraceno, Levav, & Kohn, 2005). One example is Foulds et al. (2014) who found that New Zealanders living with very low standards of living, (living in deprivation) were much more likely to be suffering psychological distress than those with higher living standards. As mental and physical health have been found to be two of the strongest predictors of quality of life (Andrews et al., 2002; Bowling & Windsor, 2001; Netuveli & Blane, 2008; Webb et al., 2011), this leads to the assumption that having a higher standard of living can help people avoid some of the causes of poor mental health, physical health and isolation and therefore reduce the chance of a low quality of life. The mediation of the relationship between standard of living and quality of life by health found in the present study could help explain the buffering effect a high standard of living has against a low quality of life. This buffering is likely achieved through two ways: a direct effect of standard of living on quality of life and also the mediating effect where standard of living affects health in general and health then affects quality of life.

The notion that health-related variables are mediators between standard of living and quality of life is consistent with a model proposed by Felce (1997). Felce (1997) categorises and connects six different models of different quality of life interpretations into one integrated model of overall quality of life. This model of overall quality of life is multifaceted and highly dynamic with nearly all of its components having two way interactions with all other components. Felce's model is consistent with the model in the present study ; objective life conditions (including material well-being) affect

subjective feeling of well-being (inlcuding physical and mental health) which in turn influence personal values and aspirations (including those regarding physical and mental health) which then affects overall quality of life. Felce's model also allows for a weaker direct effect of material well-being on quality of life. In particular, this model from Felce (1997) is consistent with the finding in the current study where the relationship between standard of living and quality of life was mediated by psychological and physical variables but standard of living also had a small direct effect. The model from Felce (1997) and the results from this study both show that it is crucial to take a wide variety of varibles into account when examining quality of life and to examine how the various variables interact with each other such as the impact of health on the interaction between standard of living and quality of life.

Rather than proposing a comprehensive model with many reciprocal relationships, Wilson and Cleary (1995) propose a more direct relationship between the environment and quality of life. The Wilson and Cleary model, later developed by Ferrans et al. (2005) is also consistent with the present study. Over the last 20 years the model proposed by Wilson & Cleary (1995) has been extensively drawn upon in both psychological and medical research (Bakas et al., 2012). The Wilson & Cleary (1995) and Ferrans et al. (2005) models propose that characteristics of the environment effect the various domains of health (biological function, symptoms, functional status and general health perceptions) which in turn effect overall quality of life. The models also have a direct effect of environmental characteristics on overall quality of life which is consistent with the present study. The input of 'characteristics of the environment' is a broad concept which captures many of the same ideas as standard of living with aspects such as housing, ownership of resources, as well as access to facilites. But the concept of 'characteristics of the environment' covers more than just standard of living. Although the model proposed by Wilson & Cleary (1995) is framed differently with a focus on health and a very broad concept in place of standard of living, the underlying pattern is consistent with the present study. The findings from Wilson & Cleary (1995), Ferrans et al. (2005) and the present study show that standard of living is an important componet to consider when understanding or attempting to improve quality of life, but that all aspects of a person's life are important and relevant when

conceptualising quality of life. This includes internal aspects such as mental health, personality and life experiences, external personal aspects like physical health, external environmental aspects such as living standards and isolation and societal interaction.

In the present study it was found that standard of living had a small direct effect on quality of life, as well as the effect which was mediated by health. Previous research has found that aspects of the financial and physical environment influence quality of life (Ferrans et al., 2005; Low & Molzahn, 2007; Netuveli & Blane, 2008; Smith et al., 2005). It is clear that low financial wealth and poor standard of physical environment lead to lower levels of quality of life, but what is not clear from the literature is *what way* standard of living influences quality of life. Low and Molzahn (2007) utilised path analysis structural equation modeling and found a small direct effect between standard of living and quality of life, which is what was also found in the present study. However they did not find any mediating affect of health between standard of living and quality of life. Low and Molzahn (2007) found direct relationships to quality of life from finances, physical environment and home environment, all of which could be considered parts of standard of living. These findings are not directly comparable to the present study as the range of variables used to explain quality of life were different (for example meaning in life, purpose in life, activities of daily living and emotional support). In spite of this, Low and Molzahn's study does suggest that the mediational relationship found in the present study may not be universal and may only be present when examined using general quality of life measures and specific standard of living measures such as those used in the present study as oppossed to proximal predictors such as those used by Low and Molzahn (2007).

The mediational relationship found is different to the intially predicted moderational relationship between standard of living health and quality of life. If a moderational relationship was found then the strength of the relationship between standard of living and quality of life would have changed at different levels of health but this was not the case. The present study found that standard of living affects quality of life through health (including psycho-social health) variables. It does reiterate the importance identified by Ferrans et al. (2005) and Halleröd and Seldén (2013) for quality of life to be addressed as a global concept for it to be fully understood. The present study supports (Ferrans et al.,

2005; Halleröd & Seldén, 2013) suggestions that the two largely independent areas of literature of standard of living and quality of life can and should be connected in one conceptual paradigm where standard of living affects health and then health effects quality of life.

5.1.2. Standard of living predicts health

The mediation model proposed in the present study is consistent with other studies which have shown standard of living to effect mental and physical health (Foulds et al., 2014; Ministry of Health, 2010; Spiers et al., 2005). Even when accounting for a large range of demographic variables, other studies have found a strong association between low standard of living and the prevalence of common mental health disorders (Foulds et al., 2014; Lund et al., 2011; Weich & Lewis, 1998). This association has been found to be even stronger in older populations, possible explanations for this are that older people often have less social support and are more prone to sickness (Weich & Lewis, 1998). Groffen, Bosma, van den Akker, Kempen, & van Eijk (2008) found that a low standard of living was a good predictor of mental and physical dysfunction for older people.

In the present study it was found that low standard of living predicts poor physical health, mental health, loneliness and ability to get around. These findings with regard to older people are consistent with both New Zealand and international literature (Halleröd & Seldén, 2013; Lund et al., 2011; Ministry of Social Development, 2010a; Patel et al., 2010). The strong association between standard of living and health indicate the consistency of this study's findings with other authors and helps to confirm the theoretical interpretation of health mediating the effect between standard of living and quality of life. The strong relationship between standard of living and mental health for older people means that lifting the standard of living of deprived older people will likely to result in considerable benefits to the health of the older population, protecting older people from some of the causes of a low quality of life. This could also reduce the overall impact on the health system which comes with a less healthy population.

5.1.3. Standard of living predicts quality of life

Standard of living is often associated with quality of life. In the present study even after accounting for various demographic and health related variables, standard of living was a small but still significant predictor of quality of life. Conceptually it makes sense that standard of living predicts quality of life as they are two different forms of well-being. Standard of living is considered a specific form of well-being, sometimes called economic or material wellbeing (Felce, 1997; Jensen et al., 2002) and quality of life is considered a more global type of well-being, sometimes referred to as global, general, subjective and overall well-being (Felce, 1997; Sirgy, 2012). Sumner (1996) interprets an individual's quality of life as being their overall assessment of their life including standard of living. Halleröd and Seldén (2013) conclude that quality of life cannot be separated from its constituent parts such as standard of living and health. They found that a form of standard of living was integral to their multi-dimensional model of quality of life (Halleröd & Seldén, 2013).

