An Investigation of the Relationship Between Cultural Identity and Loneliness in Older Māori

A thesis presented in partial fulfilment

of the requirements for the degree of

Master of Science

in

Psychology

at Massey University, Palmerston North,

New Zealand

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2023

Abstract

New Zealand, along with many other countries around the world, is experiencing an ageing population. This has led to research with a focus on the well-being of older adults. A large part of this research is centred around loneliness. In New Zealand-based research, it has been shown Māori are disproportionately affected by negative health outcomes. Despite this, there is a current lack of research with a direct focus on loneliness in older Māori. Internationally, cultural identity (CI) in indigenous and minority populations has been shown to be related to loneliness however there is no current research on the relationship between CI and loneliness in older Māori. This study aimed to investigate this relationship. A secondary analysis of data from the 2020 survey wave of the Health, Work, and Retirement (HWR) study was completed. Participants (N=653) were included in this study if they were aged 65 and over, and indicated their prioritised ethnicity as Māori. Loneliness was measured using the 6-item De Jong Gierveld Loneliness Scale and Māori CI was measured using the Multidimensional Model of Māori Identity and Cultural Engagement (third revised version). The hypothesised negative relationships between Māori CI and loneliness, and Māori CI and emotional loneliness was not supported however a significant negative correlation was found between Māori CI and social loneliness. Māori CI moderated the relationships between depression and anxiety and outcome (overall and social loneliness). Multiple regression analyses revealed overall and social loneliness were significantly associated with the whanau efficacy CI dimension. None of the other dimensions of the CI measure were related to any type of loneliness. This study recommends further exploration into the relationships revealed. The moderating role of CI should be considered when analysing relationships between antecedents and loneliness. A culturally-sensitive definition of age and new measures of Māori CI should be considered in future research.

Acknowledgements

This project would not have been possible without the help and support of many different people. I am grateful to the Massey University Health and Ageing Research Team for the work they have put into the Health, Work and Retirement study and for allowing me to utilise their data. Such an extensive study sample would not have been possible without this. A special thanks also goes out to all those who participated in the study, and to those who will participate in the future. None of the research we do is possible without you.

To my supervisor Fiona, I am extremely grateful for all your help, support, patience, and guidance throughout this research process. Your flexibility and availability allowing me to move meetings and edit deadlines was hugely appreciated. Without your detailed and insightful feedback, the standard of my thesis would not be what is it. You have made my first experience as a researcher relatively stress-free and I cannot thank you enough.

To my family and friends, thank you for all your support throughout my research process (as well as the rest of my university journey). The messages of encouragement, consistent check-ins, and reminders to make time for things that I enjoy never went unnoticed. To my Mum, you continue to inspire me every day with your unwavering support and strength. Thank you for being my rock, for helping me to stay focused, and for keeping me grounded when I became stressed and overwhelmed. I would never have made it this far without you.

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1. Introduction

Along with many countries around the world, New Zealand experiencing an ageing population. Currently, those aged 65 years and older make up 15% of New Zealand's total population (Parr-Brownlie et al., 2021). This number has almost doubled since 1998 and, due to ongoing increases in life expectancy, is projected to double again in the next 20 years. The number of older Māori currently make up 6% of the 65 years and older population (Edwards et al., 2018). This number is expected to increase by approximately 150% to 113,100 people by 2038. At this point the number of Māori aged 65+ will constitute 10% of the 65 and over population (Statistics NZ, 2018). By 2043, this number is projected to increase by a further 12.5% to 148,800 people out of a projected over 65 population of 1,337,800.

An ageing population has driven an increase in research that focuses on the wellbeing of older adults. One such area of focus has been on loneliness in older populations as a predictor of, and contributor to, poorer social and health outcomes (Czaja et al., 2021; Donovan & Blazer, 2020; Malcom et al., 2019; Poscia et al., 2019). By undertaking research that focuses on contributors to loneliness, it becomes possible to work towards prevention of negative health outcomes rather than focusing on treatment.

Previous research with a focus on Māori has shown that Māori are disproportionately affected by negative social and health outcomes (Hobbs et al., 2019; Reid et al., 2014; Rolleston et al., 2020). These disparities can be traced back to ongoing impacts of colonisation and present-day social and institutional discrimination (Hobbs et al., 2019). While there is research that has been done focusing on loneliness and cultural identity (Albert, 2021; Bhugra, 2004; Neto et al., 2017; Stick et al., 2021), there is a gap when considering Māori cultural identity specifically. Due to the known inequities Māori face, understanding the impact cultural

identity has on loneliness for Māori will add to the available literature that can be utilized when considering ways to lessen the disparities and achieve more desirable health outcomes for Māori.

This research will investigate the relationship between cultural identity and loneliness in older Māori in New Zealand. It aims to determine the presence and direction of these relationships in this particular population. The completion of the study will work to fill the gaps in current literature and provide direction for future research.

The following section provides the background and justification for the present study by reviewing the relevant literature on cultural identity with a focus on cultural identity and wellbeing, Māori cultural identity, the impact of colonisation on Māori cultural identity, and cultural identity in older Māori. This will be followed by a review of loneliness literature in relation to the definition of loneliness, sociodemographic and health factors associated with loneliness, loneliness and being Māori, cultural identity and loneliness, cultural identity and loneliness in indigenous populations, and older Māori cultural identity and loneliness. Finally, theoretical frameworks of loneliness will be reviewed. These include existential theory, interactionist theory, cognitive discrepancy theory, evolutionary theory, and the integrated theoretical model of loneliness.

2. Literature Review

2.1 Cultural Identity

Cultural identity has been shown to be an important part of one's well-being (Williams et al., 2018). The concept of cultural identity refers to both familial and cultural dimensions of a person's identity. It is inclusive of both personal and external perceptions, i.e. how one is

perceived by the individual and how others perceive the person's identity (Ibrahim & Heuer, 2016). Understanding cultural identity became of interest to researchers with the development of Cross' theory of psychological nigrescence (Cross, 1978). Cross' model expanded on the previously perceived notion of identity as a unitary variable and denotation of a sense of belonging to a social setting. The development of the definition of cultural identity has continued to evolve over time though largely holds the same understanding of cultural identity being a multidimensional phenomenon that relates to a social group with a distinct culture.

Hofstede (2001) considers the concept of culture to be a collective phenomenon allowing the possibility of as many different perspectives within each collective as there are individuals. Jensen et al. (2011) defines cultural identity as a person's self-conception and self-perception of their identity in relation to any type of social group which has its own distinct culture. Ibrahim and Heuer (2016) consider cultural identity to be a concept that is constituted by ethnicity, age, developmental stage, gender and gender identity, sexual orientation, cultural background, migration status, language(s), religion/spirituality, family composition, geographical environment, and social class. A systems perspective of cultural identity explored in youth experiences of cultural identity and migration found "the interpretation of cultural identity as being a complex of multiple identities shaped not only by the external environmental factors of various social systems and the individual factors that make up a person, but also through a set of particular lived experiences that influence and are influenced by these factors and an individual's response to them" (Khanlou et al., 2018, p. 70). A recent study looking at cultural identity development among Alaska Native university students found cultural identity to be described in diverse ways with multiple identifications and connections endorsed to understand their identity (Buckingham & Hutchison, 2022). One's

relations and place appeared to be at the core of cultural identities described although values, beliefs and roles associated with culture were all tied into the construction of identity.

Most often in research, the importance of possessing a cultural identity has been strongly linked to mental health outcomes or diminished cultural wellbeing (Brougham & Haar, 2013; Dawes et al., 2022; Houkamau & Sibley, 2011; Tan et al., 2021). Hence, a lack of connectedness to one's culture or the inability to connect with an identity that is embedded within one's cultural history has been found to have detrimental effects (Broughman & Haar, 2013; Dawes et al., 2022).

2.1.1. Cultural Identity and Wellbeing

Research has linked cultural identity to both physical and mental health outcomes (Downie et al., 2004; Houkamau & Sibley, 2011; Tan et al., 2021; Williams et al., 2018). A Canadian study focusing on tricultural university students found having cultural competence and cultural internalization was associated with positive affect in heritage cultural contexts (Downie et al., 2004). In New Zealand, Houkamau and Sibley (2011) found Māori cultural efficacy[1] was associated with a concurrent increase in personal wellbeing in Māori adults. A further New Zealand study focusing on Māori youth in New Zealand found a strong Māori cultural identity to be associated with improved well-being scores and fewer depressive episodes (Williams et al., 2018). Disengagement with one's culture and a lack of identity within that culture have been associated with increased levels of stress and poorer physical health (Heim et al., 2011). Cultural identity has also been linked to lesser predicted physical and social aggression (Flanagan et al., 2011).

[1] Cultural efficacy is defined as "reflecting the extent to which the individual perceives they have the personal resources required (i.e., the personal efficacy) to engage appropriately with other Māori in Māori social and cultural contexts" (Houkamau & Sibley, 2011, p.382).

Further research has focused on mechanisms that provide explanations for the links between cultural identity and health/wellbeing (Fox et al., 2018; Houkamau et al., 2021; Matika et al., 2017; Moise et al., 2019). Moise et al. (2019) explored whether cultural identity predicted health lifestyle behaviours in Latinx immigrant adolescents. This study concluded higher ethnic identity affirmation/commitment was associated with a healthy diet and better sleep hygiene. Findings suggest retention and endorsement of cultural roots act as a protective factor against non-Hispanic White diets and sleep hygiene leading to a more desirable, healthy lifestyle. Similarly, Matika et al. (2017) concluded Māori who have higher cultural efficacy and are seen as contributing to Māori cultural continuity will receive positive feedback from in-group members more frequently and, in turn, will have higher self-esteem. Higher cultural efficacy, and therefore self-esteem, acts as a protective factor against the negative psychological tendency to ruminate. Rumination is a form of negative obsessive thinking that has been linked with depression, depressive symptoms, negative help-seeking attitudes, emotional exhaustion, and suicidal ideation (Matika et al., 2017). Matika et al. (2017) also suggested that increased cultural efficacy is associated with higher life satisfaction which acts as a protective factor against psychological distress. A similar mechanism was highlighted by Fox et al. (2018) who found Māori cultural embeddedness in adolescents was indirectly associated with improved wellbeing through improved adaptive coping strategies. When embedded in Māori culture, adaptive coping strategies are able to be learnt through engagement with whānau, hapū and iwi. In support of these findings, research by Houkamau et al. (2021) suggested ingroup warmth and ethnic identity centrality of Māori are associated with increased life satisfaction, personal wellbeing, and self-esteem through an improved sense of belonging and self-worth.

2.1.2. Māori Cultural Identity

Māori cultural identity (CI) has evolved over time in relation to the changes Māori have experienced (Te Huia, 2015). Māori CI is developed through the perception of oneself as being Māori, as well as the way one relates to Māori culture. Following the concepts of Tajfel and Turner's social identity theory (2004), others must agree with an identity claim being made rather than just making self-proclamations of one's preferred identity. The personal act of claiming a Māori identity can be difficult for those who believe in a particular set of criteria and perceive themselves to not meet the necessary criteria for in-group membership (Bennett & Liu, 2018).

Durie (1995) recognises the heterogeneity of Māori culture and identifies three Māori sub-groups: group one is referred to as 'culturally Māori' in that they understand Māori whakapapa, te reo Māori, and tikanga Māori, group two is considered to be 'Bicultural' and identify as Māori but also operate well among Pākehā, and group three is referred to as 'marginalised' and are unable to relate to Māori or Pākehā in an effective way. Williams (2000, as cited in Houkamau & Sibley, 2010) describes a similar typology in which there are four distinguishable groups. The first group are considered to represent a traditional Māori core. These are the most enculturated, speak te reo Māori and English, and are most often rural dwelling. The second group Williams (2000, as cited in Houkamau & Sibley, 2010) describes as those who are primarily urban and bicultural. A third group is referred to as unconnected. People in this group know little about their Māori heritage and culture despite being considered 'biologically Māori'. The fourth group Williams (2000, as cited in Houkamau & Sibley, 2010) introduces is those who are socially and culturally indistinguishable from Pākehā.

Measures of Māori identity range from labels that are consistent with Western constructs of ethnic identity categorisation and are determined using ethnic identity or unidimensional questions such as "are you Māori?" to culturally specific measures. Examples of these measures include questionnaires developed by Durie, in 1993, who measures aspects of language, knowledge, and involvement with a number of Māori institutions, and Ritchie, in 1963, who used a 10-item scale to assess an individual's degree of 'Māoriness' (Stevenson, 2004). However, neither measure captures the social influences that may have impacted on an individual or any culturally specific social behaviours. Research on Māori culture has shown Māori CI to be fluid and diverse (Bennet & Liu, 2018; Stevenson, 2004; Te Huia, 2015). Stevenson (2004) indicated a need for a better measure of cultural identity to be developed; one that incorporates defining and distinctive characteristics of contemporary Māori culture but is not iwi or hapū specific.

The Te Hoe Nuku Roa (THNR) study, initially known as Māori Profiles, began in 1993 with an aim to provide a sound empirical base that will "inform Māori and other planners and facilitate the development of policies and programmes appropriate to Māori advancement in cultural, social and economic terms" (Durie, 1995, p. 461). The study utilises a Māori-centred approach to research and incorporates measures of the characteristics of cultural identity. It does not presuppose the parameters of Māori culture, but instead obtains a more comprehensive profile of Māori through attempts to link various cultural and ethnic measures with other indicators (Durie, 1995). THNR research team defined CI in terms of responses to their questionnaire which offered measures of self-identification, whakapapa, marae participation, whānau associations, whenua tipu, contacts with Māori people, and Māori language (Stevenson, 2004). Four CI profiles were able to be constructed from the seven indicators: secure identity, positive identity, notional identity, and compromised identity. A

development on the original measure was made by Stevenson (2004) where the ordinal scale of four CI profiles was modified to become a weighted continuous scale to allow CI to be quantified along a continuum. This new measure of CI was adapted by combining relevant questions from the questionnaire into seven sub-scales: whakapapa, marae participation, whānau associations, whenua tipu, contacts with Māori people, use of te Reo, and kai.

As research shows Māori continued to prominently feature in many negative aspects of social statistics (Ministry of Social Development, 2008), policymakers had acknowledged an urgency to develop ways in which Māori are supported, and engagement with Māori communities is made more effective when delivering social services (Houkamau & Sibley, 2010). In response to this need, Houkamau and Sibley (2010) sought to develop a useful assessment tool to assess and operationalise different dimensions of Māori identity and cultural engagement. They hoped for an assessment tool that would aid researchers in improving outcomes for Māori "who may score particularly low or high on different dimensions of subjectively experienced Māori identity" (Houkamau & Sibley, 2010, p.8), as well as being useful for longitudinally modelling change, the effects of interventions on identity development, and related processes. Houkamau and Sibley (2010) developed the Multi-Dimensional Model of Māori Identity and Cultural Engagement (MMM-ICE). They positioned identity as a "multi-dimensional feature of self-experience, made up of self-conceptions and self-images which are stored schematically in a representational network" (Houkamau & Sibley, 2010, p.11). A self-categorisation theory recognises the potential for multiple identities that exhibit differing levels of cognitive accessibility depending on the social situation, and that these are under constant revision (Trepte & Loy, 2017). Houkamau and Sibley (2010) also drew upon Love's (2004, as cited in Houkamau & Sibley, 2010) perspective which argued that Māori concepts of self, and their underlying assumptions, are

distinctive from Western perspectives. Love's perspective applied Sampson's (1988) concept of ensembled individualism in which identity is explained in terms of socio-centrism and is recognised as being inextricably linked to the relationships Māori have with others.

The MMM-ICE "goes beyond enculturation or knowledge of Māori cultural features and Māori cultural engagement to incorporate subjective feelings of being a group member, attitudes, group allegiances, as well as collective identification and role-related self-perceptions, political attitudes and beliefs" (Houkamau & Sibley, 2010, p.12). It consisted of a six-dimensional structure with subscales assessing: (1) group membership evaluation, (2) socio-political consciousness, (3) cultural efficacy and active identity, (4) spirituality, (5) interdependent self-concept, and (6) authenticity beliefs. A revised MMM-ICE (MMM-ICE2) was developed which added in a seventh subscale: perceived appearance (Houkamau & Sibley, 2015). A further revision (MMM-ICE3) added in an eighth subscale: whanau efficacy (Matika et al., 2020).

In each of these studies, it is made apparent Māori cultural identity is embedded in both present and historical influences. The historical impacts are further discussed in the following section with a focus on colonisation and the ongoing effects of this in developing one's cultural identity.

2.1.3. Impact of Colonisation on Māori CI

Pre-colonisation, Māori culture was the primary way of living in Aotearoa. Identity was based on small autonomous sub-tribes which resided in specific localities (Royal, 2005). The values which were honoured and upheld in society were developed from the communal way of living. In these post-colonial times, Pakeha cultural norms now govern public domains.

