CONTEXTUALISING RESILIENCE:

How do Meaning and Experience Inform Adaptation within the Contexts of Advanced Age and Culture?

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ABSTRACT

Background Resilience is a process that mobilises existing resources to achieve positive outcomes under challenging circumstances. Despite being conceptually quite easy to envisage, resilience denotes a complex relationship between adversity, protective and risk influences and a positive behavioural response. Given the health and social compromises that are regularly faced by ageing adults, resilience to adversity is especially important in very late life. This thesis adds to very scant data investigating resilience in the oldest-old (advanced age), using a population-based sample from Aoteoroa/New Zealand. As well as focusing on the socio-historical context, a sociocultural contextualisation is employed to investigate resilience in Māori (Tangata Whenua; indigenous population of New Zealand). Different life attitudes and challenges associated with ageing are likely to require different resource patterns. The aims for the current work were to assess groups of factors that hang together and collaboratively predict positive health outcomes; investigate the relationship between resilience and positive health outcomes, and compare resilience scores with psychosocial profiles.

Method Data were obtained from interviews conducted with 641 older adults (250 Māori aged 80-90 and 391 years non-Māori aged 85 years; 284 male, 357 female) and included psychological, attitudinal, social, spiritual and cultural measures. Māori data included cultural knowledge and engagement. Two hierarchical cluster analyses using 20 age-relevant psychosocial and seven cultural resource indicators were conducted to determine how resources were grouped and analyses also investigated how these profiles were related to physical and mental health. Regression analyses were conducted to investigate how resilience (functional status relative to health impairment) was related to mental health outcomes. Comparison of cluster profiles and resilience was undertaken.

Results Resource profiles and resilience were related most closely to social connections and spirituality. More advantageous profiles and higher resilience were associated with good mental and physical health outcomes.

Conclusions Māori and non-Māori of advanced age are heterogeneous when it comes to access to and utilisation of potential resilience resources. However, health was associated with high levels of participation in society in multiple domains. Knowledge of which resources contribute to

resilience and the patterns of that contribution has implications for maximising ageing well. Data on resilience for the oldest Māori is novel, unique, and will be of importance to Māori communities and wider society.

PREFACE

I bring to this study a long history of involvement in research with older adults. It started 13 years ago with my master's research investigating disability and depression in older adults who had a visual impairment. That study showed me that it is the concomitants of age that causes distress and not 'being old' and that the subjective element of health perception should not be disregarded.

This thesis has involved exploration into positive perceptions and outcomes of ageing. The research was developed as a sub-study investigation of resilience in participants of LiLACS NZ. LiLACS NZ is investigating contributions to and trajectories of successful ageing, focusing on the time of advanced age. The LiLACS NZ concept, design processes and staffing were set up to value and respect the contributions that very old participants can make to research. Other than their age, the LiLACS NZ participants are an ideal group with whom to investigate resilience. First, LiLACS NZ has a focus on successful ageing, therefore its overarching philosophy aligns with resilience. Secondly, a full cohort of Māori participants is enrolled, allowing an investigation of the cultural interface with resilience.

LiLACS NZ is a multi-disciplinary study, involving academic interest from the fields of gerontology, psychology, occupational therapy, dietetics, social geography and biostatistics. Study questions cover physical and psychological health, health practice, activity and function, nutrition, social relationships, environment, culture and perspectives of ageing. The LiLACS NZ questionnaire was lacking questions for a psychological domain of health. Consideration of the resilience literature prior to full study development showed variability in how resilience was investigated but that a key research direction was resilient resources. The LiLACS NZ psychological domain was therefore expanded to include questions relating to coping and mastery. I added these elements and was granted permission to utilise other variables from the questionnaire that aligned with the concept of resilience.

Thesis with publications

This thesis was written as a thesis with publications. The following manuscripts have all been written by me, with structural and content advice provided by their co-authors. I am grateful for

the co-author's support in shaping these manuscripts for publication. Submission is planned for those that have not yet been submitted.

Manuscript 1: Hayman, K. J., Kerse, N., & Consedine, N. S. *Resilience in Context: the Special Case of Advanced Age,* Ageing and Mental Health http://dx.doi.org/10.1080/13607863.2016.1196336

Manuscript 2: Hayman, K. J., Kerse, N., & Consedine, N. S. *Variability in Physical and Mental Health in Relation to Psychosocial Profiles for People of Advanced Age: LiLACS NZ*

Manuscript 3: Hayman, K. J., Kerse, N., & Consedine, N. S. *Variability in Physical and Mental Health in Relation to Sociocultural Character Patterns for Māori of Advanced Age: LiLACS NZ*

Manuscript 4: Hayman, K. J., Kerse, N., & Consedine, N. S. *Prediction and Correlates of Resilience in Advanced Age: LiLACS NZ*

Related conference presentations

2011

- Hayman, K. J., & Kerse, N. (2011). *Living and Thriving: Exploring Resilience in Advanced Age*. Presented at 9th Asia / Oceania Congress of Geriatrics and Gerontology, Melbourne, Australia. 23 October - 27 October 2011.

2012

- Hayman, K. J. (2012). *Resilience in Advanced Age*. Presented at Conference of General Practice, Martinborough. 17 August - 19 August 2012.
- Hayman, K. J. (2012, September). *Resilience in Advanced Age*. Presented at Centre for Ageing Research International Conference, Lancaster University, Lancaster. UK. (Poster)
- Hayman, K. J. (2012). *Resilience in Advanced Age*. Presented at New Zealand Association of Gerontology-Ageing and Diversity, Auckland, New Zealand. 13 September - 15 September 2012.

2013

- Hayman, K. J., Kerse, N., Dyall, L., Kepa, M., Teh, R. O., & Moyes, S. (2013). *An*

exploration of spirituality in advanced age. Presented at Ageing & Spirituality mini conference, University of Auckland Tamaki Campus, Auckland. 6 September - 6 September 2013.

2014

- Hayman, K. J., Kerse, N., Dyall, L., & Moyes, S. (2014). *Exploring Religion and Faith in Advanced Age*. Presented at New Zealand Gerontology Association Conference 2014, Dunedin, New Zealand. 12 September - 14 September 2014.
- Hayman, K. J., Kerse, N., & Consedine, N. S. (2014). *Resilience and the Psychosocial Make-up of People of Advanced Age*. Presented at The HOPE-Selwyn Knowledge Exchange for Research on Ageing, University of Auckland Tamaki Campus, Auckland. 29 August - 30 August 2014.

Acknowledgements

Having worked for so many years with people of older age, and latterly of advanced age, I am impressed with an outlook on life for many that remains optimistic, grateful, caring, cheeky and, most of all, engaged in life, to the point, for some, of finding it hard to fit new activities into their programme. The interest of some in making a contribution to new research, and being interested in the results, is a wonder. I'm aware also of a change in energy levels with ageing that limits *how* things are done; but, with this, a very clever attitude that reserves time for others as long as personal time is managed carefully. My mother is now in her 80's and demonstrates these qualities. What I hope is to be as optimistic, grateful, caring, cheeky and engaged in life when I am her age.

I thank my family and friends for their support to complete this thesis.

I thank those who gave me guidance over the sections that include Maori data: Mere Kepa and the LiLACS NZ Ropū Kaitiaki: Hone Kameta, Florence Kameta, Paea Smith, Betty McPherson and Leiana Reynolds They advised on the meaning of the questions and of resilience for Māori. I thank Anna Rolleston, whose advice was important to choosing the cultural variables and interpreting and writing up the Māori data.

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MĀORI GLOSSARY

hapū	sub-tribes comprising several whānau
hauora	health
hinengaro	mind, psychological
iwi	tribes comprising hapū
kai	food
kaitaiki	guardian, keeper
kaumātua	respected older Māori men and women
kaupapa	fundamental principles
koha	a traditional gift
koroua	male elder
kuia	female elder
marae	traditional gathering place for Māori, including a meeting house
Māoritanga	Māori language and culture
mauri ora	life force
rohe	iwi boundary area
Rōpū Kaitiaki	protectors of the principles of conduct in Māori research
tangata whenua	indigenous people of the land
taonga	treasure
Te Ao Māori	the world of Māori
Te Ao Mārama	the world view of Māori
te reo Māori	the language of Māori
tikanga Māori	customs of Māori
tohunga	expert e.g. a healer
waka	canoe

wairua	spirit, soul
whakapapa	lineage descent
whānau	extended family based on shared genealogy
whānaungatanga	relationship, kinship
whare	house
whenua	natural earth

TECHNICAL GLOSSARY

CSE	coping self-efficacy
GDS-15	Geriatric Depression Scale – 15 item (depression screen)
GLM	General Linear Model
GP	General Practitioner
HCA	Hierarchical Cluster Analysis
HRQoL	health related quality of life
NEADL	Nottingham Extended Activities of Daily Living scale
NZHIS	New Zealand Health Information Service
MCS	mental component summary (a summary score of the SF-12)
MOH	Ministry of Health
PCS	physical component summary (a summary score of the SF-12)
QoL	quality of life
SF-12	Short-Form Health Survey – 12 item (quality of life measure)
SF-36	Short-Form Health Survey – 36 item (quality of life measure)
SPPB	Short Physical Performance Battery (measure of physical performance)
U3A	University of the Third Age
WHO	World Health Organisation

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Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work. CHAPTER 3: Hayman, K. J., Kerse, N., & Consedine, N. S. Resilience in Context: the Special Case of Advanced Age, Ageing and Mental Health http://dx.doi.org/10.1080/13607863.2016.1196336.	
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CO-AUTHORS

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Certification by Co-Authors

The undersigned hereby certify that:

- the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and
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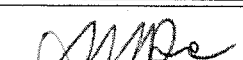
PROF Ngaire Kerse		10.4.17
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CHAPTER 1: INTRODUCTION

A lay understanding of resilience is that it is the ability to bounce back from a negative experience. In the research field, of course, resilience has a much more nuanced meaning and is applied in domains ranging from ecology through to physiology and psychological resilience as well as to individuals or whole communities and societies. Michael Rutter, an early resilience theorist, states that *"… exposure to stresses or adversities may either increase vulnerabilities through a sensitization effect or decrease vulnerabilities through a steeling effect*" (Rutter, 2012, p. 337); the one outcome representing destruction/succumbing, the other, success. This thesis is focused on individual resilience and the contributions to and outcomes from the resilience process in very advanced age for Māori and non-Māori in New Zealand (NZ). The aim of this initial chapter is to summarise the current literature regarding resilience and its relationship to health and wellbeing in successful advanced age.

1.1 Definition of resilience

There is debate, and some discord, about the meaning of resilience, its definition and its placement within the research equation. Definitions began globally. For example, Rutter (1979) suggested resilience was the ability to transform disaster into a growth experience and move forward. While it resonated with early understandings of resilience (see Chapter 2 for discussion of four key phases of resilience research) this definition may be insufficient to explain resilience across all situations and all contexts, as growth is not the most resilient outcome for everybody (Ebner, Freund, & Baltes, 2006). Also, while emphasis will always be on 'doing well' despite adversity, researchers disagree about the meaning of 'doing well', particularly in regard to the degree of stress that must be overcome and the duration of the recovery stage.

Over time, theorists have emphasised resilience as a process rather than as a personal characteristic. Process advocates offer more refined definitions of the construct than Rutter's, such as successful adaptation despite risk and adversity (Masten, 1994), and, resilience is "*a dynamic process encompassing positive adaptation within the context of significant adversity*" (Luthar, Cicchetti, & Becker, 2000, p. 543). While still global, process definitions focus less on growth and more on adaptation and, in that regard, remove any societal expectations of improvement from the definition. In other words, adaptation may be perceived of as more

personally-relevant. Adversity and adaptation are now key components of definitions of resilience (Masten, 2001). Responding to suggestions that resilience is system-based, Masten extended her definition to state that resilience is *"the capacity of a dynamic system to withstand or recover from significant challenges that threaten its stability, viability, or development"* (Masten, 2011, p. 494). The focus here is on adaptation that is inherently innate and biological. Masten's theorising in the third phase of resilience research is prominent.

Latterly, resilience theorists have further expanded the focus of definitions into multiple contexts with variously-refined and research-specific operational definitions of resilience now available. But there are as many definitions as there are contexts. For example, physiological resilience has been defined as "*the capacity to maintain adequate function and structure at molecular and cellular levels by adapting or changing to specific challenges"* (Franco et al., 2009, p. 14). Spiritual resilience is defined as the use of a spiritual/religious coping strategy with the resultant experience of positive emotional outcomes and the consequential abatement of negative emotions (Allen, Haley, Harris, Fowler, & Pruthi, 2011). Definitions of indigenous or cultural resilience offer an insight into ethnic differences in how resilience is seen, experienced and understood. For example, cultural resilience is defined by Clauss-Ehlers (2008) as the way in which the individual's cultural background, supports, values and environmental experience help facilitate the process of overcoming adversity. Definition has not been provided for an age context however. But operationalisations of resilience in the context of older age, it is suggested, should prioritise behaviours, thoughts, and feelings that facilitate contentment within the specific developmental, physical, emotional, and spiritual context of ageing (Allen et al., 2011).

As recently as 2011, theorists have continued to advocate for clarity around the meaning of resilience (Windle, 2011). The lack of consensus on a well-defined universal meaning makes the field for resilience research extremely complex and poses some intricacy in conceptual discussions. This thesis has not been written to resolve this issue or to specifically define resilience in an age context; nor is it primarily concerned with justifying the appropriateness of the resilience construct to ageing and cultural contexts per se. It does, however, offer a context-specific examination of resilience that considers features relevant to people of advanced age and to people of Māori culture living in advanced age. The thesis develops the construct by defining resilience as a process rather than as an innate ability (discussed in Chapters 2 and 3); that is, the impact of adversity on competence is understood to be influenced by particular protective resources (discussed in Chapter 3). Along the lines of previous research (see the discussion of longitudinal ageing studies in Chapter 4), resilience is operationalised as an adversity/competence

dyad. The interaction between this definition of resilience and resilience-related resources is explored.

1.2 The interface between resilience and ageing well

Individual resilience has a historic background in developmental science where interest lay with children who were, to all intents and purposes, at risk of unfavourable outcomes under stress but who nonetheless did relatively well in negotiating school and adolescence (Werner & Smith, 1992). The research field at the time was dominated by attempts to understand the causes of pathogenesis and find ways to diminish psychopathology and poor health outcomes, so a focus on those who were doing unusually well signified an about-face in health and psychology research. As the focus of health status assessment continues this shift away from a pathology model, measuring positive aspects of health in the broadest sense, across multiple sociological contexts, is emerging as a central area of research (Franco et al., 2009). Age and culture are two contexts which are underpinned by the acknowledgement of diversity in health outcomes.

Contextualising resilience to older age reflects a call to think about and maximise what older people are doing well rather than the difficulties they experience (P. B. Harris, 2006; Vaillant, 2007) and critically appraise conceptual paradigms that only partly explain the concept of ageing. For example, 'old-age' was the initial nomenclature for all people over age 65 but latterly there is acknowledgment that diversity exists in health trajectories throughout the life-span and that different ageing processes may exist within the age group (J. Smith, 2000). At least three phases of old age have been identified and, although the specific timing of the phases vary in the ageing research literature, their existence generally holds (J. Smith, 2000); broadly (and as used in this thesis) ages 65-74 years is known as young-old; ages 75-84 years, as old and ages 85 years and over, as old-old or advanced age.

These developments in ageing research are mirrored in the work on resilience. Resilience is a research domain facing increasing academic exploration. A number of critical and systematic reviews have been written since the early 1980s. Increasingly, researchers are focusing on the contribution of resilience to successful health outcomes. As well as conceptualising resilience specifically within the context of advanced age this thesis aims to investigate the relationship between resilience and health outcomes for people of advanced age.

Health in advanced age

As well as coping with modern global concerns such as financial crises, wars and environmental damage, people of advanced age have to manage the physical and cognitive changes that affect them due to their age. Age is associated with decreased physical competence and increased prevalence of chronic illness, presenting challenges to ageing well. Furthermore, health conditions increase with increasing age. Ongoing health disparity for Māori means that they have poorer health outcomes than do non-Māori.

