Exploring the Relationship between Housing Satisfaction, Neighbourhood Social Cohesion, Accessibility, Safety and Well-Being among Older Adults

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ABSTRACT

Objective: Housing can have a major impact on mental and physical health; this is particularly true for older adults who spend more time at home as they age. Housing satisfaction is an important environmental determinant of health for older adults and an area of public interest as people are living longer worldwide. The present study examines whether specific neighbourhood characteristics such as neighbourhood social cohesion, accessibility and safety can moderate the relationship between housing satisfaction and well-being and if these characteristics can improve well-being (measured as quality of life, life satisfaction, mental health, depression, and physical health). **Method:** Survey of older adults (aged 55+) living in New Zealand. Data was analysed using descriptive statistics and hierarchical regression analysis for hypothesis testing in IBM SPSS Statistics 25. **Sample:** Participants for the current study were selected from the 2016 New Zealand Health, Work and Retirement Study and resulted in a sample of *n* = 4028. **Results**: The present study showed that greater housing satisfaction was related to better well-being for older adults. The study also demonstrated that neighbourhood social cohesion significantly and positively impacted mental health, depression, quality of life and life satisfaction. Neighbourhood accessibility had a significant positive effect on mental health, depression, quality of life and life satisfaction. Neighbourhood safety significantly and positively influenced mental health. There were no significant results for these neighbourhood characteristics enhancing physical health. One significant interaction effect was found for depression demonstrating that housing satisfaction can be a protective factor against depression especially when living in an unsafe neighbourhood.
Discussion: This study confirms previous research that housing satisfaction and neighbourhood characteristics are significant contributing factors to well-being for older adults. The study also examines one unique finding around neighbourhood characteristics moderating the relationship between housing satisfaction and depression. These findings have important implications for policy, planning and improving the well-being of older adults.

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1.0 Introduction

The world has arrived at a time in history when people are spending more time indoors than ever before. The home has become more than just a place to shelter from the elements as the proverb states, “home is where the heart is.” It is a place that evokes belonging, a place of origin and a space that provides refuge from the stresses of daily life. In New Zealand, the average person spends 67% of their time in the home, and this amount increases for older adults (Khajehzadeh & Vale, 2017). One study reported that as adults age daily activities are predominantly performed in the home or close surroundings, and on average, the very old tend to spend 80% of their time at home (Baltes, Maas, Wilms, Borchelt, & Little, 1999). Home has a profound effect on the psychosocial, mental, and physical well-being of those dwelling within and the quality of life they experience (Thomson, Thomas, Sellstrom, & Petticrew, 2009).

The link between housing and health has been a topic of examination since the Sanitary Report of 1842, which highlighted the correlation between lack of sanitation, disease, high mortality rates and low life expectancy (Lewis, 1949). Reports such as this informed the 1848 Public Health Act which drastically improved the lives of city dwelling residents in Victorian England and became the first public policy to identify housing as a health issue (Ineichen, 2003; World Health Organization, 2006). In developed countries, one might assume people experience high levels of housing satisfaction and housing quality, but there is still enduring homelessness, poor quality housing, and housing-related poverty experienced in the western world (Andrews, Caldera, & Johansson, 2011).

New Zealand is one such country experiencing a debilitating housing crisis as a result of inadequate building standards, heating practices and some of the highest house prices in the world (Johnson, Howden-Chapman, & Eaqub, 2018). Many older adults in New Zealand suffer from poor housing quality leading to needless physical and mental health complications. Furthermore, evidence shows that those who have the least often suffer the most, with low-

income families disproportionately exposed to poor housing quality (World Health Organization, 2006).

Housing quality is an issue particularly relevant to older adults who spend more time at home and may be more at risk due to changes in their physical health, mobility issues or fixed pension incomes (Fox et al., 2017). Older adults may also be unable to physically perform the work required to improve their housing quality or possess the finances to pay skilled labourers to make necessary repairs. Housing quality issues faced by older adults can lead to lower housing satisfaction, which most often results from issues such as thermal comfort, damp, low ventilation, poor maintenance, poor indoor environments, accessibility, and their home being too small (Bonnefoy, 2007; Kamp, Ruysbroek, Stellato, Ruysbroek, & Stellato, 2009; Rojo Perez, Fernandez-Mayoralas Fernandez, Pozo Rivera, & Manuel Rojo Abuin, 2001).

Research has unequivocally established that poor housing quality negatively impacts on physical and mental health (Curl et al., 2015; Fox et al., 2017; Thomson et al., 2009). Housing satisfaction has also been shown to have a direct effect on well-being, and how attached a person is to their home (Kamp et al., 2009). What is less well understood is the role of broader environmental factors such as neighbourhood characteristics and how these may impact on well-being. Research has shown that neighbourhood characteristics such as neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety do impact on the well-being of older adults (Berglund, Westerling, & Lytsy, 2017; Honjo et al., 2018; Pearce, Witten, & Bartie, 2006). This study will examine how housing satisfaction contributes to better well-being and which neighbourhood characteristics may make this link stronger or weaker (Jones-Rounds, Evans, & Braubach, 2014; Jong, Hattum, Rouwendal, & Brouwer, 2018). This research will also contribute to the growing body of gerontological literature by investigating environmental factors that may mitigate the adverse effects of low perceived housing satisfaction on the well-being of the heterogeneous population of older adults.

The present study will examine whether neighbourhood qualities, defined as neighbourhood social cohesion, neighbourhood accessibility and

neighbourhood safety, can moderate the adverse effects of low housing satisfaction on mental health, physical health, and well-being of older adults living in New Zealand. The current study may inform older adults and their families to consider more than just the physical structure and function of a home but to consider housing satisfaction and neighbourhood qualities when renting or buying. This is particularly important when finances do not allow for the purchase or rental of high-quality housing and may subject an occupant to living in a poor-quality or unsafe neighbourhood. Purchasing or renting a home in a community with high neighbourhood qualities, such as social cohesion, accessibility, and safety may enhance well-being outcomes for older adult residents. This study may also inform public policy in this area and encourage the development of beneficial neighbourhood qualities among communities where older adults reside.

This paper will endeavour first to discuss the housing crisis in New Zealand and review previous research on housing quality, housing satisfaction and the mitigating role neighbourhood characteristics may play. The study will also present empirical findings outlining neighbourhood qualities which may enhance the link between housing satisfaction and well-being (measured using the CESD-10 Depression Scale, the SF-12 Physical and Mental Health Component Scores, the CASP Quality of Life Scale, and the WHOQOL–BREF Life Satisfaction Scale). Finally, this paper will discuss the implications of this research which may inform policies around housing, ageing in place and the importance of housing satisfaction, neighbourhood characteristics and well-being.

2.0 Literature Review

2.1 The Housing Crisis in New Zealand and an Ageing Population

New Zealand is currently experiencing a ‘housing crisis’ that has seen home ownership rates fall to a 60-year low and house prices rise 30% across all of New Zealand (Johnson et al., 2018). In the past five years, prices have risen up to 65% in Auckland and 45% in the Waikato region while incomes have only risen by half this rate (Johnson et al., 2018). This climate is creating many

challenges such as home affordability (Cox & Pavletich, 2018), availability, and housing shortages (Statistics New Zealand, 2013; Johnson et al., 2018). With rapidly rising house prices far exceeding household salaries, New Zealand has been ranked as severely unaffordable in all 14 Demographia International Housing Affordability Surveys, and in 2018 Auckland was ranked the 9th least affordable city out of the 92 major international housing markets (Cox & Pavletich, 2018).

2.1.1 Security of Tenure

Security of tenure is an issue impacting on the rental market in New Zealand with recent declines in both private and state rental options available to families. In a report on housing in New Zealand by Johnson et al. (2018), it reports that in 2011 the number of dwellings owned or managed by Housing NZ peaked at 69,717. Six years later in 2017, the housing stock was at 62,917 recording the lowest number of Crown-owned state houses since 2000. This has decreased the number of households residing in state housing, and between 1991 and 2013, the number of homes in private rentals rose from 60% to 83%. Housing NZ statistics reported that the number of households placed on the social housing register rose by 40% and waiting lists rose by 58% between March 2016 and March 2017 (Johnson et al., 2018). These housing difficulties are felt most severely by those living in lower socio-economic circumstances and by Māori and Pacific peoples. In 2013, New Zealand Europeans experienced home ownership rates at 57% in comparison to 28% for Māori and 19% for Pacific peoples. Although this is a statistic for the general population, it can be surmised that this points to a particular vulnerability for Māori and Pacific older adults.

The report by Johnson et al. (2018) explains that older adults, who will be defined in this study as people aged 55+, are being affected by housing shortages and affordability issues as state housing numbers have decreased. This has resulted in a reduction of housing options for low-income older adults leaving them to face unaffordable rentals in competitive private markets. The report highlights that the number of older adults receiving both NZ Superannuation and an Accommodation Supplement payment since 2012 has risen by 22% (10,000 people) and increased by 2,000 each year.

The NZ Superannuation retirement pension was developed in a time when most retired older adults enjoyed debt-free home ownership, and there was an adequate supply of social housing for those who had not achieved this goal. The Johnson et al. report explains that this is no longer the case as older adults face difficulties securing housing which forces many to cope with housing-related poverty and a lack of housing options. This report defines housing-related poverty as the cost of rent/mortgage, heating or other utility bills surpassing income forcing individuals to cut back on essential needs to maintain their current housing. International research has shown that older adults living in social housing are more susceptible than the general population to experiencing lower economic, social and physical well-being, as well as experiencing lower life expectancy and inferior health outcomes (Wheatley, 2015).

Johnson et al. (2018) also state that since 2012 New Zealand's housing supply has struggled to keep pace with population growth, and between 2012 and 2017 population growth surpassed the estimated growth of housing stock. This demonstrates that the building of new houses cannot keep pace with population increases resulting in a housing shortage attributed to record net migration of overseas immigrants, low numbers of Kiwis relocating to Australia and overseas New Zealand citizens returning home. It is estimated that Auckland's population is increasing at a rate of 40,000 people each year creating a housing deficit of between 28,000 to 45,000 dwellings. A recent report by the Building Research Association of New Zealand (BRANZ) found that 30% of tenants were forced to move, due to their landlord selling the property (36% in Auckland) (Witten et al., 2017). This research highlights that renters are obliged to live in more transient and uncertain living arrangements as rents rise, housing options are more limited, and landlords sell off property while the market is high.

2.2 Housing Quality

The New Zealand housing market struggles with homes that are poorly built for thermal efficiency, lack proper insulation and are not adequately heated resulting in damp and cold indoor environments that impact on the health of occupants (Telfar-Barnard et al., 2017). More than 35% of houses in New

Zealand were built before World War II, and insulation was not a building requirement prior to April 1978. This has resulted in a housing stock that is older, lacks modern conveniences and has fallen into disrepair (Howden-Chapman, Signal, & Crane, 1999). The Organisation for Economic Co-operation and Development (OECD) reported that only approximately two-thirds of New Zealand houses are even partially insulated which makes them very expensive to heat and creates power bills beyond the budget of many low-income families (OECD, 2017).

New Zealand households are often known for heating just one room in the winter months with 5% reporting they do not heat any living areas and 50% stating they do not heat bedrooms. Only 5% of households in New Zealand have central heating and heat is most often provided via unflued gas heaters, electric heaters, and wood burning stoves, which can be costly and cause health issues (French, Camilleri, Isaacs, & Pollard, 2006; Howden-Chapman et al., 2009; Johnson et. al., 2018). In a study of winter months (June, July and August), it was shown that most living rooms in New Zealand are below 20 degrees Celsius 83% of the time, even though the living room was reported as the warmest room in the house. This falls below the World Health Organisation recommendation of a minimum indoor temperature of 20 degrees Celsius for households with older adults (Canterbury District Health Board, 2012).

Housing quality issues commonly found in New Zealand include problems such as thermal efficiency, high humidity, inadequate ventilation, overcrowding, poor affordability and fuel poverty (Canterbury District Health Board, 2012; Telfar-Barnard et al., 2017). Two main issues highlighted in New Zealand research are thermal efficiency and energy hardship. A recent BRANZ House Condition Survey in 2015 demonstrates that half (53%) of houses in New Zealand have poor thermal efficiency with insufficient or no insulation in the roof/subfloor and that most of these homes were occupied by tenants living in rented homes (White & Jones, 2015). These two issues often result in dwellings being damp, mouldy, hard to heat, and hazardous to older people or individuals with chronic illnesses (Johnson et al., 2018).

A Statistics New Zealand report on energy hardship from 2009 and 2012 both found that up to 29% of New Zealand households struggled to pay their power bill, spend a large part of their income on power and often felt cold (Howden-Chapman et al., 2009, 2012). These issues may disproportionately affect older adults, as one-person households receiving superannuation were reported among the lowest incomes of any household in New Zealand. This impacts on older adult women between 60 and 74 years even more as they report even lower incomes than men in the same age group (Howden-Chapman et al., 1999). For older people in the lowest income bracket suffering housing related poverty or energy hardship, this may cause high levels of stress and limit the quality of life and well-being they envisioned in their retirement.

To further understand the impact of poor housing quality on older adults, relative deprivation theory (Gurney & Tierney, 1982) was used as one of the theoretical frameworks to guide the present study (see figure 1). Relative deprivation is defined as a lack of resources to sustain lifestyle, diet, activities and conveniences that older adults are accustomed to or is approved by the societal standards to which one belongs (Simandan, 2018; Townsend, 1979). Relative deprivation theory underpins the understanding of housing and older adults as they endure the current housing crisis in New Zealand. As home ownership rates decrease and house prices and rents increase, this is putting financial strain on older people (Johnson et al., 2018). As explained by previous research, when older adults retire, the cost of housing, heating and maintenance may see many facing housing related poverty. As housing costs exceed personal budgets, this may force individuals to cut back on diet, lifestyle, amenities and activities they would typically engage in for their well-being.