The systemic and structural nature of colonisation has resulted in intergenerational effects that are still very much present in today's society and Māori continue to suffer from the consequences (Moewaka Barnes & McCreanor, 2019). Not only are Māori still fighting the impact of colonisation but also present-day systemic and institutional discrimination in terms of unjust and inequitable distribution of social determinants (Harris et al, 2015).

Colonisation has severely disrupted Māori social organisation and attachment to place through "land theft, social upheaval caused by introduced diseases against which Māori had no immunity, the introduction of muskets, which altered the nature of Māori warfare, and the missionary message delivered in a manner that undermined and degenerated Māori values system" (Reweti, 2022, p.1). Alienating Māori from their lands and resources separated them from their cultural and spiritual sources of identity and well-being. As a result, traditional structures were fragmented and whānau support systems dislocated contributing to the collective health and wellbeing of Māori for generations; there has been an intergenerational loss of knowledge and values that secured cultural identity and belonging for Māori (Reweti, 2022).

Further marginalisation of Māori was caused by the Education Ordinance Act 1877 which allowed a controlled curriculum to be implemented in schools (Eley & Berryman, 2021). This curriculum was delivered in English and made schooling extremely difficult for te reo Māori speaking students. Teachers began using corporal punishment as a form of discipline against speaking te reo Māori which not only prompted feelings of isolation but also acted as a deterrent from speaking te reo Māori and weakened the intergenerational transmission of knowledge, Māori identity, and society (Stewart, 2014). It wasn't until 1985 that legislation changes in New Zealand began working to assist in the revival of Māori language (King,

2018). In this same year, the first kura kaupapa Māori (Māori philosophy school) was established on an urban Marae in Auckland. In 1987, te reo Māori was declared an official language of Aotearoa New Zealand (King, 2018).

Urbanisation was another process which had adversely impacted Māori. Before the second world war, over 80% of Māori lived in rural areas, primarily in their own tribal districts (Morrow, 2014). After the war, 26% of Māori lived in town and cities. This increased to 35% by 1956, 62% in 1966 and nearly 80% by 1986 (Morrow, 2014). The urban migration of Māori has been described as the most rapid movement of any population (Keenan, 2013). Māori found themselves trying to navigate their lives in a predominantly Pakeha environment where Māori values and cultural norms were relatively non-existent (Keenan, 2013). They experienced a disconnection with their tribal land, marae, and whanau. Also with this urbanisation came the first generation of Māori who were born and raised in urban settings (Coleman et al., 2005). This generation was separated from the tribal origins of their parents and grandparents including their marae and traditional norms and values (Coleman et al. 2005; Morrow, 2014). They were also separated from their elders resulting in a lack of guidance in ‘ traditional Māori living’. They were deemed to be a rising generation of Māori who could not speak the language and knew little to nothing about their heritage and traditions (Coleman et al., 2005).

Anthropological research has argued that Māori culture is increasingly becoming a constructed invention that subsumes ‘real’ Māori history for contemporary purposes rather than maintaining a stable heritage passed along generations (Barber, 1995; Hanson, 1989). Developing and maintaining an identity when the prefaces of one’s identity are highly unstable has proven to be difficult for Māori who have lived through, or are experiencing,

several imposed cultural variations (Barber, 1995). They are most often left with a fragmented and incomplete identity and underlying feelings of cultural dissonance. This is particularly salient for older Māori.

2.1.4. Cultural Identity in Older Māori

Older Māori, traditionally known as kaumātua, are viewed in Māori culture as anchors in their communities. Research has shown kaumātua have been forced to age in a Western-dominated society that failed to realise their full potential (Hokowhitu et al., 2020). The imposition of Western culture has led to coercive policies and an assimilatory society resulting in the loss of language, culture, epistemologies, and land (Harris et al., 2015). Te Kupenga was established in 2013 and was NZ Statistics' first survey on Māori wellbeing. It utilised a sample of those aged 15 years and over who were of Māori ethnicity and/or descent. A second wave of the survey was completed in 2018. Statistics show importance of being engaged in Māori culture has decreased in those aged 55 and over (Statistics NZ, 2014; Statistics NZ, 2020). This number decreased from 49.9% to 23.9% between 2013 and 2018. In 2013, 49.9% of participants aged 55 and over knew all aspects of their pepeha including their iwi, hapū, maunga, awa/moana, waka and tipuna/tupuna. In this age group, 8.5% knew none of these. In 2018, 47.2% knew all of their pepeha while 8.7% knew none of it. The number of people aged 55+ who had been to a marae in the last 12 months decreased from 61.2% in 2013 to 52.3% in 2018. Those who had been to their ancestral marae in the last 12 months also decreased from 53.1% to 46.4%. Te reo Māori use also appeared to decline with 20.6% of people aged 55 and over who either spoke te reo Māori as their first language or used it regularly in 2013 and only 18.4% in 2018. 44.4% of people in this age group were unable to speak more than a few words or phrases of te reo Māori in 2013 compared to 58.1% in 2018.

Today's generation of kaumātua experienced an array of historical injustices that have led to cultural dissonance. Hokowhitu and associates (2020) provide the example of the colonial education system where the use of te reo Māori was punished and many Māori children were deemed to be 'retarded' when assessed using Western models of developmental psychology. The eldest of today's kaumātua would include those who were subject to educational and loss of language injustices explored above. The younger of these kaumātua are likely to be those who were part of the urbanisation that occurred between 1960 and 1980. Indigenous Māori language and culture were deemed invaluable while Western ideologies were promoted as hegemonic and superior. Due to the cultural importance of kaumātua and their responsibility to act as carriers of culture and role models for younger generations, the subjugation of Māori culture many kaumātua have experienced has resulted in generations of Māori who have been forced to dissociate with their culture and in turn their cultural identity (Hallett et al., 2007; Harris et al., 2015; Oster et al., 2014).

Literature investigating older Māori suggests there has been a loss of cultural identity due to historical and present injustices. Previous research has found a link between cultural identity and wellbeing. The following section will discuss loneliness as an element of wellbeing and will review the available literature relating to loneliness and cultural identity.

2.2. Loneliness

Studies show loneliness to be an emerging public health concern with an ageing population. Living with feelings of loneliness has been found to have a negative impact on health, mortality and quality of life (Dahlberg et al., 2018; Routasalo & Pitkala, 2003). The perception of being lonely has been associated with increased risk for high blood pressure,

heart disease, weakened immune system, cognitive decline, alzheimer's disease, depression and anxiety (D'Acquisto & Hamilton, 2020; Golaszewski et al., 2022; Hawkley et al., 2010; Okruszek et al., 2020; Wilson et al., 2007). By understanding the causes of loneliness, more insight into the prevention of loneliness can be developed. In turn, this will work to lessen the health burden associated with the development of loneliness in older people.

2.2.1. Defining Loneliness

While there are many different definitions of loneliness used throughout the literature, one thing that is universally agreed upon is the subjective nature of loneliness. Defining loneliness as a concept in one's research is highly dependent on the theoretical underpinnings of the study. Weiss (1973) understands loneliness to develop through the lack of a specific type of relationship. This is considered to be a deficit perspective of loneliness. Through a study conducted with single mothers, Weiss concluded there were two different categories of loneliness: social loneliness and emotional loneliness (DiTommaso & Spinner, 1997). According to Weiss, social loneliness occurs when one encounters an unsatisfactory association with the desired group whereas emotional loneliness arises due to the unsatisfactory association with an intimate relationship. This separation of loneliness into distinct categories has been supported by empirical research where each category of loneliness had a unique association with specific provisions and determinants (Dahlberg & McKee, 2014; DiTommaso & Spinner, 1997).

Perlman and Peplau (1998) understand loneliness through a cognitive discrepancy model. They define loneliness as "the unpleasant experience that occurs when a person's network of social relationships is significantly deficient in either quality or quantity" (1984, p. 15). Hence, the feeling of loneliness arises when there is a perceived discrepancy between the

desired and achieved level of social relation rather than there being a tangible or objective deficit as proposed by Weiss (1973). Unlike the work of Weiss, there is no separation between emotional and social loneliness through this model. Perlman and Peplau (1998) suggest there are distal antecedents of loneliness including predisposing factors and the presence of a precipitating event that contributes to the perception of a discrepancy. However, the experience of loneliness will depend upon an individual's cognitive processes and attributions. Perlman and Peplau (1981) understand "cognitive processes such as causal attributions and perceived control are seen as affecting how we experience our situation subjectively" (p. 32). They draw upon Weiner's attribution theory (Weiner et al., 1978) which demonstrates three dimensions causal attributions can be classified along: locus of causality (internal or personal, versus external or situational), stability, and controllability. According to Weiner's model, the dimension of stability is important for future expectations within their perception of loneliness where stable causes will lead to anticipating prolonged loneliness and unstable causes will lead to more optimistic views. Locus of causality will most likely have a greater impact on a person's self-esteem and controllability is most closely related to other people's evaluations of, and liking for, the lonely individual.

De Jong Gierveld understands loneliness in a similar way to Perlman and Peplau in which "loneliness is a subjective and negative experience, and the outcome of a cognitive evaluation of the match between the quantity and quality of existing relationships and relationship standards" (de Jong Gierveld et al., 2006, p. 486). In her conceptualisation of loneliness, de Jong Gierveld (1987) was able to reconstruct a degree of communality in regard to the meaning of loneliness. Generally, associations were made between loneliness and negative feelings about problems in social relationships; there was an obvious distinction between loneliness and being alone. de Jong Gierveld (1987) was also able to identify loneliness was

most often considered to be a personal experience. In correspondence with available literature at the time, and interaction within the relevant field of research, de Jong Gierveld conceptualised loneliness as “"a situation experienced by the participant as one where there is an unpleasant or inadmissible lack of (the quality of) certain social relationships” (de Jong Gierveld, 1987, p.120). This conceptualisation led to the distinguishing of three different dimensions: (1) deprivation component, which is viewed as the core concept of loneliness, (2) time perspective, and (3) emotional aspects. de Jong Gierveld drew on the cognitive approach to loneliness understanding the emphasis of cognitive processes mediating between characteristics of the social network and the experience of loneliness (1987; de Jong Gierveld et al., 2006).

While each of these definitions is a feasible conceptualisation of loneliness when used alone, Dykstra and Fokkema (2007) acknowledge both the importance of differentiating between social and emotional types of loneliness and understanding the discrepancies between actual and desired relationships. By engaging with both the deficit and cognitive models, greater understanding and deeper insight into loneliness can be obtained.

When viewing loneliness through both a deficit and cognitive model, it is understandable why an individual’s social network size and engagement in social activity are two commonly considered antecedents to loneliness (Böger & Huxhold, 2018). However, the level of social interaction a person has can also be an outcome of changes in loneliness introducing the idea of loneliness acting in a vicious circle where it reinforces itself (Böger & Huxhold, 2018). Cacioppo et al. (2009) also found loneliness acts in this cyclic way where reduced social networks and participation in social activities are both predictors and consequences of loneliness. Research has suggested perceptions of one’s own social life as deficient can

increase vulnerability to particular behavioural and psychological responses (Böger & Huxhold, 2018; Cacioppo et al., 2006; Riggio & Kwong, 2009). It has also been shown loneliness can act as a predictor of adverse health problems (Böger & Huxhold, 2018; Hawkley et al., 2010; Pressman et al., 2005) including mortality (Holt-Lunstad et al., 2010). Sociodemographic differences have also been found to act as antecedents to loneliness. The negative effects of loneliness have been both differentiated and mediated by various sociodemographic characteristics (Böger & Huxhold, 2018; Fierloos et al., 2021; Savikko et al., 2005). Overall, there are many complex pathways that relate to loneliness by acting as either an antecedent, a consequence, or both.

2.2.2. Sociodemographic and Health Factors Associated with Loneliness

There have been several studies in recent years that have focused on associations between various sociodemographic and/or health factors and loneliness. Sociodemographic factors include age, living arrangements, marital status, social support, gender, and socioeconomic status. Health factors include depression and anxiety. While there are many other sociodemographic and health factors that relate to loneliness (Fierloos et al., 2021; Savikko et al., 2005), these few will be explored further due to their relevance to the present study.

2.2.2.1. Age

Research surrounding age and loneliness has delivered mixed results where some studies suggest a positive correlation while other research suggests a negative correlation. A meta-analysis carried out by Pinquart and Sorensen (2001) found only in those aged 80 years and over is loneliness significantly positively correlated with age. The New Zealand General Social Survey found age was inversely related to the development of loneliness (Statistics New Zealand, 2013). Further research with a focus on loneliness and age in New Zealand

cohorts has found the prevalence of loneliness was highest in young adults and decreased with age until prevalence began to increase again in those aged 76 and over (Lay-Yee et al., 2022a; Ministry of Social Development, 2016).

However, there are many studies that observe a positive correlation between age and loneliness. Fierloos et al. (2021) differentiated between social and emotional loneliness and found older age to be associated with an increase in both types of loneliness. It has been suggested these positive correlations could be linked to losses related to death, changes in family and work situations, changes in living arrangements, reduced connection and participation within the community, and changes in one's health (Utz et al., 2014; Singh & Misra, 2009). Older adults have an increased risk for loneliness as they are more likely to face these types of factors (Dykstra, 2009).

Age also presents another issue in the way there is no standard definition of an older person or age category where one will universally be considered older. In different cultures and contexts, people age in various ways and the definition of an older person will differ (Findsen, 2016). Differences in life expectancy, norms of family size, and relative onset of grandparenthood between Māori and Pākehā in New Zealand may provide alternative definitions of who is considered an 'older adult' or kaumātua (Findsen, 2016). In New Zealand, those aged 65 years and older are most often referred to as older people (Koopman-Boyden, 2011**;** Ministry of Health, 2002). This age coincides with the age at which New Zealanders are eligible for the aged pension (New Zealand Superannuation).

2.2.2.2. Gender

Gender has been shown to impact the prevalence of loneliness. Many studies have shown older women tend to have a higher prevalence of loneliness than older men (Dahlberg et al., 2022; Guo et al., 2021; Hansen & Slagsvold, 2016; Yang, 2021). Potential mechanisms explaining this difference include health status and life expectancy. Older women are more likely to have a poorer health status than older men. Poor health status has been shown to inflict limitations on one's social interactions, therefore increasing vulnerability to loneliness (Fiori et al., 2007). Women also tend to live longer than men creating an increased risk for loneliness after their husbands death (Barreto et al., 2021; Yang, 2021). On the other hand, there are also a number of studies that have found men to be more lonely than women (Barreto et al., 2021; Kim & Lee, 2022). Potential reasons for this finding include marital status, spousal death, and quantity versus quality of social support. Each of these factors will be discussed independently below.

When considering gendered differences in loneliness literature, it is important to consider the age and culture of the participants (Barreto et al., 2021). These factors can influence willingness to report loneliness (Borys & Perlman, 1985) and stigmatisation around being lonely (Lau & Gruen, 1992). Despite the large literature exploring correlates of late-life loneliness that note gender differences, there are few studies that have a direct focus on loneliness prevalence in terms of gender differences that account for age and cultured differences (Kim & Lee, 2022).

2.2.2.3. Living Arrangement

Living arrangements have also been found to impact on loneliness levels in older populations. New Zealand-based research has found those who do not live within a family nucleus have an increased likelihood of being lonely than those who live with a partner or

children (Jamieson et al., 2018; Ministry of Social Development, 2016). However, when looking at ethnic differences, similar proportions of Māori were lonely whether living alone or living with others (Jamieson et al., 2018). This finding is yet to be explored further to suggest possible mechanisms accounting for the similarity. Internationally, differences in gender have been noted in living arrangements where women living alone were more susceptible to emotional loneliness than men (Fierloos et al., 2021). In contrast, men who live alone were found to be more prone to social loneliness (Fierloos et al., 2021). Research that has found women to be lonelier than men suggests women are more likely to live alone, contributing to their higher levels of loneliness (Kim & Lee, 2022). Living preferences, defined as preferring to live alone or preferring to not live alone, have been found to moderate the relationship between living arrangement and loneliness (Wei et al., 2022).

Although research supports a positive correlation between loneliness and living alone (Ministry of Health, 2016; Russell, 2009), it is important to consider the interaction of other sociodemographic predictors on this relationship. When considering older people who live in community living or supported residential settings, loneliness prevalence has been found to be greater for those who live in larger community settings (Stancliffe et al., 2007). Social contact, liking one's living arrangement, and social climate (liking where one lives, or being afraid at home or in their neighbourhood) variables tended to be more associated with the prevalence of loneliness (Stancliffe et al., 2007). Marital status is also an important consideration. Typically, older people living alone are only doing so due to being widowed or their partner moving to an institutional care setting (Schmitz et al., 2021). This then has an impact on their social networks and size and strength of available social support. Older people who are living in a living apart together (LAT) arrangement have a higher susceptibility to loneliness than those in other living arrangements (Schmitz et al., 2021). The

increase in susceptibility to loneliness due to LAT has been associated with living alone, small social networks, and lack of social network diversity (Schmitz et al., 2021). Older people living in a coresidential partnership are most protected from loneliness (Schmitz et al., 2021).