Standard of living literature tends to focus on the ways how *deprivation* influences the quality of peoples' lives as opposed to the whole range of standard of living. Diener et al. (2010) found that satisfaction with standard of living was a significant predictor of quality of life, but they also found that the predictive power plateaus at a certain level. This means that once a certain level of standard of living is reached then the impact of an even higher standard of living does not increase the quality of life. This is inconsistent with the present study which found that standard of living was a significant predictor of quality of life at a range of different levels. This difference may have been because of the difference in measures used. The measures in the current study were in-depth standard of living measures (which incorporate domains such as material satisfaction, safety, deprivation and health). The measures used in the present study have been shown to differentiate more than just levels of deprivation; instead they measure a whole range of different levels of standard of living (Breheny et al., 2014; Jensen et al., 2002). This contrasts with Diener et al. (2010) who only used measures to assess deprivation rather than the whole spectrum of standard of living. The measures used in Diener et al. (2010) may not have been able to identify effects on quality of life at the higher end of standard of living because they did not capture any differentiation above deprivation. This would therefore

create a ceiling effect of its predictive capability, unlike the measures used in the current study. This shows that for standard of living to be an effective predictor of quality of life, the measure used must be able to differentiate standard of living at all levels. Some research suggests that it is not just the deprived who have a different health and quality of life, but that there is a gradient across the whole range of socieoeconomic status (Marmot, 2003, 2007; R. G. Wilkinson, 2002). The entire range of standard of living should therefore be examined (not just the level of deprivation) when assessing the relationship between standard of living and quality of life. The measures used in the present study allowed for the assessment of the impact of different levels of standard of living (from low levels of deprivation to high levels of standard of living) on quality of life.

A possible reason that standard of living was such a small predictor of quality of life in the present study could be New Zealand's universal superannuation, which may provide enough of the basic needs for all levels of standard of living to achieve a high quality of life. Universal superannuation raises the income and standard of living of those without retirement savings (Jensen, Krishnan, Spittal, & Sathiyandra, 2003). This results in a large proportion of older New Zealanders having enough money to help them achieve a 'reasonable' standard of living (J. Jensen et al., 2003). Without superannuation there would likely be more older people living in deprivation which might alter the shape of the relationship as there would be more of an impact from the lowest end of deprivation.

5.2. Predicting quality of life

In the present study demographic variables were not found to be predictors of quality of life. This conflicts with some authors such as Dolan, Peasgood, and White (2008) and Clark, Frijters, and Shields (2007) who have found demographic variables to be predictors of quality of life. In New Zealand, age, gender, Māori descent, retirement status, relationship status, income and asset worth have been found to be predictors of quality of life (Dolan et al., 2008). Income and asset worth tend to have a positive relation to quality of life but their predictive power diminishes with higher income or asset worth (Clark et al., 2007; Diener et al., 2010; Dolan et al., 2008; James, 2007). However, it has also been found that the relationship between income, wealth and quality of life does diminish when

other variables are taken into account (Ferrer-i-Carbonell, 2005). Studies which account for a wide range of other variables conclude that income is not a significant predictor (Myers, 2000; Netuveli et al., 2006; Tay & Diener, 2011). The reason that income was not found to be a significant predictor of quality of life in the present study could be because it was added into the hierarchical multiple regression models with many other variables, thereby limiting the relative contribution of income and asset worth. The New Zealand context of superannuation as described earlier may explain the relatively small effect of standard of living as a predictor, and the nil effect of income and wealth. Another reason that income and wealth was not a predictor of quality of life could be that, what is more important for assessing quality of life is what people can do rather than what they have (Alkire, 2005; Nussbaum, 2003; Sen, 1999). Although income and wealth is often used a proximal measure of what people are able to do, it is not a direct measure. So more direct measures of what people are able to do such as those proposed by Sen & Nussbaum (1993) are more likely to represent a person's well-being compared to what resources a person has.

Māori descent was not a significant predictor of quality of life in the present study. Other studies around the world have found ethnicity to be a predictor of quality of life (Ganglmair-Wooliscroft & Lawson, 2008; Smith et al., 2005) but New Zealand has its own unique indigenous population which cannot necessarily be compared in this respect with other indigenous populations around the world. Ministry of Social Development (2010b) and Ganglmair-Wooliscroft and Lawson (2008) found that Māori had lower overall well-being compared to the rest of the population. One reason that Māori descent was not a significant predictor of quality of life could be the sample in the present study. Over the course of the NZLSA the dropout rate led to a sample where the level of education is much higher than usual, participants of Māori descent with a tertiary education increased from 5% in 2006 to 27% in 2012, non-Māori went from 11% to 35%. The percentage of Māori people living in urban centres rose from 58% in 2006 to 79% in 2012 and the non-Māori sample rose from 69% to 81%. The percentage of Māori participants in a relationship rose from 53% in 2006 to 68% in 2012 and the non-Māori percentage rose from 64% to 78%. These changes in the sample indicate that participants of Māori descent are more educated and urban and this could explain why Māori descent was not a

predictor of quality of life. Even if Māori descent was found to be a predictor of quality of life it would be hard to generalise the findings to the wider Māori population is the Sample in the present study is markedly different from the Overall New Zealand population.

Mental and physical health were found to be predictors of quality of life in the present study with mental health being the stronger of the two, this is consistent with many other authors (Brown et al., 2004; Sirgy, 2012; Smith et al., 2005; The Quality of Life Project, 2007). One proposed reason that mental health is a bigger predictor of quality of life compared to physical health is the explanation for the disability paradox as outlined by (Albrecht & Devlieger, 1999). Albrecht and Devlieger (1999) discuss how a person with poor physical health can still have a high quality of life due to their outlook on life, expectations and cognitive resources to allow them to still be satisfied. In comparable English and Australian longitudinal studies on older people which are similar to the present study, Netuveli et al. (2006) and Andrews et al. (2002) found that depression, mobility, health and social isolation predicted quality of life, this is consistent with the present study's findings. Although the standard of living measures used in the present study were specific standard of living measures compared to the more proximal measures used by Netuveli et al. (2006) and Andrews et al. (2002), they found similar predictive contributions to quality of life from their standard of living measures.