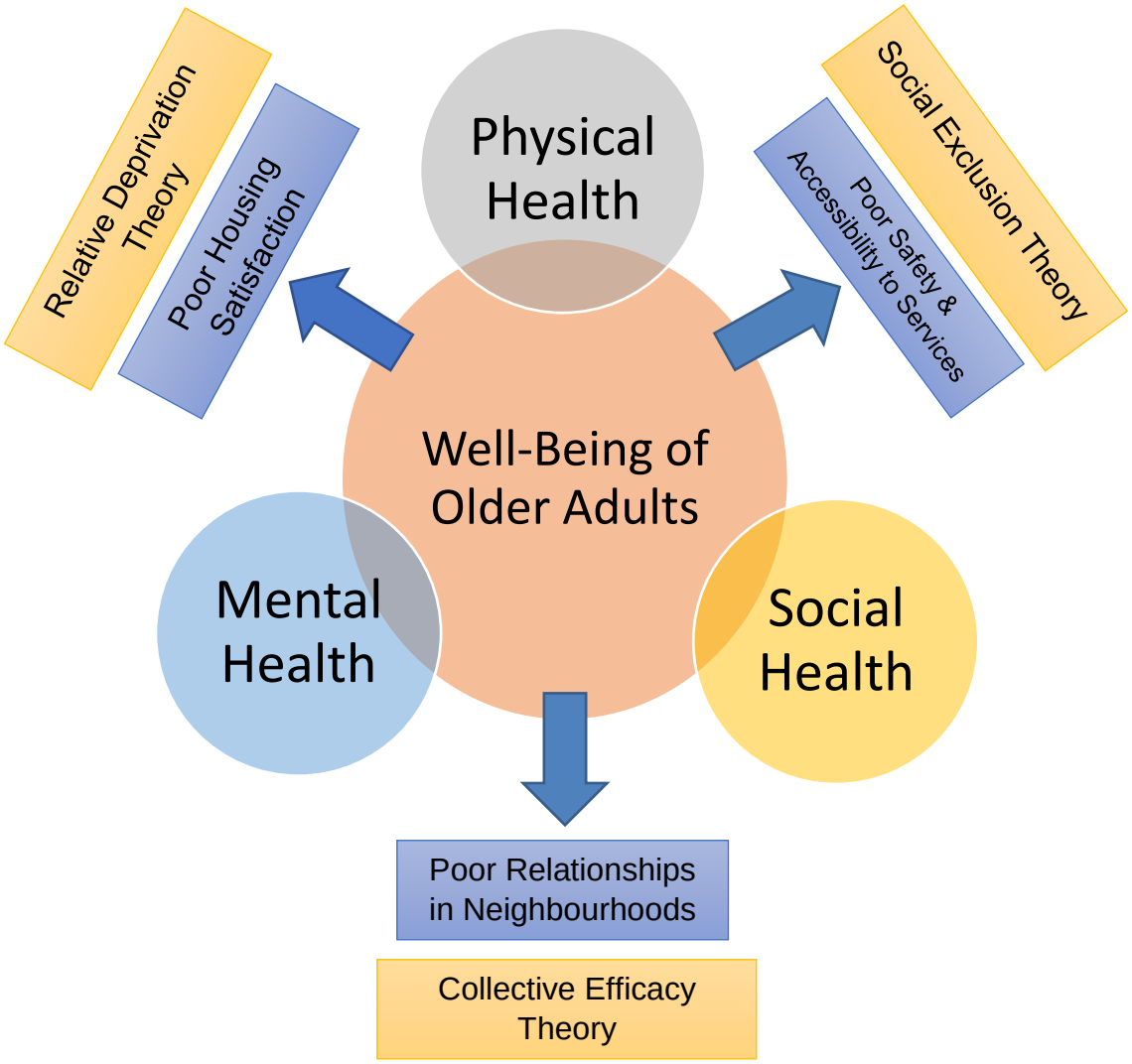

Figure 1: Theoretical Frameworks and Environmental Factors Influencing Well-being

2.3 The Adverse Physical/Mental Health Effects of Poor Housing Quality

Research consistently shows that living in poor quality housing has severe physical health effects on individuals (Thomson et al., 2009; Thomson, Thomas, Sellstrom, & Petticrew, 2013). The direct effects of living in cold homes in New Zealand includes health problems such as excess mortality from respiratory and cardiovascular disease amongst the elderly, higher rates of illness in colds and flu, and worsening of arthritis (Canterbury District Health Board, 2012). Overcrowding due to the housing crisis also leaves families living in poor quality homes subject to a range of infectious diseases such as tuberculosis, rheumatic

fever, meningococcal disease, hepatitis B, skin infections and respiratory problems (Canterbury District Health Board, 2012). One example of poor quality housing impacting on physical health took place in New Zealand during the 1990s when overcrowding of accommodation was directly related to a devastating epidemic of meningococcal meningitis (Baker et al., 2000).

Sufficient evidence also exists to state that housing quality is correlated with psychological welfare and overall well-being of older adults (Evans, Kantrowitz, & Eshelman, 2002; Evans, Wells, & Moch, 2003). Poor housing qualities such as cold, damp, overcrowding and noise have been linked to higher rates of depression and anxiety in adults (Firdaus, 2017; Guite, Clark, & Ackrill, 2006; Weich et al., 2002).

In New Zealand, older adults are highly urbanised with over two-thirds living in major urban centres (areas with 30,000 or more residents) and more elderly living in minor urban areas than the general population (22% versus 16%) (Statistics New Zealand, 2000). Due to the current housing crisis in New Zealand and more older adults living in urban areas, overcrowding may be a growing issue. Older adults who, due to the high cost of living, may share a residence with their children/grandchildren may be experiencing the adverse mental health effects of overcrowding. For New Zealanders spending as much as 67% of their time at home, and 80% for the very old population (Baltes et al., 1999; Khajehzadeh & Vale, 2017), housing quality and appropriate accommodation is an urgent concern for their mental health.

2.4 Housing Satisfaction

Housing satisfaction is a factor of importance as it goes beyond the physical quality of the home to the owner or tenant's self-perceived satisfaction with their home. Housing satisfaction is also known in the literature as residential satisfaction. Housing satisfaction will be defined in this study as the perceived quality of the home in terms of a broad attitudinal evaluation (Aragones, Francescato, & Gärling, 2002; Weidemann & Anderson, 1985). In some European countries, housing satisfaction has been shown to be the highest ranked aspect of life satisfaction demonstrating a substantial contribution to well-being (Costa-Font, 2013).

Morris, Crull, and Winter (1976) propose that lower levels of housing satisfaction occur when the living situation is not consistent with the cultural, family and community housing norms. This disconnect between the actual housing situation and housing norms results in a housing deficit and increases residential dissatisfaction. When an occupant's dissatisfaction with their current housing passes a certain level, then the inhabitants are likely to consider a form of housing adjustment (Hui & Yu, 2009). Research has shown that age has an influence on levels of housing satisfaction with older adults requiring different housing needs specific to their age and situation (Waziri, Yusof, & Rahim, 2014).

A report by Statistics New Zealand (2014) on the perceptions of housing quality in New Zealand indicates that almost half of all New Zealanders perceive their house to be cold. The report also states that 21 per cent feel their home is often or always cold, 32 per cent feel they have a problem with dampness, and 64 per cent feel they need repairs or maintenance completed on their home. The report goes on to state that self-perceived housing satisfaction is lower among renters, one-parent families most often reported housing problems, and Pacific Island families report the most problems with damp and cold. This report highlights possible vulnerabilities for older adults who are renting, Pacific older adults, and those living alone.

Research in New Zealand demonstrates that many older adults are displeased with their home as they age and would be inclined to move but have formed strong emotional ties to their home. This can prevent relocation even when an occupant perceives their housing quality to be poor (Gitlin, 2003; Severinsen, Breheny, & Stephens, 2016). Another study found that some older people happily remained in their home despite poor physical characteristics, which could adversely affect their health and quality of life. Many of the participants lived in housing situations with poor access to services, comfort and support but did not want to move despite being able to relocate because of the importance of their home and community (Severinsen et al., 2016).

A study in Europe demonstrated that older adults who perceive their home as being more accessible, meaningful, useful and that external influences are not

responsible for their housing situation, have a better sense of well-being and were more independent in daily activities (Oswald et al., 2007). It has also been shown that when a home lacks positive meaning for a person, it can cause psychological distress such as the home providing no sense of security, order, identity, connection, warmth or suitability (Gifford, 1997). Further research in North America demonstrated that for older adults living in poor quality housing there was great importance placed on relationships with communities, churches and social services which contributed to a greater sense of home, belonging and housing satisfaction (Becker, 2003; Bolzman, Fibbi, & Vial, 2006). This research demonstrates that actual housing quality does not always match perceived housing quality and that housing satisfaction is vital to the well-being of older adults.

2.5 More to Well-being than the Physical Structure of a Home

There is more to a home than merely its physical appearance and research has shown that identity is intricately intertwined with the home and what an individual or community may think about a person (Lager, Hoven, & Meijering, 2012). The structural quality or appearance of a home can provide feedback to occupants and their community about the superiority or inferiority of their environment and influence how others view the residents within (Kearns, Hiscock, Ellaway, & MaCintyre, 2000). Populations residing in state housing may feel more stigmatised by the broader community and may adopt negative perceptions about themselves or the area they live in and apply this to their own identity (Halpern, 1995). Specific areas of residence may also influence prospective employers, schools and the police creating stigma that may be attached to persons living in areas believed to be “bad neighbourhoods” (Rosenbaum, Reynolds, & DeLuca, 2002). A house can act as a symbol of a person in many western cultures and can be seen to reflect who they are, what they have accomplished, and what they stand for (Becker, 1977; Halpern, 1995; Marcus, 1997). Negative feelings about the place or area where one resides may negatively influence the outlook or self-esteem of occupants and what the broader community believes about a person (Hernandez & Blazer, 2006).

Research has provided substantial evidence that as people age they experience an increase in their attachment to social and physical environments. Buffel et al. (2014) describe three reasons why place attachment becomes more significant as people age. Ideas such as more extended periods of time in the same locality, greater time spent at home and in the neighbourhood post-retirement, and increased reliance on neighbourhood relationships for support. They investigated four communities by studying contextual factors that promoted the experience of place attachment in older adults and found that areas with strong place attachment tend to have lower population density, lower numbers of people on minimum wage, lower percentages of residents leaving their home after dark and higher satisfaction with the physical environment. This study also found that the significance of place preserved a sense of identity and independence in old age.

A New Zealand study by Wiles et al. (2017) found that for older adults' attachment to place is positively associated with health. The study investigated how participants feelings around connectedness with their home, community, neighbourhood, nature and expectations about residential mobility were associated with measures of health. It was demonstrated that older adults hold strong feelings of attachment to place but that this differed between Māori and non-Māori. Māori also experienced stronger associations between health measures and the importance of nature which was different to non-Māori.

Until recent years the majority of people aged 65+ identified as being New Zealand European, but by 2038 it is estimated that the Māori population over 65 will nearly double from 5.8% to 10% (Statistics New Zealand, 2015b). Understanding that for older adults a home is more than just a physical structure to provide shelter is particularly important when considering the differences between ethnic groups in New Zealand. A study by Butcher and Breheny (2016) found that for older Māori attachment to place is deeply linked to their identity, that Māori elders experience autonomy through dependence on land or family, and that connections to a place can enable a strong identity. The differences between ethnicities within New Zealand may see individuals prioritise different values when choosing where to reside.

One study by Giuliani et al. (2014) in Italy demonstrated the negative consequences of displacing older adults from their communities and neighbourhoods after an earthquake forced 571 older adults to relocate to 19 different areas. The participants reported on their perceived quality of life and well-being three years after the earthquake and described disruptions to their social networks, less access to services, feeling more isolated and struggling to re-establish contacts with friends and relatives. The study also found that the more negative the perception of a person's well-being, the higher their wish to live elsewhere or return to their quake-damaged homes and neighbourhoods. Many of the participants were aware that they would never be able to return to their home and this knowledge negatively affected their health, mood and desire to socialise. While the city was able to provide a house for these older adults, they could not recreate their neighbourhood environments. This resulted in an inability to re-establish social connections and daily routines, which negatively influenced their perceived quality of life, well-being and housing satisfaction. This points to the importance of a house not just providing shelter but the broader social and neighbourhood environments which are essential to older adults' well-being. This may demonstrate the moderating impact of living in a community with good neighbourhood characteristics and how this may enhance well-being.

The current study was conducted to investigate if neighbourhood qualities, assessed in terms of neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety, can positively impact on the well-being of older adults. The study will also investigate if neighbourhood qualities moderate the link between housing satisfaction and well-being. Very few studies to date have been completed internationally or in New Zealand investigating the moderating impact of neighbourhood characteristics on the relationship between housing satisfaction and well-being among older adults. The current study seeks to highlight that there is more to well-being than just the physical assets of a home and that neighbourhood qualities may be particularly essential in addressing the needs of an ageing population when planning, buying, building and improving living conditions in their communities.

2.6 The Importance of Neighbourhood Characteristics

Finding broader environmental factors that may moderate the harmful effects of low housing satisfaction may be essential to improving the well-being of older adults. Because older people spend more leisure time at home, research shows that neighbours and neighbourhoods have a strong influence on their day to day lives (Cramm, van Dijk, & Nieboer, 2013). It is also important to note that due to no longer working, limited mobility and resources, older adults spend more time in or are restricted to their local area (Bowling & Stafford, 2007; Scharf, 2002). Investigating the characteristics of environments where older adults spend a majority of their time may contribute to understanding how to improve the health and well-being of occupants experiencing low housing satisfaction.

2.6.1 Neighbourhood Qualities

The saying in real estate, “buy the worst house on the best street” may have more than just monetary benefits, but also highlight the impact that living in a good neighbourhood or community may have on health, well-being and quality of life. There is a growing body of gerontological literature internationally suggesting that community context is particularly important in the lives of older adults (Robert & Li, 2001) and neighbourhoods can significantly influence health (Cramm et al., 2013; Yen, Michael, & Perdue, 2009). Supporting older adults to age well in the place of their choice requires strong community partnerships that include the voice of older people to facilitate the meaningful creation of neighbourhoods and communities. The point of view of older adults may guide the formation of spaces that are functional to the social, physical, and psychological aspects of older adults’ lives in their homes and communities (Sixsmith et al., 2017).