2.2.2.4. Marital Status

Marital status has been found to be a direct predictor of loneliness (Creecy et al., 1985). Those who are married are generally less lonely than those who are not, however this is heavily dependent on whether the individual is not married due to being widowed or divorced (Štípková, 2021). Marital quality also plays a role in the relationship between marital status and loneliness (Štípková, 2021). While both widowhood and divorce are considered to be significant risk factors for developing loneliness among older populations, divorce has a much smaller impact on loneliness outcomes (Štípková, 2021). Early New Zealand research looking into loneliness and marital status in older adults found no significant differentiation between levels of loneliness in relation to marital status (La Grow et al., 2012), however more recent research with greater samples have supported the relationship between loneliness and marital status (Leitch et al., 2018). Gender differences have also been noted when investigating the effect of marital status on loneliness. The effect has been reported to be greater among older men than older women. Mechanistic research suggests this is due to increased reliance by men on their spouses for intimacy and support (Santini et al., 2016). Men tend to have more to lose from widowhood due to increased emotional benefit from marriage, therefore resulting in more adverse effects including depressive symptoms and loneliness (Kim & Lee, 2022; Lee et al., 2021; Santini et al., 2016). Research involving a New Zealand population also found a greater risk of loneliness in men who were widowed or divorced/separated (Leitch et al., 2018). There was no association found between loneliness

and being widowed in women or loneliness and being divorced/separated in men (Leitch et al., 2018). Positive associations, however, were found in women who were divorced/separated and men who were widowed (Leitch et al., 2018).

Marital quality is an important determinant when considering the impact of marital status on loneliness. Reports of marital quality in older adult heterosexual marriages were significant contributors to loneliness (Stokes, 2017). Positive marital quality was negatively related to personal loneliness, whereas negative marital quality was positively related to personal loneliness (Stokes, 2017). Spouses reports of loneliness were found to be positively related with their partners' loneliness (Stokes, 2017). It was suggested these partner effects may be the result of emotional contagion or induction (Stokes, 2017). Functional limitation of a spouse in a marriage has also been found to impact on the association between gender, marital status and loneliness. For functionally limited males, spousal support was associated with lower levels of loneliness (Marini et al., 2020). These types of findings reinforce the importance of adopting a contextualised approach when examining associations between loneliness and marital status in older adults.

2.2.2.5. Social Support

In the present study, social support is considered as being a measure of one's social network, the quantity of their social connections, and the quality of these connections. When social support is used as a blanket term, this is what is being referred to. In some research, distinctions are made between the different aspects of social support.

Social support has been positively linked with loneliness in an array of research. Having good social support has been considered as having a protective effect against the risk of loneliness

in older populations (Liu et al., ;2016; Prince et al., 1997). Greater numbers of social support deficits and network dissatisfaction in relation to caring and relaxation have been associated with an increased prevalence of loneliness (Barron et al., 1994; Prince et al., 1997). More recent research has focused on the size, diversity, and quality of one's social network in relation to loneliness (Dahlberg et al., 2022; Fiori et al., 2007; Gyasi et al., 2021). Many findings of the effects of social networks show gender specificity. Larger social networks have been related to decreased quality of life in older men with physical health impairments, but not older women with similar impairments (Boehlen et al., 2022). This has been linked to typical gender roles where women are usually expected to encompass a caregiver-type role for those with health-related issues whereas men are not (Chipperfield & Havens, 2001). Therefore, older men with health-related issues benefit more highly from larger social networks than older women (Boehlen et al., 2022). Older women tend to be less affected by the size of their social network, but more impacted by the quality of these networks (Orth-Gomér, 2009; Santini et al., 2016). Women experience greater feelings of social support from smaller, close-knit social networks rather than large, disconnected networks (Haines et al., 2008; Orth- Gomér, 2009).

Further gender differences were found in terms of quality of life where men benefited more from social networks and social support, whereas women found more benefits from social participation in a group or community (Tobiasz-Adamczyk et al., 2017). Similar mechanistic pathways were suggested in the way that these differences observed between social networks and loneliness may be due to the gendered nature of social networks. Older men tend to be less active when building new social ties and network participation (Cornwell, 2011; Schwartz & Litwin, 2018), and prefer more acquainted ties (Schwartz & Litwin, 2018). Older

women prefer more extensive social ties and will work to create close ties (Schwartz & Litwin, 2018).

In New Zealand study cohorts, positive correlations have been found between social support and levels of loneliness (Stephens et al., 2010; Stephens et al., 2011; Wright-St Clair et al., 2017). In the general population, those in minority groups or with lower socio-economic status were more likely to report less perceived social support and increased loneliness (Wright St-Clair et al., 2017). Older Māori are more likely than non-Māori to report feeling lonely and have weaker perceptions of total social support (Stephens et al., 2010; Stephens et al., 2011). These discrepancies for Māori have been associated with distal effects of colonisation, poorer health, living standards, and lower socio-economic status (Stephens et al., 2011; Wright St-Clair et al., 2017). Older Māori find family and locally integrated social networks to be most important (Stephens et al., 2011). Therefore, understanding culturally important relationships and how such relationships affect loneliness for older Māori is greatly important (Wright St-Clair, 2017).

2.2.2.6. Socioeconomic Status

As noted in the previous section, lower socioeconomic status has been associated with increased levels of loneliness in older populations (Dahlberg et al., 2022; Szabo et al., 2019; Wee et al., 2019). Higher levels of loneliness have been reported in those who live in poorer physical environments (Wee et al., 2019), and who are considered to have a low income (Macdonald et al., 2018). Macro and micro levels of income inequality have increased the risk of loneliness through the erosion of social trust and cohesion (Wu et al., 2022). Individual socioeconomic status has been found to have a stronger effect on late-life loneliness in more income-unequal societies and a weaker effect in more welfare-generous

societies (Wu et al., 2022). This introduces a need to consider income distribution and welfare spending on the risk of older adults with low socioeconomic status (Wu et al., 2022). Differentiation between social and emotional loneliness has also been made based on socioeconomic status with those from a lower socioeconomic group experiencing high levels of emotional loneliness compared to other socioeconomic groups (Macdonald et al., 2018). Early research linking socioeconomic status and loneliness suggested social support had a moderating role in the relationship (Dykstra & de Jon Gierveld, 1999). Those with higher educational attainment and higher incomes tended to have more extensive social networks which provided a possible protective factor against the development of loneliness (Dykstra & de Jong Gierveld, 1999). These findings have been supported in more recent literature where older adults with a low educational level (Hawkley et al., 2008) and reduced opportunity for participation in social activities (Cohen-Mansfield et al., 2016) were more likely to live in disadvantaged socioeconomic circumstances.

New Zealand-based research has found trends between levels of loneliness and personal income, and levels of loneliness and material well-being, where higher income or higher scores on a material well-being index were associated with lower loneliness levels (Ministry of Social Development, 2016). Socioeconomic status and tenure have also been found to influence certain areas relating to one's quality of life: control and autonomy (Szabo et al., 2019). While social loneliness was unrelated to quality of life, the effect of emotional loneliness on control and autonomy was moderated by tenure where the negative effects associated with emotional loneliness were stronger for renters compared to home-owners (Szabo et al., 2019). Tenure also moderated the effect of socioeconomic status on control and autonomy where the positive impact of socioeconomic status was stronger for home-owners than renters (Szabo et al., 2019). The findings suggest home-ownership can act as a

protective factor against the negative effects of emotional loneliness in older people which aligns with the safe haven hypothesis. The safe haven hypothesis suggests home can provide a refuge from stressors for owner-occupants (Kearns et al., 2000). This is mechanistically explained as home-owners tend to be more integrated within their neighbourhoods, therefore having stronger social networks, while tenants are less integrated with less community-based social connections (Szabo et al., 2019).

2.2.2.7. Depression

The association between depression and loneliness has been extensively studied. Early research in this area viewed loneliness as just an aspect of depression (Kraav et al., 2021). Further investigation into these phenomena viewed loneliness as an independent risk factor for the development of depression (Luanaigh & Lawlor, 2008). More recent literature has established a bidirectional connection between loneliness and depression where lonely individuals have an increased susceptibility to developing maladaptive behaviours, which then increases feelings of loneliness (Dahlberg et al., 2018). Theoretical models suggest the risk of depression could increase due to the social, cognitive, and biological consequences of loneliness (Lee et al., 2021). Mechanisms which act as potential explanations for this association include "negative perceptions of social interactions, negative cognitive schemas (eg. low self-belief), expectations of social threat, increased stress, reduced self-esteem, and biological effects on the stress response and inflammation" (Lee et al., 2021, pp. 48-49). Loneliness has also been associated with anticipated rejection and reduced reward responsiveness to positive stimuli (Hawkely & Cacioppo, 2010). Despite research suggesting potential mechanisms, there is little known about causal mechanism underlying the relationship between loneliness and depression (Lee et al., 2021). Kraav et al. (2021) suggest

identifying mechanisms or pathways through which loneliness and depression are interconnected is the next step of research in this field.

In older adults, research has shown as loneliness severity increases, so does depression severity (Fiske et al., 2009; Murugan et al., 2022; Schiller et al., 2022), however, there is little research with a focus on why this relationship exists. A recent study has found loneliness and rumination, which were both positively associated with depression, significantly interacted in predicting cognitive-affective depression symptoms in middle-aged and older adults only (Tong et al., 2021). Tong et al. (2021) suggest this is only a starting point in the literature on loneliness, rumination, age, and depressive symptoms and there is still a "big leap" that needs to be made in the field. These same associations have been found in older NZ populations but continue to lack in mechanistic pathways (Wright-St Clair et al., 2017).

2.2.2.8. Anxiety

Similarly to the association between loneliness and depression, the relationship between loneliness and anxiety has also been studied extensively. The model of loneliness introduced by Cacioppo et al. (2006) places loneliness in a nomological net. It postulates social isolation is comparable to feelings of being unsafe. As a result, implicit hypervigilance is initiated for detecting social threats in the environment (Cacioppo et al., 2006). Therefore, lonely individuals are more inclined to see their social world as a more threatening place where negative social interactions and negative social information is expected (Hawkley & Cacioppo, 2010). In a self-reinforcing loop, these negative social expectations tend to elicit behaviours from others that conform with what was expected. Accompanying this loneliness loop is stress, anxiety, and low self-esteem (Hawkley & Cacioppo, 2010). McMurray (2022)

has highlighted a similar mechanistic pathway where rather than social avoidance, loneliness is associated with biased emotional reactivity to negative social events. At this current time, the neural and behavioural responsiveness to social decision-making and social expectations is the most supported mechanism in the literature linking loneliness and anxiety. This field of research is still growing and will continue to develop over time.

In older adults, research has found positive correlations between loneliness and anxiety (Donovan & Blazer, 2020; McQuaid et al., 2021; Robb et al., 2020). Anxiety has been shown to be both an antecedent (Domènech-Abella et al., 2019) to, and a consequence (Hornstein & Eisenberger, 2022) of, loneliness. New Zealand specific literature investigating loneliness and anxiety supports the correlations found in international research (Davies et al., 2016; Every-Palmer et al., 2020).

2.2.3. Loneliness and Being Māori

There has been little research conducted that considers the relationship between loneliness and being Māori. Research that has been undertaken shows loneliness disproportionately affects those who identify as Māori when compared to non-Māori (Lay-Yee et al., 2022b; Wright-St Clair et al., 2017). This coincides with international literature which has found loneliness to be more prevalent in ethnic minority and immigrant groups than the mainstream population (Lay-Yee et al., 2022). It was suggested the ongoing effects of colonisation and alienation (Wright St-Clair et al., 2017; Lay-Yee et al., 2022), unfulfilled expectations of social connection due to conflict between traditional, collective, and modern individualistic values (Brougham & Haar, 2013; Lay-Yee et al., 2022), poorer living standards and health, and lower socioeconomic status (Wright St-Clair et al., 2017) may have contributed to this variance. Māori culture is seen as a collectivist culture (Broughman & Haar, 2013) where an

"individual's orientation towards self is embedded in a complex web of social relationships" (Ramamoorthy & Flood, 2002, p.1074). The conflict between collectivist values and living in a largely dominated individualistic environment has been proposed as an important factor in the disparities between Māori and non-Māori levels of loneliness. Despite this disparity, loneliness has been shown to have less impact on health-related quality of life for Māori than non-Māori (Lay-Yee et al., 2022). Cultural customary concepts have been suggested to provide resilience to disparities (Durie, 2011). Therefore, the way these associations between loneliness and other factors play out can be expected to differ. This highlights the many different facets of the relationship between loneliness and 'being Māori', suggesting a need for ethnic-specific analyses.

2.3. Cultural Identity and Loneliness

Numerous studies have found a correlation between cultural identity and loneliness (Albert, 2021; Bhugra, 2004; Neto et al., 2017; Stick et al., 2021). The majority of this research is conducted utilising migrant populations. For example, one study investigating first-generation Portuguese in Luxembourg found although cultural and intergenerational belonging were protective factors for perceived loneliness, cultural identity conflict and intergenerational conflict were the strongest predictors of perceived loneliness (Albert, 2021). Further studies have supported the findings of Albert (2021) concluding assimilation, marginalisation, lack of identity, and separation from internal cultural connectedness are positively associated with loneliness (Bhugra, 2004; Neto et al., 2017; Stick et al., 2021). New Zealand-based research has found a relationship exists between identifying as Māori and being lonely (Wright St-Clair et al., 2017; Lay-Yee et al., 2022) however, to the best of the author's knowledge, there is no literature available investigating the impact of cultural

identity on the prevalence or risk of loneliness.

2.3.1. Cultural Identity and Loneliness in Indigenous Populations

Studies focusing on the relationship between cultural identity and loneliness in indigenous populations are rare (Ballard et al., 2020; Houkamau et al., 2021; Williams et al., 2018). Some studies have investigated cultural identity and its impact on overall well-being in Indigenous populations. Houkamau et al. (2021) explored the relationship between affect towards one's Indigenous ethnic group and well-being. Findings showed a positive ethnic identity affect was correlated with improved well-being where cultural recovery and restoration are important protective responses to colonisation. An additional study investigating Māori youth and mental wellness found those with a stronger cultural identity were more likely to experience good mental health outcomes (Williams et al., 2018). In a study conducted by Ballard et al. (2020), researchers spoke to First Nation elders regarding ways to heal following forced displacement from a human-made flood in the Interlake region of Manitoba, Canada that occurred in 2011. The elders shared that the flood had resulted in detrimental effects such as premature death, depression, and loneliness. Conversations highlighted the importance of reclaiming cultural identity and reconnecting with the land on their road to healing.

Other studies with a more direct focus on loneliness support previous research and highlight the importance of connecting with cultural origins and regaining a sense of belonging within one's indigenous culture to overcome and prevent loneliness, isolation and alienation (Avdeeva et al., 2020; Hatcher, 2016; Sunga, 2017). Avdeeva et al. (2020) used the theory of compensation and the theory of memory to explain the phenomenon of 'culture historicising. This reflects the importance of overcoming problems including alienation and loneliness

through tuning into one's origins. The theories play an important role in the formation and maintenance of one's ethnocultural identity as they offer specific cultural forms of history representation (Avdeeva et al., 2020). Hatcher (2016) understands the process of colonisation involves a loss of one's sense of belonging – described as being a core part of one's cultural identity. In the present-day sense, Hatcher (2016) compares sense of belonging to a form of loneliness. In Joiner's model of the origins of suicide, this particular form of loneliness is referred to as 'thwarted loneliness' representing a combination of loneliness and an absence of relationships (Van Orden et al., 2010). Therefore, repairing one's sense of belonging, and in turn cultural identity, could lead to lower levels of loneliness. Sunga (2017) explored recognition theory and vulnerability theory to explain the relationship between systemic inequalities and social injustice faced by indigenous populations, and ethical loneliness – "of not being heard in the context of remediation of historic wrongs" (Sunga, 2017, p.136). Ethical loneliness in indigenous peoples is related to their disconnect from recognition of identity as well as their assertion of a marginalised identity in a Western-dominated environment (Sunga, 2017).

2.3.2. Older Māori Cultural Identity and Loneliness

Research conducted by Stephens et al. (2011) found family and locally integrated social networks were valued by older Māori. Therefore, deficits in such culturally and personally important relationships may contribute to loneliness and warrant further study. Further research conducted by Gordon et al. (2017) found Māori who experienced social exclusion and who also had lived experience of mental distress gained a sense of belonging through reconnection with tikanga Māori, whānau, iwi and hapū. Consistent with the findings of Gordon et al. (2017), a recent report prepared for the health promotion agency regarding Māori mental wellbeing (Russell, 2018) showed Māori with strong familial and social

relationships were less likely to feel isolated. It was suggested a greater strength of cultural identity may act as a protective factor against social isolation. Though the participant sample for the latter two reports were not confined to older Māori, the results provide valuable information that can be utilised in research going forward.