5.3. Comparing the capability approach and economic wellbeing approach to standard of living

In this study the two standard of living measures (the LSCAPE and the ELSI) acted very similarly to the other variables in this study. The LSCAPE was developed from the capability approach (M Breheny et al., 2014) and the ELSI was developed from a material well-being approach(Jensen et al., 2002). As they are based on different theoretical perspectives it could be expected they might act differently when interacting with other variables but this was not entirely the case. In the Hierarchical multiple regressions analyses the LSCAPE and ELSI both had a direct impact on quality of life, but the LSCAPE (capability approach) was a smaller predictor of quality of life compared to the ELSI

(economic well-being approach). Although the predictive power of the LSCAPE was less than the ELSI when predicting quality of life, the same patterns emerged for both standard of living measures. Both measures displayed the pattern of a high standard of living buffering people from a low quality of life as well as a high standard of living not being necessary for a high quality of life. Both measures showed that the relationship between standard of living and quality of life was strongly mediated by health. This finding is understandable because the LSCAPE was validated as a measure of standard of living using the ELSI (Breheny et al., 2013). Correlational analysis show the LSCAPE and ELSI have a medium to strong correlation and comparisons between the LSCAPE and the ELSI show that the LSCAPE correlates similarly to the ELSI with other measures of economic position, wellbeing and health (Breheny et al., 2014). Although the two standard of living measures are based on different theoretical approaches they aim to measure the concept of standard of living. These results suggest that although different approaches are used, the overall idea of an individual's standard of living represents a somewhat stable concept, even if conceptualised as material well-being or the capability to have a standard of living. A possible reason that the measures acted in similar ways could have been that both measures were designed to assess the whole spectrum of living standards rather than just the lower end of deprivation. For older people in New Zealand the present study's findings therefore suggest that there is not a large difference between using the capability approach or the material well-being approach to standard of living in terms of the overall patterns and associations found.

5.4. Comparing approaches to quality of life measurement

The three measures of quality of life used were all derived from somewhat different theoretical approaches. All measures were concerned with overall quality of life, but within that framework there was the personal perception (EUROHIS-QOL), needs satisfaction (CASP) and capability (ICECAP) approaches. It might be expected that these different approaches to measuring quality of life could lead to different interactions and relationships with other variables, but in this study all three approaches behaved in very similar ways to one another. The only difference between the measures

was that the personal perception approach (EUROHIS-QOL) had a higher proportion variance explained with the variables used. The fact that the ICECAP and CASP measures are highly correlated and that they act in similar ways when compared with other variables was understandable. Although the CASP is directly based on a needs satisfaction approach, it was theoretically driven by Sen's capability approach, which is the same approach taken to develop the ICECAP (Al-Janabi, Flynn, & Coast, 2012; Hyde et al., 2003). It has been shown that the five ICECAP domains correspond closely with the four CASP domains (Higgs, Hyde, Wiggins, & Blane, 2003). Although the specific version of the EUROHIS-QOL used in this study has not been directly compared to the CASP or ICECAP, the EUROHIS-QOL's parent measure the WHOQOL has been shown to have good convergent validity with the CASP-19 (Bowling & Stenner, 2011).The finding that all three measures were very similar, not only strengthens the reliability of the findings, but is also consistent with the view of Diener & Suh (1997) and Higgs et al. (2003), who conclude that no single measure of quality of life is good enough and that most measures overlap and can complement each other to confirm relationships found from slightly different perspectives. This study confirms the findings from Higgs et al. (2003) that the ICECAP and CASP are very similar measures. A strength of the present study was that the quality of life measures showed good convergent validity in terms of quality of life scores as well as how other variables predicted them. Some other strengths and limitations are outlined below.

5.5. Limitations, strengths and future directions for research

One of the most important limitations of the present study relates to the characteristics of the 2012 wave of the NZLSA. As mentioned earlier, over the course of the NZLSA the dropout rate has led to a sample where the level of education is much higher than usual, and Māori are more likely to have tertiary education, live in urban centres and be in a relationship compared to the general population. In contrast, the 2006 wave was considered a good representative sample of older New Zealanders with an oversampling of Māori (Towers, Stevenson, & Breheny, In press), but participant dropout has

subsequently created a sample of higher educated, urban-dwelling Māori who are more likely to be in relationships, which is not representative of the general population. This change in the sample's characteristics limits generalizability from the 2012 wave and could also be a confounding factor for the variables of education and relationship status used in the analysis. Chatfield, Brayne, and Matthews (2005) found that longitudinal research with older populations was prone to participant dropout due to multiple reasons. The main reasons (excluding death) found by Chatfield et al. (2005) were increasing age and cognitive impairment.

Relationship status and education have been shown to be predictors of quality of life (Mollenkopf & Walker, 2007; Sirgy, 2012). Mollenkopf and Walker (2007) discuss the importance which relationship status and education can play in a person's quality of life, and especially in older age, they argue it becomes more important in predicting quality of life. They propose that as other forms of fulfilment become less attainable due to a reduction in functionality, the support both physically and emotionally of a partner become even more important as people age. The limitation of the unrepresentative sample of Māori who were more likely to be in a relationship and have a tertiary education could be addressed by; conducting a similar study a new sample; or the NZLSA could recruit a targeted portion of the population to add to the initial sample to make it more representative of the general population.

Another limitation of the sample used was that this was a community based survey of older people. The sample is likely to be healthier than the general population of older people as all the participants were still living independently when recruited and not living in rest homes. This can be a problem with surveying older people as the functionally impaired and very ill are often unable to respond to surveys, especially without assistance, and this is a limitation acknowledged by others (Netuveli et al., 2006). However to further understand what constitutes positive ageing it is important to look at healthy older people who are ageing well. One of the strengths of the present study is its focus on older people living independently in the community. As health is considered one of the most important factors of quality of life (Ferrans et al., 2005; Smith et al., 2005) future studies could incorporate the full range of older people, from healthy to extremely unhealthy. It would help confirm

the relationships found in this study if future NZLSA studies included people in both community and care settings so the characteristics and perspectives of the least well people can also be examined.

The 2012 wave included three quality of life measures, but not the newer quality of life measure the EQ-5D, which limits comparison to later waves, as this is now included in the NZLSA. The EQ-5D is arguably the most used and well-known measure of health and well-being in the world (Devlin & Krabbe, 2013). The EQ-5D is very well validated and researched, with the ability to differentiate well and norms for numerous groups including older people from around the world have been established (Walters & Brazier, 2005). The EQ-5D is a general measure of well-being so it would be expected to act similarly to the other quality of life measures used in the present study. The addition of the EQ-5D to the NZLSA will help extend the applicability of the findings to a wider group.

The cross sectional nature of this study limited the ability to examine any causal influences that standard of living had on health which then lead to quality of life. Undertaking the longitudinal analysis using the NZLSA/HWR data could establish if lower standards of living lead to poorer health, which then leads to a lower quality of life. If these findings could be established in a longitudinal analysis then there would be more evidence of where and what is actually effecting the overall quality of life and allow more of an explanation of the mediating relationship of health between standard of living and quality of life. This could be done by examining the standard of living of NZLSA participants in the 2006 wave and tracking what long term effects living with different levels of standard of living can have on both health and quality of life. This could also account for the cyclical effect of quality of life effecting both standard of living and health; this would clarify the model to a much higher degree.

It is important to interpret the findings in light of the specific cohort included in this study. Cohort effects could lead to differences in personal expectations for both standard of living and quality of life. The specific timeframe the sample lived their lives during influences these relationships. This idea is discussed in detail by Rowe & Kahn (1987) who conclude that cohort effects are important to consider for older people as their lifestyle and experiences have had longer to affect them in an

individual way. This limits the study's applicability to people within the cohort of the present study. To address this, the mediational model could be examined using studies of the same age range in the future to compare to the present findings. This may identify specific cohort effects that do not necessarily apply to later cohorts.