Further studies explain that positive affiliation with a neighbourhood is related to good health and that neighbourhood resources such as green space, walkability, strong social ties and support, low levels of isolation, violence and crime can improve mental health, reduce alcohol and drug use and intimate partner violence (Howden-Chapman, 2002; O’Campo, Burke, Peak, McDonnell, & Gielen, 2005; Stockdale et al., 2007). Additional research has also found that specific features of a neighbourhood correlate with an individual’s satisfaction

with their house and neighbourhood such as lighting, crowding, noise, proximity to needed facilities, environmental quality, yard upkeep and neighbourhood landscape (Sirgy & Cornwell, 2002). A study with older adults found that common outdoor spaces can support forming and maintaining social ties with other older adult residents in inner-city neighbourhoods (Kweon, Sullivan, & Wiley, 1998). For older adults in New Zealand, research has found that intangible qualities, such as proximity to nature, gardens, accessibility to shops and public transport, may become more important than physical attributes as people age (Buckenberger, 2012).

In a study by Jones-Rounds et al. (2014) participants self-assessed their neighbourhood on a number of subjective questions such as how they and others view the area in which they live. This included the view from their building, the safety of their neighbourhood and the amount of litter or noise. This study found that poor neighbourhood quality can contribute to poor psychological well-being among residents based on their self-assessment or perception of the area. It was also found that neighbourhood quality can act as a moderator to the adverse effects of poor housing quality. Neighbourhood quality was found to mitigate the adverse effects of poor housing quality on psychological well-being even when socioeconomic status, employment status, gender and marital status were included as statistical controls. This was one of the first studies to show that physical features of housing and the quality of a neighbourhood can have an interactive effect on the mental health of occupants and surmised three possible neighbourhood characteristics responsible for the effect. The first characteristic was social support from neighbours to fill the gap left by poor housing quality in providing strong social ties and safe areas for residents to interact. The second was access to needed resources such as medical services, places to exercise and stores with healthy food. The third characteristic was a neighbourhood environment that supports social networks and provides residents with places to experience positive social interactions.

Jones-Rounds et al. (2014) established preliminary evidence that neighbourhood qualities may magnify or reduce the effects of housing quality on well-being. The detection of neighbourhood characteristics that may act as moderating variables to battle the adverse effects of poor housing quality and

low housing satisfaction on physical and mental health informs the hypotheses of this study. The present study aims to investigate whether specific neighbourhood qualities such as neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety can enhance the positive effects of housing satisfaction and influence the health and well-being of older adults living in New Zealand.

2.6.2 Social Cohesion

Social cohesion may be an untapped resource that older adults can access through their membership in a neighbourhood or community. Social cohesion embodies elements such as trust, attachments, practical help, tolerance or respect, and has many benefits for members of a neighbourhood. The benefits may include trust in others in the community, reciprocity, civic involvement and a sense of belonging within the group (Cramm et al., 2013; Stafford et al., 2003; Wilkinson, 2007). It has also been noted that social cohesion is lower in areas of higher material deprivation (Stafford et al., 2003) and in ethnically diverse areas for older adults (Sturgis, Brunton-Smith, Kuha, & Jackson, 2014).

Research by Cramm et al. (2013) in the Netherlands demonstrated that social cohesion and social capital were significantly and independently associated with greater positive well-being of older adults. The research established that social cohesion and social capital among neighbours lead to higher levels of well-being in older adults due to better social organisation and support between neighbours. This includes neighbours providing help in times of sickness and help with transport or other daily activities that may require assistance. These favours among neighbours resulted in older adults avoiding worries about the future and experiencing more support. It also increased self-esteem and a feeling of mutual respect, which resulted in an overall increase in well-being outcomes.

Additional studies reported similar findings linking social cohesion to better physical and mental health for neighbourhood residents as well as to better physical health in adults aged 50+ (Deindl, Brandt, & Hank, 2016; Rios, Aiken, & Zautra, 2012). Social cohesion in a neighbourhood was also shown to increase levels of physical activity among older adults aged 65+ (Fisher, Li,

Michael, & Cleveland, 2004). One study noted that low neighbourhood social cohesion resulted in higher rates of depression among residents, increased levels of smoking and fewer people walking for exercise (Echeverría et al., 2008; Honjo et al., 2018).

A Statistics New Zealand report (Statistics New Zealand, 2015a) investigated how connected Kiwis are to their neighbours. The report found that over half of New Zealanders have been living in the same neighbourhood for longer than six years, and more than half state they have supportive neighbours that they see at least weekly. The most common form of contact between neighbours occurs face to face and having supportive neighbours enhances the feeling of safety and trust in a neighbourhood. The report notes that individuals living in an area for six years or more are twice as likely to have supportive neighbours than those living in an area for less than one year. It is important to highlight that neighbours can be more accessible via face to face contact (due to proximity) than friends or family and may serve as strong support and a social network for older adults. Research notes that if the environment surrounding a home does not facilitate social interaction, occupants are forced to withdraw within their own homes (Yancey, 1971). This may cause communities, families and more vulnerable older adults, who live in poor-quality housing, to spend more time indoors.

To further understand the relationship between older adults and their neighbourhoods, collective efficacy theory was used (Galinsky, Cagney, & Browning, 2012) (see figure 1). Collective efficacy theory can be defined as a concept that focuses on the shared outlooks and mutual engagement of residents in developing local social control (Sampson, 2004). This is demonstrated by how likely neighbours are to help one another or act on an issue impacting the neighbourhood. It is a theory that emphasises the importance of community and how neighbourhood thinking can serve to approach local problems (Sampson, 2004). Social efficacy highlights a social network within neighbourhoods that can empower older adults to establish social norms and feel part of a group. This increases their sense of belonging to their community and highlights the need for strong social cohesion among neighbours.

2.6.3 Neighbourhood Accessibility

Older adults are less likely to travel than their younger counterparts, and the number of outings made declines each year as people age (Metz, 2000). This is due to a variety of factors such as fewer journeys made for work or business, decreases in driving ability or physical mobility and less income for holiday travel (Horswill et al., 2008; Metz, 2000). As seniors spend more time near their home and have less ability to travel to medical and financial services, support groups, social clubs and food establishments (café and groceries), accessibility becomes very important to remain active in the community. Accessibility in this study is defined as the ease with which people can reach destinations (Metz, 2000), which for older adults can mean the difference between participation in their community or separation in their homes.

Gerontological literature highlights the relationship between mobility and quality of life for older people and a loss of mobility such as inability to drive or limitations of physical movement that can have an adverse effect on health and well-being (Marottoli et al., 1997; Metz, 2000; Hirvensalo, Rantanen, & Heikkinen, 2000; World Health Organization, 2007). When older adults experience decreased accessibility to the services they need to complete daily activities, this impacts on their ability to lead active and stimulating lives. In New Zealand, most older adults reside in urban settings, but for those who live in rural locations, the regional differences in geographical accessibility to resources can be an issue. One study found that the average time to the nearest food shop could vary immensely within New Zealand from one minute to 244 minutes (Pearce, Witten, & Bartie, 2006). Traffic may also be an issue for older persons living in urban environments as traffic in larger city centres can impact accessibility and limit the capacity of older adults to drive or walk to destinations.

Many obstacles exist which are decreasing accessibility for older people living in busy urban cities or remote rural dwellings. One study on age-friendly communities recognised several environmental obstacles impeding accessibility such as physical barriers, inaccessibility of services, lack of amenities, social stress and resource shortages (Levasseur et al., 2017). This study highlights that these obstacles can negatively impact social participation, physical health

and equity of health for older adults, especially when combined with reduced mobility due to loss of a driver's license or declining physical movement.

In urban cities, several barriers may exist for older adults, including heavy traffic, lack of parking near required services and reliance on public transport or walking to places, which can be difficult for older adults to navigate (Levasseur et al., 2015). For rural communities, long distances to services and amenities due to inadequate public transport infrastructures or loss of a driver's license can create transportation barriers (Chihuri et al., 2016; Marottoli et al., 1997). There may also be a shortage of crucial services in rural areas requiring trips to be made to larger city centres (National Advisory Committee on Health and Disability, 2010). While there are pros and cons to living in urban and rural environments associated with accessibility, research highlights the need for governments and cities to implement age-friendly policies and strategies that create intergenerational cities to meet the needs of the growing older adult population (National Advisory Committee on Health and Disability, 2010).

The findings from the studies stated above resonate with the principles of social exclusion theory (Scharf, Phillipson, & Smith, 2005) which was used as a guiding concept in understanding the need for accessibility to services and safety in neighbourhoods for older adults (see figure 1). Social exclusion can be defined as a reduction in regular communications within a culture between an individual and the rest of society by being denied access to resources that allow for healthy social interaction (Green et al., 2003; Pierson & Ross, 2009). Factors that may influence this deprivation include poverty, poor education, tenure status, socioeconomic status, mental health, physical health, and physical mobility (Green et al., 2003). Older adults experience social exclusion as they age by having fewer opportunities for social interaction due to no longer working, decreased mobility in the community and shrinking social circles. Supporting older adults to reduce the adverse effects of social exclusion may include increasing accessibility to services and opportunities for social interaction within the community.

2.6.4 Neighbourhood Safety

Perceptions of safety are particularly important for older adults as research demonstrates that older people are more likely to report feeling unsafe than younger adults, despite being less likely to be victims of a crime (Scarborough, Like-Haislip, Novak, Lucas, & Alarid, 2010). Research also links perceptions of personal safety to outcomes of physical health, quality of life, well-being and social engagement (Ross & Mirowsky, 2001). Older adults who perceived their neighbourhood to be unsafe were more likely to report poorer self-rated health, with women more likely to remain at home if they felt their neighbourhood was unsafe (Berglund, Westerling, & Lytsy, 2017; Krause, 1996).

Several international studies show that older adults who perceive their neighbourhood to be unsafe are at risk due to limited mobility (Clark et al., 2009), decreased physical activity (Centers for Disease Control and Prevention (CDC), 2005) and an increase in rapid functional decline (Hébert, 1997). One study identified aspects of physical movements, such as the ability to lift, stand, and walk up a flight of stairs, which declined for older adults over a period of a year when living in neighbourhoods perceived as having high crime. (Yen et al., 2009). Other studies found that the perception of living in an unsafe neighbourhood may leave older adults more homebound, limit their life-space mobility, decondition them from physically moving, and interacting in their community (Cohen-Mansfield, Shmotkin, & Hazan, 2010; Peel et al., 2005). For example, in a longitudinal study of individuals aged 50 years and older living in the United States, poor neighbourhood safety was associated with a 10-year functional decline, even for those participants who were functionally independent at baseline.

New Zealand specific research conducted in Christchurch found that neighbourhood safety influenced the amount of leisure time and physical activity older adults engaged in (Annear, Cushman, & Gidlow, 2009). Respondents were separated into two groups of East-town or West-town suburbs, which indicated high or low deprivation areas. The respondents in the East-town (high deprivation) areas reported social and physical conditions that constrained their participation in leisure-time physical activities such as perceptions of crime, antisocial behaviour of residents, the presence of litter, graffiti and residential

degradation. Residents of the West-town (low deprivation) areas were more likely to engage in physical activity citing attractive and highly walkable neighbourhoods, perceptions of responsible and trustworthy residents and appropriate levels of required police attention to maintain safety (Annear et al., 2009). This research demonstrates that functional declines such as reduced leisure time and physical activity experienced by older adults living in unsafe neighbourhoods may severely impact their health and well-being. This inequality for older people may cause further limitations, leaving those living in poor quality housing spending more time than necessary within the walls of their own home.

The research stated above demonstrates that neighbourhood qualities can positively and negatively impact older adults living in their communities. Understanding which neighbourhood qualities can enhance mental health, physical health and well-being can support older adults to target these neighbourhood characteristics when choosing where to live or make improvements in their communities. Research concerning neighbourhoods can be challenging as lower-income people tend to reside in underprivileged neighbourhoods and many unfavourable neighbourhood characteristics tend to cluster together. Disadvantaged neighbourhoods more often experience higher crime rates, more pollution, inferior infrastructure and fewer health care resources (Ross & Mirowsky, 2001). These clusters of disadvantage make it difficult to pinpoint which neighbourhood characteristics are responsible for particular well-being outcomes. This study aims to begin to untangle some of these clusters by examining three separate neighbourhood qualities of social cohesion, accessibility and safety to understand if they contribute any unique variance to well-being.

2.7 Research Question and Hypotheses

The three main aims of the current study were to confirm the relationship between housing satisfaction and well-being, examine whether neighbourhood qualities contribute unique variance to well-being above and beyond housing satisfaction and to investigate the interactive effects of neighbourhood qualities and housing satisfaction. For the purposes of this study well-being will be

defined as a person's assessment of their life situation as a whole; the sum of their pleasure and pains or quality of life (Nieboer, Lindenberg, Boomsma, & Bruggen, 2005; Völker, Flap, & Lindenberg, 2007).

Specific hypotheses were the following:

Hypothesis 1: Housing satisfaction will be positively related to quality of life, life satisfaction, self-rated mental and physical health, and be negatively related to depression for older adults living in New Zealand.

Hypothesis 2: Neighbourhood social cohesion, neighbourhood accessibility, and neighbourhood safety will be positively associated with quality of life, life satisfaction, self-rated mental and physical health, and be negatively related to depression.

Hypothesis 3: Higher social cohesion within neighbourhoods will enhance the positive effects of housing satisfaction on quality of life, life satisfaction, self-rated mental and physical health, and depression.

Hypothesis 4: Better neighbourhood accessibility for older adults in their community will enhance the positive effects of housing satisfaction on quality of life, life satisfaction, self-rated mental and physical health, and depression.

Hypothesis 5: High levels of neighbourhood safety for older adults will enhance the positive effects of housing satisfaction on quality of life, life satisfaction, self-rated mental and physical health, and depression.