2.4. Theoretical Framework

There are a number of theories that have contributed to loneliness research to date. Early theorisation of loneliness was conducted by Perlman and Peplau (1982) who introduced eight categories of theoretical frameworks relating to loneliness. Three of these, namely psychodynamic, privacy and systems theory, will not be discussed here. This is due to key limitations which would render them unsuitable for the current research (Tzouvara et al., 2015; Donaldson & Watson, 1996). A fourth theory, the phenomenological approach, was originally developed by Carl Rogers (1961) is based on the idea that internal elements mediate one's behaviour. Dahlberg (2007) further developed this theory illustrating loneliness as a phenomenon that transcends the immediate moment that is related to both context and connection. Reisman's sociological approach (as discussed in McLaughlin, 2001) of loneliness is closely related to that of Rogers (1961) where individuals have become 'other-directed' and in doing so have disengaged with their inner selves, feelings and aspirations. Neither of the two perspectives are elaborated on further, though they provide the premise for existential theory which will be discussed here. More recent theorisations have been made by Cacioppo et al. (2006) and de Jong Gierveld et al. (2018), namely the evolutionary theory of loneliness and the interactionist model of loneliness respectively.

2.4.1. Existential Theory

The existentialist approach toward loneliness is based on the work by Moustakas in 1961 (Perlman & Peplau, 1982). It works to build on the phenomenological approach where the subjective experience becomes pivotal. Existentialists classify loneliness as either 'true loneliness,' relating to the realisation that humans are alone from birth to death, or anxiety loneliness which is identified as a response mechanism to avoid facing their inevitably lonely existence (Tzouvara et al., 2015). The main focus is directed toward the human condition and the way one experiences coming to terms with this (Sønderby & Wagoner, 2013). This includes being aware of one's mortality. Older populations are more likely to be aware of their mortality which may impact their experience of mortality and therefore the feeling of 'aloneness' (Sundström et al., 2018). However, this theory is limited by not distinguishing between subjective and objective notions of feeling alone (Tzouvara et al., 2015).

2.4.2. Interactionist Theory

The interactionist theory introduced by Weiss (1973) views loneliness as an interaction between personality and situational factors. The origins of this theory are grounded in attachment theory which suggests loneliness results from an inadequate social network and the lack of an intimate figure (Tzouvara et al., 2015). According to interactionist theory, one becomes lonely, or develops feelings of loneliness, when their perceived levels of social interactions are deficient to their social requirement. Weiss proposed there are two types of loneliness that can be differentiated through antecedents and affective responses (Perlman & Peplau, 1982). As previously discussed, emotional loneliness refers to a lack of intimate relationships whereas social loneliness occurs due to a lack of meaningful friendships, social networks or community connections (Weiss, 1973). In his theory, Weiss introduces six social provisions that are supplied by a relationship: attachment, social integration, opportunity for nurturance, reassurance of worth, reliable alliance, and guidance. A single relationship may

contribute to multiple types of these social provisions (DiTommaso & Spinner, 1997). Deficiency in one or more social provisions introduces the risk of experiencing either social or emotional loneliness depending on the provision that was lost. Follow-up studies have supported Weiss' claims about differentiating emotional and social loneliness and their experiential states (DiTommaso & Spinner, 1997).

2.4.3. Cognitive Discrepancy Theory

A cognitive discrepancy approach proposed by Peplau and Perlman (1982) concerns an individual's perception of desired and achieved levels of social contact. The entirety of the model is outlined in figure 1. The difference between the two is referred to as mismatch and is associated with specific circumstances and life events (Burholt et al., 2016). Peplau and Perlman argue the mediating effects are the primary aspect of the approach. Cognitive processes act as a mediator between the mismatch - that is, the social deficiencies and the intensity of the experience (Tzouvara et al., 2015). Through the use of cognition, including social skills and self-esteem, the experience of loneliness can be manipulated, alleviated, or prevented. This theory draws upon attribution theory where the intensity of the experience of loneliness, and the likelihood of it being persistent over time, is influenced by the perceived causes of one's loneliness (Perlman & Peplau, 1982). A further study conducted by Garber (1989) found evidence that supports the cognitive discrepancy theory. Results showed the greatest predictor of loneliness to be when one's desired sense of belonging and being understood was greater than the actual degree of their existence in relationships (Garber, 1989). This theory has also been criticized in two fundamental ways. Wenger et al. (1996) note that it does not take links between social networks and loneliness into consideration while Ribeiro (1989) discussed how individuals with cognitive impairment are not considered within the theory.

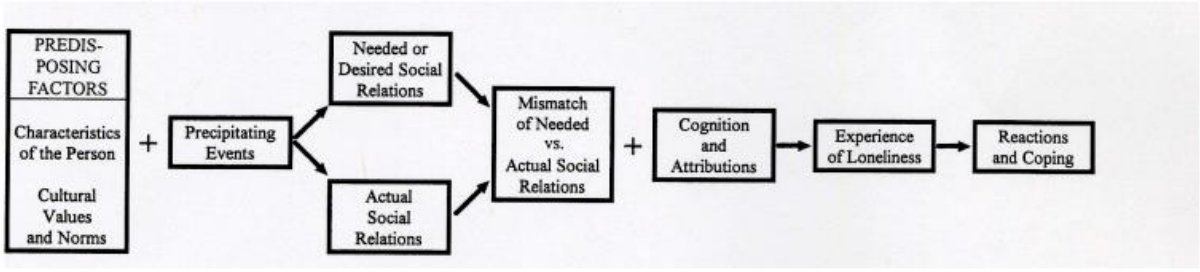


Figure 1. A discrepancy model of loneliness (Perlman & Peplau, 1988)

More recent developments in loneliness research has resulted in the development of new theories of loneliness such as the evolutionary theory and the integrated theoretical model.

2.4.4. Evolutionary Theory

The evolutionary theory of loneliness (ETL) proposed by Cacioppo (Cacioppo et al., 2006) assumes that feelings of loneliness emerge, and are maintained, over time with consequent effects on physiological and mental health (Keller et al., 2022). The probability that the line of descent of a specific trait from an individual will remain or increase in the population is referred to as evolutionary fitness (Cacioppo & Cacioppo, 2018). The presence of sufficiently reliable patterns of social interactions defines social species. The social behaviours expressed in these interactions can be classified into one of four terms according to the fitness consequence for the actor and its social partners (Cacioppo & Cacioppo, 2018): (a) selfishness – the actor (*a*) benefits at a cost (*c*) to the recipient (*r*); (b) mutual benefit – both the actor and the recipient benefit (*b)* ; (c) altruism – the recipient benefits at a cost to the actor; and (d) spite or punitive altruism – both actor and recipient suffer a loss (Gardner & West, 2006). These fitness effects are displayed in figure 2.

		Fitness Effect for Actor	
		$b_a > c_a$	$b_a < c_a$
Fitness effect for recipient	$b_r < c_r$	Selfishness $b_a > c_a$, $b_r < c_r$	Spite $b_a < c_a$, $b_r < c_r$
	$b_r > c_r$	Mutual benefit $b_a > c_a$, $b_r > c_r$	Altruism $b_a < c_a$, $b_r > c_r$

Figure 2. The propositions of Cacioppo evolutionary theory of loneliness (Cacioppo & Cacioppo, 2018)

An organism's perception of being lonely "automatically signals an environment in which the likelihood is low of encountering social behaviours categorised in terms of evolutionary fitness as mutual benefit or altruism, and the likelihood is high of the organism exhibiting behaviours categorised as selfish" (Cacioppo & Cacioppo, 2018, p. 139). Loneliness in ETL is posited to operate in part through non-conscious processes, and to represent an atypical condition for humans as a social species which has evolved to heavily depend on others in many aspects of one's life (Nowak, 2006). The human brain has been shaped to incline people toward certain ways of feeling, thinking, and acting (Cacioppo & Cacioppo, 2018). Physical pain is considered an aversive signal that alerts an individual to potential tissue damage. ETL proposes loneliness also creates an aversive biological warning signal that alerts an individual to potential damage of the social body. In each case, individuals are motivated to take care of the body and relieve the signals (Cacioppo & Cacioppo, 2018; Keller et al., 2022). Therefore, ETL posits that "loneliness increases the motivation to attend to and approach social stimuli for potential relief from the aversive state" (Cacioppo & Cacioppo, 2018, p. 140).

Where ETL views loneliness a partially non-conscious process, the integrated theoretical model builds on this and understands loneliness to be grounded in wider contextual influences.

2.4.5. Integrated Theoretical Model

de Jong Gierveld and Tesch-Römer (2012) understand the problems of lonely people to be embedded within given forms of social organisation and cultural fabrics. From this, they formulated an integrated theoretical model. Through this integrated model, loneliness-provoking factors include "characteristics of the societal context such as societal welfare, the demographic composition of the population, and prevailing norms and values concerning filial support" (de Jong Gierveld et al., 2018, pp. 397-398). This model approaches loneliness in varying social contexts by combining individual and societal-level elements. Figure 3 provides a visual representation of the model. The model suggests societal context factors (displayed in the upper half of figure 3) exert main effects (represented by grey dotted arrows on figure 3) on the individual level factors (displayed in the lower half of figure 3).

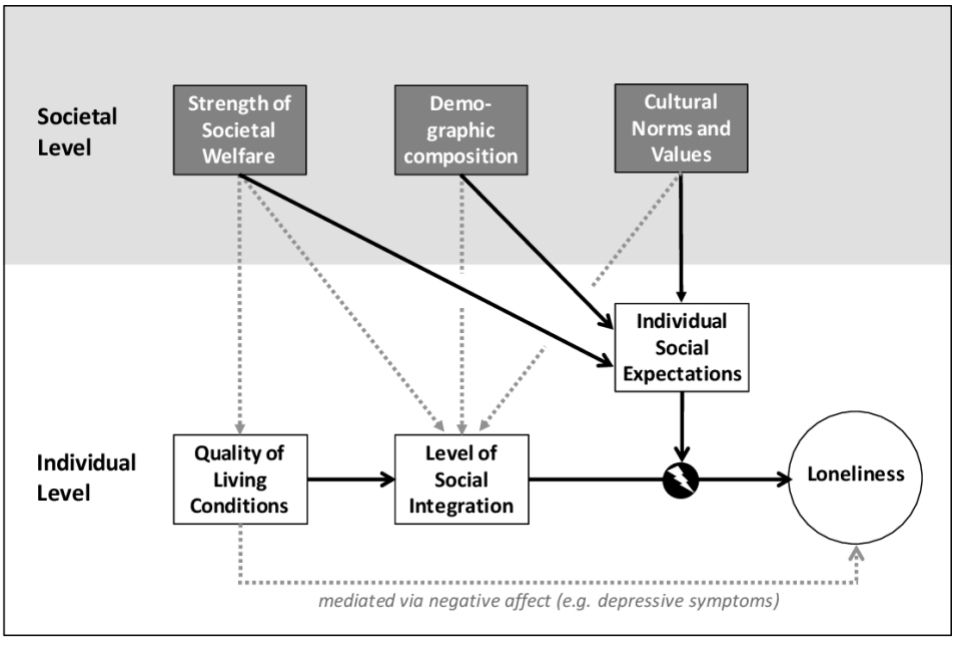


Figure 3. The integrated model of loneliness (de Jong Gierveld & Tesch- Römer, 2012).

Individuals and their social networks are embedded in larger societal and cultural contexts which create opportunities for social integration, influence individual social expectations, and shape the quality of living situations (de Jong Gierveld & Tesch- Römer, 2012). Previous research has shown culture, social policy, socioeconomic factors, and other large societal and cultural contexts condition social network structures – these are referred to as upstream forces (Berkman et al., 2000, p.847, as cited in de Jong Gierveld & Tesch- Römer, 2012). While the integrated model concentrated on only three interrelated societal and cultural contexts (strength of societal welfare, demographic composition, cultural norms and values), de Jong Gierveld and Tesch- Römer (2012) point out other aspects of these contexts could be considered as well, such as the complexity of a society or the rigidness of cultural norms.

2.4.6. Framework for the Present Study

From an interactionist perspective, loneliness is seen as a deficiency to one's social requirement based upon their perceived level of social interaction (Perlman & Peplau, 1982). Supporting this type of interactionist perspective is the integrated theoretical model of loneliness. Guided by these two theories, this study will view loneliness as a phenomenon that develops through the interaction of both individual and societal-level elements. Cultural identity measures understand cultural identity to be a development of one's individual perceptions of their culture, their being within that culture, and wider cultural norms and values. By approaching this study through an integrated model of loneliness, the entirety of a person's cultural identity make-up will be considered in relation to loneliness. This study will also draw on the interactionist perspective which differentiates between social and emotional types of loneliness.

2.5. Present Study

This study aims to investigate the relationship between cultural identity of older Māori living in New Zealand and loneliness. The data utilised for this study has been collected as part of the New Zealand Health, Work and Retirement Study (HWR). The rationale for this study comes from the preceding literature. Cultural identity is an important part of overall wellbeing for Māori. It has been linked to loneliness in both migrant and indigenous populations. As research has shown, Māori are disproportionately affected by both negative health outcomes and loneliness. This research will work to contribute to the literature considering whether cultural identity may act as a protective factor against loneliness.

2.5.1. Research Questions and Hypotheses

Based on the theoretical and empirical literature reviewed, this study will address the following research questions and hypotheses:

Q1. What is the relationship between cultural identity in older Māori and loneliness

H1. A disconnection with cultural identity will be negatively correlated with overall loneliness

Q2. What is the relationship between cultural identity in older Māori and emotional loneliness

H2. A disconnection with cultural identity will be negatively correlated with emotional loneliness

Q3. What is the relationship between cultural identity in older Māori and social

loneliness

H3. A disconnection with cultural identity will be negatively correlated with social loneliness

Q4. How are the different dimensions of cultural identity related to overall loneliness?

Q5. How are the different dimensions of cultural identity related to the types of loneliness?

As discussed previously, research has shown those who have a positive relationship with their identity have improved mental well-being (Avdeeva et al., 2020; Houkamau et al., 2021). A dissociation from one's identity has been linked with increased rates of mental distress, including depression and anxiety (Chang et al., 2017; Williams et al., 2018). A moderation analysis will further extend the analysis of hypotheses 1, 2, and 3 to determine whether CI interacts with depression and anxiety scores when investigating their relationships with the different types of loneliness.

Q6. Does cultural identity moderate the relationships between depression and anxiety and loneliness, social loneliness or emotional loneliness?

3. Method

3.1. Research Design

The current study involves a secondary analysis of data from the 2020 data wave of the New Zealand Health, Work, and Retirement (HWR) study. The HWR study is an initiative of Massey University's Health and Ageing Research Team (HART) and was first established in

2006. The study aims to longitudinally track and investigate the health and wellbeing of older adults in New Zealand describing factors related to health, retirement and ageing well (Phillips, 2021). Funding for the 2020 wave of the study was provided by the Ministry of Business, Innovation and Employment (MAUX1705). Ethical approval was granted by the Massey University Human Ethics Committee: Palmerston North (Southern A 20/07).

Data from the longitudinal surveys has been, and continues to be, collected through a postal survey. The 2020 wave survey questionnaire consisted of 36 pages and was distributed to both the existing cohort (those who had previously participated in the survey from 2006-2018) and a refresh cohort (a new sample invited to participate in the study). Cohorts in the HWR have been selected from random samples of persons aged over 55 years who are listed on the New Zealand electoral roll. Approximately 97.6% of eligible voters aged over 55 are enrolled and therefore are subject to random selection (Phillips, 2021). An over-sampling of persons who identified as being of Māori descent was included in the 2020 wave (and in previous waves) to obtain and maintain an adequate representation of this population.

3.2. Participants

Persons who had participated in at least one of the previous cohorts where participants were recruited (2006, 2009, 2014, 2016 and 2018) were surveyed again in 2020 if they had not been excluded. Exclusions occurred for persons who were deceased, had relocated overseas, had withdrawn from the study, had not responded since 2014 or earlier, or were lost to contact. These participants made up the existing cohort for the 2020 wave.

A refresh cohort for 2020 was also recruited. This employed a steady-state sampling recruitment design to ensure representation of both Māori and non-Māori New Zealand residents aged over 55. The study aimed to recruit a new representative sample of persons aged 55-65 to maintain representation of this age group as the existing cohort aged. Adequate representation of persons who identified as being of Māori descent was also ensured through the recruitment stage. All persons who were aged 55-65 and were on the electoral roll, resided in New Zealand, and had not responded to a previous HWR were assessed for inclusion.

A Māori descent sample and a general sample were selected. Utilising the Dillman (2014) sample size calculation for population surveys employing a finite population correction, it was determined that, based on the 2013 census data, a general population sample of n = 533 and a Māori sample of n = 533 would be needed to adequately represent the populations of interest for the refresh sample.

3.3. Response Rates and Final Sample Size

Postal surveys for the 2020 data wave were sent out to a total of 8,166 people including those from both the existing (N=4,614) and refresh cohort (N=3,552). Overall, 4,351 (53.3%) of the approached sample responded to the survey. Table 1 outlines the sample size of the approached cohorts and the response rate of each cohort.