A conceptualisation of ageing that focuses on adaptation via multiple personal capabilities aligns with a holistic view of health inherent in the World Health Organisation's definition that health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity(World Health Organisation, 1948). It aligns, also, with the Māori concept of health, Te Whare Tapa Whā, which describes four cornerstones of health that are each necessary to ensure strength and symmetry. In the Māori model, the cornerstones represent the sides of a whare (house) which together hold up the roof. They are taha wairua (a spiritual dimension), taha hinengaro (a psychic dimension), taha tinana (a bodily dimension), and taha whānau (a family dimension) (Durie, 1985). Te Whare Tapa Whā diverges, however, from the World Health Organisation's definition by placing greater reliance upon the interaction between the four cornerstones; emphasising collective health. Māori, particularly older Māori, see their health status as strongly connected to the health status of their whānau (Edwards, 2010). The concept of 'standing on your own two feet' may, in fact, be maladaptive for Māori (Durie, 1994) which has implications for the way in which resilience is understood for Māori. Cultural concepts of ageing and of resilience are expanded in Sections 2.2 and 2.3 respectively. Differences between Māori and non-Māori in these perspectives as well as in health status supports a cultural examination of resilience influences and correlates.

Successful ageing

The fundamental aspect of successful ageing is that ageing operates on a continuum whereby the best outcomes are achieved under the most optimal circumstances. An early definition of successful ageing was based on function and production; that is, 1. the avoidance of disease and disability, 2. the maintenance of high physical and cognitive functioning, and 3. sustained engagement in social and productive activities (Rowe & Kahn, 1987). In this three-pronged

definition, the need to draw attention away from age, or indeed, health, as a state of disease/decline was achieved.

Ageing well as a paradigm

While recognising a 'salutogenic'[1] approach to ageing, the successful ageing paradigm, as it was originally conceived, has been criticised for being potentially discriminatory of those who feel well but do not exhibit the attributes that are considered necessary to success (P. B. Harris & Keady, 2008). That is, it has been suggested that the original model placed too great an emphasis on external achievement and not enough on individual perceptions of wellness. Due to their increasing health limitations, the oldest-old more often sit apart from the successful ageing group when it is defined in this way and they risk being seen erroneously as *unsuccessful* agers. Qualitative research shows that some older people see social contact and a positive outlook on life, features not in the original definition, as more important to their ageing than their physical health (Phelan, Link, Diez-Roux, Kawachi, & Levin, 2004). Similarly, Strawbridge, Wallhagen & Cohen (2002) found that older people considered themselves to be successful agers despite lowered health status.

Responding to the call to allow for subjective valuations of success, modifications to the original concept of successful ageing have weighted outcomes more highly than objective and functional abilities. This has facilitated greater balance as to who is considered to be successful and who is not. *Active ageing* is about remaining productive. Having opportunities to be productive enhances quality of life for older people so that they may live autonomously and in dignity for as long as possible. A key policy framework for the World Health Organisation since 2002, active ageing aims to ensure that 'older persons remain a resource to their families, communities and economies' (World Health Organization, 2002). *Healthy ageing* highlights physical, social and mental health as important in enabling older people to participate in society without discrimination and to enjoy an independent and good quality of life (McKee & Schüz, 2015).

Positive ageing, a term less frequently utilised in research, is more useful to age-related and psychological services. It means recognising older people and appreciating them as valuable members of families and communities

[1] *Salutogenesis* is a term coined by Aaron Antonovsky, a medical sociologist, in 1978. By emphasising the origins of health as opposed to the origins of disease, it represents the antithesis of *pathogenesis* (Antonovsky, 1990a) and contributes to a positive ageing focus. Salutogenesis, and the measurement of associated constructs such as sense of coherence, have a following in resilience research – see sections 3.2 and 6.3.

http://www.adhb.govt.nz/seniorline/PositiveAgeing/Positive%20Ageing.htm; facing up to the challenges of later life http://positiveageing.org.uk/; or *'the process of maintaining a positive attitude, feeling good about yourself, keeping fit and healthy, and engaging fully in life as you age'* http://www.positivepsychologyinstitute.com.au/positive_ageing.html. New Zealand's *Positive Ageing Strategy* aims for a society where people can age positively, where older people are highly valued and where they are recognised as an integral part of families and communities https://www.msd.govt.nz/what-we-can-do/seniorcitizens/positive-ageing/strategy/. While these three terms have slightly different takes on the concept of doing well in later life, they are often used interchangeably because the definition of successful ageing is not consistently agreed. Fostering success within a community, perhaps by enhancing resilience to age-related challenges, is likely to enhance the perception of what it means to be aged, thereby reducing stigmatisation and adding value to the ageing experience.

1.3 Resilient ageing – is it possible?

The obvious link between successful ageing and resilience is in the focus on individuals doing well despite potentially deleterious experiences including the challenges of disability. Because physical health remains a central component of ageing well (Depp & Jeste, 2009), placing equal importance on other aspects of life emphasises that a) ageing, like health, is holistic in nature and b) positive (and resilient) outcomes are possible for anyone. Understanding the finer details of how resilience works differently in the context of advanced age is therefore likely to contribute to the successful ageing literature as well.

Resilience literature, particularly the notion that resilience has a life-span potential, therefore espouses the term *resilient ageing* (P. B. Harris, 2006). Resilient ageing considers that activities that are undertaken by older people are chosen because they are meaningful, as well as achievable, to the individual, in contrast to activities that may be more important to others. Acknowledging this subjectivity means that anyone, including those with disabilities and unmet social needs, has the potential to age resiliently. Ensuing empirical research of ageing populations, and resilience in ageing people, has been built upon such developmentally-relevant notions of success. Seeing ageing as a unique time also facilitates opportunities to investigate how to enrich the ageing process by attempting to reduce the risks of adverse events and enhance personal resilience when risks are present. The themes of meaning and age-specific functionality are ones that will be referred to throughout the thesis.

An understanding of how resilience impacts upon health and wellbeing for older people, as a function of both life stage and the sequelae of upbringing, has usefulness in clinical, educational, community support and family settings. Moreover, the steeling effect of resilience against decline can, as Rutter suggests, decrease the vulnerabilities older people experience. The cost of health care is likely to be impacted if health relapses are lessened (Carver, 1998). Intervention possibilities also exist to improve motivation toward health maintenance and to strengthen resilience that is low (Ahern, Kiehl, Sole, & Byers, 2006; Carver, 1998; Polk, 1997).

The bicultural history of NZ calls for additional appreciation of how Māori are adapting to ageing. Acknowledging that Māori views of ageing and health are functions of a unique world-view has relevance for the perception (and measurement) of resilience in a cultural context. Resilience among Māori is not well understood and subsequently has not been extensively examined. The empirical studies discussed in Chapter 4 aim to determine what components go together best in advanced age and establish the patterns of characteristics related to successful ageing that can be termed resilience.

1.4 Thesis structure

The thesis is written as a thesis with publications, with four chapters written and inserted as complete manuscripts. There are 11 chapters in total. Chapters 1, 2 and 3 are introductory chapters, introducing the background to resilience and justifying a context-related conceptualisation. Chapter 2 outlines the global perspective of resilience which was structured by four phases of research that helped to develop the construct. The concepts of adversity, resources and competence are introduced. Chapter 2 also focuses the notion of contextual relevance on the contexts of age and culture. The chapter outlines, first, theories that focus on general salutogenic aspects of ageing (lifespan development, selection and optimisation with compensation, socio-emotional selectivity theory) and, second, cultural perspectives of ageing and resilience. Chapter 3 expands the notion of context by introducing advanced age as a very particular context, arguing that adversity, resources and competence in relation to resilience are all age-related. The manuscript in Chapter 3 has been published in the Journal of Ageing and Mental Health and is included in its submitted form.

Chapters 4 and 5 concern research methods and outcomes from previous work. In Chapter 4, the evidence that resilience exists in older people is discussed. Psychosocial and other research

outcomes that relate to resilience from ageing studies are forwarded and critiqued. Chapter 5 aligns previous resilience methodologies (person-focused, variable-focused and the use of resilience tools) with the goals of the current research, culminating in a rationale for the chosen operationalisation of resilience and the structure of analyses.

Chapters 6 and 7 position the current participants and methods more specifically. Chapter 6 provides background to the participants; that is, the features of their life stage and cohort events that help to define them as a group. For Māori, a different history impacted a different world-view and perspective of age and these differences are highlighted. Health statistics for Māori and non-Māori of advanced age are included to show current health status. Chapter 7 presents the research design and methods that underpin the three stages of empirical work that follow. Methods of recruitment, study procedure and data analysis are provided and justification is given for the selection of independent and dependent variables.

Written as independent research manuscripts, Chapters 8 and 9 present the study results in relation to the clustering of potentially resilient resources and adaptive health outcomes for people of advanced age and older people of Māori ethnicity. Chapter 8 describes the derivation of psychosocial clusters based on psychological, social and attitudinal variables, and health outcomes associated with the clusters and Chapter 9 describes the generation of sociocultural clusters (using psychosocial and cultural variables) and associated health outcomes for Māori. Chapter 10 is also written as a research manuscript, focusing on the results of analyses between a resilience measure and health outcomes and comparing the results with those of the clusters. Chapter comments are offered at the start of each results chapter to position the work within the overall thesis and make the links between the various components of the thesis more prominent.

The final chapter, Chapter 11, draws the themes of the overall resilience conceptualisation together. Ageing and culture are treated as separate contexts but have obvious connection in terms of the age of participants. Implications for research, practice and policy are outlined.

1.5 Key terms used in this thesis

Terms related to ageing

In the context of this thesis *ageing* means age 65+ years. References to *old-old* or *oldest-old* correspond to *advanced age* which is the term used most frequently in this thesis and pertains to

those aged 85+ years. While the ageing process begins from the time we are born, *ageing* research, as it is understood in this thesis, concentrates on the study of those who are living in the latter third of their lives. *Developmental* research, by contrast, considers the entirety of the lifespan.

Terms related to adversity

Throughout the thesis I will talk about adversity and resilience. Adversity has been described in many ways: *misfortune, hardship, restriction, disadvantage, stress, challenge, demands, disturbance, disruption, negative events* and *hassles*. In this thesis, these terms will be used interchangeably, as they are used interchangeably in the literature, more to provide variation for the reader than to suggest any difference in the underlying construct. Unless otherwise noted they will be deemed to simply be alternatives to the term used in most definitions of resilience - '*adversity*'. The terms risks and vulnerabilities are used by some to define adversity and by others to define resources that confer detriment. In this thesis, *risks* and *vulnerabilities* are used in relation to negative resources rather than negative outcomes.

Terms related to resources

Resources that facilitate resilience are commonly depicted as protective within the resilience process as opposed to negative resources or risks as noted above. Terminology differs across the literature; assets, strengths, resilience toolkit, capabilities, survival arsenal, and other terms are all used but, again, they reference similar factors. While all may be used within the thesis, the primary term used for resilience resources in studies and theories is *protective resources* and items or variables assessed to answer the research questions above are termed *resilience resource indicators, resource indicators, resilience resources* or just *resources*.

Terms related to resilience

The term *resilience* in this thesis defines the process of mobilising resources to achieve an adaptive outcome rather than the outcome itself. The process is also referred to as *the resilience process*. The main terminology for a resilient outcome is the term *competence*, although at times the term *adaptation* is used. Early conceptualisations used the term resiliency but this has been relegated to the trait resilience field as opposed to naming resilience measured in other ways (Masten, 1994).

Māori translations

Māori terms appear throughout the text where it is appropriate to use them. They are translated at the first instance and are referenced in a glossary at the front of the thesis. Finally, culture is a term that is used throughout this thesis. Culture can address gender, sexual orientation or economic class but, since ethnic group, Māori, specifically, is the cultural group of interest in this thesis, the term *culture* is positioned in relation to ethnic identity rather than to other contexts.

CHAPTER 2: THEORIES OF RESILIENCE AND AGEING

This chapter introduces the construct of resilience. It adopts a predominantly global assessment of the phases of resilience work as it emerged as a critical field of enquiry. Theory and empirical research about resilience has encompassed four distinct and progressive phases (Richardson, 2002), beginning with uncovering qualitative differences between more and less resilient people (i.e. looking for *characteristics* that distinguished someone who did well from someone who didn't). This approach framed the concept of trait resilience (phase 1) and sat comfortably alongside the early evidence of children's success despite sometimes very detrimental environmental influences. Next, investigations considered resilience as a *process of adaptation* which encompassed multiple domains and followed multiple pathways (phase 2). The third phase approached resilience as an *innate* possibility for everybody, positing that the potential for resilience was already embedded in biological and other internal adaptational systems. In the fourth phase greater emphasis was placed on the *contextual* underpinnings of resilience, which could potentially constitute more effective application of resilience resources across diverse situations and environments. It is in here that developmental and cultural contexts fit best.

Debate persists about whether these four approaches are complementary or alternative (Masten, 1994); however, what seems most likely is that each approach intertwines with and builds upon previous phases. Consequently, a more comprehensive understanding of resilience as a construct is becoming possible, and is enabling a more cohesive and targeted treatment of resilience.

This chapter critically appraises the shifting foundation of the understanding of resilience. To illustrate how resilience is applicable to specific milieu, reflections from ageing (advanced age) and cultural (indigenous NZ Māori) perspectives are also offered and are set up as points of difference in the conceptualisation and measurement of resilience that is offered in subsequent sections of the thesis.

2.1 Four phases in the investigation of resilience

Phase 1: The characteristics of resilience

When the term 'resilience' was first coined, internal characteristics or traits were the main focus of enquiry. The trait philosophy contends that resilience stems from within. Proponents of trait resilience focus on personal aetiology and positive adaptation (Masten, 2007). Trait resilience, '*resiliency*', is viewed primarily as a set of specific characteristics that are believed to predict success in people who face unusual and trying circumstances. Some researchers call trait resilience 'dispositional resilience', which has been operationalised via two main concepts – hardiness and ego resiliency.

Hardiness focuses on qualities of tenacity and courage. Hardiness is a stable personality trait and, in the face of stressors, is defined by; 1) acknowledging the challenge - life is naturally stressful and every new stress represents opportunity for growth, 2) commitment - it is important to stay involved in whatever is happening – good or bad, learn and pass that on to help others and, 3) control - it is possible to turn stress from potential disaster into an advantage (Kobasa, 1979). Hardy attitudes are required to achieve advantage over stress; thus, to be resilient, coping skills, social interactions and self-care must all be hardy in nature (Maddi, 2013).

Ego-resiliency was a phrase also coined in the very early years of resilience research (J. H. Block & Block, 1980) and, with ego-control (the balancing of psychological tensions in relation to the self/ego's decision-making), was used to explain impulse control and resourceful adaptation to motivational forces. Ego-resiliency and ego-control, operating in advantageous harmony, were thought to facilitate positive adaptation so as to preserve or enhance system equilibration. In ego resiliency a positive attribution is given to an unpleasant experience so that it is perceived favourably. Thus, ego resiliency shares features with hardiness.

Inner strength (Nygren et al., 2005), a relatively new construct, is also related to trait resilience (Lundman et al., 2011; Nygren, 2006) via shared characteristics. Inner strength has been described as:

> feeling competent yet having faith in others, looking on the bright side of life without hiding from the dark, feeling eased and also being active, being the same yet growing into a

> new garment, and living in a connected present but also in the past and the future. (Nygren, Norberg, & Lundman, 2007, p. 1063)

Current proponents of the inner strength construct have found high levels of inner strength in advanced age along with high levels of resilience (Nygren et al., 2005). The terms ego-resilience, hardiness and inner strength are used in the literature interchangeably with the term resilience, adding to the complexity of work in this area.