Research highlights several factors that should be considered to reduce the effect of confounding variables when conducting a study with older adults on the relationship between housing and well-being in New Zealand. Covariates to consider in the current study include ethnicity, gender, age, economic living standards, marital status, employment status, level of education and tenure status.

Research has demonstrated significant differences between Pākeha (New Zealand European), Māori and Pacific Islanders in health outcomes (Harris et al., 2006), tenure status (Johnson et al., 2018), socioeconomic status and education level (Marriott & Sim, 2015). Māori and Pacific Island older adults experience disproportionate disadvantages that may see them more frequently

enduring low housing satisfaction in poor quality rental accommodation and have lower levels of home ownership (Butler, Williams, Tukuitnga, & Peterson, 2003). These factors should be taken into consideration when analysing data for these populations.

There are also essential gender differences that need to be taken into account with women generally living longer, enjoying better quality of life and life satisfaction, (Women's Health Action, 2014) but earning less over the course of their working life than men (Statistics New Zealand, 2017). Age is also a covariate that may influence results as ageing is associated with cognitive and physical declines (Beddoes-Ley, Khaw, Duke, & Botti, 2016). Economic living standards and socioeconomic status have also been shown to confound health inequalities, as those who earn more often have better health; therefore, measures should be taken to control for this effect (Grundy & Holt, 2001).

Marital status is another variable to be considered as married older adults report higher incomes, better physical health (Koball, Moiduddin, Henderson, Goesling, & Besculides, 2010) and mental health (Kim & McKenry, 2002). Employment status has also been shown to influence physical and mental health with those employed experiencing better outcomes (Ohrnberger, Fichera, & Sutton, 2017). Level of education influences earning and better health (Tamborini, Kim, & Sakamoto, 2015) and lastly, homeowners report better physical/mental health and well-being than those who are renting (Chang, 2017; Szabó, Allen, Alpass, & Stephens, 2017).

3.0 Research Methodology and Data

3.1 The 2016 New Zealand Health, Work and Retirement Study

The New Zealand Health, Work and Retirement Study is a study of community-dwelling older adults aged 55 years and older who live in New Zealand. The study aims to provide information on topics such as work, retirement, health and housing. This research has been led or co-led since 2006 by the Health and Ageing Research Team at Massey University and was reviewed and approved by the Massey University Human Ethics Committee. In 2006, a large sample (*N* = 13,044) of adults aged 55–70 were selected from the New Zealand Electoral

Roll. During this process, the New Zealand Health, Work and Retirement Study oversampled potential participants of Māori descent in order to sufficiently represent the indigenous people of New Zealand. The response rate to this initial survey was 51%, which resulted in a sample of *n* = 6662.

The original cohort has been resurveyed on a biennial basis since 2006. To ensure longitudinal data represents the experiences of people aged 55 and older the study has added new participants to the study in 2009, 2014, and 2016 to continue to include younger participants. Recruitment targeted participants aged 55 to 56 to refresh the sample as previous cohorts continued to age.

The present study uses data only from the 2016 survey, which was the first to include questions concerning perceptions of housing. The 2016 Health, Work and Retirement postal survey (see appendix) was sent to a total of 7823 participants (*n* = 4298 new and *n* = 3525 existing participants). The response rate to the 2016 survey was 78.2%. Participants received a postal survey, information sheet and a paid return envelope. Those participating for the first time were approached for written consent, and the last page of the survey included a tear-out form to offer their phone and email contact details or an alternative contact person for future follow up (Allen, 2018). After two weeks, a postcard reminder was sent to all participants and again at eight weeks for those who have yet to return the survey. The second postcard included a final reminder, an information sheet, a survey booklet and another paid return envelope. The respondents received no payment for their participation in the study. The postal questionnaire included seven sections evaluating health, well-being, quality of life, family/friends, living environments, work, retirement, financial well-being, personality and demographic information (Allen, 2018).

3.2 Sample

Participants for the current study were selected from the 2016 New Zealand Health, Work and Retirement Study data collection wave, which included *n* = 4037 respondents aged 54 to 89 years. N = 7 were excluded from the study due to a miss-match among previously recorded and reported demographic information regarding date of birth and gender data. N = 1 response was

omitted as the participant withdrew from the study and n = 1 participant was excluded from the dataset as they were under the age of 55 resulting in a final sample of *n* = 4028. The demographic composition of the current sample is recorded in Table 1. The predominant ethnicities were 60.3% New Zealand European, 31% Māori and 1.4% Pacific Islander. The mean age of the participants was 65.51 years (*SD* = 6.58), with 55.9% recorded as female. Of participants, 32.7% were employed in full-time work, 18.8% were employed in part-time work, and 71.9% were married, or in a civil union/de facto relationship, 83.1% owned their primary residence, and 75.3% have completed education at a secondary school level or higher.

Table 1

Descriptive Statistics for the 2016 Sample

	Total	%	Mean	SD
Age (years)				
N	4,028	100	65.51	6.58
Youngest age	55	-	-	-
Oldest age	89	-	-	-
Participants aged 65+	2043	50.7		
Missing	0	-	-	-
Gender				
N	3,950	98.1	-	-
Male/Tane	1,745	44.2	-	-
Female/Wahine	2,203	55.8	-	-
Gender Diverse	2	0.1	-	-
Missing	78	1.9	-	-
Ethnicity				
N	3,943	97.9	-	-
New Zealand European	2,427	60.3	-	-
Māori	1,250	31	-	-
Pacific People	58	1.4	-	-
Asian	32	.8	-	-
Other	176	4.4	-	-
Missing	85	2.1	-	-
Employment Status				
N	3,195	79.3	-	-
Full-time work	1,318	32.7	-	-
Part-time work	756	18.8	-	-
Retired	780	19.4	-	-
Other	341	8.5	-	-
Missing	833	20.7	-	-
Marital Status				
N	3,972	98.6	-	-
Married or de facto	2,904	72.1	-	-
Not married or de facto	1,068	26.5	-	-
Missing	56	1.4	-	-
Highest Educational				
N	3,966	98.5	-	-
No qualification	935	23.2	-	-
Secondary school	930	23.1	-	-
Post-secondary/trade	1,297	32.3	-	-
Tertiary	804	20	-	-
Missing	62	1.5	-	-
ELSI Short Form Score				
N	3,874	96.2	5.46	1.54
Severe hardship	140	3.5	-	-
Significant hardship	135	3.4	-	-
Some hardship	198	4.9	-	-
Fairly comfortable	306	7.6	-	-

	Comfortable	678	16.8	-	-
	Good	1,399	34.7	-	-
	Very good	1,018	25.3	-	-
	Missing	154	3.8	-	-
Tenure Status					
	N	3,919	97.3	-	-
	Owner	3,346	83.1	-	-
	Not owner	573	14.2	-	-
	Missing	109	2.7	-	-

3.3 Measures

3.3.1 Demographics and Economic Living Standards

Demographics considered as confounding variables included ethnicity (Māori vs non-Māori descent), gender (male vs female), age, marital status (married or in a de facto relationship vs not married nor in a de facto relationship), employment status (full-time work, part-time work or retired), level of education (no qualification, secondary school, post-secondary/trade, tertiary), tenure status (owner vs not owner) and economic living standards (severe hardship, significant hardship, some hardship, fairly comfortable, comfortable, good or very good).

The economic Living Standards Index-Short Form (ELSI-SF) (Jensen et al., 2006) was developed in New Zealand for the general population to measure not only deprivation but a description of living standards across New Zealand. The shortened ELSI-SF has been shown to be a valid measure among populations of older adults (Jensen, Spittal, & Krishnan, 2005). To complete the ELSI-SF, participants were asked if they possess items such as a telephone, washing machine, home contents insurance or a personal computer. They were also asked questions about their ability to heat their home, go on a holiday, have a night out for socialising or entertainment and what measures they employ to keep their costs down. Scores were reported on 3, 4, and 5-point Likert scales. The ELSI-SF results in a score ranging from 0 to 30 as shown in table 2. For the present study, the Cronbach's alpha coefficient for internal consistency was α = .83, indicating acceptable scale reliability. The scale can be further divided into seven levels with living standards at level one being characterised as living in severe hardship at the lowest end of the living standards continuum. Those at level two are living in significant hardship, level three represents some hardship,

level four is described as fairly comfortable, and level five is described as a comfortable standard of living. Lastly, level six represents a good standard of living and level seven the highest living standards of the population (Jensen et al., 2005).

Table 2

ELSI-SF Scoring

Score ranges for the ELSI-SF		
Score	**Living standard level**	**Label**
0 – 8	1	Severe hardship
9 – 12	2	Significant hardship
13 – 16	3	Some hardship
17 – 20	4	Fairly comfortable
21 – 24	5	Comfortable
25 – 28	6	Good
29 – 31	7	Very good

3.3.2 Quality of life

Quality of life is examined utilising the CASP (Hyde, Wiggins, Higgs, & Blane, 2003) which was developed to measure the perspective of older adults in four domains including control, autonomy, self-realisation and pleasure. The CASP-12 is a condensed version which asks participants to rate, on a 4-point Likert scale ranging from 1 = Never to 4 = Often, how often each of 12 statements applies to them. The CASP includes statements such as “my age prevents me from doing the things I would like to do” (Control), “I can do the things I want to do” (Autonomy), “I look forward to each day” (Pleasure), and “I feel full of energy these days (Self-realisation). The total score ranges from 0 to 36 with some items requiring reverse scoring. Higher scores on the CASP-12 indicate better perceived quality of life. The CASP has been validated for use with both indigenous and non-indigenous older adult populations in New Zealand (Towers, Yeung, Stevenson, Stephens, & Alpass, 2015). For the present study, the Cronbach’s alpha coefficient for internal reliability was α = .86, indicating acceptable scale reliability.

3.3.3 Life Satisfaction

The WHOQOL–BREF (World Health Organization, 1996) is an abbreviated version of the WHOQOL–100 which was developed by the World Health Organisation to assess quality of life. This measure has been validated for use in older adults and in different countries and cultures (von Steinbüchel, Lischetzke, Gurny, & Eid, 2006). This study uses one item from the WHOQOL-BREF in a question that states, “All things considered, how satisfied are you with your life as a whole these days?” This question was scored on a 5-point scale ranging from 1 = very dissatisfied to 5 = very satisfied. In the present study, Cronbach’s alpha coefficient could not be calculated as only one item from the scale was applied.

3.3.4 Physical and Mental Health

The SF-12v2 health survey (Jenkinson et al., 1997) was designed as a shorter measure of the SF-36 to measure perceived health status. This brief 12-question assessment measures the physical and mental health of participants. The SF-12 has been validated for use with older adults (Marosszeky & Sansoni, 2005) and the physical and mental health scores have been normed for the older adult New Zealand population (Frieling, Davis, & Chiang, 2013). The measure includes questions regarding physical functioning, role restrictions due to physical or mental health problems; levels of physical pain, general health perceptions, presence of energy or fatigue, social functioning and general mental health. Sample items include “In general, how would you rate your mental health, including your mood and your ability to think?”, “In general, how would you rate your physical health?”, and “In general, how would you rate your satisfaction with your social activities and relationships?”

The SF-12v2 produces two scores: A Physical Component Summary (PCS) and a Mental Component Summary (MCS). Each component score can range from 0 to 100 with 50 indicating the population mean. The lower the score on the SF-12, the more disability a participant would experience, i.e., a score of zero is equivalent to maximum disability, and a score of 100 is equivalent to no disability. The standard deviation for the scale is 10 with a score of 40 indicating one standard deviation below the mean and a score of 60 indicating one standard deviation above the mean. For the present study, the Cronbach’s

alpha coefficient for the physical health component was α = .88, and for the mental health component α = .85, indicating good internal consistency for both subscales.

3.3.5 Depression CESD–10

Symptoms of depression were assessed using the Center for Epidemiological Studies Depression Scale (Radloff, 1977). The New Zealand Health Work and Retirement Study survey used the 10-item shortened version (CESD-10), which is a self-report measure that assesses symptoms of depression over the past week (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993). The CESD-10 is marked on a 4-point scale anchored at 0 = rarely or none of the time and 4 = all of the time. The measure includes both positively and negatively phrased items such as, “I felt hopeful about the future”, “I was happy”, “I had trouble keeping my mind on what I was doing”, and “I felt that everything I did was an effort”. A total score can be created by summing all ten items, ranging from 0 to 30 with a score above 10 being indicative of clinically relevant depression. The CESD-10 has been shown to be a valid and reliable measure among older adults (Andresen, Malmgren, Carter, & Patrick, 1994) and for the present study, the Cronbach’s alpha coefficient for internal consistency was α = .83, indicating acceptable scale reliability.

3.3.6 Housing Satisfaction

Housing Satisfaction was assessed by utilising a self-report measure of the present home and perceived housing environment on ten questions adapted from Heywood, Oldman, and Means (2002) and Oswald et al. (2007) to cover themes such as general housing satisfaction, housing quality and social provisions. Questions such as “I am satisfied with my house”, “I am happy with the living conditions of my house”, “my house meets all my needs”, and “my house is difficult for me to maintain” were rated on a 5-point Likert scale ranging from 1 = No, definitely not to 5 = Yes, definitely. The measure results in a score of up to 50 with higher scores indicating better housing satisfaction. The Cronbach’s alpha coefficient for internal consistency was α = .88, suggesting acceptable reliability.

3.3.7 Neighbourhood Social Cohesion, Accessibility and Safety

The Neighbourhood Social Cohesion Tool (Stafford et al., 2003) is comprised of 19 statements used to measure trust, attachment to the neighbourhood, practical help and respect. These areas were represented by questions such as "If you were in trouble, there are lots of people in this area who would help you" (trust). "People in this area do things to help the community" (attachment). "I feel comfortable asking a neighbour to collect a prescription if ill in bed" (practical help). "Everybody in this area should have equal rights and an equal say" (respect). Items were scored on a 5-point scale anchored at 1 = Strongly disagree, and 5 = Strongly agree. Scores range from 19 to 95 with higher scores indicating stronger social cohesion. This scale has also been shown to have good internal consistency and construct validity in previous research (Stafford et al., 2003). In the present study, this scale resulted in a Cronbach's alpha coefficient for internal consistency of $\alpha = .89$, indicating acceptable scale reliability.