Table 1

Existing and Refresh Cohort Postal Questionnaire Approach and Response Rates for the 2020 HWR Data Wave

Year Cohort Recruited	Approached 2020 Wave	N Responses in 2020	2020 Response Rate
	N	N	%

2006	1,543	1295	83.9
2009	604	502	83.1
2014	697	523	75.0
2016	1,180	754	63.9
2018	590	406	68..8
2020	3,552	871	24.5
Total	8,166	4,351	53.3

Participants were included in the present study if they were aged 65 and over, and indicated Māori as their prioritised ethnicity. The age limit was set at 65 years and over as this is generally considered to be the marker of an 'older person' in New Zealand (Koopman-Boyden, 2011**;** Ministry of Health, 2002). There were n = 2,325 participants who were aged 65 or above who returned questionnaires in 2020. Of these participants, 28.1% indicated their prioritised ethnicity[2] was Māori. Table 2 outlines the prioritised ethnicity of those aged 65 and over. Therefore, the final sample size for the present study was n = 653.

Table 2

Prioritised Ethnicity of Participants Aged 65 and Over

Prioritised Ethnicity	Frequency	Percentage
	N	%
NZ European	1,527	65.7
Māori	653	28.1
Pacific Peoples	19	0.8
Asian	12	0.5
Other	89	3.8
Missing	25	1.1

[2] Prioritised ethnicity (Towers, 2007): When a single ethnicity was indicated by the participant, a single ethnicity was accorded. When more than one ethnic affiliation was indicated, ethnicity was assigned using priority rules. These rules are provided below in rank order. Subsequent rules will only apply to those participants who have not yet been assigned to a specific ethnic group on the basis of prior rules.

1. If Māori was one of the groups reported by a respondent, then the respondent was assigned to 'Māori '
2. If a Pacific ethnic group was one of the groups reported, the respondent was assigned to 'Pacific'
3. If an Asian ethnic group was one of the groups reported, the respondent was assigned to 'Pacific'
4. If a MELAA ethnic group was one of the groups reported, the respondent was assigned to 'MELAA'
5. If New Zealand European or Kiwi or New Zealander ethnic group was one of the groups reported, the respondent was assigned to 'New Zealand European'
6. If Other was reported as the main ethnic group (which included nonrespondents to the question), the respondent was assigned to MELAA

Total	2,325

3.4. Measures

3.4.1. Loneliness

Loneliness was measured using the 6-item De Jong Gierveld Loneliness Scale (de Jong Gierveld & Van Tilburg, 2006). This scale is a shortened version of the 11-item scale enabling easier use in large surveys. Each of the two scales produce scores for overall loneliness as well as providing the option to distinguish between emotional loneliness and social loneliness. The possible answers for the scale are 'yes', 'more or less', and 'no'. The scale contains three positively formulated items and three negatively formulated items (de Jong Gierveld & Van Tilburg, 2010). Neutral and positive answers on negatively formulated questions indicate loneliness and are counted towards the overall score. Likewise neutral and negative answers on positively formulated questions are counted towards the loneliness score. A score greater than 1 on either the overall scale, the emotional subscale, or the social subscale indicates the relative type of loneliness.

The 6-item scale for overall loneliness has been deemed reliable with Cronbach's α coefficients of between .70 and .76 (de Jong Gierveld, & Van Tilburg, 2006). The α coefficients of the 3-item sub-scales for emotional and social loneliness were slightly lower than the overall loneliness coefficients (between .67 and .74, and between .70 and .73 respectively). This reported reliability did not change between different age groups. The congruent validity for overall loneliness between the 11-item and 6-items scales was exceedingly high (varying between .93 and .95). High correlations were also seen for sub-scales of emotional and social loneliness with correlations of .88 and .93, respectively (de Jong Gierveld & Van Tilburg, 2006).

Cronbach α reliabilities of this present study were .68, .76, and .479 for the total loneliness scale, social loneliness scale, and emotional loneliness scale respectively. The α reliability of emotional loneliness is low therefore caution should be taken when interpreting these results.

3.4.2. Depression

Depression was measured using the shortened 10-item version of the Centre for Epidemiologic Studies Depression Scale (CES-D) (Andresen et al., 1994). This 10-item version (CES-D-10) was adapted from the original 20-item CES-D (Radloff, 1997). The CES-D has been adopted as one of the best screening methods for depression in older adults (Blazer, 2003; Himmelfarb & Murrell, 1983). Each of the 10 items offers four responses with an assigned score ranging from 0-3. There are two positively formulated items and eight negatively formulated ones. After reversing the positively formulated items, a score between 0 and 30 will be given. A score ≥10 on the CES-D-10 represents a depressed mood.

The CES-D-10 has been shown to have high reliability and validity to detect clinical and non-clinical symptoms of depressed mood for an array of populations including older adults (Blazer, 2003). The CES-D-10 was found to have high interrater reliability (κ .97) when a cutoff score of 10 was used to detect depression (Andresen et al., 1994). The stability of the CES-D-10 was also tested showing a strong statistically significant correlation (*r* .59 with a P-value of <.01) (Andresen et al., 1994). Cronbach α reliability for the depression scale in the present study was .824.

3.4.3. Anxiety

Anxiety was measured using a shortened version of the Geriatric Anxiety Inventory (GAI-SF). The shortened form of this assessment was developed specifically for use in large epidemiological studies (Byrne & Pachana,, 2011). This version contains 5-items compared to the original 20-item GAI. Using a cutoff score of 3 or greater, the GAI-SF has been shown to have both high sensitivity and specificity (75% and 87% respectively) (Byrne & Pachana, 2011). The scale offers two possible responses – either 'agree' or 'disagree'. An 'agree' response equates to a score of 1 whereas 'disagree' carries a score of 0. Byrne and Pachana (2011) recommend a cutoff score of three to detect generalised anxiety disorder in an older population.

Internal consistency was also found to be high at $\alpha = .81$. Item-rest correlations ranged from 0.51 to 0.68 (mean = 0.59). Concurrent validity has been tested against the State-Trait Anxiety Inventory where a correlation of $r_s = 0.48$ ($p < 0.001$) was found. Cronbach α reliability for the anxiety scale in the present study was .852.

3.4.4. Social Support

Social support was measured using the revised Social Provisions Scale (Cutrona & Russell, 1987). This scale includes 24 items and measures total social provisions and contains 6 sub-scales or provisions: attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance (Cutrona & Russell, 1987). Respondents answer the items on a four-point Likert scale depending on the degree to which their social relationships are currently supplying each of the provisions (strongly disagree = 1 to strongly agree = 4). Negatively formulated items have their scoring reversed to calculate a score for each social provision. The higher the score, the better one's provision of social functions.

Internal consistency for the total scale score has been shown to range from .85 to .92 regardless of age (Cutrona & Russell, 1986). The individual subscales have also shown high α coefficients ranging from .64 to .76 (Cutrona & Russell, 1986). Factor analysis solidified the six-factor structure that corresponds to the six provisions (Cutrona & Russell, 1986). Cronbach α reliability for the total social provisions scale in the present study was .918.

3.4.5. Living Alone

This variable was measured using a single question where respondents could indicate whether they resided with another person, their relationship to that person, and whether the person was over or under 18 years of age.

3.4.6. Ethnic Background

Ethnicity was measured using a single question where respondents could identify each ethnic group they identified with. These were Māori, Niuean, New Zealand European, Chinese, Samoan, Indian, Cook Island Māori, Tongan, and Other (please specify). A prioritised ethnicity coding was used to determine which group each participant was assigned to (see footnote 2).

3.4.7. Marital Status

Marital status was measured using a single question where respondents could indicate whether they were married, in a civil union/de facto/partnered relationship, single, widowed, or divorced or permanently separated from their legal husband or wife. This information was recoded into two categories: married or de facto and not married or de facto.

3.4.8. Socio-Economic Status

Socio-economic status was measured using the Economic Living Standard Index Short Form ($ELSI_{SF}$) (Jensen et al., 2005). A person's economic standard of living refers to the material aspects of well-being reflected in their personal possessions and consumption (Jensen et al., 2005). The measure can result in a score ranging from 0 to 31 where higher scores reflect better living standards. A person's score will equate to a living standard level between 1 and 7. Level 1 equates to a score between 0 and 8 and represents significant hardship. Level 7 equates to a score of 29-31 representing very good living.

The $ELSI_{SF}$ has an α coefficient of 0.88 indicating high internal consistency. The scores of the $ELSI_{SF}$ have also been shown to highly correlate with the original ELSI with Pearson's correlation coefficient of $r = .99$ in the total population. Similar correlations were found throughout various populations (Jensen et al., 2005). Cronbach α reliability for the $ELSI_{SF}$ in the present study was .81.

3.4.9. Cultural Identity

Cultural identity was measured using the Multidimensional Model of Māori Identity and Cultural Engagement (third revised version) (MMM-ICE3). This is a self-report survey that aims to measure the extent to which Māori view various domains of their culture as relevant to their self-concept (Matika et al., 2020). The MMM-ICE3 describes psychometric features of eight different subscales: (1) Group membership evaluation, (2) cultural efficacy and active identity engagement, (3) interdependent self-concept, (4) spirituality, (5) socio-political consciousness, (6) perceived appearance, (7) authenticity beliefs, and (8) whānau efficacy (Houkamau et al., 2019). Each of the eight subscales have Cronbach's α coefficients which represented high internal reliability (Matika et al., 2020). Confirmatory factor analysis

also shows the eight domains of identity fit better than any alternative factor structures (Matika et al., 2020). The total scale of the present study had a Cronbach's α coefficient of 0.91.

The current study uses six of the eight subscales (as only these six were measured in the 2020 wave of the HWR study) excluding interdependent self-concept and authenticity beliefs: (1) group membership evaluation, (2) cultural efficacy, (3) spirituality, (4) socio-political consciousness, (5) perceived appearance, and (6) whānau efficacy. Definitions of each of the subscales can be found in table 3. Each subscale contains 3 questions which are answered based on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). After reversing the scores for negatively formulated questions, a lower mean score in a particular domain represents lesser connection to that domain. Cronbach's α coefficients for each of the subscales in the present study were: (CI1 GME) 0.71, (CI2 CE) 0.76, (CI3 Sp) 0.78, (CI4 SPC) 0.75, (CI5 PA) 0.89, and (CI6 WE) 0.85.

Table 3

Definitions of the six subscales used in the present study from the MMM-ICE3

Subscale	Definition
1. Group membership evaluation (GME)	"The extent to which a person positively evaluates their membership in the social category Māori and views their membership as Māori as a personally important or central aspect of their self-concept *versus* the extent to which a person negatively evaluates their membership in the social category Māori and views their membership as Māori as peripheral or irrelevant to their self-concept" (Matika et al., 2020, p.60).
2. Cultural efficacy (CE)	"The extent to which a person perceives that they have the personal resources required (that is, the personal efficacy) to

	engage appropriately with other Māori in Māori social and cultural contexts *versus* the extent to which the person perceives that they lack the personal resources and ability to engage appropriately with other Māori in Māori social and cultural contexts" (Matika et al., 2020, p.60).
3. Spirituality (Sp)	"The extent to which a person is engaged with thei thau wairua and has a belief in Māori concepts of spirituality, including feeling a connection with tupuna or believing in tapu *versus* the extent to which the person is disengaged from or does not believe in Māori concepts of spirituality" (Matika et al., 2020, p.60).
4. Socio-political consciousness (SPC)	"The extent to which a person perceives historical factors as being of continued importance for understanding contemporary intergroup relations between Māori and other ethnic groups in Aotearoa New Zealand; and how actively engaged the individual is in promoting and defending Māori rights given the context of the Treaty of Waitangi *versus* the extent to which the person perceives historical factors and injustices experienced by Māori as being irrelevant in contemporary society" (Matika et al., 2020, p.60).
5. Perceived appearance (PA)	"The extent to which a person subjectively evaluates their appearance as having clear and visible features that signal their ethnicity and ancestry as Māori (or high Māori prototypicality) *versus* the extent to which the person evaluates their appearance as less indicative of having Māori ancestry (low Māori prototypicality)" (Matika et al., 2020, p.60).
6. Whānau efficacy (WE)	"The extent to which a person subjectively considers their whānau as solutions-focused and able to work together (high whānau efficacy) *versus* the extent to which a person has little

confidence that their whānau can deal with conflict or accomplish work together (low whānau efficacy)" (Matika et al., 2020, p.60).

3.5. Procedure

Postal surveys have been carried out as part of the Health, Work and Retirement study biennially since 2006. Off-wave surveys were also completed in 2009, 2013, and 2021 for particular sub-projects. Each of the longitudinal surveys comprises indices of health and well-being, social participation, and economic participation (Allen et al., 2022). A focal topic is also examined in each survey: work and retirement (2006), retirement planning (2008), social connectedness (2010), living standards (2012), nutrition (2014), housing and neighbourhood quality (2016), extended working lives (2018-2020), and impacts of the COVID-19 pandemic (2021). Each survey has also included a section relevant to Māori relating to their cultural identity and/or whakapapa/whanaungatanga.

The 2020 HWR survey was 36 pages long and consisted of eight subsections. These were health and wellbeing, whanau, family and friends, caregiving, where you live, work and retirement, financial wellbeing, your personal situation, and Māori cultural identity. As previously discussed, new participants (refresh cohorts) were recruited from the New Zealand electoral roll. Existing participants from previous cohorts were also included in the new wave of the study if they had not been excluded for any reason.

The 2020 wave of the study saw three stages of contact for both refresh and existing participants. Initially, participants were sent an introductory letter, an information sheet, a pen, a survey booklet, a consent form and a reply-paid return envelope. The second point of contact was made after three weeks. This consisted of a postcard thanking those who had

completed the survey and asking those who hadn't completed it to do so. A third and final point of contact was made after a further nine weeks to those who had still not returned a completed survey. This consisted of a final reminder letter, an information sheet, a survey booklet, a consent form and a reply-paid return envelope.

3.6. Data Analytic Plan

A statistical analysis of the data was conducted using SPSS Statistics software and G*Power. G*Power was used to complete a power analysis which would provide a minimum sample size for the present study. Littles' missing completely at random test (MCAR) was conducted to ensure the data was not missing in a uniform or patterned way. A final preliminary analysis was then run to demonstrate the descriptive statistics of the sample. A partial correlation analysis and three multiple linear regression analyses were conducted to investigate each of the research questions.

4. Results

All of the analyses carried out in this study, with the exception of the power analysis, were conducted using *Statistical Package for Social Sciences (SPSS) Version 28.0*. The power analysis was conducted using *G*Power Version 3.1*.

4.1. Power Analysis

Statistical power represents the likelihood of a significance test detecting an effect when there is one present. A real, non-zero relationship between two variables is considered to be a true effect. The higher the power, the increased chance there is of detecting a true effect. There is always a risk of making either type I or type II errors when interpreting results. A type I error

is rejecting the null hypothesis when it is actually true; a type II error is not rejecting the null hypothesis when it is actually false. Statistical power lowers the risk of making a type II error. Power analysis is made up of four components:

1. Statistical Power: the likelihood a test will detect an effect of a certain size if there is one
2. Sample Size: the minimum sample size needed to observe an effect of a certain size with a given power level
3. Significance Level: the maximum risk of rejecting a true null hypothesis
4. Expected Effect Size: a standardized way of expressing the magnitude of the expected result of the study.

If you have or know three of these components, you are able to calculate the fourth. The power analysis in this study was used to calculate sample size. Effect size was determined using Cohen's f^2 (1998). A significance level is the measure of type I error probability. This was set at the conventional threshold of 0.05 (Spence & Stanley, 2018). At this threshold, findings will be considered statistically significant if there's less than a 5% chance they will occur under the null hypothesis. Statistical power was set at the ideal power size of 0.8 (Serdar et al., 2020). This means there is an 80% chance the test will detect a true effect if there is one to be found.

To obtain power of 80%, using an effect size of 0.15 (f^2 value proposed by Cohen (1998) to represent a medium effect size), an α error probability of 0.05, and 17 predictors (including all independent, dependent, and control variables), a sample size of $n = 146$ is required. The sample size of the current study ($n = 653$) comfortably exceeds the minimum requirement.

4.2. Missing Data and Imputations

A missing variables analysis was conducted for each of the principal variables in this study, as well as for the control variables. Little's missing completely at random (MCAR) test was conducted. This concluded a non-significant result (X^2 (411) = 381.55, p = 0.848) indicating the data was MCAR.

As a general rule of thumb, missing data proportions less than approximately 5% are negligible and complete case analysis may be used (Jakobsen et al., 2017). Five of the variables were found to have more than 5% of data values missing: (1) socioeconomic status (ELSI), 7.8%; (2) CI dimension 3, 5.2%; (3) CI dimension 4, 5.2%; (4) CI dimension 5, 5.5%; (5) CI dimension 6, 6.6%. Following the flowchart of when to use multiple imputation presented by Jakobsen et al., (2017), as these values are only minimally above the 5% threshold and the MCAR test observed no statistical significance, the observed data will be used for the following analyses and cases will be removed by utilising missing pairwise deletion.