Critique of trait resilience

Two main critiques are levelled at trait resilience as a realistic approach. The most important and basic critique concerns its underlying premise. A view in which resilience is simply a trait tends to imply that those with low levels of resilience are lacking something fundamental, that is, some people 'have what it takes' and others don't. Current thinking considers the focus on 'invulnerability' naïve, arguing against the notion that there are some personality or attitudinal traits available to some people and not to others (Luthar & Cicchetti, 2000).

Secondly, in the introduction to this chapter, it was stated that a global perspective of resilience would be proffered. However, it should be clarified that *global resilience* does not really exist. Instead, resilience seems to vary within and between individuals. Intra-individually, resilience may be evident in some domains of functioning and not in others (Luthar & Cushing, 1999). Inter-individually, not every individual is resilient under the same circumstances. Trait resilience can help our understanding, at a superficial level at least, of different outcomes for two people facing the same (or a similar) situation. It is not as good at accounting for differences in resilience for someone facing different stressors at one time or for someone facing a similar stress across different contexts.

Along these lines, researchers are concerned that mere lists of independent health predictors and disease outcomes, although comprehensive, are on their own too narrow to account for the complexity of psychosocial effects (O'Dougherty Wright, Masten, & Narayan, 2013). Friedman (2000) states that *"Failure to consider the broad picture and the complexity of the associations between personality and health has led to less than ideal interventions"* (p. 1090). Resilience factors should therefore also be understood as interrelated in their influence on health outcomes rather than existing as static or unrefined characteristics.

That the effectiveness of resilient characteristics may depend upon other situational factors suggests that one 'stone' (trait) does not always kill all 'birds' (stressors). For example, Rosowsky suggests that while psychological disorder inhibits resilience to the hardships associated with ageing, personality traits may be adaptive or maladaptive depending on the situation or environment (Rosowsky, 2011). In the domain of physiology, resilience would mean resistance to disease and might require a robust immune system, bone and muscle strength etc. Emotional resilience requires predominantly strong personal characteristics. Psychological resilience might be enhanced by past experience of similar stresses, coping skills, social support and personality traits such as self-efficacy and optimism. Environmental resilience might be enhanced most by external systems of support such as effective and accessible community agencies and trauma action groups, as well as supportive local policy.

Although identification of possible individual factors was a necessary step before investigation of the underlying structures was possible, the *intertwining* of protective and risk factors (respectively, enhancing and detracting from resilience - see below) clearly points to a construct broader than a simple list of internal traits. While some researchers retain an interest in the components that contribute to resilience in preference to the interactions between and manifestations of those components in different situations, the trait philosophy has now largely been abandoned. Researchers in general are more interested in how internal and external factors may combine in particular contexts.

Expansion of the understanding of resilience resources

Almost all factors that impact on the ability of youth to do well following adversity have been identified (Kumpfer, 1999; Masten, 2001; O'Dougherty Wright et al., 2013) but there is a rather more sketchy understanding of the factors that apply in adulthood (Bonanno, Galea, Bucciarelli, & Vlahov, 2007), partly because they are infrequently investigated. In later life research, qualitative studies have elucidated some of the attitudinal characteristics, life skills and behaviours, support systems and other contributors to resilience, that are important. When asked, respondents cite recognition and utilisation of resources from both internal and external sources. Commonly reported factors that assist those in advanced age to 'bounce back from adversity' or remain healthy amid disability, illness or trauma include a positive attitude (dependent on both innate and environmental factors), counting their blessings and focusing on the good things in their life, having purpose and keeping busy, interaction with others or having an interest 'outside yourself', support from family and friends and being able to accept that help, engagement in

culture, and a feeling of connection to their local community (Wiles, Wild, Kerse, & Allen, 2012).

The interaction between personal characteristics and available external resources and relationships that underlies similar lists of factors highlights the importance of environmental or situational components of resilience in addition to personality characteristics (Bennett & Windle, 2015). Specific resources of particular salience to people in advanced age are discussed in more detail in Chapter 3, and resources chosen for analyses in this thesis are discussed in detail in Chapter 7 alongside the study methods.

Resilience resources are organised into patterns

Following a multi-level and multi-domain interpretation of resilience resources, researchers started looking into how they might be organised. A concept synthesis and critical analysis of resilience factors from conceptual, qualitative and quantitative studies that had been conducted up until the mid-1990s distinguished four patterns of resources that, overall, worked well together (Polk, 1997). The patterns were categorised as dispositional (physical and ego-related psychosocial attributes), relational (intrinsic and extrinsic social factors), situational (attitudinal and perceptive factors) and philosophical (personal beliefs).

Resources may also be categorised in terms of protection and risk or vulnerability. Protective factors are ones which confer advantageous qualities and assist a person under stress to cope; risk or vulnerability factors are the opposite, making it harder to recover from adversity. In this way, protective factors become resources that can be drawn upon, consciously or unconsciously, when adversity strikes. Expanding the general categorisation in a meaningful way, Luthar and colleagues offer a directional method of conceptualisation (Luthar, 1993; Luthar et al., 2000). Within the 'protective' category, Luthar et al (2000) differentiate between *protective-stabilising, protective-enhancing* and *protective but reactive* factors. The overarching grouping of vulnerability factors can be similarly deconstructed into *vulnerable-stable* and *vulnerable and reactive* factors. Differences between these subcategories relate to the type of outcome and the level of stress experienced. Organisation, as above, speaks to the complexity of defining the implicit nature of resilience factors and further highlights the situational nature of the construct 'resilience'.

In summary, although personality traits are important to resilience, a wide array of factors have emerged from well-conducted qualitative and quantitative studies. This thesis contends that resilience is a process in advanced age, whereby the experiential impact of a stressor varies according to the influence of age-specific internal and external factors. The *process* conceptualisation of resilience is discussed next.

Phase 2: The resilience process – resilience models

Perception of the complex interrelationships amongst the elements thought to influence resilience and positive outcomes led to the development of frameworks to conceptualise the attainment and utilisation of protective or facilitating resources. A number of research models emerged during the 1980s and 90s, many with common understandings and some, this time, directed at specific population groups. Although there are others, five influential resilience models are summarised below. The first three are general models of resilience chosen because they represent important aspects of the process approach while being parsimonious in their explanation; the fourth is a re-purposed cognitive-behavioural model adapted to the construct of resilience by the addition of important contextual elements. The fifth model was developed specifically to conceptualise resilience in advanced age.

The Resiliency Model; RM: Richardson, 1990

Potential outcomes following adversity are defined in the Resiliency Model (RM) by their relationship to 'reintegration' towards homeostatic balance; that is, life events and stressors act upon a normal state of 'wholeness' (biopsychospiritual homeostasis - physical, mental and spiritual dimensions of functionality sitting in balance). The extent of disruption caused by a stressor depends upon the extent of the individual's internal and external resilience resources (Richardson, Neiger, Jensen, & Kumpfer, 1990). In its concept, the model defines resilience as growth rather than simply returning to homeostasis; resilient reintegration rather than reintegration back to homeostasis (Richardson, 2002). In other words, resilience is demonstrated by taking something positive from the situation. Two other possible outcomes are defined in the model; that of detrimental reintegration (reintegration with loss), and dysfunctional reintegration. A major protective resource outlined in this framework is prior experience which enhances factors that can buffer the stressors. Novel situations, that have no current response patterns, on the other hand, and force their integration into the person's world view without adequate defence

are, thus, prone to disrupt the balance. Viability of the model is demonstrated by structured equation modelling to validate these four levels (Richardson, 2002).

Resilience and Thriving: Carver, 1998

Similar to the RM, Carver's theoretical model of thriving describes four possible outcomes following adversity (Carver, 1998). The model of thriving diverges most from the RM by semantics, suggesting that resilience denotes recovery to normal functioning and thriving denotes surpassing normal functioning. The approach by Carver also expands the RM by suggesting how improvement may occur; either the traumatic event or chronic stressor may become dampened by experience (for example immunity following exposure to chicken pox), in a second event of the same type, the event may hit as hard but the individual may recover more quickly because of the first experience, or the trauma itself may confer a learning experience and lead to a higher level of functioning. Thus, thriving occurs because of the ability to consolidate a challenge into a meaningful form.

These two models demonstrate a number of key elements about resilience that can be discussed in relation to people in advanced age. First, the RM denotes resilience primarily as an ability to move forward and grow, a concept based on the underlying premise that adversity that represents a challenge can make a person better off (O'Leary & Ickovics, 1995). However, growth in advanced age is not common (Staudinger & Fleeson, 1996). The RM connotes 'reintegration back to homeostasis' as not quite as resilient. Yet, the notion of resilient ageing would suggest that maintenance of function or minimisation of loss could be resilient responses in older age (Ebner et al., 2006). In this, the thriving model seems more useful and supports a contextual reference for resilience. For example, physical improvements, such as shifting from a sedentary to a more active lifestyle, may demonstrate thriving better than psychological gains. However, a 'scaling back' of expectations, for example, a reduction of social communication because of hearing difficulties, may nullify the possibility of thriving. Others have found that in advanced age the ability to retain activities that are comfortable and hold importance in daily life may offer a sense of security to the older person (Wright-St Clair, Kerse, & Smythe, 2011). In both the resiliency and thriving models, any loss following adversity is depicted as less than resilient.

Secondly, both models highlight the importance of prior experience in adapting to new events. According to the thriving model, gains are made through acquiring skills or knowledge to enhance future decision-making, gaining confidence about personal mastery of future events, or

the strengthening of enabling and supportive relationships. But these elements may also contribute to resilience that does not achieve a noticeable improvement in function. Numerous qualitative studies find that elements such as these are recognised by older people as protective and facilitative of ageing well and maintaining positive relationships (Bennett, 2010; Moore & Stratton, 2002; Wiles et al., 2012). It is intuitive that a longer life affords a greater reservoir of positive experiences, and the potential for positive resource attainment. In summary, the RM is useful in describing the process of resilience and potential outcomes following adversity but is geared to a more general organisation of adaptation, without considering context as fully as it might. Why advanced age, which extends from a life of potential resilience acquiring opportunities, is a unique context is discussed more fully in Chapter 3.

Coping, Adaptation and Resilience; CAR: Foster, 1997

The interesting thing about the coping, adaptation and resilience (CAR) framework is that the terms coping, adaptation and resilience could be and, in empirical research, have been, utilised interchangeably. Displaying minor differences in conceptualisation in this model, these elements represent respectively: a response to stressful events, a response that improves environment fit, and an enduring outcome representing positive change in coping and adaptation (Foster, 1997). CAR is an extensive model which highlights 169 Sectors that fit under 29 Components that are contained within five Domains. Factors within the divisions represent life influences and span genetic, physical, psychological, attitudinal, behavioural, societal, environmental and cultural elements. The complexity of the model interactions masks the parsimony of its components. Grouping the factors allows for ready interpretation of outcome pathways. Consistent with the previous two models, as well as describing positive change processes (utilising protective resources that are implicit within the divisions), potential *dysfunction* can be accounted for via multiple feedback loops that demonstrate relationships between the model's elements and enable alternate routes to outcomes. Consideration of poor outcomes is part of the resilience discourse as resilience has potential for improvement. The factors are seen to have stress-enhancing potential as well, similar to the risk gradients assigned to factors within the other models. Also, as with the previous two models, extraordinary outcomes such as enhancement of social or personal resources and development of new coping skills are possible with high levels of CAR processes. The CAR model uses different terminology and shows more complex relationship, but still represents the influence of internal and external factors on outcomes.

Application of CAR to the older population rests upon Foster's view that success in ageing represents 'remarkable' physical and psychological health. This view is debated. But even when successful ageing is defined in a more holistic way that allows for success *independent* of health status, the model's premise can still be engaged. Moreover, the association of threats with evident protective and risk factors mapped onto the CAR divisions is able to suggest potential areas for intervention, either through strengthening affected Sector elements or supporting unaffected Sector elements to maximise their influence.

Five-part Model of Resilience; 5-PR: de Terte, Becker and Stephens, 2010

Resilience factors are also grouped in the Five-part Model of Resilience (de Terte, Becker, & Stephens, 2010). In an adaptation of the Five Areas model of cognitive-behavioural assessment (Williams & Garland, 2002), de Terte et al describe how resilience can be built through four internal domains of response (cognitions, emotions, physical feelings and behaviours) plus an environmental domain (family, community and social support). Resources inherent in each domain are treated as dynamic and are utilised through the domains' interdependence. Refinement of the model in a study of police and ex-police officers showed that three domains were particularly key – cognitions such as optimism and adaptive coping, adaptive behaviours and environment (de Terte, Stephens, & Huddleston, 2014). During adversity or a disaster which might affect multiple community members, the environmental domain takes on a particular importance. In later life, social relationships are a key stressor as well as a key resilience resource so the expansion of the environmental part is one that would make the model applicable in advanced age. The choice of variables within the domains can fit the model into various areas of application. The 5-PR and the 3-PR posit that resilience is not innate but can be learned, although, as is discussed below, innate resilience does not preclude additional learning.

Resilience in women older than 85: Felten and Hall, 2001

The final model reviewed in this section talks to the advanced age group, specifically older women[2]. Writing as gerontology nurses who have seen resilience in action, Felten and Hall (2001) argue that widowhood, resource acquisition and social status pose a different meaning for women of advanced age compared to younger women or to men of their cohort. The 'Resilience in women older than 85' model is based on a jack-in-the-box; whereby accumulated stresses bear

[2] Although qualitative research has interviewed older men, no models seem to have been developed with men in mind

downward pressure on the coiled wire in the box. Salient resources (frailty, determination, previous experience with hardship, access to care, culture, family support, self-care activities, caring for others and functioning like 'efficient working machines') fill the box and provide spring to the wire, allowing it to recoil after compression. The wire (resilience) recoils less and less easily as pressures mount. Apart from being just a nice visualisation, this analogy suggests that with increasing stress, related to increasing age, achieving resilience is harder and this again speaks to the notion that a long life is conceptually different to a shorter one. On the other hand, although the conception of a resilient outcome may be altered, the prevalence of resilience is not necessarily reduced in later life (Demakakos, Netuveli, Cable, & Blane, 2008). While relevant in a developmental and gendered sense, a conceptualisation the focuses on too small a sample has less usefulness in terms of application. In summary, this model highlights that particular resources that are salient to people of advanced age relative to other age groups can facilitate improvement in function, independence and quality of life. The theory of gender-specific resilience is posited as a framework to nurture and support resilience-enhancing activities (Felten, 2000).

Key elements described by the models and how an ageing paradigm can fit into the process

Although the models outlined above vary in many regards there are commonalities. The most consistent aspect of resilience models is the prominence of the key features of adversity and adaptation, which are intersected by resilience resources (Rutter, 1987) and together delineate a process. Resilience is displayed when all three features are present; that is, a threat is perceived, resources are employed and a positive outcome results from the interaction between the threat and advantageous resources. The resilience models described above are common in attributing adversity and adaptation a see-saw type relationship. In other words, the status quo is 'safety' with a homeostatic balance between physical, mental and spiritual wellness. When adversity strikes and forces the individual into working below par, even if only for a short while, there is opportunity through resource deployment to gain ground either to improve from the decline, re-attain what was lost or to rise to a level higher than before. Thus, a downturn may be followed by an upturn and so on through life as challenges arrive and are managed.

Challenges in advanced age are arguably higher than at other ages. The disablement process (Verbrugge & Jette, 1994) is perhaps the antithesis of resilience, focusing on negative outcomes from adversity. With inherent exacerbators and interventions, the disablement process shows how initially detrimental conditions can lead to disability if resources are insufficient to facilitate a

status improvement. For example, hygiene neglect following a stroke may lead to skin breakdown and ensuing additional mobility limitations. In advanced age the reality is that health deterioration or death are genuine outcomes from stress and represent succumbing to adversity. The avoidance of deterioration or the delay of death, however, may represent resilience, again suggesting that functional outcomes (in the sense of their usage or operation) are important.