Accessibility was measured using four items adapted from research by van der Pas et al. (2015), which investigated older adults and accessibility in their neighbourhoods and communities. Participants were asked to rate statements such as "I am close enough to important facilities", "I can get to shops easily", "I am close enough to any help I need", and "I have access to transport." Statements were measured on a 5-point Likert scale anchored at 1 = No, definitely not and 5 = Yes, definitely. A higher score indicates better neighbourhood accessibility, and for the present study, the Cronbach's alpha coefficient for internal consistency was $\alpha = .72$, suggesting acceptable reliability.

Neighbourhood safety was assessed utilising five items identified by Buckenberger (2012). Participants were asked to rate statements such as "I feel safe in my neighbourhood", "My neighbourhood is pleasant" and "The neighbourhood is peaceful," on a 5-point Likert scale anchored at 1 = No, definitely not and 5 = Yes, definitely. Higher scores are indicative of better neighbourhood safety, and for the present study, the Cronbach's alpha coefficient for internal consistency was $\alpha = .91$, indicating high reliability.

3.4 Analytic Plan

3.4.1 Data Source

Data for the present study was sourced from The New Zealand Health, Work and Retirement Study. Permission was given from Massey University to utilise data from the 2016 survey. The 2016 data collection wave was specifically chosen as it was the first time the study included detailed questions concerning housing satisfaction and neighbourhood qualities. The present study applied for permission to investigate housing related questions by requesting information completed by participants who were aged 55 or older and had completed the following measures: SF-12v2 physical health, SF-12v2 mental health, quality of life, depression, life satisfaction, economic living standards, neighbourhood social cohesion, neighbourhood accessibility, neighbourhood safety, and housing satisfaction. Information was also requested regarding ethnicity, gender, age, economic living standards, marital status, employment status, level of education and tenure status. The data requested was sent by Massey University in .sav format via a password protected file. From the data received one subject was excluded from the study prior to the analysis for being under the age of 55. All other participants' data were included n = 4028.

3.4.2 Analysis Objectives

The objective of the present study is to determine if broader environmental neighbourhood variables can positively influence health outcomes associated with low housing satisfaction and poor-quality housing for older adults. To achieve this objective, control variables were identified based on previous research and marked for further preliminary statistical analysis. Primary statistical analyses were then performed to test all three hypotheses.

3.4.3 Handling of Missing Data

Any missing data were reported as missing in the analyses and means were not substituted for answers that were incomplete. Missing data were handled with listwise deletion.

3.4.4 Statistical Procedures

All statistical analyses were performed using IBM SPSS Statistics 25. A preliminary analysis was performed to determine descriptive statistics regarding

the participants' ethnicity, gender, age, economic living standards, marital status, employment status, level of education and tenure status (see Table 1).

Statistical analyses were completed to identify confounding variables for consideration in the primary analyses. A correlational analysis was performed using Pearson's Correlation to analyse the association between age, economic living standards, and the study variables. A correlational analysis was also performed to understand the interrelationship between neighbourhood factors, such as neighbourhood social cohesion, neighbourhood accessibility, neighbourhood safety, and housing satisfaction to see if issues with multicollinearity were present. A correlational analysis was also performed to examine the association between the independent variables (i.e., housing satisfaction and neighbourhood qualities) and outcome measures.

Independent samples t-tests were calculated to test differences based on gender, marital status, ethnicity, and housing tenure in all measures used in the study.

One-way ANOVAs were completed to investigate if any statistically significant differences existed between groups when considering the level of education and employment status.

Hypotheses were tested using hierarchical regression analysis. Five hierarchical regression analyses were performed to test the main and interactive effects of housing satisfaction and neighbourhood qualities, such as neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety, on well-being. For each hierarchical regression, a four-step analysis was used to test the relationships of socio-demographic and independent variables to depression, SF-12 physical health, SF-12 mental health, quality of life and life satisfaction (the dependent variables). In step one, demographic controls (age, ethnicity, gender, economic living standards, marital status, employment status, level of education and tenure status) were entered. At step two, housing satisfaction was examined. At step three, neighbourhood qualities were considered such as neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety. At step four, interaction effects were examined between housing satisfaction, neighbourhood social

cohesion, neighbourhood accessibility and neighbourhood safety. Significant interactions were interpreted using simple slope analyses in ModGraph (Jose, 2013). For all tests of significance, alpha was set at .05.

Bonferroni correction was also used to adjust the *p*-value to be more conservative to correct for multiple testing and highlight effects with a $p < .01$. This correction is noted at the end of each section of the hierarchical regression analysis.

4.0 Results

4.1 Correlational Analysis

Pearson's Correlation was performed to analyse the relationship between age and the study variables. Two significant correlations were noted between age and the measures used. Age was negatively and weakly associated with the SF-12 physical health component score ($r = -.187$, $n = 3863$, $p = .001$). Age was also positively and weakly correlated with social cohesion ($r = .119$, $n = 3978$, $p = .001$). The weak correlation coefficients suggest that age is unlikely to be a confounding variable (see table 3).

Correlations were also calculated between economic living standards and the study variables. It was found that the ELSI-SF was positively and moderately associated with physical health ($r = .364$, n = 3731, $p < .001$) mental health ($r = .441$, n = 3731, $p < .001$), quality of life ($r = .589$, n = 3818, $p < .001$), life satisfaction ($r = .443$, n = 3839, $p < .001$), housing satisfaction ($r = .470$, n = 3845, $p < .001$), neighbourhood social cohesion ($r = .352$, n = 3841, $p < .001$), neighbourhood accessibility ($r = .270$, n = 3847, $p < .001$) and neighbourhood safety ($r = .413$, n = 3850, $p < .001$). The ELSI-SF was also found to be negatively and moderately correlated with depression ($r = -.501$, n = 3831, $p < .001$). Due to these results, the ELSI-SF was incorporated as a control variable in the main analysis (see table 3).

A correlation analysis was also performed investigating the interrelationship among neighbourhood factors such as social cohesion, accessibility, and safety. Although the neighbourhood factors were positively and moderately correlated, the magnitude of the associations was below $r = .6$ (ranging from $r =$

.564 to *r* = .310). This demonstrates that they are related concepts but measuring different aspects of the broader neighbourhood environment (see table 3). In addition, housing satisfaction was positively and moderately associated with social cohesion (*r* = .399, *n* = 3954, *p* < .001), accessibility (*r* = .409, n = 3980, *p* < .001), and safety (*r* = .505, n = 3981, *p* < .001). Neighbourhood safety demonstrated a positive and moderately strong correlation with life satisfaction (*r* = .303, n = 3941, *p* < .001), quality of life (*r* = .374, n = 3928, *p* <.001), mental health (*r* = .311, n = 3832, *p* <.001), and physical health (*r* = .159, n = 3832, *p* < .001), and was negatively and moderately associated with depression (*r* = -.331, n = 3941, *p* < .001); (see table 3).

Table 3

Bivariate Correlations among the Study Variables

	2	3	4	5	6	7	8	9	10	11
1. Age	-.187**	.086**	.014	-.024	.057**	.119**	.118**	.065**	.105**	.114**
2. Physical Health		.211**	.441**	-.399**	.328**	.135**	.159**	.130**	.193**	.364**
3. Mental Health			.685**	-.787**	.549**	.289**	.311**	.245**	.371**	.441**
4. Quality of Life				-.741**	.595**	.383**	.374**	.311**	.446**	.589**
5. Depression					-.560**	-.320**	-.331**	-.261**	-.393**	-.501**
6. Life Satisfaction						.285**	.303**	.237**	.365**	.443**
7. Social Cohesion							.564**	.310**	.399**	.352**
8. Safety								.391**	.505**	.413**
9. Accessibility									.409**	.270**
10. Housing Satisfaction										.470**
11. ELSI-SF										

Note: Results of hierarchical equation regressing physical health on four sets of variables. *p < .05. **p < .01. ***p < 001.

4.2 Independent Samples t-test

An independent samples t-test was performed to analyse gender differences in the study variables. Significant differences were found between men and women in life satisfaction, economic living standards and quality of life scores. Two participants reported as gender diverse in the sample but were excluded from this analysis due to the small sample size. It was found that men had higher economic living standards; $t(3867) = 3.04$, $p = .002$, $d = .098$. Women reported higher scores in life satisfaction and quality of life; $t(3896) = -3.05$, $p = .002$, $d = .102$ and $t(3884) = -2.68$, $p = .007$, $d = .086$, respectively (see table 4). No other significant gender differences were found. The differences between genders was controlled for as a possible confounding variable.

Significant differences were also found based on marital status. Married or de facto participants had better outcomes in all measures, including physical health [$t(3810) = 3.933$, $p < .001$, $d = .139$], mental health [$t(3810) = 7.886$, $p < .001$, $d = .276$], quality of life [$t(3910) = 7.975$, $p < .001$, $d = .277$], life satisfaction [$t(3919) = 8.623$, $p < .001$, $d = .301$], economic living standards [$t(3851) = 14.973$, $p < .001$, $d = .497$], housing satisfaction [$t(3935) = 10.907$, $p < .001$, $d = .374$], neighbourhood social cohesion [$t(3927) = 9.459$, $p = .001$, $d = .329$], neighbourhood accessibility [$t(3936) = 5.508$, $p < .001$, $d = .194$], and neighbourhood safety [$t(3936) = 10.900$, $p < .001$, $d = .360$]. This population also reported lower levels of depression [$t(3921) = -9.140$, $p < .001$, $d = .316$]. Due to these results, marital status was controlled for as a possible confounding variable in further analyses (see table 4).

Table 4

Demographic Differences in Study Variables: Means and Standard Deviations for Gender and Marital Status

	Gender				Marital Status			
	Male/Tāne		Female/Wāhine		In a relationship		Not in a relationship	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
SF-12 Physical	46.871	9.946	46.417	10.584	47.014	9.849	45.532	11.379
SF-12 Mental	50.351	9.711	50.033	9.762	50.918	9.187	48.111	11.035

Quality of Life	27.984	5.825	28.478	5.595	28.697	5.415	27.066	6.292
CESD Depression	5.962	4.887	6.210	4.952	5.660	4.646	7.269	5.485
Life Satisfaction	4.080	0.882	4.17	0.880	4.200	0.849	3.93	0.937
Social Cohesion	3.869	0.596	3.871	0.634	3.929	0.587	3.721	0.673
Safety	4.625	0.609	4.628	0.624	4.693	0.542	4.454	0.760
Accessibility	4.562	0.717	4.589	0.642	4.613	0.660	4.479	0.716
Housing Satisfaction	4.361	0.709	4.352	0.739	4.433	0.673	4.15	0.818
Economic living standards	24.594	6.182	23.967	6.522	25.166	5.422	21.794	7.903

Significant differences were also found in housing tenure comparing tenants vs owners. Owners had better outcomes in all measures, including physical health [$t(3763) = 8.817$, $p < .001$, $d = .389$], mental health [$t(3763) = 11.073$, $p < .001$, $d = .465$], quality of life [$t(3855) = 13.267$, $p < .001$, $d = .555$] life satisfaction [$t(3869) = 11.001$, $p < .001$, $d = .468$], economic living standards [$t(3782) = 22.154$, $p < .001$, $d = .878$], housing satisfaction [$t(3896) = 12.808$, $p < .001$, $d = .525$], neighbourhood social cohesion [$t(3877) = 9.191$, $p < .001$, $d = .396$], neighbourhood accessibility [$t(3896) = 4.301$, $p < .001$, $d = .186$], and neighbourhood safety [$t(3898) = 11.563$, $p < .001$, $d = .455$]. This population also reported less depression symptoms [$t(3873) = -12.513$, $p < .001$, $d = .517$]. Consequently, housing tenure was controlled for as a possible confounding variable in subsequent analyses (see table 5).

Significant differences were also found between participants of Māori and non-Māori descent. An independent samples t-test demonstrated that there were significant differences for Māori resulting in poorer physical health [$t(3861) = -9.601$, $p < .001$, $d = .315$], mental health [$t(3861) = -4.560$, $p < .001$, $d = .149$], quality of life [$t(3961) = -5.203$, $p < .001$, $d = .169$], life satisfaction [$t(3974) = -5.258$, $p < .001$, $d = .170$], economic living standards [$t(3872) = -12.607$, $p < .001$, $d = .406$], and neighbourhood security [$t(3986) = -4.666$, $p < .001$, $d = .148$]. Māori also had poorer outcomes on the depression measure [$t(3974) = 7.460$, $p < .001$, $d = .240$]. These results were all significant and Māori descent was controlled for as a confounding variable. There were no significant differences between Māori and non-Māori in neighbourhood social cohesion

and accessibility; $t(3976) = -1.222$, $p = .222$, $d = .039$ and $t(3985) = -.468$, $p = .640$, $d = .014$, respectively (see table 5).