4.3. Normality of the Data

Normality of the individual principal variables was assessed by obtaining skewness and kurtosis measures, histograms, normal Q-Q plots, and detrended normal Q-Q plots. The histogram and both Q-Q plots showed moderate skewness for each of the variables. Social loneliness, emotional loneliness, loneliness, and CI dimension five were all positively skewed while cultural identity and CI dimensions one, two, three, four, and six were negatively skewed. When investigating the skewness and kurtosis data, it can be considered normal when skewness is between -2 and 2 (Bryne, 2010; Hair et al., 2010). Emotional loneliness recorded the highest skew with a value of 1.268 and cultural identity (CI) recorded the lowest skew with -0.226. Therefore, each of the variables fall within the skewness range to be considered normal. Tabachnick and Fidell (2013) note that underestimates of the variance

associated with kurtosis disappear when sample sizes are above 100 for positive kurtosis and above 200 for negative kurtosis. The valid data for each of these variables surpassed the necessary number of cases, therefore variance due to kurtosis can be ruled out.

Log10 transformations of the skewed data were completed to achieve a more normal distribution however the results obtained from the transformed data showed no significant deviance from the original data. Therefore, the untransformed data was used to complete the analyses.

4.4. Univariate Outliers

Univariate outliers were explored using box plots and standardised scores (*z* score). Probable outliers (with values >1.5x the interquartile range (Pallant, 2010)) were detected in two of the ten principal variable distributions: loneliness and emotional loneliness. Data for these cases were analysed and it was determined the values fell inside the expected range for the variable. *Z* scores were also explored to determine the possibility of outliers. Tabachnick and Fidell (2013) explain *z* values exceeding 3.29 ($p < 0.001$, two tailed test) can be determined to be potential outliers. All of the *z* scores for each of the ten variables fell below the 3.29 cut-off including the cases that were identified as probable outliers in the box plot. Due to this, no case was removed from the data set due to being identified as an outlier.

4.5. Participant Characteristics

Participants for the present study ($n = 653$) were aged between 65 and 85 years old. The average age of the participants was 72 years old. Just under half of the participants (40.4%) were categorised as being lonely. When broken down into emotional loneliness and social loneliness subscales, 43.8% were categorised as emotionally lonely and 44.4% were

categorised as socially lonely. Cultural identity had an average score of 3.71. When categorised into dimensions of cultural identity, cultural efficacy had the highest average score while perceived appearance had the lowest.

Almost three-quarters of the sample was found to be not depressed (73.5%), while 24.5% of participants were recorded to have a depressed mood. Only a small proportion of the sample was detected to have generalised anxiety disorder (13.9%). Social provision scores ranged from 46 to 96 with a mean score of 79.15. Of the n = 653, 27.4% reported living alone while 35.8% reported they were not married or in a de facto relationship. Few participants reported experiencing severe (1.5%) or significant (1.7%) hardship in relation to their economic standard of living. Over half of the participants reported either good or very good economic living standards (54.7%). Composition characteristics of the final sample are detailed in table 3.

Table 4

Description of Sample Characteristics

		n	Proportion (%)	Mean
Age	65-85	653	100%	72.3
Living Alone				
	Yes	179	27.4%	
	No	474	72.6%	
	Missing	0	0.0%	
Marital Status				
	Married or De Facto	410	62.8%	
	Not Married or De Facto	234	35.8%	
	Missing	9	1.4%	
ELSI (Social Economic Status)				

	Severe Hardship	10	1.5%	
	Significant Hardship	11	1.7%	
	Some Hardship	104	15.9%	
	Comfortable	120	18.4%	
	Good	210	32.2%	
	Very Good	147	22.5%	
	Missing	51	7.8%	
Social Provision (Social Support)				79.1
	Valid	635	97.2%	
	Missing	18	2.8%	
Depression				6.66
	Depressed	160	24.5%	
	Not Depressed	480	73..5%	
	Missing	13	2.0%	
Anxiety				1.46
	Anxious	91	13.9%	
	Not Anxious	534	81.8%	
	Missing	28	4.3%	
Loneliness				1.48
	Lonely	259	39.7%	
	Not Lonely	382	58.5%	
	Missing	12	1.8%	
Emotional Loneliness				0.61
	Lonely	286	43.8%	
	Not Lonely	355	54.4%	
	Missing	12	1.8%	
Social Loneliness				0.87
	Lonely	290	44.4%	
	Not Lonely	354	54.2%	
	Missing	9	1.4%	
Cultural Identity (CI)				3.71
	Valid	632	96.8%	

	Missing	21	3.2%	
CI Dimension 1 (GME)				3.91
	Valid	624	95.6%	
	Missing	29	4.4%	
CI Dimension 2 (CE)				3.99
	Valid	624	95.6%	
	Missing	29	4.4%	
CI Dimension 3 (Sp)				3.82
	Valid	619	94.8%	
	Missing	34	5.2%	
CI Dimension 4 (SPC)				3.95
	Valid	619	94.8%	
	Missing	34	5.2%	
CI Dimension 5 (PA)				2.94
	Valid	617	94.5%	
	Missing	36	5.5%	
CI Dimension 6 (WE)				3.75
	Valid	610	93.4%	
	Missing	43	6.6%	

4.6. Descriptive Statistics

Table 4 provides descriptive statistics for each of the principal variables in this study. The skew of the distribution is shown by the relevant mean and median scores, where variables with a median (M) greater than the mean ($\bar{y}$) indicate a left (negative) skew and a median (M) less than the mean ($\bar{y}$) indicates a right (positive) skew. This occurs due to the tendency for the mean to be more greatly influenced by extreme values. Standard deviations (SD) range from 0.79 to 2.24 showing a difference in the variability from the mean between variables. Standard errors of the mean (SE) are all less than 0.1 indicating sample means are closely distributed around the population mean. Each of the response ranges coincides with the expected range.

Table 5

Sample Means ($\bar{y}$), Medians (M), Standard Deviations (SD), Standard Errors (SE), and Range for Principal Variables

Variable	$\bar{y}$	*M*	SD	SE	Range
Loneliness	1.47	1.00	1.56	0.06	6.00
Social Loneliness	0.87	0.00	1.11	0.04	3.00
Emotional Loneliness	0.61	0.00	0.80	0.03	3.00
Cultural Identity	3.71	3.78	1.35	0.05	6.00
CI Dimension 1	3.91	4.00	1.60	0.06	6.00
CI Dimension 2	3.99	4.00	1.60	0.06	6.00
CI Dimension 3	3.82	4.00	1.85	0.07	6.00
CI Dimension 4	3.95	4.00	1.64	0.06	6.00
CI Dimension 5	2.94	3.00	2.24	0.09	6.00
CI Dimension 6	3.75	4.00	1.69	0.07	6.00

4.7. Partial Correlation Analysis

A partial correlation analysis was conducted to measure the strength and direction of a linear relationship between two variables (cultural identity and each type of loneliness) while controlling for other possible confounding variables (Pallant, 2020). Partial correlation relies on five assumptions:

1. There is one dependent variable and one independent variable both of which are measured on a continuous scale
2. There are one or more control variables or covariates
3. A linear relationship between all the variables is present
4. There are no significant outliers
5. Variables are approximately normally distributed

Preliminary assessments were performed to ensure the normality and linearity assumptions were not violated. To explore linearity in the data a scatterplot was used. Bivariate

scatterplots for Cultural Identity (CI) on the Y-axis and Loneliness, Emotional Loneliness, and Social Loneliness on the X-axis revealed no evidence of curvilinearity in these bivariate relationships. Therefore, the linearity assumption of partial correlation was satisfied. Variables were previously determined to assume approximately normal distribution and the presence of significant outliers had also been ruled out. The produced scatterplots substantiated these assumptions. By analysing the scatterplots, it appeared CI was negatively correlated with both Loneliness and Social Loneliness while CI and Emotional Loneliness had a weak positive correlation.

Pearson's product-moment correlation coefficients were calculated to analyse the strength and direction of the relationship. A partial correlation was used to allow for the controlling of possible confounding variables: (1) depression, (2) anxiety, (3) living alone, (4) marital status, (5) social support, and (6) socioeconomic status. These calculations are presented in table 5.

Table 6

Partial Correlation Matrix for Principal Variables While Controlling for Possible Confounding Variables

	Loneliness	*Social Loneliness*	Emotional Loneliness	Cultural Identity
Loneliness	1			
Social Loneliness	0.84**	1		
Emotional Loneliness	0.62**	0.08**	1	
Cultural Identity	- 0.06	- 0.12**	0.07	1

*Note. ** Correlations were significant at the p<0.05 level.*

Loneliness and social loneliness were both weakly negatively correlated with cultural identity (CI) after controlling for each of the six possible confounding variables. Emotional loneliness was weakly positively correlated with CI. Of these correlations, only that between social

loneliness and CI was statistically significant (r = 0.12, n = 572, p 0.003). An inspection of the zero-order correlation suggested controlling for each of the six variables had an impact on the correlation between loneliness and CI, removing the statistical significance of the correlation (r = -0.10, n = 619, p = 0.02). There was little effect of controlling variables on the strength of the relationship between emotional loneliness and social loneliness and CI. Partial correlation was used to test hypotheses 1, 2, and 3. Only hypothesis three was supported by these results.

4.8. Assumptions of Multiple Regression Analysis

Multiple linear regression (MLR) analyses were undertaken to explore research questions 4 and 5. The MLR is used to predict the value of one variable (total, social or emotional loneliness) based on the value of two or more other variables (each of the six dimensions of CI). This will explain the variance of the model and the relative contribution of each dimension of CI to the total variance. MLR analyses will be used to explore research questions four and five. MLR relies on eight assumptions: (Pallant, 2020)

1. The dependent variable is measured on a continuous scale
2. There are two or more independent variables
3. There is independence of residuals
4. A linear relationship between the dependent variable and each of the independent variables is present, as well as the dependent variable and independent variables collectively
5. The data shows homoscedasticity
6. The data does not show multicollinearity
7. There are no significant outliers, high leverage points, or highly influential points
8. The residuals are approximately normally distributed

Three hierarchical multiple regression analyses were performed. The analyses assessed the ability of six measures (each of the CI dimensions) to predict levels of loneliness, social loneliness, and emotional loneliness. Each of the analyses was carried out by controlling for depression, anxiety, living alone, social support, and socioeconomic status.

4.8.1. Normality

Preliminary assessments were performed to ensure no violations of the assumptions of normality, linearity, multicollinearity and homoscedasticity. The normality of the data was assessed by looking at the histogram and normal P-P plot of regression standardized residuals. The data was slightly skewed so Log10 transformations were completed. Upon re-running the analysis, the results showed no significant change compared to the untransformed data. Therefore, the untransformed data was used in the hierarchical analyses.

4.8.2. Linearity and Homoscedasticity

To examine linearity and homoscedasticity, the scatterplot of the standardised residuals was inspected. The residuals appeared to be in a centralised rectangle shape with no systematic pattern, therefore, showing no evidence of non-linearity or heteroscedasticity. Thus, it was concluded both the linearity and homoscedasticity assumptions had been satisfied.

4.8.3. Multicollinearity

Multicollinearity was explored by looking at the Pearson product-moment correlations provided in the correlations table. Pallant (2010) explains a bivariate correlation of 0.7 or more is considered high and as a result, one of the correlated variables should be removed.

Pearson correlations found the two control variables living alone and marital status to be highly correlated ($r = 0.761$).

Research shows marriage does not necessarily act as a protective factor against loneliness (Essex & Nam, 1987; Johar et al., 2021). Marital quality is a much better predictor of loneliness; Negative marital quality is associated with greater levels of loneliness than positive marital quality (Stokes, 2017). Further examination of the available literature shows a contextual approach to investigating the reasons behind one's marital status (for example, widowed or divorced) is crucial in examining relationships between well-being and loneliness (Marini et al, 2020).

Living alone is closely related to objective social isolation, and closely corresponds with subjective social isolation (Holt-Lunstad et al., 2015). Social isolation has been found to drastically increase the chances of one feeling lonely (Fakoya et al., 2020; Steptoe et al., 2013). As a result of the high correlation and reviews of relevant literature, marital status was removed from the regression and analyses were re-run.

Tolerance and VIF were also examined to further assess multicollinearity. Tolerance values less than 0.1 and VIF values equal to or greater than 10 indicate potential problems with multicollinearity (Tabachnick and Fidell, 2013). Using these thresholds, no further issues of multicollinearity were discovered.

4.8.4. Multivariate Outliers

Multivariate outliers were assessed using Mahalanobis distance. This refers to the number of standard deviations a data point is away from the mean of the distribution (Tabachnick &

Fidell, 2013). As marital status, an independent variable, was removed from the analysis, the degree of freedom value was reduced by one. Mahalanobis values above 31.26 (alpha = 0.001, DF = 11) were considered to be potential outliers. There were 3 cases in each regression where the value exceeded 31.26. Each of these cases was individually inspected to determine whether there was a data entry error or if any of the data fell outside the expected range for a particular variable. Upon inspection, each case was found to have values inside the expected ranges.

Casewise diagnostics and Cook's distance were also examined to ascertain whether any of these cases would need to be removed from the data. Casewise diagnostics presents information regarding cases that have standardised residual values above 3 or below -3. It was found 4 cases fell outside of this range in both the loneliness and emotional loneliness regressions, however only very minimally. The regression for social loneliness revealed no outlier values in Casewise diagnostics. Cook's distance values larger than 1 can suggest a potential problem (Tabachnick & Fidell, 2013). None of the cases presented a value larger than 1, therefore suggesting no major problems. Due to the results of each of the three analyses, it was decided to not remove any of the cases.

4.9. Hierarchial Regression Analyses

4.9.1. Loneliness and Cultural Identity Dimensions

The first regression analysis examined the ability of each of the six CI dimensions to predict levels of loneliness (see table 6). Depression, anxiety, living alone, social support, and socioeconomic status were entered at step one, explaining 42.4% of the variance in loneliness. After entry of the six CI dimensions at step two, the total variance explained by the model as a whole was 44%, (F (11, 553) = 39.52, p = < .001). The six measures explained

an additional 1.6% of the variance in loneliness and was statistically significant (*R* squared change = .016, *F* change (6, 553) = 2.57, *p* = 0.02). In the final model, the only CI measure that was statistically significant was CI dimension 6 (WE) recording a semi-partial correlation value of -0.11 (*p* = < .001).

Table 7

Hierarchical Multiple Regressions Analysis Predicting Loneliness with Depression, Anxiety, Living Alone, Social Support, Socioeconomic Status, and the Six Dimensions of Cultural Identity

Step and Predictor Variable	*B*	*SE B*	Beta	*sr*	Change in R^2	R^2
Step 1					0.424**	0.424
Constant	7.345	0.767				
Depression	0.083	0.014	0.252**	0.189		
Anxiety	0.024	0.063	0.015	0.012		
Socioeconomic Status	-0.074	0.006	-0.470**	-0.398		
Living Alone	-0.122	0.116	0.035	-0.034		
Social Support	-0.013	0.010	-0.045	-0.039		
Step 2					0.016**	0.440
Constant	7.417	0.770				
Depression	0.080	0.014	0.243**	0.181		
Anxiety	0.013	0.062	0.008	0.007		
Socioeconomic Status	-0.073	0.006	-0.462**	-0.384		
Living Alone	-0.146	0.115	-0.042	-0.040		
Social Support	-0.015	0.011	-0.053	-0.045		
CI Dimension 1 (GME)	-0.002	0.044	-0.002	-0.001		
CI Dimension 2 (CE)	0.046	0.044	0.047	0.033		
CI Dimension 3 (Sp)	-0.008	0.038	-0.009	-0.006		
CI Dimension 4 (SPC)	0.055	0.041	0.058	0.043		
CI Dimension 5 (PA)	-0.015	0.026	-0.021	-0.018		
CI Dimension 6 (WE)	-0.135	0.038	-0.146**	-0.114		

Note. sr = semi partial correlation coefficient. *** Correlations were significant at the p<0.05 level.*

4.9.2. Emotional Loneliness and Cultural Identity Dimensions

The second regression analysis examined the ability of each of the six CI dimensions to predict levels of emotional loneliness (see table 7). Depression, anxiety, living alone, social support, and socioeconomic status were entered at step one, explaining 32.9% of the variance in emotional loneliness. After entry of the six CI dimensions at step two, the total variance explained by the model as a whole was 33.6%, (F (11, 564) = 25.40, p = <0.001). The six control measures explained an additional 0.7% of the variance in loneliness but was not statistically significant (R squared change = .007, F change (6, 553) = 0.941, p = 0.465). In the final model, there were no statistically significant CI measures.