At the upper level of achievement, the models differ in their definition of a resilient outcome; that is, whether resilient adaptation is restricted to a return to normal, denotes reaching a higher level of functioning (Hochhalter, Smith, & Ory, 2011), or depicts both outcome possibilities. First, the level of function a person must achieve to be considered resilient may be related to their developmental stage. Life-course theory suggests that expected milestones exist throughout life (Alwin, 2012). But competent, or adaptive, outcomes also include inter-personal and intra-personal variation (Hochhalter et al., 2011; Luthar et al., 2000). For example, a baby will be more resilient to a war experience than an adolescent because they do not understand what is going on or what the consequences of war will be. Competence is also dependent upon individual circumstance. For example, financial independence is likely to be more salient to someone who is paying a hefty mortgage and has had the opportunity to save a 'nest-egg' over time than to someone early in their career who is paying rent and for whom future financial demands are not imminently threatening.

Finally, the models outlined all place resources in a position to influence adaptive outcomes. A holistic perspective on life upholds that biological, psychological, social and spiritual factors underpin life choices. In the case of resilience this means such influences should be multi-dimensional, spanning internal and external spheres of existence. The depiction of resilience as a process is useful for understanding adaptive outcomes following adversity in advanced age because it allows for age-salient historical and on-going resource contributions. Protective factors such as self-determination, previous experience with hardship, access to care and support, cultural values and self-care activities are likely to facilitate adaptive outcomes by drawing on individual strengths and agency as well as community-based support systems.

Phase 3: Resilience is innate

The perspective that resilience is inherently normal is an attractive notion because, if it is true, it means that every person, as opposed to only those with certain traits, would have the potential to overcome when things went wrong. The third phase of the resilience movement, *innate*

resilience, was the study of the motivational force within everyone that drives them to pursue wisdom, self-actualisation, and altruism (Richardson, 2002). This notion purports resilience to be 'life-enriching' and to arise primarily from an ecological or spiritual source or from, as Masten puts it, 'normative functions of human adaptational systems' (Masten, 2001). One's moral framework enables one to understand what good and bad responses look like, thus minimising the energy required to decipher one's own actions (Richardson, 2002). On the other hand, a poor moral framework saps energy. The focus in the fourth phase was on the facility of the resources rather than their component make-up.

The American stress researcher, George Bonanno, is a key operant in this area. In support of an inherent propensity to overcome, Bonanno (2005) argues that resilience (absence of detrimental psychological or physiological symptoms) following potentially traumatic events is more common than was previously thought. An argument that the absence of unfavourable symptoms is either an extraordinary or a pathological response to trauma is refuted by recent research. That is, a great number of individuals seem to experience no debilitating psychological symptoms than previously imagined and few develop referred adverse physiological symptoms, a potential 'complicated' outcome in the absence of obvious grief or PTSD. In all-age populations, Bonanno's studies have found high levels of resilience to PTSD symptoms following extremely traumatic events such as the 2001 New York World Trade Centre terrorist attack; 33-56% (Bonanno, Galea, Bucciarelli, & Ylahov, 2006), and death of a spouse 6-18 months post loss; 46% (Bonanno, Wortman, et al., 2002). Comparably, the 'well-being paradox', where ageing is viewed as healthy and satisfactory despite physical disability, suggests that resilience in old age is not uncommon (Lamond et al., 2009; Ryff & Singer, 2009). Protective functions exist even within people who seem to lack resilience (Aléx & Lundman, 2011).

Phase 4: Contextual specificity

That resilience should be seen as a contextual process whereby the ability to recover from or overcome adversity is informed, not only by access to and the facility of resources, but also by situational influences and world-views is a feature of more recent resilience work (Wiles et al., 2012). The general inquiry into *contextual resilience* describes how resilience differs according to the system, developmental stage or cultural context, and involves a multi-level, multi-disciplinary approach as a distinct research goal that builds upon a priori assumptions of resilience. The fourth phase acknowledges that much of the previous work on resilience was conducted from a Eurocentric perspective and it is time to identify the limitations of prior approaches and include

methods and population groups where resilience may have a different meaning. In addition to noticing the *availability* of resources this phase is interested in *when* the resources and processes are required, a perspective that contrasts with the trait and process orientations by virtue of its relationship to effective mobilisation of resources. This ties resilience to the challenge rather than the individual (Hochhalter et al., 2011).

Contextual considerations now becoming prominent in the literature include environmental influences in personal spaces, such as life-stage or culture, (Luthar et al., 2000; Wiles et al., 2012) as well as the public spaces in which people are active, such as their community, where the accessibility of emergency and support services, for example, following adversity are important (de Terte et al., 2010). Equally, a person's cultural background (P. Clarke & Smith, 2011; Consedine, Magai, & Conway, 2004; Consedine, Magai, & Horton, 2005; Gunnestad, 2006; Stuart, 2010; Ungar, 2011) affects variability in resilient responses through differential histories of adversity and perceptions of illness and different resource requirements in times of stress. Gender (Aléx & Lundman, 2011; Bennett, 2010; Cottrell, 2009; Felten & Hall, 2001; Gattuso, 2003; Kinsel, 2005; Wagnild & Young, 1990) and specific traumatic situations such as bereavement (Bonanno et al., 2006), terrorism or natural disasters (de Terte et al., 2010) provide other contexts for resilience that may also impose specific demands. Context, then, relates to both life stage and the environment, and the spaces in which the agent operates have a place in defining what adversity is and what competency should look like.

The current study utilises the notion of contextual specificity to try to understand resilience in people of very advanced age. That means, importantly, employing a developmentally-relevant operationalisation of resilience. In this case, the operationalisation is informed by the particular constraints experienced in relation to adversity and the potential composition of competent outcomes for people of advanced age. The next two sections of this chapter introduce concepts relevant to understanding resilient aging and lead to a working definition of resilience.

2.2 Theories of ageing

Moving on from discussing resilience as a construct that is possible for anybody, the aim of this section is to expand on factors that might have greater relevance in advanced age compared to other ages. General theories of life-span and ageing position life as a continuum and suggest ways

in which people alter their behaviour in late life to manage conflicts. Indeed, with advancing age, people may start to internalise physical and social restrictions to lessen their negative impact.

Three key research theories attempt to explain life changes and decision-making over time. The first theory discussed below is applicable to all stages of life but has an important focus in terms of ageing; the other two concentrate primarily on decision-making in late life. Because ageing is marked by losses (both physical and social), an understanding of late life behaviours warrants due consideration of the factors that impact upon retention of other abilities that then have potential to contribute to resilience. All the theories below are salutogenic in that they focus on wellness rather than pathology and promote ageing as an opportunity for adaptation rather than a time of unavoidable decline. To position the cultural context within a largely Eurocentric landscape, cultural perspectives of ageing are highlighted as well.

Life-span development

Life-span theory considers the capacity for adaptation as a life-long endeavour; that is, one does not stop learning and developing at any age (Paul B. Baltes, Staudinger, & Lindenberger, 1999). The notion that productivity is possible in all life stages is a concept gerontologists have long advocated. Life-span theory centres on the way the person-system changes as people age and the way functional aspects of being, such as perception or information-processing, are internalised as time passes (Paul B. Baltes et al., 1999). Expanding understanding of human behaviour has seen a morphing of these personal and functional strands of being into more of a whole-of-life theory that developed into *life-span developmental psychology* or *life-span psychology* (Goulet & Baltes, 1970), where the focus is placed on both the 'totality of ontogenetic behavioural changes' and in 'intra-individual variability' that shows up changes between people (Paul B. Baltes & Goulet, 1970). The ability to adapt in order to achieve a positive outcome positions the 'individual' within the 'collective'.

Life-span psychology's relevance to resilience lies in a critical appraisal of what has gone before and how that impacts upon current life expression. For example, the concept of life-span psychology has been used to describe intellectual development (Paul. B. Baltes, Dittmann-Kohli, & Dixon, 1984), locating it within biological and cultural systems. There is an understanding that the timing of developmental change differs within the three phases of old-age, with pragmatic abilities (lying within the cultural system) taking longer to decline than mechanical/biological ones (Paul B. Baltes et al., 1999). Thus, the theory recognises the importance of viewing ageing

within multi-layered contexts, be they cultural or social. Conceptual theories of ageing that follow the life-span approach take account of changes that have occurred over time and that affect multiple systems within the ageing individual (Masten, 2001). Some conceptualisations focus on age as the main contextual reference.

Life course theory is a related concept. A life course perspective is interested in the stages or milestones of the life cycle and the interactions people have with their environment (events, transitions and trajectories) (Alwin, 2012). But the fact that life courses do not follow a universal trajectory argues against an approach that considers stereotypical outcomes such as having a family or retiring as common milestones (World Health Organisation, 2015).

Life-span psychology and life course frameworks are conceptually distinct but aligned. Life-span psychology considers the biological and behavioural differences that occur with age, while a life course approach is better suited to encapsulating social effects on decision-making with ageing (Alwin, 2012). Both concepts consider the whole of life to be a process and it may be in combination that the theories most clearly elucidate the values held and activities undertaken in advanced age. My view that perceptions and behaviours held in advanced age are a function of both the individual's life stage and their historical experiences is consistent with this integration, clearly aligning life-span theories with the current research outline.

Selection and Optimisation with Compensation

Continuing expansion of life-span theories helped researchers to understand how older people negotiate their strengths and losses to achieve success in ageing and the theory of *Selection and Optimisation with Compensation* (SOC) was proposed. SOC theory contends that when faced with limitations, people either *select* or retain fewer and more meaningful activities, *optimise* the activities they do well, or adapt, or *compensate*, for the losses they face by altering the way in which they accomplish tasks (Paul B. Baltes & Baltes, 1990). An older person, for example, who is finding it harder to hear may choose to attend more intimate social gatherings with family rather than going to larger (and noisier) group occasions … *selection*; offer to cater family functions at their own home rather than going out to a busy restaurant … *optimisation*, or keep in touch with overseas family by letter-writing or email instead of struggling to hear a telephone conversation … *compensation*. Such adaptations may be employed together as strategies to maximise the individual's competency. Now recognised for its utility in explaining the manner in which older adults adapt to the challenges of ageing, SOC theory is widely referenced in the

gerontological research literature to explain how response decisions are made. Effective application of the principles of SOC theory in research and clinical settings also means accepting that different value is placed on competence over time and different weight should be placed on resources that facilitate desired outcomes.

Socioemotional selectivity

The *socioemotional selectivity* model is premised on extending the universal developmental changes that occur throughout the lifespan, and which are defined within the life-span psychology framework, to a social milieu. In specific terms, the socioemotional selectivity model is most interested in explaining the changing pattern of social interactions and motivations that occur with increasing age. Multiple social functions are important in advanced age, but to varying degrees. They include discretionary relationships (social networks – friends and family), social activities (social participation) and formal systems of care (social support). Social interactions in advanced age are often reciprocal whereby social partners treat older adults more positively compared to their younger contacts, thereby potentially boosting the older person's psychological resilience (Luong, Charles, & Fingerman, 2011). People in later life typically report greater satisfaction with their social relationships than do younger people (Luong et al., 2011).

Socioemotional selectivity theory suggests that the value of social interactions to people in later life lies within their depth and breadth rather than the novelty of additional connections, and that age-associated needs govern the salience of particular relationships (Carstensen, 1987, 1991). In advanced age, the affective element of established social contacts is typically more rewarding than the potential for information acquisition or future contact, and even supersedes the frequency of actual social interaction. Thus, despite older adults' selectivity in how they limit their social time, the time spent is valuable and beneficial on an emotional level (Carstensen, 1992). Older adults' concentration on established social networks also speaks to the increasing discernment or selectivity by which relationships remain valued and invested in over time (c.f. SOC).

Cultural perspectives of ageing

The theories above may be useful to understand behaviour in ageing adults but established theories will not be applicable to all ethnicities. Despite theoretically being an extension of one's earlier life, the reality is that being old is still stigmatised at times in societies that value individualistic goals; and the declines that accompany increasing age are viewed by some as

evidence of under-functioning (P. B. Harris & Keady, 2008). Collectivistic societies, on the other hand, attach greater importance to social and reciprocal connections rather than the uniqueness or autonomy of their individual members (Durie, 1994). Whilst not strictly a theoretical discourse, the more balanced approach to ageing that is followed by many collectivist societies sees elders as integral to the functioning of a healthy society and, as such, they are highly valued (Edwards, 2010).

Māori ageing well

Māori position ageing as a positive life course transition (Durie, 1999) and, in line with theories of active ageing, Māori elders fulfil significant roles within Māori society. Kaumātua (respected older Māori men and women) are seen in some sense as a conduit for knowledge and are looked to as leaders of tradition, advisors on tribal and community matters, and as important mentors and nurturers of youth. The reciprocity paradigm of Māori society functions in a particular way in older life, so, while iwi (tribes comprising hapū), hapū (sub-tribes comprising several whānau) and wider community participation is expected, kaumātua are also revered and well-cared for (Durie, 1999). For older Māori, the ability to make contributions to society and the strength of cultural identity are markers of wellbeing (Waldon, 2004).

To understand their health status, the ageing individual draws upon a world-view they have carried with them throughout their life. The Māori view of health, Whare Tapa Wha, connects health outcomes to wider community vigour rather than individual wellness (Durie, 1985).

2.3 Resilience in context

Resilience is receiving greater research attention in ageing studies as communities attempt to manage the effects of global population ageing. Synthesis of theories of resilience and theories of ageing provides a framework to expand the ageing-well paradigm within a socio-historical context. That is, older people are aware of their lives changing and are active participants (Hill, Kellard, Middleton, Cox, & Pound, 2007). Advanced-agers are usually well versed in their own competency and may become skilled manipulators in terms of seeking situational advantage. So, despite increasing disability older people continue to value life highly (Jopp, Rott, & Oswald, 2008), with centenarians found to have a more positive outlook on life than the young-old or old (Rott, Jopp, d'Heureuse, & Becker, 2006).

Socio-historical context – advanced age

The major context that flows through this thesis is that of advanced age. For a number of reasons advanced age should be seen as a specific context in relation to resilience. The following is a recap of aspects of resilience that have resonance in this time of life. These elements are further expanded in a conceptualisation in Chapter 3.

First, adversity is context-specific. The adversity related to resilience in research with older people has tended to focus on significant life events such as ill health and bereavement although both every day and more traumatic experiences also present challenges (Allen et al., 2011). In discussing survival (the 'mortality effect'), Walter-Ginsberg et al talk about illness, social isolation, physical disability and unhealthy lifestyles as general stresses and challenges affecting people in extreme old age and it is in resisting these challenges that people exhibit resilience (Walter-Ginzburg, Shmotkin, Blumstein, & Shorek, 2005). Thus, ill health and disability may be seen as the adversity and aspects of health-related quality of life may be seen as a positive outcome.

Secondly, particular resources will be of relevance and will relate to both the challenges of the adversity and the meaning of potential adaptive outcomes. The perception of adversity and degree of adaptation is posited to be related to a personal valuation of whatever domain is involved. With increasing age, some resources become less available (Paul B. Baltes, 1997). However, an intentional alteration in the value of resources over time reflects the shifting nature of needs with increasing age. Adaptive practices that contribute to resilient outcomes were discussed earlier in this chapter. Effective behaviours learned early on are likely to have a benefit at the end of life as well, particularly if they are reinforced so a longer life affords greater opportunity for resource attainment.

Thirdly, moving from usual ageing to successful ageing seems to be the key to describing resilience in advanced age (Allen et al., 2011; Hochhalter et al., 2011; Lamond et al., 2009), and may define 'resilient ageing'. Such movement acknowledges the 'ordinary magic' (Masten, 2001) of resilience, as ageing is the norm but people age differentially along a continuum. If resilience is an innate feature of living, then ageing well is also available to everyone, given the right circumstances. But what defines success in older life is related to what is possible, as well as what is desired. For example, active participation in a senior centre may be a pragmatic outcome after experiencing a major loss, even when mobility remains low. 'Thriving' (Carver, 1998) or

‘adversarial growth’ (Bonanno, 2005; Richardson, 2002) is an obviously advantageous and entirely possible outcome following a challenge, although it is not as common a goal as maintaining function. Nevertheless, older people are able to improve strength and balance, for example, to lessen the likelihood of falls (Robertson, Devlin, Gardner, & Campbell, 2001). Given that growth is possible, stability and improvement might jointly define resilience and the distinction might be better placed between individuals who resist or recover from challenges and those who succumb (Walter-Ginzburg et al., 2005).