The present study found that a high standard of living was protective against low quality of life, but a low standard of living did not prohibit a high quality of life, although a small number of older people did not follow this trend. Future study in this area could include specific investigation of the small groups of people who have a high standard of living but a low quality of life and the group who have a low standard of living but a high quality of life. Using a larger sample would result in larger numbers of people in these groups allowing statistical analysis to be undertaken. This could provide an excellent opportunity to clarify why standard of living does not always protect against a low quality of life and what aspects lead to low quality of life for older people when they have a high standard of living. Many other studies found poor health, depression, low emotional support and low perceived financial situation to be significant predictors of a low quality of life (Andrews et al., 2002; Bowling & Windsor, 2001; Centers for Disease Control and Prevention, 2000; Netuveli et al., 2006). Although it has been shown that standard of living directly affects those variables in this study, if depression, poor physical and mental health are still present in conjunction with a high standard of living then the buffering effect through mediation may be diminished. This research would have important implications in terms of improving people's quality of life and identifying possible risk factors for the rest of the population.

Further study could also be conducted using more complex statistical approaches such as structural equation modelling. This could allow for the relationship between more variables in a more complex way to be examined. Some research has examined multi directional relationships like the International Classification of Functioning from . World Health Organization (2003) or the multidimensional approach of Diener et al. (2010). More complex statistical approaches like structural equation modelling could allow for a more reciprocal model to be conceptualised as it has been suggested that

a unidirectional model is inadequate to truly understand quality of life (Ferrans et al., 2005; Mathisen et al., 2007).

5.6. Conclusion

Quality of life is a multidimensional concept which is related to standard of living, mental health and physical health. A high standard of living is not essential to a high quality of life but it can affect quality of life either directly or through health. The present study of the 2012 wave data from the NZLSA has robustly demonstrated that having a high standard of living acts as a buffer against a low quality of life for most older people, via the effect of health. This has important implications for future policy as increasing the standard of living of older people who have a low standard of living can help improve their health and quality of life. This could help to reduce the economic and social implications associated with poor health in later life.

6. References

Addington-Hall, J., & Kalra, L. (2001). Who should measure quality of life? *BMJ : British Medical Journal, 322*(7299), 1417-1420.

Agresti, A. (2007). *An introduction to categorical data analysis* (2nd ed.): Wiley.

Al-Janabi, H., Flynn, T., & Coast, J. (2012). Development of a self-report measure of capability wellbeing for adults: the ICECAP-A. *Quality of Life Research, 21*(1), 167-176. doi: 10.1007/s11136-011-9927-2

Al-Janabi, H., Peters, T., Brazier, J., Bryan, S., Flynn, T., Clemens, S., . . . Coast, J. (2013). An investigation of the construct validity of the ICECAP-A capability measure. *Quality of Life Research, 22*(7), 1831-1840. doi: 10.1007/s11136-012-0293-5

Albrecht, G. L., & Devlieger, P. J. (1999). The disability paradox: high quality of life against all odds. *Social Science & Medicine, 48*(8), 977-988. doi: http://dx.doi.org/10.1016/S0277-9536(98)00411-0

Alkire, S. (2005). Why the capability approach? *Journal of Human Development, 6*(1), 115-133. doi: 10.1080/146498805200034275

Alkire, S. (2008). The capability approach to the quality of life: Working paper prepared for the working group "Quality of life".

Andrews, G., Clark, M., & Luszcz, M. (2002). Successful Aging in the Australian Longitudinal Study of Aging: Applying the MacArthur Model Cross–Nationally. *Journal of Social Issues, 58*(4), 749-765. doi: 10.1111/1540-4560.00288

Bakas, T., McLennon, S. M., Carpenter, J. S., Buelow, J. M., Otte, J. L., Hanna, K. M., . . . Welch, J. L. (2012). Systematic review of health-related quality of life models. *Health Qual Life Outcomes, 10*, 134. doi: 10.1186/1477-7525-10-134

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182. doi: 10.1037/0022-3514.51.6.1173

Beard, J. R., & Bloom, D. E. (2015). Towards a comprehensive public health response to population ageing. *The Lancet, 385*(9968), 658-661. doi: http://dx.doi.org/10.1016/S0140-6736(14)61461-6

Bellani, L. A. C. (2011). Deprivation, social exclusion and subjective well-being. *Social Indicators Research, 104*(1), 67-86. doi: 10.1007/s11205-010-9718-0

Berges, S. (2007). Why the Capability Approach Is Justified. *Journal of Applied Philosophy, 24*(1), 16-25. doi: 10.1111/j.1468-5930.2007.00368.x

Berthoud, R., Blekesaune, M., & Hancock, R. (2006). Are 'poor' pensioners 'deprived'? Department for Work and Pensions Research Report No 364.

.

Björgvinsson, T., Kertz, S. J., Bigda-Peyton, J. S., McCoy, K. L., & Aderka, I. M. (2013). Psychometric properties of the CES-D-10 in a psychiatric sample. *Assessment, 20*(4), 429-436. doi: 10.1177/1073191113481998

Blanchflower, D. G., & Oswald, A. J. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics, 88*(7–8), 1359-1386. doi: http://dx.doi.org/10.1016/S0047-2727(02)00168-8

Blanchflower, D. G., & Oswald, A. J. (2008). Is well-being U-shaped over the life cycle? *Social Science & Medicine, 66*(8), 1733-1749. doi: http://dx.doi.org/10.1016/j.socscimed.2008.01.030

Borrell, C., Muntaner, C., Benach, J., & Artazcoz, L. a. (2004). Social class and self-reported health status among men and women: what is the role of work organisation, household material standards and household labour? *Social Science & Medicine, 58*(10), 1869-1887. doi: http://dx.doi.org/10.1016/S0277-9536(03)00408-8

Bowling, A. (2011). Do older and younger people differ in their reported well-being? A national survey of adults in Britain. *Family Practice, 28*(2), 145-155. doi: 10.1093/fampra/cmq082

Bowling, A., & Stenner, P. (2011). Which measure of quality of life performs best in older age? A comparison of the OPQOL, CASP-19 and WHOQOL-OLD. *Journal of Epidemiology & Community Health, 65*(3), 273-280. doi: 10.1136/jech.2009.087668

Bowling, A., & Windsor, J. (2001). Towards the good Life: A population survey of dimensions of quality of life. *Journal of Happiness Studies, 2*(1), 55-82. doi: 10.1023/A:1011564713657

Breheny, M., Stephens, C., Alpass, F., Stevenson, B., Carter, K., & Yeung, P. (2013). Development and validation of a measure of living standards for older people *Social Indicators Research* (Vol. 114, pp. 1035-1048): Springer Netherlands.

Breheny, M., Stephens, C., Henricksen, A., Stevenson, B., Carter, K., & Alpass, F. (2014). Living standards for elders. *Summary report, measuring living standards of older peopl: development and validation of the LSCAPE*.