Table 5

Demographic Differences in Study Variables: Means and Standard Deviations for Housing Tenure and Māori Descent

	Housing Tenure				Māori Descent			
	Owner		Not an Owner		Māori descent		Not of Māori descent	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
SF-12 Physical	47.268	9.936	43.063	11.593	44.571	10.659	47.815	9.892
SF-12 Mental	50.816	9.196	45.806	12.130	49.182	10.298	50.664	9.477
Quality of Life	28.746	5.378	25.351	6.758	27.630	5.799	28.603	5.624
CESD Depression	5.692	4.634	8.453	5.961	6.858	5.225	5.661	4.712
Life Satisfaction	4.190	0.848	3.760	0.982	4.040	0.896	4.190	0.868
Social Cohesion	3.911	0.597	3.654	0.693	3.856	0.642	3.880	0.602
Safety	4.673	0.562	4.354	0.815	4.569	0.688	4.663	0.566
Accessibility	4.599	0.658	4.467	0.754	4.570	0.760	4.581	0.621
Housing Satisfaction	4.418	0.678	4.003	0.887	4.286	0.781	4.400	0.691
Economic living standards	25.137	5.538	18.934	8.315	22.596	7.173	25.216	5.640

4.3 One-way ANOVA

A one-way ANOVA was performed to ascertain if any statistically significant differences existed in the study variables based on level of education. It was found that older adults who had attained any level of formal education, from secondary to tertiary, experienced better physical health than those participants who had no qualifications; [$F(3, 3805) = 51.03$, $p < .001$]. It was also found that those participants who had achieved a post-secondary level of education or higher had better mental health and lower levels of depression symptoms; [$F(3, 3805) = 5.25$, $p = .001$] and [$F(3, 3917) = 19.73$, $p < .001$], respectively. This trend regarding the level of education/trade achieved and better outcomes also resulted in better quality of life [$F(3, 3904) = 22.468$, $p < .001$], life satisfaction [$F(3, 3912) = 13.301$, $p < .001$], economic living standards [$F(3, 3845) = 53.170$,

$p < .001$], and neighbourhood security [$F(3, 3930) = 4.195$, $p = .006$]. See table 6 for means and standard deviations of one-way ANOVA. Due to these findings, level of education was controlled for as a possible confounding variable in further analyses.

Table 6

One-way ANOVA Mean and Standard Deviation for Level of Education

	Level of Education							
	No Qualification		Secondary School		Post-Secondary School/Trade		Tertiary	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Physical Health	43.819	10.560	45.834	10.646	47.220	10.099	49.750	8.873
Mental Health	49.233	10.870	49.912	9.884	50.833	9.216	50.548	9.109
Quality of Life	27.306	5.996	27.869	5.923	28.534	5.508	29.433	5.147
Depression	6.964	5.319	6.303	4.957	5.793	4.750	5.255	4.502
Life Satisfaction	4.020	0.902	4.080	0.916	4.160	0.862	4.280	0.839
Social Cohesion	3.876	0.655	3.854	0.614	3.860	0.615	3.910	0.584
Safety	4.586	0.694	4.611	0.643	4.635	0.593	4.687	0.517
Accessibility	4.593	0.646	4.578	0.651	4.568	0.749	4.570	0.621
Housing Satisfaction	4.361	0.775	4.356	0.749	4.365	0.697	4.347	0.677
Economic living standards	22.403	7.234	24.078	6.136	24.492	6.145	26.227	5.242

A one-way ANOVA was also performed to ascertain if any statistically significant differences exist in the study variables based on employment status. Statistically significant differences were found in physical health [$F(3, 3093) = 115.43$, $p < .001$], mental health [$F(3, 3093) = 47.151$, $p < .001$], quality of life [$F(3, 3150) = 65.831$, $p < .001$], depression [$F(3, 3160) = 61.886$, $p < .001$], life satisfaction [$F(3, 3154) = 38.506$, $p < .001$], economic living standards [$F(3, 3099) = 125.096$, $p < .001$], social cohesion [$F(3, 3099) = 23.031$, $p < .001$], neighbourhood security [$F(3, 3174) = 25.75$, $p < .001$], neighbourhood accessibility [$F(3, 3173) = 16.774$, $p < .001$] and housing satisfaction [$F(3, 3172) = 42.030$, $p < .001$]. See table 7 for means and standard deviations of one-way ANOVA for employment status. Due to these findings, employment status (working vs not working) was controlled for as a possible confounding variable in further analyses.

Table 7

One-way ANOVA Mean and Standard Deviation for Employment Status

	Employment Status							
	Full-time Work		Part-time Work		Retired		Other	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Physical Health	49.641	8.153	48.997	8.484	45.696	10.111	39.630	12.894
Mental Health	50.997	8.896	51.144	8.888	51.478	9.104	44.670	12.304
Quality of Life	29.046	5.152	29.321	5.125	28.868	5.159	24.755	6.826
Depression	5.275	4.324	5.370	4.551	5.606	4.536	9.002	6.015
Life Satisfaction	4.180	0.810	4.240	0.833	4.280	0.795	3.720	1.025
Social Cohesion	3.836	0.608	3.944	0.590	3.965	0.553	3.680	0.660
Safety	4.630	0.577	4.661	0.579	4.728	0.492	4.393	0.820
Accessibility	4.610	0.612	4.606	0.778	4.619	0.563	4.340	0.797
Housing Satisfaction	4.396	0.636	4.371	0.694	4.521	0.594	4.032	0.873
Economic living standards	25.574	5.001	24.721	6.036	25.757	4.765	19.089	8.445

4.4 Hierarchical Regression Analysis

4.4.1 Depression

A four-step hierarchical regression analysis was performed to test the extent to which the study variables predicted levels of depression (dependent variable). Step one was performed to test the impact of socio-demographic variables. Step two was performed to test the influence of housing satisfaction. Step three tested the effect of neighbourhood qualities such as neighbourhood social cohesion, neighbourhood safety and neighbourhood accessibility. Step four tested the interactions between housing satisfaction and neighbourhood qualities. The sample size for the hierarchical regression was n = 2981 for participants who completed all measures. No missing data was included. All four steps in the hierarchical regression demonstrated significant results (see table 8).

In step one, demographic controls explained 23.8% of the variance. At step two, housing satisfaction had a significant impact on depression and explained 3.8%

of additional variance. In step three, neighbourhood social cohesion and neighbourhood accessibility demonstrated significant effects on depression and explained an additional 1.4% of variance. At step four, one significant interaction effect emerged, explaining 0.2% of the variance in depression (see table 8).

In step four, employment status had a positive main effect on depression (β = .080, p < .001). This demonstrated that participants who engaged in work had lower scores on the CESD-10 depression measure (indicating lower levels of depression) than those who were not working. The ELSI-SF (β = -.318, p < .001), housing satisfaction (β = -.153, p < .001), neighbourhood social cohesion (β = -.102, p < .001) and neighbourhood accessibility (β = -.058, p = .003) had significant negative main effects on depression. Finally, one significant interaction was found between housing satisfaction and neighbourhood safety (β = -.052, p = .035) (see table 8).

The interaction demonstrated that the negative main effect between housing satisfaction and depression was modified by neighbourhood safety. The strength of the relationship between housing satisfaction and depression changed based on the level of neighbourhood safety. This is shown in figure 1 which demonstrates that the negative relationship between housing satisfaction and depression is the strongest in neighbourhoods with the lowest levels of neighbourhood safety. In other words, living in a house that meets one's needs can be a protective factor against depression symptoms especially when you live in an unsafe neighbourhood. This finding supports hypothesis 5 that housing satisfaction interacts with neighbourhood safety to reduce the negative effects of poor self-perceived housing satisfaction on depression symptoms among older adults.

Table 8

Hierarchical multiple regression of the prediction of depression

	Step 1			*Step 2*			*Step 3*			*Step 4*		
	ΔR^2	β	*t*	ΔR^2	β	*t*	ΔR^2	β	*t*	ΔR^2	β	*t*
Gender	.238***	-.024	-1.471	.038***	-.019	-1.202	.014***	-.015	-.946	.002*	-.013	-.856
Level of educational		.002	.104		-.022	-1.330		-.024	-1.493		-.024	-1.510
Tenure status		.021	1.193		.006	0.340		.002	.107		.000	0.023
Marital status		.035	2.058*		.015	0.905		.009	.550		.008	0.486
Employment status		.073	4.410***		.077	4.777***		.081	5.052***		.080	4.954***
Māori Descent		.013	0.804		.015	0.918		.021	1.329		.022	1.392
Economic living standards (ELSI-SF)		-.450	-25.333***		-.351	-18.436***		-.319	-16.494***		-.318	-16.389***
Housing satisfaction					-.222	-12.453***		-.161	-8.149***		-.153	-7.608***
Social cohesion								-.096	-5.051***		-.102	-5.308***
Safety								-.038	-1.848		-.011	-0.460
Accessibility								-.048	-2.753**		-.058	-3.014**
Housing satisfaction x Cohesion											.010	0.479
Housing satisfaction x Safety											.052	2.109*
Housing x Accessibility											-.024	-1.190

*Note. Results of hierarchical equation regressing depression on four sets of variables. *p < .05. **p < .01. ***p < .001.*

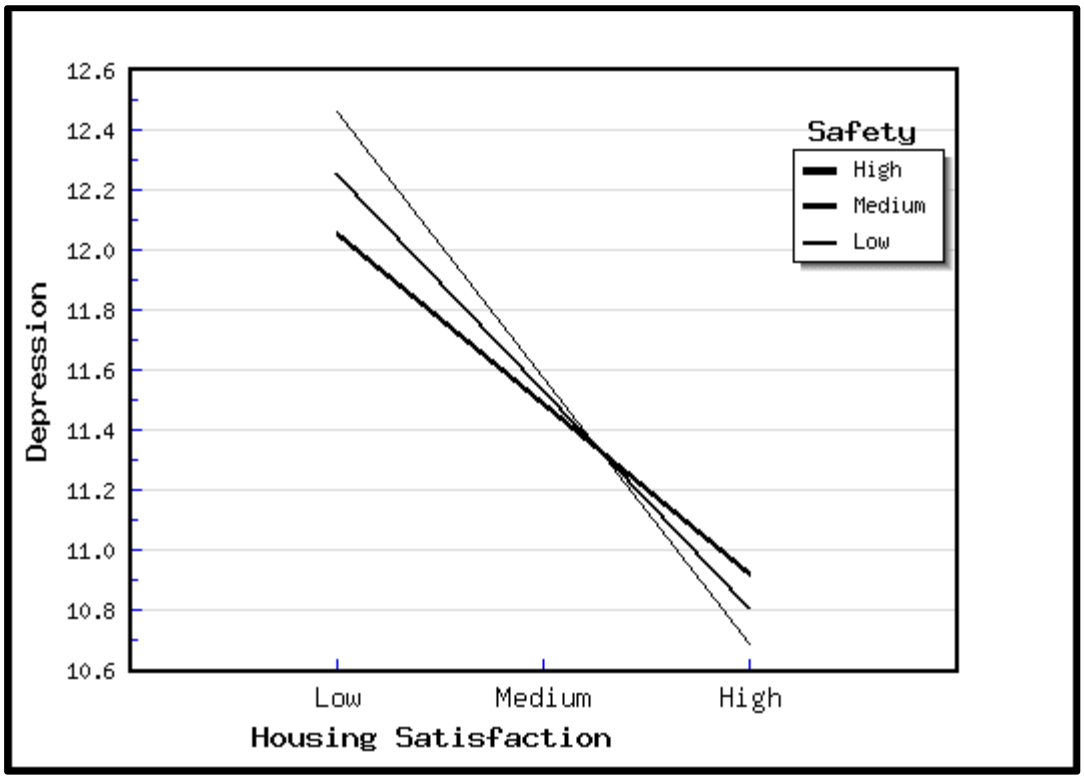

Figure 2: *The Interaction Between Housing Satisfaction and Neighbourhood Safety in Predicting Depression*

After taking Bonferroni correction ($p < .01$) into account, the following effects remained significant: employment status, economic living standards, housing satisfaction, neighbourhood social cohesion, and neighbourhood accessibility.

4.4.2 SF-12 Physical Health

A 4-step hierarchical regression analysis was performed with physical health as the dependent variable. The sample size for the hierarchical regression was n = 2922 for participants who completed all measures. No missing data was included (see table 9).

In step one, demographic controls explained 18.9% of the variance. At step two, housing satisfaction had a significant impact on physical health and explained 0.4% of additional variance. In step three, no significant effects were found for neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety. At step four, no significant effects were found for the interactions between housing satisfaction, neighbourhood social cohesion, neighbourhood safety and

neighbourhood accessibility (see table 9). Therefore, results from step two are interpreted.

In step two, employment status had a significant negative main effect on physical health (β = -.236, p < .001). This demonstrated that participants engaged in work had better levels of physical health. Level of education was also found to have a significant positive main effect on physical health (β = .099, p < .001) with those achieving any level of formal education experiencing better physical health. Gender had a significant positive main effect on physical health (β = .037, p = .029) with males reporting better physical health than females. The ELSI-SF had a significant positive main effect on physical health (β = .230, p < .001) with those having a better economic living standard reporting better physical health. Māori descent had a significant negative main effect on physical health (β = -.094, p < .001) with those of Māori descent reporting worse physical health. Housing satisfaction was also found to have a significant positive main effect on physical health (β = .049, p = .022) with those experiencing higher housing satisfaction reporting better physical health (see table 9).

Table 9

Hierarchical multiple regression of the prediction of physical health

	Step 1			*Step 2*			*Step 3*			*Step 4*		
	ΔR^2	β	*t*	ΔR^2	β	*t*	ΔR^2	β	*t*	ΔR^2	β	*t*
Gender	.189***	.038	2.279*	.004***	.037	2.195*	.001	.035	2.098*	.001	.037	2.191*
Level of educational		.090	5.210***		.098	5.622***		.098	5.639***		.099	5.687***
Tenure status		.018	.987		.022	1.250		.024	1.319		.023	1.283
Marital status		.005	.261		.011	.602		.013	.724		.013	0.754
Employment status		-.234	-13.557***		-.235	-13.661***		-.236	-13.663***		-.236	-13.683***
Māori Descent		-.092	-5.346***		-.093	-5.390***		-.094	-5.456***		-.094	-5.418***
Economic living standards (ELSI-SF)		.270	14.593***		.238	11.717***		.227	10.926***		.230	11.031***
Housing satisfaction					.072	3.762***		.050	2.361*		.049	2.295*
Social cohesion								.014	.702		.015	0.707
Safety								.027	1.223		.032	1.313
Accessibility								.018	.992		.032	1.561
Housing satisfaction x Cohesion											-.038	-1.602
Housing satisfaction x Safety											.025	0.927
Housing x Accessibility											.037	1.764

*Note: Results of hierarchical equation regressing physical health on four sets of variables. *p < .05. **p < .01. ***p < .001.*

After taking Bonferroni correction ($p < .01$) into account, the following effects remained significant: employment status, level of education, economic living standards, and Māori descent.