Socio-cultural context – cultural values

Noting that cultural context must also be at the forefront of understanding resilience, Michael Ungar (2008) defines resilience as:

> both the capacity of individuals to navigate their way to health-sustaining resources, including opportunities to experience feelings of wellbeing, and a condition of the individual’s family, community and culture to provide these health resources and experiences in culturally meaningful ways. (p. 225)

Within the resilience construct, culture plays a role in the experience of adversity (such as discrimination and prejudice) and in the relevance of protective factors, particularly when coping with culturally-related stressors. Culture also affects the development of resilience and how resilience is manifest within cultural norms, i.e. what it means to be resilient for a particular culture. This section considers components of cultural resilience (as it is manifest in an ethnic sense) to provide a general justification for examining resilience resources and outcomes amongst Māori.

As a starting point, the notion of indigenous resilience, even as a concept, sits uncomfortably for some. There seem to be three arguments. Critique has been levelled at the impression that those who do not ‘overcome’ adversity lack sufficient personal strength. This notion clearly echoes the early conceptualisation of resilience as invulnerability, an approach that was roundly criticised in its own right. Māori, for instance reject a deficit lens in any aspect of health. Others are concerned with the implication that those who are resilient have suffered, for its implication that they are in some way not really ‘healthy’ or ‘whole’ (Boulton, Gifford, & Tamehana, 2010). Indeed, in most definitions it is not possible to achieve resilience without adversity. The difficulty, and the answer, is in traversing the concept carefully. Resilience has found ready discussion when examined within a culturally-relevant framework (Boulton & Gifford, 2014).

Unsurprisingly, factors rather different to those found in studies of resilience in non-indigenous peoples appear to be important to Māori; 'natural resources' including family and friends, links to their marae (traditional meeting place) and other institutions of culture, education (e.g. knowledge of the harmful effects of negative lifestyles) and understanding of their consumer rights (Boulton & Gifford, 2014). Individual and collective resilience are connected here.

A third major flaw of the resilience literature is that of an emphasis on individual response. This was noted also in relation to understandings of health earlier and runs counter to the sense of unity inherent in collective societies. It runs counter, as well, to a view for Māori, that attention should focus on historical and contemporary oppression and how that might be addressed instead of individual capacity (Boulton & Gifford, 2014). Interventions that are based on Western understanding, but aimed at addressing poor resilience for Māori, are misplaced. Notions of individual wellness, then, for Māori, must be discussed in terms of connections to others (Durie, 1985).

Resilience research is sparse in the NZ cultural context overall. International reviews have examined differences in the influences that affect cultural self-identity, such as values. Some work, for example, discusses the effect that cultural values have on goal-setting for older adults; by internalising the values of their culture, individuals are more able to make sense of their life (Fung, 2013). In younger samples, a person's cultural/ethnic identity has a positive relationship with resilient outcomes although it depends upon the status of the study group. For example, *enculturation* (identification with one's heritage cultural group) holds inherently different challenges to *acculturation* (identification with a majority ethnic group) and in international studies different effects have been found (Hwang & Myers, 2007; R. L. Walker, Utsey, Bolden, & Williams III, 2005). Although Māori are indigenous to NZ, disenfranchisement is an important notion with respect to older Māori in particular, who would have been exposed to the effects of colonisation early in their lifetime (see Chapter 6).

As put by Eggerman & Panter-Brick (2010), "*… culture functions both as an anchor for resilience and an anvil of pain"* (p 71), meaning, I suggest, that cultural ways and expectations provide cohesion and aid the understanding of resilient responses but will also provide unique challenges to the development and maintenance of resilience. Critique of the term resilience as it applies to Māori (and others) suggests that examination of strengths-based perceptions need to be carefully navigated. However, that different resources were important in the younger working Māori above than those found in non-indigenous studies supports an examination of potentially

protective resources in older Māori who will have experienced a different upbringing from younger Māori and older non-Māori. The current work aims to contribute to the understanding of cultural resilience.

2.4 Summary and working definition of resilience

In review, resilience is not yet well defined, making the construct complex to understand and difficult to assess across contexts. Nevertheless, this chapter has attempted to clarify the empirical and theoretical advancement of resilience as a research direction. Four distinct phases of inquiry have made contributions to the understanding of resilience although none, on their own, offers the full picture. Questions each phase attempts to answer about resilience might look like this:

Phase 1 (characteristics):	What resources contribute to resilience?/what contributes to different responses?
Phase 2 (process):	How is resilience expressed?/what are other responses?
Phase 3 (innate):	Who can show resilience?/what internal processes affect resilience?
Phase 4 (context):	When and why is resilience manifest?/what situational effects are influential?

The four phases seem complementary for this complex construct (Masten, 2001), usefully organising the detail around what factors contribute to resilience, how it is expressed and who is likely to demonstrate it. The first three phases of research are perhaps functions of the fourth, as it is only through knowing the context within which the agent operates that any detail about what is happening can be understood.

At a practical level, and notwithstanding the importance of context, a process orientation is the one most useful to research the operationalisation and outcomes of resilience. Traits define characteristics but resilience operates more widely than that and, in advanced age, the subjectivity of adversity, resources and adaptation suggests that these three elements be included in any conceptualisation. The Resilience Framework (Kumpfer, 1999) denotes six stages to the resilience process where the resource element is split rather than new elements added. The stages are: 1. stimuli to activate the process (adversity or challenge), 2. external influences (protective and risk), 3. person-environment interactions (social and connection variables), 4. internal

characteristics (protective and risk), 5. resilience processes (behaviours that maximise resilience) and 6. positive outcomes (successful adaptation). The stressor and the adaptation at either end are impacted by the essential ingredients of external factors, internal factors, interactions between them and other behavioural factors. Notably, the stressor is in itself a mechanism of enhancement via a learning experience as it is the beginning of the resilience process towards maladaptation or resilient reintegration (Kumpfer, 1999). These are the important aspects that make up resilience within any contextual space, the specific components of which, however, may be debated.

Introducing a conceptualisation of resilience in advanced age

Given debate about the components inherent in the resilience process, my definition and approach to investigating resilience are described below. I contend, specifically, that in advanced age life stage and cohort effects (historical experiences) interact in the individual to influence adaptation to age-related challenges. That is, relevant learnings and characteristics that are built up and change and develop over time are pulled out as resources when an individual is faced with adversity.

The following research:

1. Defines resilience as *"a dynamic process encompassing positive adaptation within the context of significant adversity"* (Luthar et al., 2000, p. 543). The definition is global and in that sense, applicable to multiple contexts; it stresses a dynamic process which allows for multiple influences on the construct as well as interactions between elements; and it links adaptation to adversity via context. Moreover, Luthar's definition is parsimonious.

2. Seeks to understand how resources such as those mentioned in this chapter (a positive attitude purpose and keeping busy, interactions and support from family and friends, engagement in culture) are spread amongst older people and how they facilitate the management of age-related health challenges. All resilience research considers the impact of resources on adaptive outcomes; it is predominantly in the naming and defining of resources that debate abounds and which are now promoted from a context point of view.

3. Emphasises the relationship between adversity and competent outcomes as promoted in Luthar's definition and as treated as an operationalisation of resilience in other work (for example the Berlin Ageing Study and the Longitudinal Ageing Study of Amsterdam; see Chapter 4). For

the purposes of this thesis, the term *adversity/competence dyad* is used to describe resilience that is defined by an adversity in relation to a positive adaptive response. For example, emotional wellbeing despite functional restriction is one age-related operationalisation of resilience. The adaptive response is related to the adversity in that lower self-rated health usually accompanies functional decline (Femia, Zarit and Johansson, 2001) and, thus, more positive responses may be seen as more resilient. My operationalisation defines resilience as functional status relative to health impairment.

In the following study, the interaction between resources and resilience will highlight this conceptualisation of resilience operating as a process.

CHAPTER 3: CONCEPTUALISING RESILIENCE

3.1 Comment on the chapter

This chapter synthesises the research and theoretical backgrounds to the resilience construct and places this synthesis within the first of the two thesis contexts of advanced age and culture. Capitalising on the previous discussion, resilience in advanced age is seen as common, salutogenic, historical, multi-dimensional and subjective. Resilience is considered to be a dynamic process rather than a defined trait (Greve & Staudinger, 2006).

A conceptualisation of resilience as it applies to advanced age is presented here. The chapter comprises a journal manuscript, published in the Journal of Ageing and Mental Health. Although the themes above are mentioned in the previous chapters, the aim of this chapter is to place them together within context rather than to repeat earlier text. The content of the manuscript should stand alone. The manuscript is included in its entirety.

3.2 Manuscript 1: Resilience in Context: the Special Case of Advanced Age

Introduction

In today's complex world, the capacity to navigate challenges inherent to living in the 'everyday' without succumbing is an obvious advantage. Traumatic experiences (and those perceived as such) pose additional challenges and reveal varied individual responses (Westphal & Bonanno, 2007). A desire to know who adapts to adversity more effectively (and why) has led to ongoing interest in the capacity for resilience - the ability to overcome or bounce back from adversity – with a suggestion that resilience is available to everybody (Bonanno et al., 2006).

As a construct, resilience has been focused on children and adolescents who certainly experience numerous trials and tribulations. Given the health and social compromises faced regularly by older adults, with their potential to compound as age advances, however, resilience is especially important in later life. A shift over recent years in the emphasis of health research from

limitations and illness to wellness (Antonovsky, 1990b) is matched by a move in gerontological research to identify and maximise what people are doing well rather than the shortcomings of age (P. B. Harris, 2006; Vaillant, 2007). Given the fact that people continue to contribute to society in multiple ways into their old age, understanding what support agencies, learning opportunities, and other interventions they need in order to remain capable and resilient to challenges is of obvious importance to a healthy society. This paper provides a conceptualisation of resilience (adversity, resources and outcomes) in very advanced age (the oldest-old), a life-stage somewhat neglected in the resilience literature.

Although resilience in the old has been reviewed by a few researchers (Allen et al., 2011; Stewart & Yuen, 2011; Wild, Wiles, & Allen, 2012; Windle, 2011; Windle, Markland, & Woods, 2008), and actively repositioned by others (Felten & Hall, 2001; Grenier, 2005; Greve & Staudinger, 2006; Hoge, Austin, & Pollack, 2007; Wild et al., 2012), the very advanced age group have been somewhat neglected. Commentary in lifespan and developmental perspectives, suggests that positive and negative adaptation is informed by both the presence and absence of resilience factors relevant and variable in different life-stages (Greve & Staudinger, 2006). In relation to later life, they contend that maintenance of quality of life is related to on-going resilience processes. Others argue for a more precise positioning of resilience within places of importance for older people and also for a recognition of the subjective needs of older people (Golant, 2011; Wild et al., 2012). In this view, prior conceptualisations of resilience understate the influence of community interdependence, where community members are agents as well as recipients of care.

Along these lines, recognition by health and service providers of the variety of contexts in which adversity is present and within which health care is assumed to be needed, has the potential to generate a more positive and ‘coherent’ experience for those who face increasing dependence (Grenier, 2005). In one of the few conceptualisations of resilience targeted at advanced age, Felton and Hall (2001) offer a gendered vision; however, because unifying policy implementation may be set by age, a more useful conceptualisation would position age as the key defining feature. Despite an explicit connection to social ageing, we believe that resilience work has an opportunity to align itself more clearly with challenges and resources relevant to people of advanced age.

Resilient outcomes result from the mobilisation of resources in response to adversity (Masten, 2001). In Figure 1 we propose an age-related model whereby a developmental and socio-

historical context (which includes physical and social life-stage and cohort factors) surrounds and defines these features.

This paper argues several points of difference with respect to the manifestation and operation of resilience in the oldest-old relative to younger old (and younger groups in general). First, that the challenges the oldest-old face are age-related, second, that the influence of situational and social factors on resilience is greater in advanced age, and third, that as health declines (as age increases) the capacity to achieve the same activities alters and means that tasks and outcomes may be valued differently than for younger people.

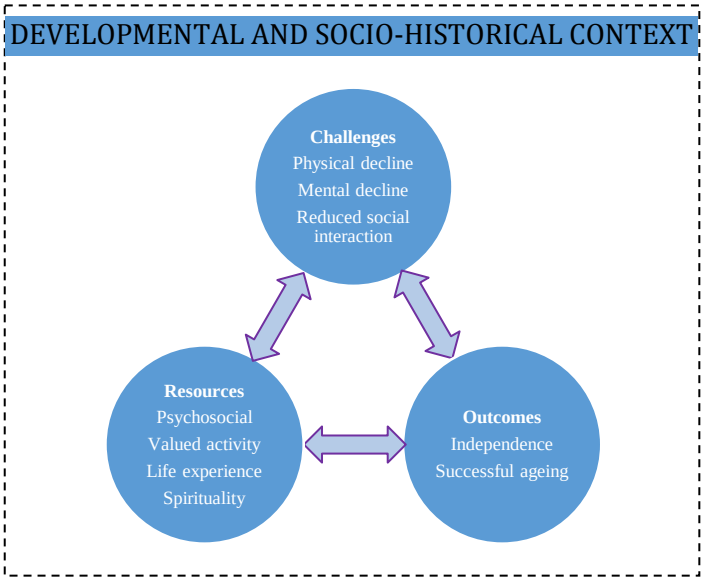

Figure 1: Resilience Process from a Developmental and Socio-historical Context

We begin this discussion by briefly outlining what is meant by resilience. The main portion of the paper is then devoted to describing the advanced age life-stage as a context that shapes how the oldest-old act and interact and what resilience might mean in this context. We comment on pertinent developmental perspectives and discuss what is different about the challenges and potentially mitigating resources of advanced age. We finish by returning to our conceptualisation to argue that the experiences and attainments associated with living into advanced age are central to understanding when and how resilience emerges among the oldest-old.

What is resilience?

Research on individual resilience stretches back to the 1950's when two seminal studies involving the children of schizophrenic parents (Rutter, 1979; Werner & Smith, 1982) showed that it was possible for children to achieve relatively unaffected futures despite seemingly insurmountable odds. These finding countered early assumptions that extreme disadvantage would inevitably have detrimental effects and that the absence of negative symptoms was rare and exceptional.

Broadly, resilience is described as the ability to achieve, retain, or regain a level of physical or emotional health after devastating illness or loss (Felten & Hall, 2001). Physical and social losses are of high importance to positive outcomes for the oldest-old (J. Smith, 2000). Other work suggests a difference between *resilience* and *recovery*, the distinguishing feature being the length of time to improvement, recovery implying improvement after a deep and long-term reduction in function and resilience being demonstrated when the impact of adversity is shorter-term or when there is no discernible functional decline at all (Bonanno, 2004). These approaches consider resilience to be about homeostasis, or maintenance of normal competencies under adverse conditions. Conversely, resilience conceived as *"an extraordinary and positive response to a challenge or stressor"* (Hochhalter et al., 2011) suggests that rather than merely 'getting through' a hard time, a resilient response denotes improved functioning. Although improvement is possible in advanced age, the extent of growth may be less than is evident in younger populations or may be modified with age (Paul B. Baltes, 1997).

Response approaches aside, various life-stage and cohort factors affect how people manage new experiences. Positive resources, also described as a 'resilience repertoire' (Clark, Burbank, Greene, Owens, & Riebe, 2011), are thought to shield individuals against setbacks. Sub-optimal resources, alternatively, may jeopardise adaptive outcomes (Luthar et al., 2000). The constant balancing of protective and risk factors determines the level of resilience in any given situation. Both adversity and protective resources are influenced by the degree of exposure to them and their significance to the individual. Protective resources may either maintain or enhance competence in stressful situations, or reduce adversity. It seems most likely that a combination of protective factors have a synergistic effect whereby greater benefit is possible together versus factors considered alone (Luthar, 1993).