Breheny, M., Stephens, C., Henricksen, A., Stevenson, B., Carter, K., & Alpass, F. (2014). Measuring living standards of older people using Sen's Capability Approach: Development and validation of the LSCAPE (Living Standards Capabilities for Elders) and LSCAPE-6. . *Ageing and Society, Available on CJO 2014*, 26. doi: 10.1017/S0144686X14001160

Brown, J., Bowling, A., & Flynn, T. (2004). Models of quality of life: a taxonomy, overview and systematic review of the literature (pp. 113). Sheffield, Dept of Sociological Studies: European Forum on Population Ageing Research.

Budge, C., Stephens, C., & Stichbury, C. (2014). The New Zealand longtitudinal study of aging summary report, Health: Massey University.

Burholt, V., & Windle, G. (2006). The material resources and well-being of older people. York: Joseph Rowntree Foundation.

Camfield, L., & Skevington, S. M. (2008). On subjective well-being and quality of life. *Journal of Health Psychology, 13*(6), 764-775. doi: 10.1177/1359105308093860

Carpinter, P. (2012). Summary - history of the welfare state in New Zealand. Wellington: New Zealand Treasury

Carr, A. J., & Higginson, I. J. (2001). Measuring quality of life: are quality of life measures patient centred?, 1357.

Centers for Disease Control and Prevention. (2000). Measuring healthy days: Population assessment of health-related quality of life. Atlanta, Georgia: Centers for Disease Control and Prevention.

Chatfield, M. D., Brayne, C. E., & Matthews, F. E. (2005). A systematic literature review of attrition between waves in longitudinal studies in the elderly shows a consistent pattern of dropout between differing studies. *Journal of Clinical Epidemiology, 58*(1), 13-19. doi: http://dx.doi.org/10.1016/j.jclinepi.2004.05.006

Christensen, K., Doblhammer, G., Rau, R., & Vaupel, J. W. (2009). Ageing populations: the challenges ahead. *The Lancet, 374*(9696), 1196-1208. doi: http://dx.doi.org/10.1016/S0140-6736(09)61460-4

Clark, A., Frijters, P., & Shields, M. (2007). Relative income, happiness and utility: an explanation for the easterlin paradox and other puzzels *Discussion paper No. 2840*: French Institute for the Study of Labour.

Coast, J., Flynn, T. N., Natarajan, L., Sproston, K., Lewis, J., Louviere, J. J., & Peters, T. J. (2008). Valuing the ICECAP capability index for older people. *Social Science & Medicine, 67*(5), 874-882. doi: 10.1016/j.socscimed.2008.05.015

Coast, J., Peters, T., Natarajan, L., Sproston, K., & Flynn, T. (2008). An assessment of the construct validity of the descriptive system for the ICECAP capability measure for older people. *Quality of Life Research, 17*(7), 967-976. doi: 10.1007/s11136-008-9372-z

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*(2), 310-357. doi: 10.1037/0033-2909.98.2.310

Cutler, D. M., & McClellan, M. (2001). Is technological change in medicine worth it? *Health Affairs, 20*(5), 11-29. doi: 10.1377/hlthaff.20.5.11

De Jong Gierveld, J., & Tilburg, T. v. (1999). *Manual of the loneliness scale*: VU University of Amsterdam.

Devlin, N. J., & Krabbe, P. F. M. (2013). The development of new research methods for the valuation of EQ-5D-5L. *The European Journal of Health Economics, 14*(Suppl 1), S1-S3. doi: 10.1007/s10198-013-0502-3

Diener, E., Ng, W., Harter, J., & Arora, R. (2010). Wealth and happiness across the world: Material prosperity predicts life evaluation, whereas psychosocial prosperity predicts positive feeling. *Journal of Personality and Social Psychology, 99*(1), 52-61. doi: 10.1037/a0018066

Diener, E., & Suh, E. (1997). Measuring quality of life: Economic, social, and subjective indicators. *Social Indicators Research, 40*(1/2), 189.

Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology, 29*(1), 94-122. doi: http://dx.doi.org/10.1016/j.joep.2007.09.001

Dulin, P. L., Stephens, C., Alpass, F., Hill, R. D., & Stevenson, B. (2011). The impact of socio-contextual, physical and lifestyle variables on measures of physical and psychological wellbeing among Māori and non-Māori: the New Zealand health, work and retirement study. *Ageing & Society, 31*(08), 1406-1424. doi: doi:10.1017/S0144686X10001479

Easterlin, R. A. (2000). The Worldwide Standard of Living Since 1800. *Journal of Economic Perspectives, 14*(1), 7-26.

Ekwall, A. K., Sivberg, B., & Hallberg, I. R. (2005). Loneliness as a predictor of quality of life among older caregivers. *Journal of Advanced Nursing, 49*(1), 23-32. doi: 10.1111/j.1365-2648.2004.03260.x

Felce, D. (1997). Defining and applying the concept of quality of life. *Journal of Intellectual Disability Research, 41*(2), 126-135.

Fellinghauer, B., Reinhardt, J. D., Stucki, G., & Bickenbach, J. (2012). Explaining the disability paradox: a cross-sectional analysis of the Swiss general population. *BMC Public Health, 12*(655). doi: 10.1186/1471-2458-12-655

Fergusson, D., Hong, B., Horwood, J., Jensen, J., & Travers, P. (2001). The living standards of older New Zealanders: The Ministry of Social Policy.

Ferrans, C. E., Zerwic, J. J., Wilbur, J. E., & Larson, J. L. (2005). Conceptual model of health related quality of life. *Journal of Nursing Scholarship, 37*(4), 336-342. doi: 10.1111/j.1547-5069.2005.00058.x

Ferrell, B. R., Hassey Dow, K., & Grant, M. (1995). Measurement of the quality of life in cancer survivors. *Quality of Life Research, 4*(6), 523-531. doi: 10.1007/BF00634747

Ferrer-i-Carbonell, A. (2005). Income and well-being: an empirical analysis of the comparison income effect. *Journal of Public Economics, 89*(5–6), 997-1019. doi: http://dx.doi.org/10.1016/j.jpubeco.2004.06.003

Field, A. (2007). *Discovering statistics using SPSS*: SAGE Publications.

Flaskerud, J. H., & Winslow, B. J. (1998). Conceptualizing vulnerable populations health-related research. *Nursing Research, 47*(2), 69-78.

Flynn, T. N., Huynh, E., Peters, T. J., Al-Janabi, H., Clemens, S., Moody, A., & Coast, J. (2013). Scoring the ICECAP-A capability instrument. Estimation of a UK general population tariff. *Health Econ*. doi: 10.1002/hec.3014

Foulds, J., Wells, J. E., & Mulder, R. (2014). The association between material living standard and psychological distress: Results from a New Zealand population survey. *International Journal of Social Psychiatry, 60*(8), 766-771. doi: 10.1177/0020764014521394

Frey, B. S., & Stutzer, A. (2002). *Happiness and economics : how the economy and institutions affect well-being*. Princeton, N.J: Princeton University Press.

Fries, J. F. (2002). Aging, natural death, and the compression of morbidity. *Bulletin of the World Health Organization, 80*, 245-250.