4.4.3 SF-12 Mental Health

A 4-step hierarchical regression analysis was performed to test mental health as the dependent variable. The sample size for the regression was n = 2922 for participants who completed all measures. No missing data was included (see table 10).

In step one, demographic controls explained 18.4% of the variance. At step two, housing satisfaction had a significant impact on mental health and explained 3.2% of additional variance. In step three, neighbourhood social cohesion, neighbourhood safety and neighbourhood accessibility demonstrated significant effects on mental health and explained an additional 1.1% of variance. At step four, no significant effects were found in the interaction between housing satisfaction, neighbourhood social cohesion, neighbourhood safety and neighbourhood accessibility (see table 10). Therefore, results from step three are interpreted.

In step three, employment status had a significant positive main effect on mental health ($\beta = .037$, $p = .029$) with those participants engaged in work reporting better levels of mental health. The ELSI-SF status had a significant positive main effect on mental health ($\beta = .293$, $p < .001$) with those participants experiencing better mental health also enjoying a better economic living standard. Housing satisfaction had a significant positive main effect on mental health ($\beta = .146$, $p < .001$) with higher levels of housing satisfaction predicting better mental health. Neighbourhood social cohesion ($\beta = .069$, $p = .001$) and neighbourhood accessibility ($\beta = .061$, $p = .003$) had significant positive main effects on mental health (see table 10).

Table 10

Hierarchical equation regressing mental health on four sets of variables

	Step 1			*Step 2*			*Step 3*			*Step 4*		
	ΔR^2	β	*t*	ΔR^2	β	*t*	ΔR^2	B	*t*	ΔR^2	β	*t*
Gender	.184***	.009	.529	.032***	.005	.281	.011***	.001	.032	.001	.000	0.026
Level of educational		-.055	-3.185***		-.034	-1.959*		-.032	-1.857		-.031	-1.829
Tenure status		-.022	-1.207		-.008	-.460		-.005	-.271		-.005	-0.261
Marital status		-.040	-2.290*		-.023	-1.333		-.018	-1.017		-.017	-0.980
Employment status		-.031	-1.809		-.035	-2.069*		-.038	-2.220*		-.037	-2.189*
Māori Descent		.017	.989		.016	.913		.010	.602		.010	0.592
Economic living standards (ELSI-SF)		.413	22.283***		.321	16.071***		.293	14.356***		.293	14.332***
Housing satisfaction					.206	10.974***		.150	7.183***		.146	6.915***
Social cohesion								.067	3.306***		.069	3.399***
Safety								.048	2.204*		.038	1.562
Accessibility								.051	2.777**		.061	3.010**
Housing satisfaction x Cohesion											-.014	-0.601
Housing satisfaction x Safety											-.016	-0.614
Housing x Accessibility											.025	1.199

*Note: Results of hierarchical equation regressing mental health on four sets of variables. *p < .05. **p < .01. ***p < .001.*

After taking Bonferroni correction ($p < .01$) into account, the following effects remained significant: economic living standards, housing satisfaction and neighbourhood social cohesion.

4.4.4 Quality of Life

A four-step hierarchical regression analysis was performed to test quality of life as the dependent variable. The sample size for the hierarchical regression was n = 2973 for participants who completed all measures. No missing data was included (see table 11).

In step one, demographic controls explained 34.3% of the variance. At step two, housing satisfaction had a significant impact on quality of life and explained 4.0% of additional variance. In step three, neighbourhood social cohesion and neighbourhood accessibility demonstrated significant effects on quality of life and explained an additional 2.3% of variance. At step four, no significant effects were found in the interaction between housing satisfaction, neighbourhood social cohesion, neighbourhood safety and neighbourhood accessibility (see table 11). Therefore, results from step three are interpreted.

In step three, employment status had a significant positive main effect on quality of life (β = -.056, $p < .001$) with those engaged in work reporting better quality of life. Level of education had a significant positive main effect (β = .035, p = .018) with those participants with any level of education reporting better quality of life. Gender had a significant positive main effect (β = .077, $p < .001$) with women reporting better quality of life than men. Māori descent had a significant positive main effect (β = .036, p = .014) with Māori reporting poorer quality of life. Further, ELSI-SF (β = .428, $p < .001$), housing satisfaction (β = .150, $p < .001$), neighbourhood social cohesion (β = .125, $p < .001$), and neighbourhood accessibility (β = .080, $p < .001$) had significant positive main effects on quality of life (see table 11).

Table 11

Hierarchical equation regressing quality of life on four sets of variables

	Step 1			*Step 2*			*Step 3*			*Step 4*		
	ΔR^2	β	*t*	ΔR^2	β	*t*	ΔR^2	β	*t*	ΔR^2	β	*t*
Gender	.343***	.088	5.870***	.040***	.083	5.674***	.023***	.077	5.403***	.001	.077	5.336***
Level of educational		.007	.471		.032	2.096*		.035	2.379*		.035	2.370*
Tenure status		-.023	-1.463		-.009	-.552		-.004	-.286		-.005	-0.294
Marital status		.001	.010		.020	1.290		.027	1.810		.028	1.829
Employment status		-.048	-3.136**		-.052	-3.515***		-.057	-3.869***		-.056	-3.838***
Māori Descent		.047	3.030**		.046	3.049**		.037	2.480*		.036	2.460*
Economic living standards (ELSI-SF)		.570	34.534***		.468	26.569***		.428	24.152***		.428	24.074***
Housing satisfaction					.229	13.882***		.152	8.380***		.150	8.151***
Social cohesion								.124	7.079***		.125	7.128***
Safety								.034	1.812		.023	1.111
Accessibility								.073	4.617***		.080	4.511***
Housing satisfaction x Cohesion											.008	0.378
Housing satisfaction x Safety											-.027	-1.176
Housing x Accessibility											.014	0.745

*Note: Results of hierarchical equation regressing quality of life on four sets of variables. *p < .05. **p < .01. ***p < .001.*

After taking Bonferroni correction ($p < .01$) into account, the following effects remained significant: employment status, gender, economic living standards, neighbourhood social cohesion, and neighbourhood accessibility.

4.4.5 Life Satisfaction

A 4-step hierarchical regression analysis was performed to test life satisfaction as the dependent variable. The sample size for the hierarchical regression was n = 2973 for participants who completed all measures. No missing data was included (see table 12).

In step one, demographic controls explained 18.9% of the variance. At step two, housing satisfaction had a significant impact on life satisfaction and explained 3.6% of additional variance. In step three, neighbourhood social cohesion and neighbourhood accessibility demonstrated significant effects on life satisfaction and explained an additional 0.8% of variance. At step four, no significant effects were found in the interaction between housing satisfaction, neighbourhood social cohesion, neighbourhood safety and neighbourhood accessibility (see table 12). Therefore, results from step three are interpreted.

In step three, gender had a significant positive main effect ($\beta = .077$, $p < .001$) with women reporting higher life satisfaction than men. The ELSI-SF ($\beta = .289$, $p < .001$), housing satisfaction ($\beta = .167$, $p < .001$), neighbourhood social cohesion ($\beta = .068$, $p = .001$), and neighbourhood accessibility ($\beta = .051$, $p = .012$) had significant positive main effects on life satisfaction (see table 12).

Table 12

Hierarchical equation regressing life satisfaction on four sets of variables

	Step 1			*Step 2*			*Step 3*			*Step 4*		
	ΔR^2	β	*T*	ΔR^2	β	*t*	ΔR^2	β	*t*	ΔR^2	β	*t*
Gender	.189***	.085	5.066***	.036***	.080	4.866***	.008***	.076	4.659***	.001	.077	4.710***
Level of educational		-.002	-.112		.021	1.230		.023	1.366		.024	1.404
Tenure status		-.028	-1.575		-.014	-.791		-.011	-.656		-.010	-0.599
Marital status		-.049	-2.815**		-.031	-1.801		-.026	-1.551		-.026	-1.529
Employment status		-.003	-.148		-.007	-.419		-.009	-.547		-.009	-0.535
Māori Descent		.002	.088		.001	.011		-.005	-.279		-.005	-0.279
Economic living standards (ELSI-SF)		.408	22.193***		.311	15.774***		.288	14.306***		.289	14.292***
Housing satisfaction					.216	11.714***		.170	8.258***		.167	7.973***
Social cohesion								.067	3.372***		.068	3.414***
Safety								.025	1.153		.024	1.007
Accessibility								.046	2.537*		.051	2.510*
Housing satisfaction x Cohesion											-.033	-1.480
Housing satisfaction x Safety											.014	0.530
Housing x Accessibility											.014	0.673

*Note: Results of hierarchical equation regressing life satisfaction on four sets of variables. *p < .05. **p < .01. ***p < .001.*

After taking Bonferroni correction ($p < .01$) into account, the following effects remained significant: gender, economic living standards, housing satisfaction, and neighbourhood social cohesion.

5.0 Discussion

5.1 Overview of Results

The three main aims of the current study were to confirm the relationship between housing satisfaction and well-being, to examine whether neighbourhood qualities contribute unique variance to well-being above and beyond housing satisfaction, and to investigate the interactive effects of neighbourhood qualities and housing satisfaction on well-being outcomes. Well-being was assessed in terms of depression, mental and physical health, quality of life and life satisfaction.

In the first hypothesis, it was predicted that housing satisfaction was positively related to quality of life, life satisfaction, physical health, and mental health and negatively related to depression. Results supported the hypothesis that housing satisfaction was significantly related to all outcome variables. These effects were significant after controlling for demographic variables including gender, level of education, tenure status, marital status, employment status, Māori descent and economic living standards. This confirms previous research linking housing satisfaction to better psychological and physical health outcomes (Bowling, 2005; Costa-Font, 2013; World Health Organization, 2005). These findings reinforce the importance of high housing satisfaction for the well-being of older adults and promotes a holistic approach that takes both objective and perceived aspects of housing into account in future policy and planning.

In the second hypothesis, it was tested whether neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety enhance well-being for older adults. The results partially confirmed the hypothesis. Neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety were all related to higher levels of mental health. Further, neighbourhood social cohesion and neighbourhood accessibility were significantly and negatively

related to depression symptoms and were positively associated with quality of life and life satisfaction. However, neighbourhood safety had no significant association with these outcomes. There was also no significant relationship between any of the neighbourhood qualities examined and physical health.

These result of hypothesis two support previous research demonstrating the positive impact of neighbourhood social cohesion on mental health (Cramm, van Dijk, & Nieboer, 2013; Deindl, Brandt, & Hank, 2016; Echeverría, Diez-Roux, Shea, Borrell, & Jackson, 2008), quality of life (Cramm & Nieboer, 2015), and life satisfaction (Hoogerbrugge & Burger, 2018). These findings may support that establishing and sustaining social relationships in later life is a matter of both individual and societal importance. Previous research supports that creating opportunities for older adults to engage in social activities within their neighbourhood is beneficial to overall health and well-being (Deindl, Brandt, & Hank, 2016) but more research needs to be done to develop an understanding of social cohesion as a public policy concept and how it may reduce social disparities in health-related quality of life among older adults.

Similarly, the positive impact of neighbourhood accessibility on well-being outcomes, such as mental health (Levasseur et al., 2017) and depression (Berke, Gottlieb, Moudon, & Larson, 2007), quality of life and life satisfaction (Kerr, Rosenberg, & Frank, 2012) is a widely documented finding both in international literature and the New Zealand context. However, previous research found important differences between rural versus urban New Zealand communities in accessing community resources (Pearce, Witten, & Bartie, 2006). For example, in a recent study, neighbourhood accessibility predicted better quality of life in older adults living in rural communities only when health care services were no more than 15 minutes away (Stephens, Szabó, Allen, & Alpass, 2018). Ensuring that all communities have access to core services regardless of their location is vital to promoting the health and well-being of older adults. A focus on access to social and health-related community resources at the neighbourhood level may enable health researchers and policymakers to examine disparities in the characteristics of neighbourhoods that impact on well-being.

Neighbourhood safety was also shown to positively influence mental health (Ram et al., 2017). Perceptions of safety are particularly important for older adults. Older people are more likely to report feeling unsafe than younger adults, despite being less likely to be victims of a crime (Scarborough, Like-Haislip, Novak, Lucas, & Alarid, 2010). If an older adult perceives their neighbourhood to be unsafe, this may lead to a reduction in the amount of time they spend exercising, socialising and being outdoors (Berglund, Westerling, & Lytsy, 2017; Clark et al., 2009; Ross & Mirowsky, 2001; Stockdale et al., 2007). Unsafe neighbourhoods may also struggle to attract new businesses and services that could provide material resources and other amenities to support older adults and their well-being (Clark et al., 2009). The finding that living in a safe neighbourhood is associated with better mental health may inform policy and contribute to discussions around the importance of improving safety for older adults within their neighbourhoods.

Neighbourhood safety also interacted with housing satisfaction in predicting depression symptoms. Specifically, findings demonstrate that housing satisfaction can be a protective factor against depression symptoms especially when living in an unsafe neighbourhood. This is a new contribution to the literature concerning older adults. Research shows that individuals who live in unsafe neighbourhoods spend more time indoors and have fewer social interactions (Clark et al., 2009; Stockdale et al., 2007). For older adults living in unsafe neighbourhoods, having a house that satisfies their needs may enable them to pursue their daily activities or to invite friends and family over. This can act as a protective factor against functional decline and social isolation, both of which are risk factors for depression (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Gayman, Turner, & Cui, 2008).

No other interaction effects were found between housing satisfaction and social cohesion or neighbourhood accessibility. This highlights the independent positive effects of these environmental factors on well-being in older adults. The lack of interacting effects suggests that living in a neighbourhood with good access to services and a strong community is not necessarily enough to offset the potential detrimental effects of poor housing.