Table 8

Hierarchical Multiple Regressions Analysis Predicting Emotional Loneliness with Depression, Anxiety, Living Alone, Social Support, Socioeconomic Status, and the Six Dimensions of Cultural Identity

Step and Predictor Variable	*B*	*SE B*	Beta	*sr*	Change in R^2	R^2
Step 1					0.329**	0.336
Constant	2.714	0.423				
Depression	0.056	0.008	0.335**	0.250		
Anxiety	0.101	0.035	0.121**	0.101		
Socioeconomic Status	-0.020	0.003	-0.251**	-0.213		
Living Alone	-0.026	0.064	-0.015	-0.014		
Social Support	0.000	0.006	-0.003	-0.003		
Step 2					0.007	0.329
Constant	2.610	0.428				
Depression	0.055	0.008	0.331**	0.247		
Anxiety	0.100	0.035	0.120**	0.100		
Socioeconomic Status	-0.021	0.002	-0.262**	-0.218		
Living Alone	-0.034	0.064	-0.019	-0.018		
Social Support	0.000	0.006	0.002	0.002		
CI Dimension 1 (GME)	-0.010	0.025	-0.021	-0.014		
CI Dimension 2 (CE)	0.038	0.025	0.076	0.053		
CI Dimension 3 (Sp)	0.002	0.021	0.004	0.003		
CI Dimension 4 (SPC)	0.022	0.023	0.044	0.033		
CI Dimension 5 (PA)	-0.003	0.014	-0.009	-0.008		
CI Dimension 6 (WE)	-0.010	0.021	-0.022	-0.017		

Note. sr = semi partial correlation coefficient. ** *Correlations were significant at the p<0.05 level.*

4.9.3. Social Loneliness and Cultural Identity Dimensions

The third regression analysis examined the ability of each of the six CI dimensions to predict levels of social loneliness (see table 8). Depression, anxiety, living alone, social support, and socioeconomic status were entered at step one, explaining 32.9% of the variance in emotional loneliness. After entry of the six CI dimensions at step two, the total variance explained by the model as a whole was 29.8%, (F (11, 553) = 24.43, p = <0.001). The six CI measures explained an additional 2.9% of the variance in social loneliness and was statistically significant (R squared change = .029, F change (6, 553) = 0.941, p = 0.01). In the final model, the only CI measure that was statistically significant was CI dimension 6 (WE) recording a semi-partial correlation value of -0.145 (p = < .001).

Table 9

Hierarchical Multiple Regressions Analysis Predicting Social Loneliness with Depression, Anxiety, Living Alone, Social Support, Socioeconomic Status, and the Six Dimensions of Cultural Identity

Step and Predictor Variable	*B*	*SE B*	Beta	*sr*	Change in R^2	R^2
Step 1					0.298**	0.298
Constant	4.643	0.603				
Depression	0.026	0.011	0.113**	0.084		
Anxiety	-0.078	0.049	-0.067	-0.056		
Socioeconomic Status	-0.054	0.005	-0.484**	-0.409		
Living Alone	-0.091	0.091	-0.037	-0.036		
Social Support	-0.012	0.008	-0.061	-0.052		
Step 2					0.029**	0.327
Constant	4.817	0.600				
Depression	0.024	0.011	0.102**	0.076		
Anxiety	-0.088	0.049	-0.076**	-0.063		
Socioeconomic Status	-0.052	0.005	-0.465**	-0.386		

Living Alone	-0.108	0.090	-0.043	-0.042
Social Support	-0.015	0.008	-0.076	-0.064
CI Dimension 1 (GME)	0.007	0.035	0.011	0.007
CI Dimension 2 (CE)	0.009	0.035	0.013	0.009
CI Dimension 3 (Sp)	-0.009	0.030	-0.016	-0.011
CI Dimension 4 (SPC)	0.033	0.032	0.049	0.036
CI Dimension 5 (PA)	-0.012	0.020	-0.024	-0.021
CI Dimension 6 (WE)	-0.122	0.029	-0.185	-0.145**

Note. sr = semi partial correlation coefficient. ** *Correlations were significant at the p<0.05 level.*

4.10. Moderation Analysis

To explore the relationship between loneliness and cultural identity variables further, moderation analyses were undertaken to assess the moderating role of cultural identity (Mean CI Score) on the relationship between each of the three types of loneliness (total, emotional and social) and depression or anxiety.

Moderation analyses for each of the three relationships used the simple moderation model *(Model 1)* provided in PROCESS (Hayes, 2022). Moderation focuses on a situation in which the relationship between two variables or constructs is dependent on a third variable – the moderator variable. The moderator variable can work to change the size, strength or direction of the relationship between the independent and dependent variable (Hair et al., 2021).

The diagram of this model is presented in figure 4 representing the potential of the moderating variable (W) to moderate the effect of the independent variable (X) on the dependent variable (Y) (Hayes, 2022). A statistical diagram of this model is presented in figure 5. This model is a visual representation of the interactions between each of the three variables (X, Y, and W). b_1 represents the conditional effect of X (depression or anxiety) on Y (loneliness, emotional loneliness, or social loneliness) when W (cultural identity) is equal

to 0. b_2 represents the conditional effect of W on Y when X=0. b_3 represents the estimate of "the difference in Y between two cases that differ by a unit on X changes as W changes by one unit" (Hayes, 2022, p242).

Six moderation analyses were run to investigate the impact of CI as a moderating variable. In three of these analyses depression was the independent variable (X), one of the three types of loneliness as the dependent variable (Y) and cultural identity as the moderator (W). For the remaining analyses the X variable was anxiety.

The overall model summaries for the six analyses are displayed in table 9. Each of the models was found to be significant with *p*-values of less than <0.001. The total variance explained in the models ranged from 5% (Model 6) to 28% (Model 2).

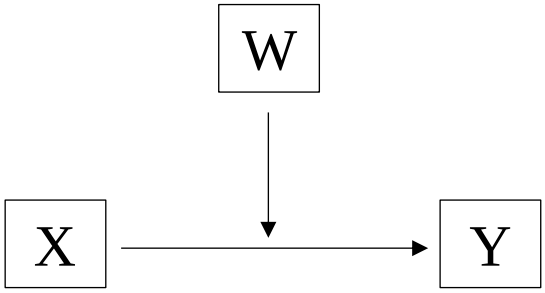


Figure 4. Diagram of the simple moderation model depicting the relationship between the independent (X) and dependent (Y) variables when moderated by W.

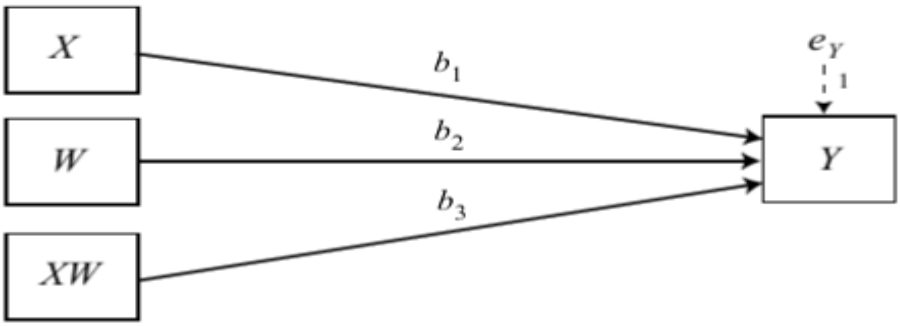


Figure 5. Diagram of the simple moderation model depicted as a statistical diagram (Hayes, 2022, p241).

Table 10

Model Summary of Analysis Assessing the Moderating Role of Cultural Identity on Depression or Anxiety and Loneliness, Social Loneliness, or Emotional Loneliness

	X	Y	W	F	DF 1	DF 2	*p*	R^2
Model 1	Depression	Loneliness	CI	72.03**	3	607	<0.001	0.26
Model 2	Depression	Emotional Loneliness	CI	77.95**	3	607	<0.001	0.28
Model 3	Depression	Social Loneliness	CI	31.41**	3	609	<0.001	0.13
Model 4	Anxiety	Loneliness	CI	22.96**	3	592	<0.001	0.10
Model 5	Anxiety	Emotional Loneliness	CI	32.31**	3	592	<0.001	0.14
Model 6	Anxiety	Social Loneliness	CI	11.07**	3	594	<0.001	0.05

*Note. **Significance was measured at the p<0.05 level*

Interaction effects were significant in four of the six models (see Table 10). No significant effects were found for the moderation role of cultural identity on the relationship between depression and emotional loneliness or anxiety and emotional loneliness.

Table 11

Moderation Analysis Assessing the Moderating Role of Cultural Identity on Loneliness, Social Loneliness, or Emotional Loneliness and Depression or Anxiety

	X	Y	W	Interaction Coeff	T	DF	p
Model 1	Depression	Loneliness	CI	-0.02**	-2.32	607	0.02
Model 2	Depression	Emotional Loneliness	CI	-0.04	-0.86	607	0.39
Model 3	Depression	Social Loneliness	CI	-0.02**	-2.43	609	0.02
Model 4	Anxiety	Loneliness	CI	-0.11**	-2.08	592	0.04
Model 5	Anxiety	Emotional Loneliness	CI	-0.02	-0.97	592	0.33
Model 6	Anxiety	Social Loneliness	CI	-0.08**	-2.16	594	0.03

*Note. ** Significance was measured at the p<0.05 level.*

Although the interaction effects for models 1,3,4, and 6 were found to be significant, the strength, and in one case (model 6) the significance, of the interaction varied at the differing

levels of CI (see table 11). The effect indicates at a specific level of W, for every point on the X scale (depression or anxiety), an individual's score on the Y scale (loneliness, emotional loneliness, social loneliness) is altered by this amount. The greatest effect was found at a low level of CI where for every point on the anxiety scale, there was a 0.62 point increase on the loneliness scale. The smallest effect was found at a high level of CI where for every point on the depression scale, there was a 0.05 point increase on the social loneliness scale.

Table 12

Moderation Analysis Assessing the Effect of the Moderator CI at Different Levels on the Relationship Between the X and Y Variables

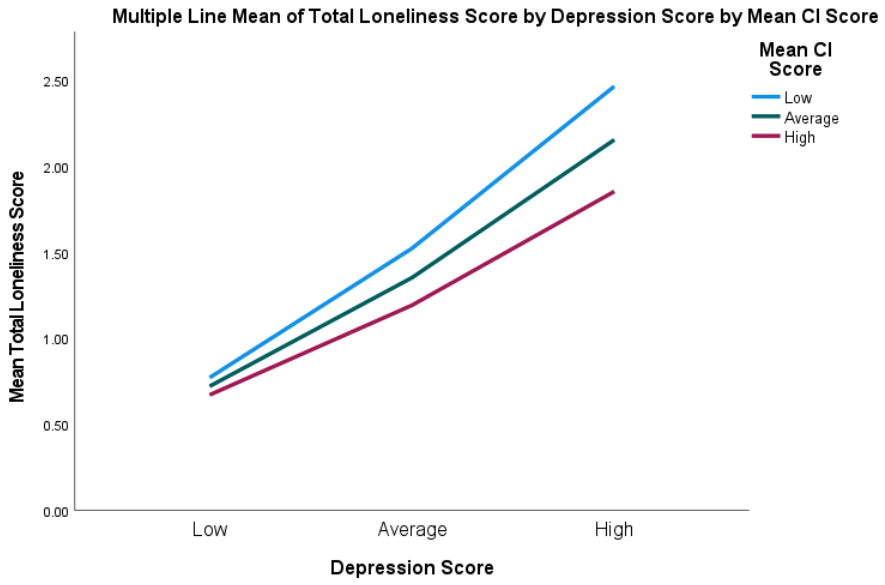
	Effect	t	*DF*	*p*
Depression and Loneliness				
Low CI	0.19**	12.06	607	<0.001
Average CI	0.16**	14.12	607	<0.001
High CI	0.13**	8.34	607	<0.001
Depression and Social Loneliness				
Low CI	0.09**	7.91	609	<0.001
Average CI	0.07**	8.38	609	<0.001
High CI	0.05**	4.24	609	<0.001
Anxiety and Loneliness				
Low CI	0.62**	6.76	592	<0.001
Average CI	0.48**	7.54	592	<0.001
High CI	0.34**	3.60	592	<0.001
Anxiety and Social Loneliness				
Low CI	0.28**	4.17	594	<0.001
Average CI	0.17**	3.71	594	<0.001
High CI	0.07	0.95	594	0.34

*Note. ** Significance was measured at the p<0.05 level.*

Simple slope analyses of each of the interactions were also conducted. A simple slope analysis is defined as the regression of Y on the predictor X at a specific value of the moderator W (Hayes, 2022). The interaction plots which display the results of the simple slope analyses show the regression of Y on X at W values of -1SD, mean, and +1SD. A

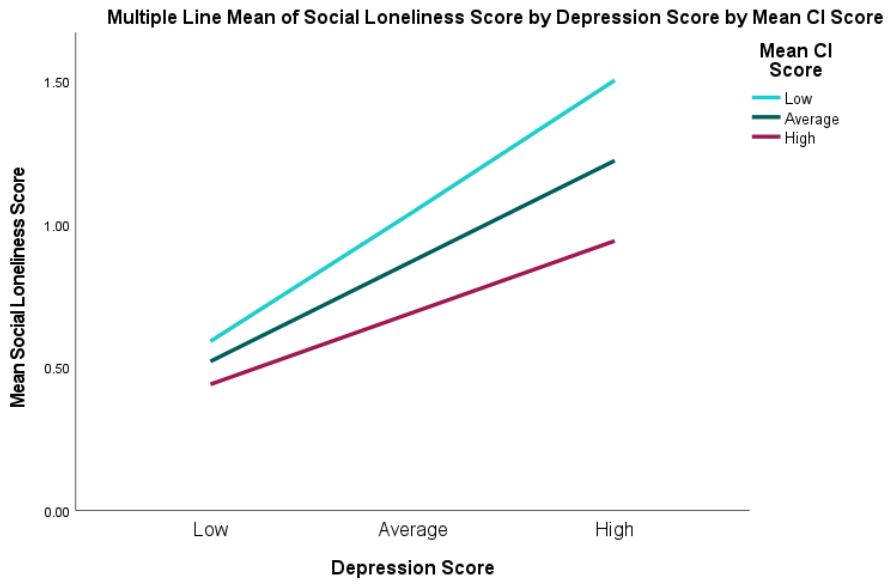
positive interaction coefficient implies the higher the moderator W (CI), the greater, or more positive, the effect of X (depression or anxiety) on Y (loneliness, emotional loneliness, or social loneliness) is (Hair et al., 2021). Contrastingly, a negative interaction coefficient implies the higher W is, the lesser, or more negative, the effect of X on Y is. These interactions can be seen in the plots displayed below. The results of these supported the interaction coefficients provided in the moderation analyses.

Examination of the interaction plot (a) shows that as levels of depression increased, so did loneliness. At low levels of depression, loneliness was similar for those with low, average, and high CI. At each level of depression, those with low CI had the highest loneliness scores. Those with high levels of depression and low CI had the highest loneliness scores.



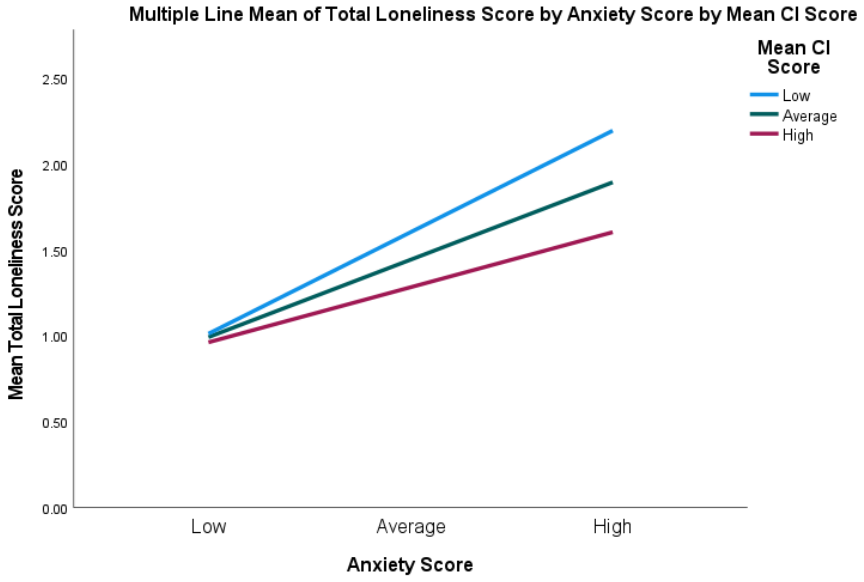
(a)

Interaction plot (b) also shows that as levels of depression increased, so did social loneliness. At low levels of depression, loneliness was similar for those with low, average, and high CI. At each level of depression as CI levels increased, social loneliness levels decreased. Those who had a high level of depression, and a low CI had the highest social loneliness scores.