Gandek, B., Ware, J. E., Aaronson, N. K., Apolone, G., Bjorner, J. B., Brazier, J. E., . . . Sullivan, M. (1998). Cross-validation of item selection and scoring for the SF-12 health survey in nine countries. *Journal of Clinical Epidemiology, 51*(11), 1171-1178. doi: 10.1016/S0895-4356(98)00109-7

Ganglmair-Wooliscroft, A., & Lawson, R. (2008). Applying the international wellbeing index to investigate subjective wellbeing of New Zealanders with European and with Maori heritage.

Kōtuitui: New Zealand Journal of Social Sciences Online, 3(1), 57-72. doi: 10.1080/1177083X.2008.9522432
Goli, S., Singh, L., Jain, K., & Pou, L. (2014). Socioeconomic determinants of health inequalities among the older population in india: A decomposition analysis. *Journal of Cross-Cultural Gerontology, 29*(4), 353-369. doi: 10.1007/s10823-014-9251-8
Groffen, D. A., Bosma, H., van den Akker, M., Kempen, G. I., & van Eijk, J. T. (2008). Lack of basic and luxury goods and health-related dysfunction in older persons; findings from the longitudinal SMILE study. *BMC Public Health, 8*, 242. doi: 10.1186/1471-2458-8-242
Gwozdz, W., & Sousa-Poza, A. (2009). Ageing, health and life satisfaction of the oldest old: an analysis for Germany: German Institute for the Study of Labor
Halleröd, B., & Seldén, D. (2013). The multi-dimensional characteristics of wellbeing: How different aspects of wellbeing interact and do not interact with each other. *Social Indicators Research, 113*(3), 807-825. doi: 10.1007/s11205-012-0115-8
Helgeson, V. S. (2003). Social support and quality of life. *Quality of Life Research*(12), 25-31.
Higgs, P., Hyde, M., Wiggins, R., & Blane, D. (2003). Researching Quality of Life in Early Old Age: The Importance of the Sociological Dimension. *Social Policy & Administration, 37*(3), 239-252. doi: 10.1111/1467-9515.00336
Howden-Chapman, P., Signal, L., & Crane, J. (1999). Housing and health in older people: aging in place. *Social Policy Journal of New Zealand, 13*, 14-30.
Hyde, M., Wiggins, R. D., Higgs, P., & Blane, D. B. (2003). A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19). *Aging Ment Health, 7*(3), 186-194. doi: 10.1080/1360786031000101157
Irwin, M., Artin, K., & Oxman, M. N. (1999). Screening for depression in the older adult: Criterion validity of the 10-item center for epidemiological studies depression scale (ces-d). *Archives of Internal Medicine, 159*(15), 1701-1704. doi: 10.1001/archinte.159.15.1701
James, O. (2007). *Affluenza: How to be Successful and Stay Sane*: Vermilion.
Jennings, B. (2002). Quality of life, philosophical and ethical dimensions. *Encyclopedia of aging.* Retrieved 14/04, 2014, from http://www.encyclopedia.com/doc/1G2-3402200345.html
Jensen, Spittal, M., Crichton, S., Sathiyandra, S., & Krishnan, V. (2002). Direct measure of living standards: The New Zealand ELSI scale: The Ministry of Social Development.
Jensen, J., Krishnan, V., Spittal, M., & Sathiyandra, S. (2003). New Zealand living standards: their measurement and variation, with an application to policy. *Social Policy Journal of New Zealand*(20), 72-97.
Jensen, J., Spittal, M., & Krishnan, V. (2005). ELSI short form user manual for a direct measure of living standards. Centre for Social Research and Evaluation: Ministry of Social Development.
Kawachi, I., & Kennedy, B. P. (1999). Income inequality and health: pathways and mechanisms. *Health Services Research, 34*(1 Pt 2), 215-227.
Kesebir, P., & Diener, E. (2008). In Pursuit of Happiness: Empirical Answers to Philosophical Questions. *Perspectives on Psychological Science, 3*(2), 117-125. doi: 10.1111/j.1745-6916.2008.00069.x
Kontodimopoulos, N., Pappa, E., Niakas, D., & Tountas, Y. (2007). Validity of SF-12 summary scores in a Greek general population. *Health Qual Life Outcomes, 5*, 55-55. doi: 10.1186/1477-7525-5-55
Kutner, J. S., Nowels, D. E., Kassner, C. T., Houser, J., Bryant, L. L., & Main, D. S. (2003). Confirmation of the "disability paradox" among hospice patients: Preservation of quality of life despite physical ailments and psychosocial concerns. *Palliative & Supportive Care, 1*(03), 231-237. doi: doi:10.1017/S1478951503030281
Lawton, M. P. (1983). Environment and other determinants of weil-being in older people. *The Gerontologist, 23*(4), 349-357. doi: 10.1093/geront/23.4.349
Low, G., & Molzahn, A. E. (2007). Predictors of quality of life in old age: A cross-validation study. *Research in Nursing & Health, 30*(2), 141-150. doi: 10.1002/nur.20178
Lund, C., De Silva, M., Plagerson, S., Cooper, S., Chisholm, D., Das, J., . . . Patel, V. (2011). Poverty and mental disorders: breaking the cycle in low-income and middle-income countries. *The Lancet, 378*(9801), 1502-1514. doi: http://dx.doi.org/10.1016/S0140-6736(11)60754-X