Numerous socio-demographic variables have shown robust effects in this study. Some gender differences emerged, with men reporting greater levels of mental and physical health compared with women. In addition, men had better economic living standards, which could be one of the mechanisms contributing to differences in self-reported health (Women's Health Action, 2014). This highlights disparities in wealth and health that disadvantage women as they age and move into retirement. Another finding was that women had better quality of life and life satisfaction than men (Bowling, 2005). Previous research has stated that women place importance in multiple life domains while men appear to focus primarily on partner relationships and financial satisfaction. This may indicate that men have a narrower scope of what informs their idea of overall satisfaction and whether life, in general, is improving or worsening from the past to the present (Schafer, Mustillo, & Ferraro, 2013).

Differences were also found based on marital status. Older adults who were married or in a de facto relationship reported better physical and mental health, quality of life, life satisfaction, housing satisfaction, and fewer depression symptoms. Married or de facto participants also reported higher neighbourhood social cohesion, accessibility and safety. These differences could be attributed to a number of factors, such as partnered older adults experiencing better living standards and being financially more stable (Kim & McKenry, 2002; Koball, Moiduddin, Henderson, Goesling, & Besculides, 2010; Waite & Gallagher, 2002). This may also enable them to access better health care and obtain health insurance (Waite & Gallagher, 2002). Married or de facto couples may be able to afford to live in better quality neighbourhoods with higher combined incomes. Living with a partner might also contribute to feelings of safety, a sense of belonging and connectedness (Truman, Langton, & Planty, 2012). Finally, being married or in a stable/long-term relationship is often considered a cultural norm, as a result of which single people may experience some form of marginalisation or social exclusion (Hertel, Schütz, DePaulo, Morris, & Stucke, 2007).

As expected, housing tenure showed outcomes in favour of owners who experienced better physical and mental health, quality of life, and life

satisfaction, and reported lower levels of depression symptoms. Some studies suggest that this may be due to home owners' better socioeconomic status (Pierse et al., 2016). However, some previous investigations found evidence for the health and well-being promoting effects of home-ownership in older adults even after controlling for indicators of socioeconomic status (Szabó, Allen, Alpass, & Stephens, 2017; Stephens, Szabó, Allen & Alpass 2018). The greater housing satisfaction of owners might be explained by their increased freedom and ability to make improvements to their own home to meet their changing needs (Chang, 2017; Johnson, Howden-Chapman, Eaqub, & Government, 2018). Owners also lived in communities characterized by better neighbourhood social cohesion, accessibility and safety. This may be due to owners choosing safer neighbourhoods with access to services when purchasing a home, and once settled becoming more socially involved in the neighbourhood where they plan to live long term.

After controlling for differences in socio-demographic factors, being of Māori descent was associated with better quality of life but poorer self-reported physical health. One study by Dyall et al. (2014) suggests that quality of life may be higher for older Māori who are culturally engaged in their communities by attending their tribal marae (sacred meeting ground) and other cultural functions and activities. Better quality of life may also be associated with the increased levels of respect and cultural responsibilities Māori experience as they age within their whanau (family), iwi (tribe) and hapū (clan or sub-tribe). On the other hand, poorer physical health may be linked to decreased access to culturally appropriate health care services, institutional racism experienced as Māori service users, cost of healthcare or poor accessibility to services in communities (Dyall et al., 2014; Harris et al., 2006; Marriott & Sim, 2015).

Indicators of higher socioeconomic status, such as education and economic living standards, were associated with greater well-being and living in better neighbourhoods, a finding commonly documented in the literature (American Psychological Association, 2015; Grundy & Holt, 2001; Robert & Li, 2001; Tamborini, Kim, & Sakamoto, 2015)

Those working full-time or part-time also reported better outcomes. Research by Wickrama, O'Neal, Kwag, & Lee (2013) explain that working in later years has many benefits for older adults to decrease some of the cognitive declines associated with normal ageing such as task performance, processing speed and memory. They further state that engaging in work has been shown to protect against the deterioration of physical functioning and mental health. This may be due to work settings generally providing more physically and cognitively stimulating environments than do non-work environments. Role theory also provides a possible explanation that work provides access to resources which have psychosocial benefits that increase self-esteem, self-control, life satisfaction, and social support, positively contributing to health (Herzog, House, & Morgan, 1991; Moen, Dempster-McClain, & Williams, 1992). The psychosocial benefits gained for some by employment also highlights the need for volunteer opportunities in retirement. Volunteer opportunities or community activities targeted at newly retired adults may help to decrease the negative effects associated with role loss experienced in retirement.

More recent research by Szabó, Allen, Stephens, & Alpass (2018) has pointed to discrepancies in the benefits of employment for all older adults suggesting that it may only benefit the healthy and wealthy. They explain that for older adults living with poor physical or mental health it is possible that work could maintain or make these health conditions worse. A similar result may occur for those employed in low paying jobs as working longer may have a negative impact if the pension results in a higher income or access to better resources than current wages. This may inform discussions around the retirement age for older adults as many are working longer than previous generations and receiving psychosocial benefits from doing so, but this may also disadvantage some populations of older adults with health issues or earning wages lower than the pension.

5.2 Broader Implications of Results

The findings from the current study have important implications for New Zealand older adults, especially considering the impact of the current housing crisis on tenure status and rental accommodation. The composition of New

Zealand's population is changing with life expectancy rates at the highest level in history, and older adults are enjoying better health and longevity than previous generations (Cornwall & Dave, 2007). Projections suggest that between 2011 and 2021 the baby boom generation aged over 65 will grow by 215,000 and between 2021 and 2031 by another 250,000. It is estimated that by 2051, there will be 1.18 million New Zealanders aged 65 and over, an increase of 165% since 1999. By 2051 older adults will make up 26% of the predicted 4.63 million total population with the 85+ age group experiencing the most significant growth (Cornwall & Dave, 2007).

The implications of population ageing on housing, in a country already in the throes of a housing crisis, will be felt even more severely by subsequent generations ageing towards retirement (Statistics New Zealand, 2013; Johnson et al., 2018). It may also see subsequent generations of older adults struggle to age in place and obtain the lifestyle in retirement that was afforded to previous generations. Relative deprivation theory highlights some of the issues that may arise as housing costs exceed personal budgets, forcing individuals to cut back on diet, lifestyle, amenities and activities they would typically engage in for their well-being impacting on the quality of their retirement and their ability to age in place. Ageing in place is a term used internationally in research and government policies and highlights the importance of older adults remaining in their communities (Davey, 2006). Research supports that the majority of older people aged 65+ prefer to live independently in their own home for as long as possible (Gitlin, 2003) but this preference may be affected if older adults are priced out of their communities. Research has also stated that not being able to age in place in the community of one's choice may impact negatively on feelings of security, familiarity with and attachment to home/community, and sense of identity (Davey, 2006; Johnson et al., 2018; Wiles, Leibing, Guberman, Reeve, & Allen, 2012).

The Organisation for Economic Co-operation and Development (OECD) has reported a worrying trend among OECD countries that does not demonstrate positive ageing in place, instead promoting institutional care in old age (Wiles et al., 2012). Institutional care can medicalise normal ageing and lead to negative stereotypes of the aging process. Successfully ageing in place should see older

adults living in their family home or supported accommodation, rather than residential care and emphasises living independently as long as possible (Davey, 2006; Wiles et al., 2012). The New Zealand Positive Ageing Strategy reinforces this by advocating that older adults have the opportunity to live the independent lifestyle of their choosing in a place of their choosing (Ministry of Social Development, 2001).

Several studies have found that there is a need to incorporate specific demographic changes for older adults in residential housing development and policy planning (Waziri et al., 2014; Statistics New Zealand, 2013). The universal design concept promotes planning an environment to be accessible, understood, and used by all people regardless of their age, size, ability or disability (Carr et al., 2013). The living environment can generate opportunities for seniors to participate in activities of daily living by catering the community setting to intergenerational environments that create age-friendly cities. (Buffel, Phillipson, & Scharf, 2012; Carr et al., 2013).

The present study emphasises neighbourhood characteristics as an important factor in achieving good quality of life in old age. Incorporating neighbourhood qualities into policy and community planning may assist older adults to age in their own homes and communities. The results of the current study highlight specific neighbourhood qualities, such as neighbourhood social cohesion, accessibility and safety, that can enhance quality of life, life satisfaction, and mental/physical health for older adults in New Zealand. It was also found that having high housing satisfaction can serve as a protective factor against depression, especially when living in an unsafe neighbourhood, a unique finding to this research.

This study also highlights that health and quality of life of older adults might be promoted by targeting environmental factors, such as fostering better social cohesion among neighbours. Collective efficacy theory highlights the benefits of improving social cohesion which may improve shared outlooks and mutual engagement of residents leading to neighbours being more likely to help one another, act on an issue impacting the neighbourhood, emphasise the importance of community, or how neighbourhood thinking can serve to

approach local problems (Sampson, 2004). Social efficacy theory also emphasises the social network within neighbourhoods which may result from increased social cohesion empowering older adults to establish social norms and feel part of a group.

The results of the study call attention to the need for increased accessibility to services and safety in neighbourhoods. Social exclusion theory highlights issues that can arise from poor accessibility and safety as it may result in a reduction in regular communications within a neighbourhood by being denied access to resources or not feeling safe enough to engage in activities that allow for healthy social interaction (Green et al., 2003; Pierson & Ross, 2009). By providing a safe community where older adults feel safe enough to navigate the landscape and access service this may improve the quality of the community and the well-being of its inhabitants.

When planning for the future of the older adult population in New Zealand, improving neighbourhood characteristics can provide another way to support older adult's well-being, general mental health, quality of life and life satisfaction, thus enabling them to pursue the lifestyle in retirement they desire.

6.0 Limitations and Future Research

Some limitations in the present study are the use of a postal survey, which may be prone to response bias and missing data. Also, responding to a paper/pencil survey may demonstrate a certain level of motivation and ability that may exclude some respondents who have literacy issues, have a disability, or poor physical/mental health. Respondents to postal surveys may not be representative of the total New Zealand population as it may exclude more deprived sections of the older population or those physically unable to complete the survey. Further, longitudinal cohort studies are often affected by selective attrition. Participants who remain in the study over a long period of time may be healthier and wealthier than those who drop out. The continued recruitment of participants will reduce these limitations as well as the phone and email support offered in the study. Also, in statistical analyses, socioeconomic factors, such as education and economic living standards, were controlled to minimize the influence of external factors on the measured effects.

The current study was only able to access the survey from 2016 as this was the first-year housing data was available. This resulted in the analysis of cross-sectional data, which provided information about associations between variables, but was not able to determine causation. Future longitudinal research is needed to provide more robust evidence regarding the health and well-being promoting effects of neighbourhood qualities and housing satisfaction in older New Zealanders.

Although the focus of the present study was on understanding the impact of neighbourhood characteristics in the older adult population, most of the sample were young old adults transitioning from work to retirement (32.7% full-time work 18.8% part-time work). Further research may seek to differentiate between the young old and old old as ages 55+ is a broad age range when researching older adults. The housing and neighbourhood qualities experienced at age 55 versus at age 80 may produce different results in housing satisfaction and neighbourhood qualities due to functional limitations, disabilities, frailty and chronic conditions.

Another potential limitation is that the life satisfaction outcome measure only comprised one item. Problems may arise with construct validity with single item measures, as one question may not adequately represent the whole construct. However, this single item measure showed moderately strong correlations with measures of mental health and quality of life, and a weak to moderate association with physical health. This provides supporting evidence for the construct validity of the measure.

Another limitation is the difficulty in isolating which qualities of a neighbourhood have the most significant impact on overall well-being. While this research solely focused on three characteristics other aspects of neighbourhood quality such as access to green space, housing types available, or diversity of residents may also impact on health and well-being.

One limitation of the study was that investigating specific demographic differences was beyond the scope of the study. Examining these differences within groups would be important in understanding the variances between ethnicities, genders, marital status or tenure status. For example, further

research could be done to understand the differences for participants of Māori descent who in the present study experienced poorer physical and mental health but better quality of life. Research that supports understanding how the housing needs of Māori may differ from the general population could consider the values placed on connection to ancestral lands, intergenerational living and links to nature. This may uncover which housing and neighbourhood characteristics are most beneficial for Māori and influence policy and planning for iwi and government. Each group could undergo extended analyses in future research that examines unique group differences.

7.0 Conclusions

Research investigating the ways neighbourhood settings impact on health and well-being can support policymakers to design new strategies and targeted interventions. The potential adverse effects of living in disadvantaged neighbourhoods highlights the need for neighbourhood improvements that support older adults to age in place so that they can live independently longer, avoiding or postponing the need for costly long-term care.

The findings from the current research generally suggest that older adults in New Zealand derive psychosocial benefits from greater housing satisfaction, neighbourhood social cohesion, neighbourhood accessibility and neighbourhood safety. Results show that improving these aspects of the environment can contribute to better mental health, quality of life and life satisfaction in old age. This would also benefit the general population. Studies have shown these neighbourhood qualities are also important for adults and children in creating intergenerational neighbourhoods and a livable environment that promotes better health and well-being for the whole community (Centers for Disease Control and Prevention, 2005; Hoogerbrugge & Burger, 2018; Leventhal & Brooks-Gunn, 2000).

Implementing policies which promote a holistic approach that takes both objective and perceived aspects of housing into account in future policy and planning will improve housing satisfaction and the well-being of older adults. Policy and planning targeting stronger neighbourhood social cohesion will

promote establishing and sustaining social relationships in later life and create opportunities for older adults to engage in social activities within their neighbourhood. Furthermore, we need to ensure that all communities have access to core services regardless of their location to reduce disparities in access to health care across geographical locations. Lastly, a focus on improving neighbourhood safety will provide older adults with a sense of security and an environment they can navigate freely and without fear.

To improve housing satisfaction and neighbourhood social cohesion, accessibility and safety government policy and planning is critical, but community groups can also play an important part in implementing initiatives that improve their homes and neighbourhoods. Improving the well-being of older adults should be a primary focus for this growing population to ensure that the previous generations, which have built and sustained our communities, achieve the lifestyle in retirement they desire.

8.0 Conflict of Interest

The author declares no conflict of interest.

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10.0 Appendix

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