(b)

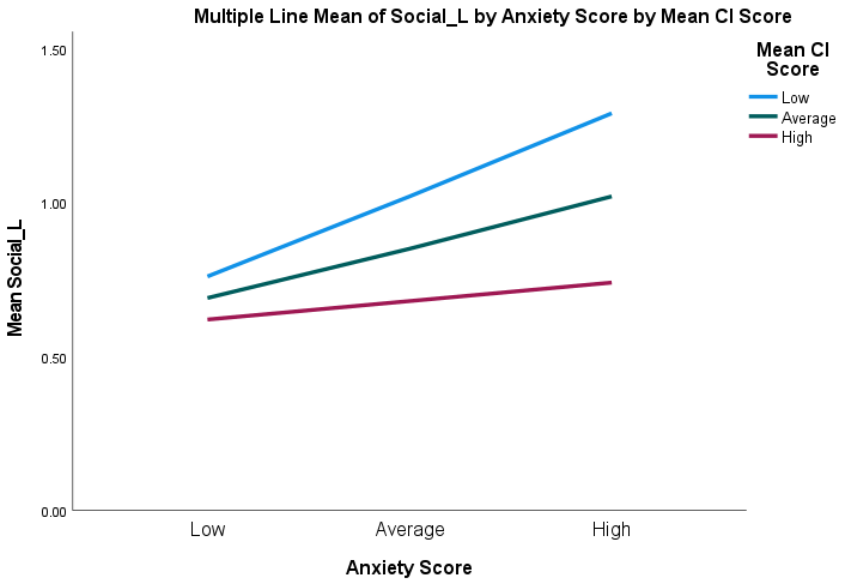
Interaction plot (c) shows that as anxiety increases, so did loneliness. At low levels of anxiety, loneliness was similar for those with low, average and high CI. At each level of anxiety, those with low CI had the highest loneliness scores. Those with high levels of anxiety and low CI had the highest loneliness scores.



(c)

Interaction plot (d) shows that as anxiety increased so did social loneliness. At low levels of anxiety, social loneliness was similar at low, average and high CI. At each level of anxiety, as CI increased, social loneliness levels decreased. Those with high anxiety and low CI had the highest social loneliness scores.

(d)



5. Discussion

5.1. Summary

This study investigated the impact of Māori cultural identity on the experience of loneliness in an older Māori population (aged 65+) using data collected as part of the 2020 wave of the Health, Work and Retirement Study (HWR). A secondary analysis of the data from participants who fit the inclusion criteria for the study (n=653) was undertaken to answer each of the six research questions. Hypotheses for the first three research questions proposed that cultural identity would be negatively correlated with overall loneliness as well as both

social and emotional loneliness. Thus as cultural identity increased, the prevalence of loneliness would decrease. The remaining three research questions were exploratory and no hypotheses were proposed. This discussion will review and interpret the major findings in the context of previous research, explore the strengths and limitations of the present study, and identify the implications for these findings.

5.2. Cultural Identity and Loneliness

Partial correlation analysis found the hypotheses for research questions one and two were not supported. In older Māori, a negative relationship between Māori cultural identity and loneliness was observed however it did not reach statistical significance. When considering the relationship between Māori cultural identity and emotional loneliness, a weak positive correlation was found although again it did not reach statistical significance. These findings suggest that cultural identity was not a significant factor in the experience of total loneliness or emotional loneliness for the present sample. These findings are inconsistent with previous research focusing on cultural identity of migrant populations (Bhugra, 2004; Neto et al., 2017; Stick et al., 2021), indigenous populations (Avdeeva et al., 2020; Hatcher, 2016; Sunga, 2017), and Māori populations (Gordon et al., 2017; Russell, 2018; Stephens et al., 2011) which found significant negative correlations between cultural identity and loneliness. In contrast, the hypothesis for research question three was supported by the results of this study and aligned with previous research (Gordon et al., 2017; Russell, 2018; Stephens et al., 2011). A statistically significant negative correlation was found between Māori cultural identity and social loneliness in older Māori. Cultural identity may be more influential on social loneliness in older Māori due to the collectivist nature of Māori culture (Brougham & Haar, 2013). In collectivist cultures, an individual's "orientation towards self is embedded in a complex web of social relationships" (Ramamoorthy & Flood, 2002, p.1074, as cited in

Brougham & Haar, 2013). As social loneliness has been described as an unsatisfactory association with the desired group (DiTommaso & Spinner, 1997), a disconnect with one's cultural identity in older Māori would align with higher prevalence of social loneliness.

This aligns with Turner's self-categorisation theory (Turner et al., 1987). Within this theory, identity is made up of self-conceptions and self-images forming a multidimensional feature of self-experience. These objective dimensions of identity accumulate over one's lifetime and specify "who they are and what that means as a member of society in different contexts" (Houkamau & Sibley, 2010, p.11). Older Māori have accumulated a number of objective dimensions over their lifetime and therefore, have a well-developed understanding of who they are and what that means. When one's self experience (self-conceptions and self-images) does not align with their ideal association to Te Ao Māori and Māori culture (unsatisfactory association with one's desired group), their identity within a Māori cultural context will be low. An unsatisfactory association with an intimate relationship will not have the same, if any, impact on identity in a cultural context under self-categorisation theory. Love's perspective reinforces this idea where an individual can only be understood in relation to their social and cultural contexts and relationships (Houkamau & Sibley, 2010).

The importance of social loneliness in comparison to emotional loneliness when considering Māori cultural identity is highlighted in interactionist theory (Weiss, 1973), cognitive discrepancy theory (Peplau & Perlman, 1982), and evolutionary theory (Cacioppo & Cacioppo, 2006). In interactionist and cognitive discrepancy theories, loneliness is understood to occur through a difference in what one considers to be a desirable level of social contact/networks and their achieved levels of social contact/networks. When considering Māori cultural identity through self-categorisation theory and Love's perspective, desired levels of social contact/networks are likely to revolve around contact with Te Ao

Māori and Māori cultural contexts in social realms. Therefore, it is likely desired levels of social contact/networks are relative to their 'desired group' rather than intimate relationships.

The difference in relationships between social and emotional loneliness and Māori cultural identity could also be explained through Cacioppo and Cacioppo's evolutionary theory of loneliness (ETL) (2006). In a collectivist culture, individuals are more likely to hold their group relationships to a higher importance than individual, intimate ones (Brougham & Haar, 2013), therefore CI is more likely to play a bigger role in the development of social loneliness than emotional loneliness for older Māori. As ETL suggests social stimuli can act as a potential relief from aversive states of loneliness (Cacioppo & Cacioppo, 2018), those who feel disconnected from their Māori culture, and therefore have a weaker cultural identity, are more likely to find it difficult to satisfy their social needs to relieve them from their social loneliness.

Moderation analyses undertaken to explore research question six found cultural identity significantly moderated the relationship between depression and anxiety and overall loneliness and social loneliness, but not the relationship between depression or anxiety and emotional loneliness. This means that increasing levels of CI ameliorated the relationship between depression or anxiety and loneliness and social loneliness, although high levels of cultural identity were not found to significantly moderate the relationship between anxiety and social loneliness. Both depression and anxiety have been found to have bidirectional connection with overall loneliness (Dahlberg et al., 2018; Hawkley & Cacioppo, 2010) and a positive correlation with social loneliness (Diehl et al., 2018; Heylen, 2010). In addition, cultural identity has been found to be negatively correlated with both depression and anxiety (Chang et al., 2017; Williams et al., 2018), thus it is not a surprising finding that CI acted as a

moderator on the relationship between depression and anxiety and overall and social loneliness. Cultural identity did not moderate the relationship between depression or anxiety and emotional loneliness. This may also be explained by self-categorisation theory where the strength of one's cultural identity may not be dependent on their intimate relationships, but rather more affected by their social relationships and their perceived association with Māori culture. As noted in the Method section, the emotional loneliness subscale had poor reliability suggesting the main effects and moderating findings for this variable should be treated with caution.

5.3. Dimensions of Cultural Identity and Loneliness

Multiple regression analyses were run to investigate the relationships between the six dimensions of cultural identity measured in this study and loneliness. The only dimension of cultural identity that was found to be significantly associated with of any type of loneliness was whanau efficacy. Results showed whanau efficacy to be negatively correlated with overall loneliness and social loneliness (but unrelated to emotional loneliness). Whanau efficacy is explained as being "the extent to which a person subjectively considers their whānau as solutions-focused and able to work together (high whānau efficacy) *versus* the extent to which the person has little confidence that their whānau can deal with conflict or accomplish work together (low whānau efficacy)" (Matika et al., 2017, p.60). Within Māori society, whānau are accepted as the primary social unit and is recognised as being vital to one's identity and sense of wellbeing (Matika et al., 2017).

Viewing loneliness through an evolutionary theoretical model may provide an understanding as to why whānau efficacy was correlated with overall and social loneliness. In Cacioppo and Cacioppo's (2006) ETL, it is recognised that feelings of loneliness emerge, and are

maintained, over time. Colonisation and the urbanisation of Māori has led to a disconnection with whānau (Keenan, 2013) and the dislocation of whānau support systems (Reweti, 2022) among older Māori. The ongoing effects of these processes has led to unfulfilled expectations of social connection (Lay-Yee et al., 2022). It is known older Māori value family/whānau highly (Stephens et al., 2011). This is inclusive of more than just immediate family (Matika et al., 2017) indicating the physical presence of whānau in the lives of older Māori may be an important factor contributing to the development of meaningful social networks and community connections. ETL understands one's perception of loneliness to signal an environment in which one is more likely to encounter selfish or spiteful social behaviours. In turn, the lonely person is more likely to exhibit selfish behaviours (Cacioppo & Cacioppo, 2018). Loneliness may be reinforced in the way that selfish social behaviours will diminish trust and reliance among whānau lowering one's perception of whānau efficacy.

The remaining five dimensions of cultural identity measured in the present study were not found to be associated with loneliness in any regard. One possible explanation for this could be the loneliness measures used in this study are not culturally appropriate for older Māori. This explanation could be supported by the low α reliability of emotional loneliness that was found in this study. A second reason for the lack of association between the dimensions of Māori CI and loneliness may be the measure of CI used is not accurately capturing the concept of cultural identity. Each of the constructs (dimensions), as they were added to the MMM-ICE in revised versions, are said to have good construct validity. However, in the process of the MMM-ICE3 development, the seven subscales that were already included in the measure (Group Membership Evaluation, Socio-Political Consciousness, Cultural Efficacy and Active Identity Engagement, Spirituality, Interdependent Self-Concept, Authenticity Belief, and Perceived Appearance) were further refined by either rewording or

removing items (Matika et al., 2020). Matika et al. (2020) found each of the subscales to have internal reliability however validity of the refined existing dimensions was not examined. As this MMM-ICE third revision is a relatively new measure, to the best of the author's knowledge the original research (Matika et al., 2020) is the only study which investigates the validity of the MMM-ICE3.

Cultural identity has been described as a concept referring to both familial and cultural dimensions of one's identity (Williams et al., 2018), and being inclusive of both personal and external perceptions (Ibrahim & Heuer, 2016). Approaching the present study through the lens of an integrated theoretical model ensured all aspects of social organisation and cultural fabrics were considered throughout the research process meaning all aspects of cultural identity, as a concept, were considered and incorporated into the research process. Although this study only found one significant relationship, the differing relationships between loneliness and the individual dimensions of cultural identity provides support for the integrated theoretical model. The interactionist model was also supported in the present study as the types of loneliness were related to Māori cultural identity in differing ways.

5.4. Strengths and Limitations

This study contributes to the growing research on loneliness in older adults in New Zealand. This study, to the best of the author's knowledge, is the first to address the relationship between cultural identity and loneliness in an older Māori population in New Zealand. It provides a foundation for future research considering the impact and importance of Māori cultural identity in relation to loneliness. When interpreting the findings from this study, the following limitations must be considered.

First, this study was a secondary analysis of the data collected for the 2020 wave of the Health, Work, and Retirement study (HWR). As a result, the author had no control over the data collection procedure or the use of measures. One consequence of this was the necessity of using measures which had low Cronbach α reliabilities in the study sample. Total loneliness had a marginally acceptable α reliability (.68) and the α reliability of emotional loneliness was very low (.479). A study investigating the cross-cultural equivalence of the 6-item scale among older native and diasporic Chinese adults found emotional loneliness to have α reliabilities of .61 and .59 for native and diasporic Chinese adults respectively (Cheung et al., 2022). Low α reliabilities were also found in a study of Chilean older adults with scores of .44 and .62 for indigenous and non-indigenous Chilean older people respectively (Rodríguez-Blázquez, 2021). These low scores for Cronbach α reliabilities indicate the 6-item De Jong Gierveld Loneliness Scale may not be a culturally appropriate measure for indigenous populations.

The cultural identity measure used in the HWR study only collected data on six of the eight dimensions of Māori CI outlined by Matika et al. (2017). It is unknown if the six subscales used in this study truly represent cultural identity. Including the two other dimensions from the measure may have provided more complete information about the relationships between cultural identity and overall loneliness, social loneliness, and emotional loneliness. It is worthwhile noting here that the 2022 HWR survey is collecting data to investigate new ways of conceptualising Māori cultural identity for future studies.

The HWR study categorises ethnicity through prioritised ethnicity coding. This meant any participant who indicated they affiliated with Māori was assigned to the Māori ethnic grouping. There may be a difference in the importance of cultural identity to those who

consider Māori to be their only ethnic grouping compared to those who affiliate with more than one ethnic group however this was not explored in the current study.

This present study only included participants who were aged 65 and over as this is the generally accepted age of an older person in New Zealand (Koopman-Boyden, 2011; Ministry of Health, 2002). However, research suggests the definition of an older person may differ between cultures based on life expectancy, norms of family size, and relative onset of grandparenthood (Findesen, 2016). This age may not have been appropriate for the consideration of an 'older adult' or kaumātua in the Māori community and therefore the sample may not be truly representative of 'older Māori'.

There are many strengths of this study. The HWR study is considered to be a nationally representative sample which is drawn through a process of random sampling. There is an oversampling of Māori participants to allow adequate representation in the data which allowed the present study to use a large sample size. A large literature was available to explore the concept of loneliness which allowed this study to develop a detailed operational definition of loneliness and for it to be grounded in theoretical models which were relevant for the relationship to cultural identity.

5.5. Implications and Recommendations for Future Research

This study was the first to investigate the relationship between cultural identity of older Māori and loneliness, social loneliness, or emotional loneliness. It adds to the growing literature on loneliness, and presents a new set of criteria in regard to the impacts of cultural identity, both as a whole and when considering the different dimensions of CI, that may be important in the development of, or protection against, loneliness in older Māori.

A significant correlation was found between social loneliness and cultural identity implying there is a relationship that can be explored further in future research. As Māori tend to be over-represented in negative health statistics in New Zealand, and loneliness among older adults is referred to as a public health concern, understanding this relationship better may be beneficial to the development of public health policies and programmes that work towards equity in health for Māori. Through the understanding of loneliness correlates for older Māori, findings from this type of research may be able to be used for the development of prevention programmes against loneliness targeting risk factors and providing possible protective factors to lower the prevalence of loneliness among older Māori populations.

Whānau efficacy was the most important dimension of cultural identity in relation to loneliness implying differentiating between different dimensions of cultural identity may be important for future research. As whānau efficacy was only added to the MMM-ICE in its third, and most recent, revision in 2017 (Matika et al., 2017), it will be important to explore new measures of cultural identity for Māori as they are developed.

This study also found cultural identity was an important moderating factor for the relationship between loneliness or social loneliness, and depression or anxiety. This could have important implications for clinical practice where strengthening one's cultural identity may help to reduce depression and anxiety related loneliness in older Māori. It may be useful for future research to consider how the different dimensions of cultural identity operate on the relationship between depression and anxiety and loneliness.

Emotional loneliness was not correlated with any of the measures in this study. While potential explanations for this have been provided (such as the collectivist nature of Māori culture), it is likely that the poor internal consistency of the subscale served to contribute to an underestimation of the true relationship between emotional loneliness and other variables. The concept of emotional loneliness (and its measurement) could be explored further in the future to address potential mechanistic pathways for the relationship between CI and loneliness.

The criterion for an "older adult" was determined in this study by using a 'nationally accepted' cut-off age of 65 or older. It may be beneficial in the future to determine what is considered to be an older adult in relation to Māori specifically when completing research on a Māori population.

5.6. Conclusion

This study aimed to investigate the relationship between loneliness and cultural identity in older Māori. This was a previously unexplored area of research and aimed to provide insight into the presence of potential relationships. The present study utilised the data collected as part of the Health, Work, and Retirement study. It used multiple statistical methods to examine the relationship between types of loneliness (overall, social, and emotional), and dimensions of Māori cultural identity (overall, group membership evaluation, cultural efficacy, spirituality, socio-political consciousness, perceived appearance, and whānau efficacy).

Analyses showed only social loneliness was significantly negatively correlated with cultural identity. Social loneliness, along with overall loneliness, was also significantly correlated

with the whānau efficacy dimension of cultural identity. However, this was the only dimension to produce a significant relationship. Cultural identity moderated the relationship between both anxiety and depression and loneliness and social loneliness.

The present study recommends further exploration into the relationships found to develop a greater understanding of the role of cultural identity in relation to loneliness in older Māori. In doing this, a culturally-sensitive definition of age should be sought and new measures of Māori cultural identity should be considered as they are developed. The moderating role of cultural identity should be carefully considered when assessing the relationship between antecedents and loneliness.

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