Lynch, J. W., Smith, G. D., Kaplan, G. A., & House, J. S. (2000). *Income inequality and mortality: importance to health of individual income, psychosocial environment, or material conditions* (Vol. 320).
Marmot, M. (2003). Understanding social inequalities in health. *Perspectives in Biology and Medicine, 46*(3), S9-S23.
Marmot, M. (2007). *The status syndrome: how social standing affects our health and longevity*: Henry Holt and Company.
Maslow, A. (1968). *Toward a psychology of being* (second ed.). Princeton, N.J.: Van Nostrand.
Mathisen, L., Andersen, M. H., Veenstra, M., Wahl, A. K., Hanestad, B. R., & Fosse, E. (2007). Quality of life can both influence and be an outcome of general health perceptions after heart surgery. *Health & Quality of Life Outcomes, 5*, 27-10. doi: 10.1186/1477-7525-5-27
Menard, S. (2002). *Applied logistic regression analysis: Sage University series on quantitative applications in the social sciences* (Vol. 106). Thousand Oaks, CA: SAGE Publications.
Metz, D. H. (2000). Mobility of older people and their quality of life. *Transport Policy, 7*(2), 149-152. doi: http://dx.doi.org/10.1016/S0967-070X(00)00004-4
Ministry of Health. (2010). Living standards and health: New Zealand 2006/2007. Ministry of Health, PO Box 5013, Wellington 6145, New Zealand.
Ministry of Social Development. (2010a). The material wellbeing of older New Zealanders: background paper for the retirement commissioner's 2010 review. Wellington: Ministry of Social Development.
Ministry of Social Development. (2010b). The social report. Wellington: Ministry of Social Development.
Mollenkopf, H., & Walker, A. (2007). *Quality of life in old age: International and multi-disciplinary perspectives* (A. C. Michalos Ed. Vol. 31). University of Northern British Columbia, Prince George, Canada: Springer.
Montazeri, A., Vahdaninia, M., Mousavi, S. J., Asadi-Lari, M., Omidvari, S., & Tavousi, M. (2011). The 12-item medical outcomes study short form health survey version 2.0 (SF-12v2): a population-based validation study from Tehran, Iran. *Health & Quality of Life Outcomes, 9*(1), 12-19. doi: 10.1186/1477-7525-9-12
Moons, P., Budts, W., & De Geest, S. (2006). Critique on the conceptualisation of quality of life: A review and evaluation of different conceptual approaches. *International Journal of Nursing Studies, 43*(7), 891-901. doi: http://dx.doi.org/10.1016/j.ijnurstu.2006.03.015
Muldoon, M. F., Barger, S. D., Flory, J. D., & Manuck, S. B. (1998). What are quality of life measurements measuring? *BMJ, 316*(7130), 542. doi: 10.1136/bmj.316.7130.542
Murali, V., & Oyebode, F. (2004). *Poverty, social inequality and mental health* (Vol. 10).
Myers, D. G. (2000). The funds, friends, and faith of happy people. *American Psychologist, 55*(1), 56-67. doi: 10.1037/0003-066X.55.1.56
Netuveli, G., & Blane, D. (2008). Quality of life in older ages. *British Medical Bulletin, 85*(1), 113-126. doi: 10.1093/bmb/ldn003
Netuveli, G., Wiggins, R. D., Hildon, Z., Montgomery, S. M., & Blane, D. (2006). Quality of life at older ages: evidence from the English longitudinal study of aging (wave 1). *Journal of Epidemiology and Community Health, 60*(4), 357-363. doi: 10.1136/jech.2005.040071
Nolan, B., & Whelan, C. (1996). *Resources, deprivation, and poverty*. Oxford: Clarendon Press.
Nussbaum, M. (2003). Capabilities as fundamental entitlements: Sen and social justice. *Feminist Economics, 9*(2-3), 33-59. doi: 10.1080/1354570022000077926
Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*: Allen & Unwin.
Patel , V., Lund, C., Hatherill, S., Plagerson, S., Corrigall, J., Funk, M., & Flisher, A. (2010). Mental disorders: equity and social determinants *Equity, social determinants and public health programmes* (pp. 115-127). Geneva: World Health Organisation.
Perry, B. (2013). The material wellbeing of older New Zealanders: Background paper for the retirement commissioner's 2013 review.
Pfoertner, T.-K., Andress, H.-J., & Janssen, C. (2011). Income or living standard and health in Germany: Different ways of measurement of relative poverty with regard to self-rated health. *International Journal of Public Health, 56*(4), 373-384. doi: 10.1007/s00038-010-0154-3

Ramsey, S., Blough, D., Kirchhoff, A., Kreizenbeck, K., Fedorenko, C., Snell, K., . . . Overstreet, K. (2013). Washington State Cancer Patients Found To Be At Greater Risk For Bankruptcy Than People Without A Cancer Diagnosis. *Health Affairs, 32*(6), 1143-1152. doi: 10.1377/hlthaff.2012.1263

Reader, S. (2006). Does a Basic Needs Approach Need Capabilities? *Journal of Political Philosophy, 14*(3), 337-350. doi: 10.1111/j.1467-9760.2006.00259.x

Restrepo, H. E., & Rozental, M. (1994). The social impact of aging populations: some major issues. *Soc Sci Med, 39*(9), 1323-1338.

Rio Group. (2006). Compendium of best practices in poverty measurement. Rio de Janeiro: Expert Group on Poverty Statistics.

Robeyns, I. (2006). The Capability Approach in Practice*. *Journal of Political Philosophy, 14*(3), 351-376. doi: 10.1111/j.1467-9760.2006.00263.x

Rochford, T. (2004). Whare Tapa Wha: A Mäori Model of a Unified Theory of Health. *Journal of Primary Prevention, 25*(1), 41-57. doi: 10.1023/B:JOPP.0000039938.39574.9e

Rowe, J., & Kahn, R. (1987). Human aging: usual and successful. *Science, 237*(4811), 143-149. doi: 10.1126/science.3299702

Rowe, J. W., & Kahn, R. L. (1997). Successful aging. *Gerontologist, 37*(4), 433-440.

Sanderson, K., & Andrews, G. (2002). The SF-12 in the Australian population: Cross-validation of item selection. *Australian and New Zealand Journal of Public Health, 26*(4), 343-345. doi: 10.1111/j.1467-842X.2002.tb00182.x

Saraceno, B., Levav, I., & Kohn, R. (2005). The public mental health significance of research on socio-economic factors in schizophrenia and major depression. *World Psychiatry, 4*(3), 181-185.

Saunders, P., Naidoo, Y., & Griffiths, M. (2008). Towards new indicators of disadvantage: Deprivation and social exclusion in Australia. *Australian Journal of Social Issues*(2), 175.

Schmidt, S., Mühlan, H., & Power, M. (2006). The EUROHIS-QOL 8-item index: Psychometric results of a cross-cultural field study. *The European Journal of Public Health, 16*(4), 420-428. doi: 10.1093/eurpub/cki155

Sen, A. (1985). *The standard of living.* Paper presented at the The Tanner Lectures on Human Values, Cambridge University.

Sen, A. (1999). *Development as freedom*: Alfred A. Knopf, Inc.

Sen, A., & Nussbaum, M. C. (1993). *The quality of life*. Oxford: Clarendon Press.

Sexton, E., King-Kallimanis, B. L., Conroy, R. M., & Hickey, A. (2013). Psychometric evaluation of the CASP-19 quality of life scale in an older Irish cohort. *Qual Life Res, 22*(9), 2549-2559. doi: 10.1007/s11136-013-0388-7

Shinkai, S., Fujimoto, K., Watanabe, K., Kondo, H., Okada, K., Wang, D. G., . . . Horiguchi, J. (1999). Mobility in the community-dwelling elderly and its correlates. *Nihon Koshu Eisei Zasshi, 46*(1), 35-46.

Sirgy, J. (2012). *The psychology of quality of life: Hedonic well-being, life satisfaction, and eudaimonia*: Springer.

Smith, D. M., Langa, K. M., Kabeto, M. U., & Ubel, P. A. (2005). Health, Wealth, and Happiness. *Psychological Science (Wiley-Blackwell), 16*(9), 663-666.

Smith, H. J., Pettigrew, T. F., Pippin, G. M., & Bialosiewicz, S. (2012). Relative deprivation: A Theoretical and meta-analytic review. *Personality & Social Psychology Review (Sage Publications Inc.), 16*(3), 203-232. doi: 10.1177/1088868311430825

Sousa, K. H., & Kwok, O. M. (2006). Putting Wilson and Cleary to the test: analysis of a HRQOL conceptual model using structural equation modeling. *Qual Life Res, 15*(4), 725-737. doi: 10.1007/s11136-005-3975-4

Spiers, N. A., Matthews, R. J., Barker, G. A., Jagger, C., & Hancock, R. M. (2005). Standard of living in the retirement survey: A predictor of six-year functional limitation onset and mortality in women, but not in men from ages 55-69 years. *Disability and Rehabilitation: An International, Multidisciplinary Journal, 27*(23), 1415-1423.