Overall, resilience denotes a complex relationship between adversity, protective and risk factors and a positive behavioural response (Antonovsky, 1974, 1983). Resilience may be innate (Masten, 2001) and, importantly, the *process* of resilience in aged individuals is one of interactions and feedback specific to their life stage and cohort factors as discussed below.

What is advanced age?

A discussion of resilience amongst the oldest-old is facilitated when recalling who this group of individuals are. A global per capita population increase plus ever-improving medical techniques and increasing investment in community service means that people are living longer than ever before with the oldest increasing in number faster than any other age group (Kinsella & Phillips, 2005). The oldest-old (age 85 plus in developed countries) comprise 50% of the people who attain ages 50 or 60 (Paul B. Baltes & Smith, 2003) and constitutes more women, reduced social interaction, higher dependency (Bowling & Browne, 1991) and increased healthcare spending (Felten & Hall, 2001). But advanced-agers are also the most heterogeneous group (Blood & Bamford, 2010) with the greatest variability in physical and mental health (Wu, Schimmele, & Chappell, 2012). Moves to characterise the heterogeneity of people living beyond age 65, previously expressed as a single 'old' cohort, have been advanced by theories such as Baltes theory of 'incomplete architecture' which describes an increasing mismatch between gains and losses as the human body ages (Paul B. Baltes, 1997). Given evidence for some people of good psychological health in very old age *despite* physical compromise (Scheetz, Martin, & Poon, 2012), however, other processes appear to offset losses and enable the maintenance of good functional ability. Some researchers have suggested that people may move in and out of health states subject to the risks and resources they have available (Verbrugge & Jette, 1994). Advanced agers have been exposed to more events and particular challenges in development but have also had longer to develop effective coping methods.

It is not only the ageing adults themselves that are heterogeneous; the contexts in which they live also vary widely. Within the intersecting spaces of household, family, neighbourhood and community, particularly household and family spaces, where the oldest-old spend much of their time, mental and physical health concerns operate in conjunction with social concerns (J. Smith, 2000; Wild et al., 2012). Variability exists in decision-making ability, motivational practices, the importance placed upon daily activities, and access to social support. A more informed understanding of this socio-historical context is essential to maximising the wellbeing of the oldest-old who face an increasing timespan living with disability.

Resilience is context-specific - advanced age as a context

Although some resilience resources may be effective in multiple contexts, the existence of an overall resilience capacity is unlikely; resilience seems responsive to specific situations in both an inter-personal (Hochhalter et al., 2011) and an intra-personal (Luthar et al., 2000) sense. A developmental approach to resilience suggests that when people of different ages face the same situation they may have different experiences of stress. For example, few research studies in advanced age assess financial stress as an adversity. That people in advanced age rate financial stress differently than younger people may reflect previous experiences in managing frugality (Hill et al., 2007). The perception of adversity has also been found to differ between the agent and health professionals and researchers. Feelings of vulnerability in advanced age, for instance, appear to be triggered, not by the physical, psychological and social characteristics that are related to frailty, as clinicians or researchers would assume, but by fear of the unknown e.g. sudden health decline and dependence (von Faber & van der Geest, 2010) and anxiety about reduced personal control (Abley, Bond, & Robinson, 2011).

Secondly, the differences between those who do well and those who do not in the same situation is partially dependent on the resources the individual can draw upon. Resources are thought to be different in advanced age, with psychosocial resources more accessible and other resources perhaps less so (Jopp & Rott, 2006). But resources, too, are context-dependent (Kaplan, 2002). Social support, for example, is constituted differently for people living alone than for those living inter-generationally. Moreover, although having accessible social support may be generally protective, service providers, while well-intentioned, do not always accurately determine either subjective or objective need. For some people, living alone is a preference and the presence of care workers in their home adds stress rather than value. The degree to which social support resembles social capital (the value ascribed to social networks) depends upon how support is perceived by the recipient and how appropriately it is utilised. Age and the accumulation of prior experience is likely to be significant in influencing whether a resource is experienced as positive.

Thirdly, strategies employed by older people to maintain competence in activities they see as important are common. ‘Meaningful ageing’ (Stuckey, 2006) is now a central focus in gerontology work and seeing meaning in life experiences is a key component of resilience for ageing adults. Ageing is also a whole-of-life process (Goulet & Baltes, 1970) and, as such, adaptation along the way to facilitate desired and meaningful outcomes is actively sought. Now widely recognised for its utility in explaining behavioural decisions within gerontology, the

theory of Selection and Optimisation with Compensation (Paul B. Baltes & Baltes, 1990) proposes that when faced with limitations, older people select or retain fewer and more meaningful activities, optimise the activities they do well, and/or compensate for the losses they face by altering the way in which they accomplish tasks. People in advanced age recognise and actively strategise to manage losses and re-conceptualise them into a perception of ageing that maximises what they can do rather than what they can't (von Faber & van der Geest, 2010). Optimal individual functioning in response to age-related demands is theorised as an ecological approach to the person-environment interaction (Lawton & Nahemow, 1973; Satariano, 2006).

Misunderstanding the components of resilience in any context risks placing importance on activities that don't matter. This may be illustrated by valuation studies. In social contacts the oldest-old, in contrast to the young-old, seem to value phone contact over face-to-face support (Jopp et al., 2008), which may reflect a changing set of values with age and a psychological adaptation to declining abilities (Scheetz et al., 2012). In contrast to definitions of resilience that denote thriving, in advanced age loss management may be as important as regaining previous levels of function (Greve & Staudinger, 2006). Indeed, research suggests that the ability to keep going, i.e. to *maintain* activities that are both functional and meaningful, despite potentially significant challenges, may better define success for this age group than making and striving to achieve new goals (Ebner et al., 2006).

While the literature about contributions to resilience is growing steadily, empirical studies which focus on, or even include, people of very advanced age remain scarce. Little is known about age-related changes in the manifestations of resilience as few studies have compared resilience between older and younger populations or indeed between the oldest-old and younger old. However, the few relevant findings are consistent with the notion that there is considerable heterogeneity in late life (Jopp et al., 2008; Kotter-Gruhn, Kleinspehn-Ammerlahn, Gerstorf, & Smith, 2009; Kunzmann, Little, & Smith, 2000; Schindler, Staudinger, & Nesselroade, 2006; J. Smith & Baltes, 1997; Windle, Woods, & Markland, 2010) and that resilience is either stable or increases with age (Cherry, Silva, & Galea, 2009; Shen & Zeng, 2010; Staudinger & Fleeson, 1996; Zeng & Shen, 2010).

Antecedents to resilience in advanced age: adversity and resources

Advanced age provides a relevant context for resilience research in a number of ways. We might ask whether the exposure to (or experience of) adversity is different for the oldest-old than it is

for younger old, as well as consider whether different resources that might mitigate harm are available to the oldest-old. While good physical and mental health are amongst the most valued factors in maintaining wellness, older adults are aware of their lives changing and of meaningful activities becoming more difficult (Hill et al., 2007). Indeed, the changes that accompany and comprise ageing might themselves create an adversity of sorts, although Hilden et al caution against focusing on *ageing* rather than *changes* (Hildon, Smith, Netuveli, & Blane, 2008). Whilst ordinary everyday pursuits might offer a 'comfortable familiarity', whereby awareness of one's limitations are accepted, they also expose potentially challenging age-related changes (Wright-St Clair et al., 2011). Neither adversities nor protective and risk factors have been systematically analysed within the oldest-old (Hildon et al., 2008). Below we reflect upon the unique challenges and resource experiences available to this group, drawing from what is known about advanced age in this area as well as the literature addressing resilience in older age more broadly.

Adversity in advanced age

Losses, particularly related to physical health and social networks, seem central to the oldest-old (J. Smith, 2000). Chronic disease and disability are major contributors to hospitalisation and institutionalisation in advanced age, as well as the need for home care (Bonanno, 2004; Ostir et al., 1999). Physical and social aspects of ageing are highly connected. People with greater physical dependence tend to rely more heavily upon family and friends in times of need and often live geographically close to these sources of informal support (Bowling & Browne, 1991). But, unfortunately, while the need for informal and formal instrumental support may increase, loss of significant others (e.g. spouses) is also higher in advanced age, reducing access to this personal reserve. Similarly, vulnerability to poor health outcomes, which is more common in advanced age, is affected by social influences and positive and negative aspects of human agency (Schröder-Butterfill & Marianti, 2006); that is, the exposure to and ability to cope with risk affects an individual's susceptibility to harm. A qualitative study of successful ageing found that while current or projected health declines were of major concern to octogenarians, it was the effect of disability on social opportunities that caused the most distress (von Faber & van der Geest, 2010). Functional ability, therefore, seems to negatively affect overall capacity rather than just the achievement of immediate activities. With increasing limitations in mobility and decreasing access to informal support systems, opportunities for the very old to engage socially also become more elusive.

Negotiating ordinary everyday activities may be a source of stress modifiable by resilience resources (Ong, Bergeman, & Boker, 2009). Paradoxically however, although increasing losses

and compromises in advanced age should translate to increased stress, older adults tend to report less frequent and less severe daily stressors (Almeida & Horn, 2004). Daily stress has been investigated as a dependent variable in studies of adaptation for older people (Diehl & Hay, 2010; Ong, Bergeman, Bisconti, & Wallace, 2006) but rarely specifically in those of advanced age. One study, finding age-related effects in stress reporting, hypothesised that stress experienced over time facilitates a more balanced perspective of new stresses and that the effects of stress are actively minimised by those in poorer health in order to avoid further compromise (Aldwin & Yancura, 2010). Despite differing perceptions of stress and although potentially impacted by different coping strategies, *responses* to routine stressors could be similarly adaptive for the oldest-old compared to others (Aldwin, Sutton, Chiara, & Spiro, 1996). Serious trauma, such as environmental disasters, as have occurred across the globe in recent times, may also compound already reduced social circumstances for the oldest-old. There are complexities for older people around receipt of care in times of crisis; nevertheless, resilience is evident in reports of older adults response to disasters (Davey & Neale, 2013) and they may even actively contribute to disaster relief (Cherry et al., 2009; Davey & Neale, 2013).

As well as personal complaints, inter-personal social and community factors are more salient in advanced age compared to other ages (Luthar et al., 2000). The coping literature suggests that older respondents, compared to others, perceive stressors that are experienced by their significant others, particularly family members, as more salient than egocentric ones (Aldwin & Yancura, 2010).

Resources in advanced age

In addition to generating some age-normative challenges and stressors, very late life is also a time in which the resources needed for resilient responding vary. Adaptive resources, while similar across the life-span, may be weighted differently in advanced age (Connor & Davidson, 2003; Hoge et al., 2007; Kumpfer, 1999; Lamond et al., 2009). For example, informal social support is a key determinant of independence and well-being amongst the oldest-old, more-so than in other age groups. Key social, psychological and attitudinal resources relevant to the understanding of resilience in advanced age are described below, with the focus resting on possible differences between the oldest-old and younger old.

Social support - informal and formal, emotional and instrumental, received and given – is a central resilience resource in advanced age. Social support operates protectively by providing help, companionship, advice or advocacy, and by validating an individual's worth (Fiori, Smith,

& Antonucci, 2007). Informal support is usually supplied by family members (Bowling & Browne, 1991). In ageing studies greater resilience is associated with greater formal support (Netuveli, Wiggins, Montgomery, Hildon, & Blane, 2008), higher quality social relationships (Hildon, 2009), and more frequent social participation (Blane, Wiggins, Montgomery, Hildon, & Netuveli, 2011).

Interestingly, studies of spousal loss in older men have found significant levels of resilience (Bennett, 2010; Bonanno, Wortman, et al., 2002; Moore & Stratton, 2002), despite the loss of a key supporter. Hardiness (O'Rourke, 2004) and sense of control (Ott, Lueger, Kelber, & Prigerson, 2007) are other resources found to speed up adjustment to widowhood. Greater pre-loss acceptance of death (Bonanno, Wortman, et al., 2002) and preparation for death (Ott et al., 2007) may also help explain high resilience to widowhood in advanced age, as bereavement is often predated by ill health which is more commonly experienced as age advances.
Equally, a positive perception of the self might contribute to resilience by helping to mitigate the stigma of ageing as a period of decline (Brandtstadter & Greve, 1994). Time to adapt to age-related changes is important to survival into advanced age (Kotter-Gruhn et al., 2009) and the oldest-old do seem to have higher self-rated physical health when they feel younger (Infurna, Gerstorf, Robertson, Berg, & Zarit, 2010; Liang, 2014). In another study, although visual impairment was associated with high rates of depression in nursing home residents (42.5%), adaptation to nursing home living decreased depression (Ip, Leung, & Mak, 2000).

With increasing age, control over external events is decreased (Lachman, Rosnick, & Rocke, 2009) and may be reflected in a reduction of assimilative (active) coping as the costs required to actively cope are perceived as too high to bear (Golant, 2015). The more emotion-focused coping style employed by the oldest-old (accommodative coping) seems to be most effective for events where problem-focused coping options are few; such events may be more likely in very advanced age. The Maturation hypothesis suggests that mature and effective coping styles and greater wisdom may buffer against severe late-life stress (Blazer & Hybels, 2005). ‘Meaning-based coping’ sustains positive as opposed to negative emotional responses to stressful situations and may be particularly relevant to advanced-agers achieving resilience (Folkman, 1997). An holistic view of ageing suggests that social productivity is also valued by older people and aspired to as a means of maintaining wellness or resilience (Wiles et al., 2012). Engaging in valued activities provides meaning (Paul B. Baltes & Baltes, 1990) and may tap into the advantages of being socially-connected.

There is growing evidence that previous exposure to stressful events also contributes to the manifestation of resilience during later events (Jennings, Aldwin, Levenson, Spiro III, & Mroczek, 2006). It works by providing a reference for positive action, empowering the individual through enhancing self-efficacy, or possibly by inoculating against stressful effects (Aldwin et al., 1996). People in advanced age have a unique history to draw from when adapting to challenges. An 85 year old in 2015, for example, would have been born in 1930 and would have lived through global, formative experiences such as the Great Depression, WWII and social movements after WWII (Consedine, Magai, & Krivoshekova, 2005). Reflecting upon past life events is an active strategy employed by older people when facing adversity; indeed life review involves connecting what *was* to what *is* in the experience of very old people (Gattuso, 2003).

Finally, adversity and resilient resources are effective right up until the end of life. Qualitative work with people living with terminal illness shows that reliance upon effective past strengths, meaningful life-review, and spiritual and social connections provide some relief from the negative effects of illness and the dying process, or negotiating through the health system at the end of life (Nakashima & Canda, 2005). Octo- and nona-genarians have a more accepting perspective of death than the younger old and feel comforted by religious and spiritual perspectives (A. Clarke & Warren, 2007), contributing more closely to fulfilment of their personal potential at their end of life.

Conceptualisation of resilience in advanced age

So, adults in advanced age are usefully characterised both in terms of the specific challenges they face as well as the resources they have to manage them. These two factors combine to offer insight into resilience in advanced age, an important consideration given that degrees of resilience may hold the key to health improvement (Verbrugge & Jette, 1994); those with greater resilience improve faster in the face of adversity.

The foregoing discussion shows that although a disease-free old age is unlikely for most people (Hildon, Montgomery, Blane, Wiggins, & Netuveli, 2009), advanced age does not preclude the existence of resilience. Developmental psychology's suggestion that older peoples' dignity is at risk due to the drastic difference between the resources available to them and biological decline (Paul B. Baltes & Smith, 2003) is countered by evidence that quality of life, a positive attitude and age-related competencies exist amongst the oldest-old. Resilience may even be higher in advanced age than at other ages (Staudinger & Fleeson, 1996), perhaps because life experience

plays a major part in resilient outcomes. In conceptualising resilience within the context of advanced age, we have highlighted the importance of the developmental and socio-historical context that surrounds adversity, resource availability and mobilisation and positive adaptation. The subjective evaluation of these elements is key but perhaps the most important difference in the way resilience operates for people of advanced age compared to others is the length of time the oldest-old have had to accumulate experience. Four points of difference are expanded below.

1. Resilience is an ongoing process

The resilience process mobilises existing internal and external factors to reduce the negative effects of stressors and achieve positive outcomes, be they maintenance or improvement. In the developmental process, these elements are constantly updated through conscious or unconscious internalisation of experiences and thus they change over time (Luthar et al., 2000). Even in later life, positive outcomes, such as successful coping, are assimilated into one's psyche and build upon one's world view to become a future referent (Nakashima & Canda, 2005; Richardson, 2002). Through their interactive nature, the elements also feed into each other. Wherever competencies are able to confer advantage they contribute to a happier and more resilient ageing experience.

2. The perception of adversity is dependent upon experience and meaning

People in advanced age have had more time and opportunity to be exposed to stresses and to develop resources to deal with them. Someone in their 80's now is experiencing unique age-related conditions and cohort effects, as well as coping with societal stereotypes of ageing. Significant world events have occurred that will not be part of current generational experiences. However, surviving trauma can have benefit as well as loss; for example, by increasing confidence in one's coping ability. Data suggest that WWII veterans who experienced the greatest adversity during the war showed the greatest improvement in resilience in later life (Elder & Clipp, 1989).

Consistent with Luthar's argument that adaptation to high stress situations is more reflective of resilience, with increasing age and frailty, managing ordinary daily tasks represents an ongoing challenge which can be interpreted as a high stress situation (Guilley et al., 2008). However, as importantly, the reality of normal life changes for the oldest-old may be accepted in the light of past experiences as even people with seemingly low resilience express pride in having once been strong and active. Their comparison with others who they think are worse off may be a 'normalising' effect of growing older (Aléx & Lundman, 2011). Thus, the subjective meaning

ascribed to an experience also influences its impact. Moreover, what is adverse in one situation may be protective in another for the same person and may vary across the life course (Elder & Clipp, 1989). For example, although personal life investment is generally considered to be adaptive, *low* personal life investment was protective of a positive perception of ageing given higher somatic risk in the very old, supporting the notion of selectivity of activities as age and disability increase (Staudinger, Freund, Linden, & Maas, 1999). Factors such as social support and the memory of past actions that work in favour of resilience when they are positive, can create stress when they are poor or lacking (Aléx & Lundman, 2011).

In addition to the advantage of experience, the perception of challenge is affected by current health state, self-efficacy and other adaptive behaviours. That is, those who are more compromised (physically or otherwise, but commonly as a function of age) may under-rate adversity because they can't afford additional compromise; the knowledge that one has effective resources and that positive outcomes are possible (self-efficacy) may mitigate the strength of a stressor; or, because older adults already creatively manage routine activities, when faced with the same stressors as younger people the perception of hardship is likely to be lower.

3. Although the same resources may be protective, they should be weighted differently
Even towards the end of life, resilient responses to adversity may be enhanced by a history of positive learning experiences, multifaceted personal strengths and the ability to draw upon accumulated and new systems of support. Living to a greater age builds up an asset pool. However, because perceived adversity and opportunities to acquire resources are different in advanced age, different protective resources are required. The influence of situational and social factors on resilience is likely greater in advanced age suggesting the need for appropriate weighting on factors such as life history and external support from other people. Such factors have been identified as conferring resilience in longitudinal studies of ageing, which also focus on age-relevant adversities such as physical impairments and bereavement (Nygren, 2006; Staudinger et al., 1999).

4. Resilient outcomes in advanced age are about maintenance of functional competence
Although various outcomes are possible in dealing with any adverse situation, maintaining competence and independence may be the most salient outcomes for the oldest-old whose goals tend to be focused on immediate needs. Independent living is a goal for many but how that is achieved rests upon an individual's values and what makes sense to them. That is, although physical improvements, such as shifting from a sedentary to a more active lifestyle, may

demonstrate thriving or resilient growth (Richardson, 2002), others have found that in advanced age the ability to retain activities that are comfortable and hold importance in daily life may offer a sense of security to the older person (Wright-St Clair et al., 2011). Indeed, 'resilient ageing', with a focus on subjectively achievable goals, seems more realistic for people of advanced age (P. B. Harris, 2006).

The fact that individuals are more concerned about how they *function* than what they are able to *achieve* reflects the concept that actions are readily translated into functional reality for people in advanced age. In this sense function is broadly defined as both physical and emotional competence to achieve subjectively important resilient outcomes. Resilient outcomes hinge upon the person's own experience of environmental challenges and decisions are made within that space that utilise available resources to enhance congruence between the person and their environment (Golant, 2015).
Advanced agers who are aware of their health changes and needs may be able to actively influence their own health outcomes. Research is consistent with the notion that advanced age is not a barrier to a personal investment in health (Hall, Chipperfield, Heckhausen, & Perry, 2010) or to subjective wellbeing (Lawton, Kleban, Rajagopal, & Dean, 1992). Consideration of the views and specific motivations of the people who are approaching very old age, then, is essential to an appropriate conceptualisation of resilience.

In summary, the developmental and socio-historical context affects the exposure to and experience of, measurement of, and impact of adversity and resilience. Our conceptualisation underlines the importance of individual approaches to wellness at best and cohort-focused approaches at a minimum. Awareness by health professionals and service providers of the potential of the oldest-old to maintain competency despite health challenges has the potential to improve their QOL and lead to more 'coherent' health treatments and end of life processes.

Implications for practice

There are many ways to maximise resilience to enable best outcomes for those in advanced age but resources have to be focused in the right place to be effective, targeting what is possible and what is important. Communities can promote resilience by validating advanced age as a productive time rather than a burden. This includes recognising the place of older people in relation to productive activity such as part-time work and maintaining opportunities for social

engagement outside the home and enabling access to these. Interventions, furthermore, need to actively seek and include the oldest-old who are often living alone.

The oldest members of society argue that involvement in service is a key component of their resilience (Stanford, 2006). Recognising that they often have the time to give to others in productive and caring activities can help to alleviate some of the burden on family and community members caring for dependents. The concept of 'lifelong learning' means that new experiences have the potential to inform current self-perceptions and life-view (Pincas, 2014) and contribute to adaptation. Encouraging age-directed learning into advanced age includes more than formal learning but also skills training, volunteering and learning new creative activities. Learning opportunities offered by local councils, charities, voluntary organisations and self-help groups such as the U3A (University of the Third Age) have the potential to maximise civic involvement and productivity.

The most resiliently ageing older adults might be the ones who are able to review their lives as active coping strategies. An emphasis on emotion-focused coping suggests that interventions could focus on boosting emotional intelligence (Allen et al., 2011). Given, also, that many stressors in late life have psychological impact (chronic illness, dependence, loss, loneliness), this means encouraging positive emotional reappraisals of events that have caused negative feelings, thereby shifting the consequences to more positive ones. On the other hand, efficacious outcomes can also be achieved by encouraging largely passive older people, aiming to simply minimise their distress, to expand their range of manageable activities or to accept problem-focused action from others (Birkeland & Natvig, 2009). As well as identifying strengths and resources that older people have, when resources are limited, vulnerabilities (tempered by acknowledgment of the needs and motivations as expressed by the individual) can be alleviated by providing 'place resilience' through age-appropriate architectural and urban design (Golant, 2015) and sound community-based support and formal homecare services.

That adversity and resources are different in advanced age has important implications for the measurement of resilience. Multiple methods have been used to measure resilience, including self-report resilience scales. However, measures that appear to assume that resilience is an age-neutral construct with largely psychological components should be used cautiously given the situation-specificity and multidimensionality of resilience and the likelihood that both challenges and resources fluctuate in age-normative ways. For example, the oft-cited Resilience Scale (Wagnild & Young, 1993) assesses only internal characteristics, omitting the valuable

contribution of other mechanisms of support that are important to those in advanced age. Other scales are similarly incomplete with little attention paid to context-specific factors. Nor have resilience scales been developed specifically for people in advanced age. Such instruments should attend to the specific challenges faced by ageing adults as well as assessing the maintenance of function rather than exclusively concentrating on improvement. Scales of any sort are problematic given the complex nature of resilience. Other methods of measurement, such as resource clustering show promise (J. Smith & Baltes, 1997).

Conclusion

In conclusion, the contexts through which adversity is experienced and in which it is expressed are increasingly central to understanding resilient outcomes. Above, we have suggested that the developmental and socio-historical background of advanced age is usefully conceptualised as a resilience-relevant context; one which recognizes the heterogeneity of what was once thought of as 'old' age. An appropriate conceptualisation of late-life resilience should emphasise subjectivity and life experience in relation to the challenges, resources and adaptive outcomes that typically occur for these individuals. This conceptualisation has been necessarily constrained as the topic is broad and complex. We have tried to incorporate examples that reflect the most salient aspects of advanced ageing and how they combine to create a specific context in which resilience may manifest. Coupled with strategies the older person can undertake to maximise their resilience, and spurred on by the increasing global life span, developing a better understanding of resilience in advanced age has the capacity to benefit older people through more focused service development, intervention development, and successful ageing strategies. In truth, resilience thrives upon adversity and may constitute a process by which people can make the most of their longer lives and live them out with dignity.

CHAPTER 4: EVIDENCE FOR RESILIENCE IN ADVANCED AGE

The aim of this chapter is to describe empirical research that has met the synthesis between resilience and ageing to provide context for the empirical sections of this thesis. The time of advanced age has received little specific research attention, however, even in longitudinal ageing studies. Of over 60 longitudinal studies enrolling only people over age 65, only around 10 focus specifically on people aged 80 and over (Thorpe, 2014). LiLACS NZ, initiated in 2010 in NZ, is one of the only longitudinal ageing studies to measure resilience.

In younger-old populations resilience or related constructs have been investigated in relation to quality of life in the Boyd-Orr study (Hildon et al., 2009), life satisfaction and psychological wellbeing in the Michigan Health and Retirement Study (Ryff, Singer, & Palmersheim, 2004), depression and anxiety in the PATH Through Life Project (Burns, Anstey, & Windsor, 2011), physical functioning in the In-CHIANTI study (Milaneschi et al., 2010) and emotional wellbeing in the BASE (Kunzmann, Little, & Smith, 2002). If a general comment can be made about prior findings, it is that resilience is commonly associated with positive health outcomes in older age. While such findings uphold the notion of positive or healthy ageing, they are also complicated because poor health may equally be an adversity, particularly in advanced age when health often declines. The conceptualisation of a research question becomes paramount, then, to any conclusions that may be drawn. In the current work the focus of outcomes is on health-related quality of life and psychological health with a minimisation of health-related concepts as resilience adversities or risks resources. A general comment may be inadvisable anyway because findings have shown themselves at times to be counterintuitive. Reasons for counterintuitive results from the studies below are proposed.

4.1 Research: resilience and psychosocial outcomes

Findings in relation to resilience from seven large-scale longitudinal studies of ageing are outlined. In the absence of research enrolling only those of advanced age, general ageing studies have the greatest contact with the oldest-old and predominantly offer robust research design and results. However, reflective of the difficulties experienced in adequately defining resilience,

empirical study in ageing populations also demonstrates methodological inconsistency. The elements of adversity, resources and adaptation all appear but resilience has been investigated from different angles; as an outcome, a predictor or as a mediator, and studies ask different research questions. Additionally, single predictor variables have sometimes been equated with resilience, which runs counter to the process theory of resilience that highlights multiple influences.

Although methodological differences make comparison between studies difficult, certain resilience resources are emerging as important to resilient ageing. The first two longitudinal studies of ageing discussed assessed resilience resources as mediators or moderators between adversity and a positive health outcome. They are well known studies and the first has a strong interest in resilience in advanced age as a subset of a wider age band of participants (Paul B. Baltes & Mayer, 1999; Jonker, Comijs, Knipscheer, & Deeg, 2009). The resources assessed include *personal life investment* and personality resources (*coping, neuroticism, self-efficacy* and *mastery*). In these studies, resilience was defined primarily as an adversity/competence dyad, with adversity and competence defined by variables salient to old age; that is, functional limitation relative to emotional health. The third study below (Jeon & Dunkle, 2009) assessed mastery and social *support resources* as mediators of a stress/mood dyad in people of advanced age.

The Berlin Ageing Study

The Berlin Ageing Study (BASE) is a seminal study in ageing research with data collected over eight years. The resulting database offers a comprehensive array of research findings on resilience and related constructs in the oldest-old. Age stratification (oversampling the very old; age range 70-103 years with a mean age of 85 years) has enabled comparison between the oldest-old and younger old. Resilience was operationalised in BASE as emotional well-being despite physical constraints; morbidity, vision, hearing and ADL function (Staudinger & Fleeson, 1996). Potential resilience resources, coping and personal life investment, were assessed for a mediation effect between the elements of the dyad.

First, a negative longitudinal relationship existed between constraints and emotional well-being indicating lower resilience over time. Coping and life investment decreased with age. Secondly, for the oldest-old with moderate physical constraints, coping and investment in physical health were associated with higher emotional wellbeing, indicating the predictors had a protective effect.

Flexibility in coping (utilising a range of coping styles) also positively contributed to resilience, implying that having adaptability in the techniques used to cope may be advantageous when physical constraints increase (Staudinger & Fleeson, 1996).

In another study resilience was defined as the maintenance of satisfaction with ageing despite increasing physical, cognitive and socioeconomic restrictions. However, the relationship between potentially protective self-related processes (neuroticism, positive emotions, coping style and personal life investment) and this adversity/competence dyad was not as expected. The resources did mediate the relationship but in surprising ways (Staudinger et al., 1999). For example, higher neuroticism was associated with higher adaptation to physical impairments. In advanced age, with increasing disability, a desire for help may boost satisfaction with ageing. Or, alternatively, the experience of adversity may be altered by higher neuroticism which would focus attention on less than optimal areas of life (Staudinger et al., 1999). Low personal life investment was also protective of the perception of ageing given higher somatic risk, which supports the notion of selectivity of activities as age and disability increase.

Longitudinal Ageing Study of Amsterdam

Mastery seems to be one of the most robust resilience resources in protecting against the effects of functional decline, certainly in the old age group. The Longitudinal Ageing Study of Amsterdam (LASA; participants aged 55-85) assessed mastery, self-esteem and self-efficacy for mediation effects between persistent deterioration of functioning (PDF: persistent decline in cognitive functioning and/or physical functioning, and/or increase of chronic diseases over time) and emotional wellbeing. Tracing PDF over six years and four data collection points, 163 individuals out of 608 met criteria for PDF at year six (Jonker et al., 2009). A mediation effect was supported in the analyses, suggesting that coping is important in minimising the negative psychological effects of functional decline in older people. Although the relationship between PDF and emotional wellbeing was not defined specifically as resilience in this study, the findings support coping as an adaptive mechanism.

In other analyses, mastery, neuroticism and self-efficacy were assessed as predictors of recovery from depression. High baseline mastery and low neuroticism but not self-efficacy, predicted recovery from depression after nine years (Steunenberg, Beekman, Deeg, Bremmer, & Kerkhof, 2007). Having no functional limitations also predicted improvement in depression but was no more predictive than the personality variables, suggesting that mastery and neuroticism have

additional protective impact over physical health on depression. Mastery, or feeling 'in control', is thought to confer benefit by reducing the negative impact of events and enabling more effective adaptation. Neuroticism moderates negative rumination and might have a greater positive effect on a mood disorder than on satisfaction with ageing as in BASE. Self-efficacy is related to mastery so a potential significant effect for self-efficacy may have been masked by mastery, or confounded by an association between self-efficacy and physical decline, as both physical decline and depression increase with age (Femia, Zarit, & Johansson, 2001). In a moderation model, mastery and neuroticism did not moderate the negative impact of deteriorations in functional limitations or pain on depression. A limitation of this study was the long three-year timespan between waves and, thus, potential confounding effect of unaccounted-for mood changes during that time.