Statistics New Zealand. (2006). A history of survival in New Zealand: cohort life tables 1876-2004. Wellington: Statistics New Zealand.

Statistics New Zealand. (2010). National Ethnic Population Projections: 2006(base)–2026 update.

Statistics New Zealand. (2013). The New Zealand general social survey: 2012. Wellington: Statistics New Zealand.
Statistics New Zealand. (2014). Standard of living. 24/03/2014, from http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-social-indicators/Home/Standard%20of%20living.aspx
Statistics New Zealand. (2014). National population estimates: At 30 June 2014. Wellington: Statistics New Zealand.
Steckel, R. H., & Roderick, F. (1997). The standard of living debate in international perspective: Measures and indicators *National Bureau of Economic Research* (Vol. Health and Welfare during Industrialization, pp. 17-46): University of Chicago Press.
Stevenson, B. (2014). NZLSA measures *Summary report for the New Zealand Longitudinal Study of Aging (NZLSA)*. Palmerston North: Massey University.
Sumner, L. W. (1996). *Welfare, Happiness, and Ethics*: Clarendon Press.
Tabachnick, B. G., & Fidell, L. S. (2012). *Using multivariate statistics*: Pearson Education.
Tay, L., & Diener, E. (2011). Needs and subjective well-being around the world. *Journal of Personality and Social Psychology, 101*(2), 354-365. doi: 10.1037/a0023779
Teh, R. (2014). Self-rated health, health-related behaviours and medical conditions of Māori and non-Māori in advanced age : LiLACS NZ. *New Zealand medical journal (Online)*.
The New Zealand Treasury. (2009). Challenges and choices, New Zealand's long-term fiscal statement. Wellington: The New Zealand Treasury.
The Quality of Life Project. (2007). Quality of life' 07 in twelve of New Zealands cities.
Tilburg, T. v., & Leeuw, E. d. (1991). Stability of scale quality under various data collection procedures: A mode comparison on the 'De Jong-Gierveld loneliness scale. *International Journal of Public Opinion Research, 3*(1), 69-85. doi: 10.1093/ijpor/3.1.69
Towers, A., & Stevenson, B. (2014). NZLSA cohort profile *Summary report for the New Zealand Longitudinal Study of Aging (NZLSA)*. Palmerston North: Massey University.
Towers, A., Stevenson, B., & Breheny, M. (In press). The health, work and retirement longitudinal study.
United Nations. (2014). Human development report 2014 *Sustaining human progress: reducing vulnerabilities and building resilience*. New York: United Nations Development Programme.
Vaillant, G. E. (2004). Positive Aging *Positive Psychology in Practice* (pp. 561-578): John Wiley & Sons, Inc.
Ventegodt, S., Merrick, J., & Andersen, N. J. (2003). Quality of life theory I. The IQOL theory: An Integrative Theory of the Global Quality of Life Concept. *The Scientific World Journal, 3*, 1030-1040. doi: 10.1100/tsw.2003.82
Walker, I., & Pettigrew, T. F. (1984). Relative deprivation theory: An overview and conceptual critique. *British Journal of Social Psychology, 23*(4), 301-310. doi: 10.1111/j.2044-8309.1984.tb00645.x
Walters, S., & Brazier, J. (2005). Comparison of the minimally important difference for two health state utility measures: EQ-5D and SF-6D. *Quality of Life Research, 14*(6), 1523-1532. doi: 10.1007/s11136-004-7713-0
Webb, E., Blane, D., McMunn, A., & Netuveli, G. (2011). Proximal predictors of change in quality of life at older ages. *Journal of Epidemiology and Community Health, 65*(6), 542-547. doi: 10.1136/jech.2009.101758
Weber, K., Canuto, A., Giannakopoulos, P., Mouchian, A., Meiler-Mititelu, C., Meiler, A., . . . de Ribaupierre, A. (2015). Personality, psychosocial and health-related predictors of quality of life in old age. *Aging Ment Health, 19*(2), 151-158. doi: 10.1080/13607863.2014.920295
Weich, S., & Lewis, G. (1998). Material standard of living, social class, and the prevalence of the common mental disorders in Great Britain. *Journal of Epidemiology and Community Health, 52*(1), 8-14. doi: 10.1136/jech.52.1.8
Weinstein, M. C., Torrance, G., & McGuire, A. (2009). QALYs: The Basics. *Value in Health (Wiley-Blackwell), 12*, S5-S9. doi: 10.1111/j.1524-4733.2009.00515.x
Wiggins, R., Netuveli, G., Hyde, M., Higgs, P., & Blane, D. (2008). The evaluation of a self-enumerated scale of quality of life (CASP-19) in the Context of research on ageing: A

combination of exploratory and confirmatory approaches. *Social Indicators Research, 89*(1), 61-77. doi: 10.1007/s11205-007-9220-5
Wilkie, W. L., & Moore, E. S. (1999). Marketing's contributions to society. *Journal of Marketing, 63*(4), 198-218.
Wilkinson, P., Pattenden, S., Armstrong, B., Fletcher, A., Kovats, R. S., Mangtani, P., & McMichael, A. J. (2004). Vulnerability to winter mortality in elderly people in Britain: population based study. *BMJ, 329*(7467), 647.
Wilkinson, R. G. (2002). *Unhealthy societies: the afflictions of inequality*: Taylor & Francis.
Wilson, I. B., & Cleary, P. D. (1995). Linking clinical variables with health-related quality of life: A conceptual model of patient outcomes. *JAMA, 273*(1), 59-65. doi: 10.1001/jama.1995.03520250075037
Wisloff, T., Hagen, G., Hamidi, V., Movik, E., Klemp, M., & Olsen, J. A. (2014). Estimating QALY gains in applied studies: a review of cost-utility analyses published in 2010. *Pharmacoeconomics, 32*(4), 367-375. doi: 10.1007/s40273-014-0136-z
World Health Organization. (1995). The World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. *Social Science & Medicine, 41*(10), 1403-1409. doi: http://dx.doi.org/10.1016/0277-9536(95)00112-K
World Health Organization. (1997). *WHOQOL : Measuring quality of life*. (WHO/MSA/MNH/PSF/97.4). Geneva: World Health Organization Retrieved from http://www.who.int/iris/handle/10665/63482#sthash.wRlOgeGI.dpuf.
World Health Organization. (2003). Towards a common language for functioning, disability and health ICF. Geneva: World Health Organisation.
World Health Organization. (2008). Closing the gap in a generation, health equity through action on the social determinants of health executive summary (pp. 40): World Health Organisation.
Wu, T.-Y., Chie, W.-C., Kuo, K.-L., Wong, W.-K., Liu, J.-P., Chiu, S.-T., . . . Blane, D. (2013). Quality of life (QOL) among community dwelling older people in Taiwan measured by the CASP-19, an index to capture QOL in old age. *Archives of Gerontology and Geriatrics, 57*(2), 143-150. doi: 10.1016/j.archger.2013.03.010