The oldest-old in everyday life

A less well-known longitudinal study of people aged 85 years and older also supports mastery as a protective resource. Increasing depression across two years was associated with increased stress, defined by a slower increase in positive but not negative life events, and a faster increase in daily hassles (Jeon & Dunkle, 2009). Mastery seemed to provide a protective effect in that a faster increase in positive life events was associated with a faster increase in mastery and led to a slower increase in depressive symptoms. That negative life events were not associated with increased depression was proposed to be due to older adults normalising negative events (Jeon & Dunkle, 2009). Results of the BASE study also suggested a normalising effect of health expectations for the oldest-old as a felt age/actual age discrepancy did not increase with age for people with poorer health at baseline the way it did for people with better health (Kleinspehn-Ammerlahn, Kotter-Gru¨hn, & Smith, 2008). Positive stressors affect mastery in a positive way (Jopp & Schmitt, 2010).

The next two studies assessed resilience as an outcome. Both are longitudinal studies of ageing that add knowledge to how *social* and s*ocio-demographic* factors relate to resilience in ageing although neither focused on the very old.

British Household Panel Survey

In the British Household Panel Survey (BHPS; participants aged 50+ years) resilience was operationalised as a change in a single variable over time, although it was also assessed for a

relationship with challenges of ageing. General Health (Goldberg & Williams, 1988) was measured over three study phases and an increase then a decrease defined resilience (Netuveli et al., 2008). An adverse change in status between phase one and phase two for functional limitation, bereavement or marital separation, or poverty delineated adversity. Social variables were assessed as predictors. First, having someone to rely upon at baseline predicted a change in general health more powerfully than liking the neighbourhood in which one lived, not planning to move from there or additional adversity, conferring a 40-60% greater chance of being resilient compared to those who had low social support. By this definition of resilience social variables were protective of decline in health perceptions.

When adversity was included in analyses in the third phase, all variables lost significance as predictors of resilience. Formal social support is often instigated following functional adversity such as a fall, particularly if functional decline is likely to be a problem, but this study seems to suggest that support is of more use when it is routinely fostered or, at least, promptly instigated during adversity, than when it is provided after a stressful event. However, while these results may be useful in understanding resilience-related resources, this is where their value lies rather than in defining resilience as an outcome.

English Longitudinal Study of Ageing

While social support (and social participation and other relationships) is cited by older people as a key resource, it is a complex construct, with elements of need and independence complicating positive findings (Adams, Leibbrandt, & Moon, 2011). The following study assessed the relationship of social variables to a measure of resilience, generating counterintuitive findings. The English Longitudinal Study of Ageing (ELSA; participants aged 54+ years) operationalised resilience as the non-worsening of depression following deterioration of mobility or widowhood (Demakakos et al., 2008). Data were collected over three time points with adversity reported in Wave two. Outcome variables of quality of life and expectancy of survival (a proxy for longevity) were significantly different between resilient and non-resilient people at all three time points.

In cross-sectional analyses, for the oldest respondents (aged 75+), both education and material wealth were graded by resilience, that is, the higher the factor the higher the resilience, suggesting that these are important resources for managing adversity in this generation. But, surprisingly, given the strength of the relationship found in other research, neither social support

nor other socio-demographic factors influenced resilience. Nonlinear, age-related factors or methodological differences may account for this finding. For example, a depression-related resilience measure may be limited in its application. When resilience was operationalised as quality of life (QoL; measured with the CASP-19) despite having a functionally limiting condition, the negative relationship between QoL and functional limitation was moderated by social relationships: frequency of contact with friends ($p=0.033$ for interaction term), social participation ($p<0.001$), membership of social organisations ($p<0.001$) and engagement in leisure activities ($p=0.001$) (Blane et al., 2011). The CASP-19 is a validated quality of life instrument (Wiggins, Netuveli, Hyde, Higgs, & Blane, 2008). It was developed from the Boyd-Orr cohort, which was interested in the relationship between life-course factors and QoL at older ages. Because it is applicable to late-life populations and was applied in a life-course setting, it may better capture age-specific social relationships.

Resilience assessed specifically in the oldest-old

The Umeå 85+ study of Northern Sweden assessed resilience both as a predictor and as an outcome. This study is one of the few longitudinal studies of ageing using a formal (self-report) resilience instrument and concentrating specifically on the oldest-old. The study enrolled three cohorts, aged 85, 90 and 95+ years and although the sample overall is smaller than in other studies reviewed here, the numbers of the oldest-old is comparable. The relationship between resilience and QoL was assessed for 125 participants. Resilience was assessed by the Resilience Scale (Wagnild & Young, 1990) and QoL by the SF-36 physical and mental component summary scores (Ware & Sherbourne, 1992). When entered as an independent predictor, resilience was not related to either physical or mental health-related QoL, but an aggregated measure of inner strength that included resilience, sense of coherence, purpose in life and self-transcendence significantly predicted higher mental health-related QoL ($p< 0.001$). The Resilience Scale has not been widely validated in ageing studies so may be limited in scope in this population, as evidenced by the improved significance when included in multivariate analyses. Indeed, a qualitative follow-up interview with 24 participants who scored in the highest quintile on the Resilience Scale found gender differences in life perspectives that the scale hadn't picked up (Aléx, 2010). Less structured measures of resilience may be more useful in an advanced age population (see Chapter 5).

Resilience was also examined as an outcome in relation to variables that were significant in univariate analyses. The predictor variables were health-related (depressed mood, number of

psychological symptoms, self-rated general health, death anxiety, independence in ADL, taking no prescribed drugs, and feeling safe and secure), disease-related (heart failure), social (feeling lonely and having family to talk to) and demographic (living in one's own housing, and number of children). Together, the variables explained 27.5% of the variation in resilience scores (p=0.000), supporting a multi-dimensional nature to aspects of resilience. Health variables (the absence of depressed mood and psychological symptoms, and not being on medication) explained the greatest variance (Nygren, 2006).

Resilience assessed in a New Zealand sample of older people

Resilience has not been specifically studied in NZ with ageing adults. The New Zealand Longitudinal Study of Ageing (NZLSA) is the closest longitudinal study in NZ. NZLSA surveyed 4,000 people aged 50-84 years in 2010 and continues to interview subgroups for specific projects. To address resilience, NZLSA re-purposed the Five Areas model of cognitive-behaviour therapy to increase its alliance with community adversity (see Chapter 2) (de Terte et al., 2010). The resulting 5-PR model measures resilience resources and was applied to a study of police officers and ex-police officers to assess resilience to traumatic experiences (de Terte et al., 2014). Results suggested adaptation of the model to three resources instead of five – cognitions, environment and behaviours. These three were associated with fewer symptoms of posttraumatic stress, less psychological distress and better physical health. They are supported as resilience resources in a younger sample of New Zealanders.

4.2 Other resilient outcomes

Resilience and survival

Based on findings related to positive health, studies have started to investigate whether resilience might delay death. Not counting studies which used a proxy for longevity, two longitudinal studies have found a positive relationship between resilience and greater survival; one in the United Kingdom (UK) and one in Israel.

The UK study used data from over 20,000 people aged 41-80 years gathered during 1996-2000 for the European Prospective Investigation into Cancer study, (EPIC)-Norfolk (Surtees, Wainwright, Luben, Khaw, & Day, 2003). Results showed a 30% reduction in all-cause, cardiovascular, and cancer mortality three years (stage two) later for people with a strong sense of

coherence using a three-item version of the Sense of Coherence Scale (Antonovsky, 1987b). Death data for the period from inception to seven years later showed that a strong sense of coherence reduced mortality by 6% through the mechanism of perceived adaptation reported at stage two (the cumulative perceived impact of adverse events experienced over their lifetime) (Surtees, Wainwright, & Khaw, 2006). One's sense of coherence scale may vary over long time periods (B. Nilsson, Holmgren, Stegmayr, & Westman, 2003) and retrospective reporting is more difficult for older people which may account for lower results in the second study. Nevertheless, adaptive capacity seems to mediate a sense of coherence and mortality.

The Israeli Cross-Sectional and Longitudinal Ageing Study (CALAS) reported equivocal findings about resilience as a predictor of survival. Data from 960 participants aged 75-94 years was obtained twice over an average of three and a half years between 1989 and 1995 (Walter-Ginzburg et al., 2005). Resilience was operationalised across a number of variables as a positive change or no change between waves. Resilience factors that showed association with a lower risk of mortality included having stable or fewer difficulties with ADLs (43% reduction for men; 44% reduction for women), having stable or decreased availability of paid caretakers (30% reduction for men; 26% reduction for women) and smoking the same amount or less at Wave two (63% reduction for women). Other results were counterintuitive. For example, synagogue attendance and increasing physical activity and solitary activities increased mortality but these factors were high to start with. Stability in such factors may not necessarily indicate resilience (Walter-Ginzburg et al., 2005). This questions the validity of the resilience measure. Nevertheless, the study supports the notion of the 'paradox of ageing', which suggests that people may be resilient despite having declining health and therefore a combination of factors may be the best way to define resilience. Which exact combinations relate to resilience is not known.

Prevalence of resilience in ageing studies

Resilience prevalence varies according to the definition of the construct, as well as the methodology that studies have used, so rates are not directly comparable. Overall, resilience in aged populations may be high. Using formal instruments, prevalence was moderately-high to high in advanced age (Aléx, 2010; Nygren et al., 2005), 39.8% in people aged 70-80 years (Surtees et al., 2003). Using other definitions, prevalence in ageing populations ranges widely from 14.5% (Netuveli, Wiggins, Hildon, Montgomery, & Blane, 2006) to 45-60% (Demakakos et al., 2008). Resilience appears to be at least stable over time (Lövheim, Graneheim, Jonsén, Strandberg, & Lundman, 2013; Zeng & Shen, 2010). However, inconsistent operationalisation of

resilience makes the comparison of prevalence rates (and outcomes) complicated (Windle, Bennett, & Noyes, 2011). In fact, prevalence rates are often overlooked in research, in favour of reporting mean scores and standard deviations that relate simply to the measure that was used.

4.3 Summary

This section attempted to synthesise the empirical study of resilience. Theory does not always drive ageing work but aspects of the theories of ageing from Chapter 2 can be seen in interpretation of the results reported in section 4.1. The studies that are discussed were chosen because they sampled large populations of older people and some, people of advanced age. They operationalise resilience and resilience resources in a variety of ways. First, resilience is commonly operationalised as an age-specific relationship between adversity and competence, for example, function in relation to emotional well-being. Adversity in this dyad may be a pragmatic operationalisation in this age group because it can be tied specifically to values important in advanced age. Resilience measured using an instrument is not common, even in studies not cited here. The Resilience Scale, used in the Umea 85+ study, was not as successful at delineating positive health results as other measures despite potentially valid predictors.

In the adversity/competence dyads physical function was a common adversity. Physical constraints are more prevalent with increasing age. Physical constraints and bereavement were analysed as independent stressors in most of the studies reported here. Depressive level was reported as both an adversity and an outcome and is known to have age-related effects and different clinical features (Mehta et al., 2008).

Second, potentially protective mediating factors were common across the studies. Factors such as coping and mastery, personal investment in life and social support are commonly assessed in studies of adaptation to loss and lifestyle changes in the old and oldest-old. Stoicism may contribute to higher resilience for older people and may assist them in dealing with the adversities they encounter which are potentially normalised aspects of ageing. Normalising changes that are unavoidable or that occur for many in late life is one way that older people adapt to ageing and might reflect selection, optimisation or compensatory mechanisms in managing activities. Mastery and coping showed consistently positive associations with resilience or resilience-related constructs. The literature suggests that coping functions by facilitating changes in cognitive and behavioural responses (Folkman, 1997). Such changes might be one of the mechanisms whereby

resilience is effective. Like coping (style, efficacy and flexibility), social interaction is measured in multiple ways. The choice of predictor has to be carefully considered and, from this selected literature, all may affect resilience.

Inconsistent findings for some variables might be due to interactions between predictor variables or between predictor and outcome variables; or to inappropriate measurement in this population. It might also be because potential resources are valued differently in advanced age compared to other ages. The value of social capital, for instance, is based on a subjective rating of its importance (see Chapter 3). Given the changing importance of variables over time and the specific connection they have to subjective outcomes, it is not uncommon to find shared variance such as found by Nygren. As life-span theories and the notion of holistic ageing propose, the whole of the life is a breeding ground for new and improved resource contributions. The specific mix may again be one that is developmentally important.

The influence of spirituality on adaptation to adversity has not been commonly assessed in longitudinal cohort studies although it emerges in qualitative work and is recommended for greater attention in relation to empirical resilient outcomes (Windle et al., 2008). Spirituality is a key cultural value and may affect how adversity is managed for Māori so it is included as a resilience resource in the following analyses. Differences in cultural background are also likely to affect resilience in advanced age, as discussed in Chapter 9. Increasing disability with age suggests that some of these variables are likely to remain important for the oldest-old.

Finally, the two local discourses reflect back to considering the importance of external or environmental influences on individual competence and the reciprocal nature of that relationship. Resilience to age-associated adversity is likely to be enhanced the most when communities acknowledge the part they play in supporting their members. In the NZ context, which has many small communities that already know their members, this is a key direction to take to maximise resilient outcomes. This section has set up some possibilities for measuring resilience using a process approach in an advanced age context with specific aims to investigate the elements of the resilience process via 1. the availability of protective resources and 2. the relationship between adversity and competence as a measure of resilience.

CHAPTER 5: APPROACHES TO MEASURING RESILIENCE IN AGEING

In order to justify the research methodology that is used in the current body of work, this section specifies three possible choices for measurement of resilience and critiques their applicability. Methodologically, resilience research falls into person-focused and variable-focused approaches (Masten, 2001), each requiring particular analysis decisions. The third choice is whether to use a measure specifically developed for resilience. These methods are discussed and the chapter concludes with a statement of the aims for new work set up to inform the details of participant recruitment and data collection that will be discussed in Chapter 7.

5.1 Person-focused approach to measuring resilience

Person-focused approaches centre the research on naturally-occurring groups of individuals, basing the groups on a set of common criteria (Masten, 2001). They are descriptive and uncover hidden structure in the data. One such approach is cluster analysis which involves the generation of smaller mutually exclusive groups of individuals based on similarities in characteristics (Ward Jr, 1963). The process is iterative and thus reduces a priori bias (Ott et al., 2007).

Ageing studies utilising cluster analysis have included studies of psychosocial profiles (Klabbers et al., 2014), profiles of psychological adaptation (Magai, Consedine, King, & Gillespie, 2003), recovery from bereavement and adjustment to widowhood (Middleton, Burnett, Raphael, & Martinek, 1996; Ott et al., 2007); and, in the very old, psychological functioning (J. Smith & Baltes, 1997). In the latter study, desirable profiles (ones high on sociability, personality, cognitive function and control) were populated predominantly by the young-old and less desirable profiles by the oldest-old; however, the 85+ age group was found to be fairly heterogeneous with 25% having desirable profiles. Klabbers et al. (2014) aimed to predict morbidity from psychosocial profiles. Poorer self-rated health was predicted by having an adverse (OR 2.66) or an average (OR 1.74) profile compared to a beneficial profile but morbidity was not. The combination of factors was more predictive than variables considered alone.

Considering the notion that certain types of resources are likely to be more closely aligned with positive adaptation than others, analysis of how positive resources are grouped is ideally suited to a person-focused research approach. Using cluster analysis for this is consistent with the third wave of resilience research which suggests that factors inherent in people's lives will confer advantage and that the advantage is available to everybody (Masten, 2001). From a context perspective, the heterogeneity of ageing adults is likely to emerge using a cluster analysis method. Different variables may also be important to culturally different groups of people.

5.2 Variable-focused approach to measuring resilience

Variable-focused approaches use multivariate statistics to test for linkages between the adversity, the outcome, and potential protective or vulnerability factors. In variable-focused approaches, resilience may be treated as an outcome, a predictor or a mediator/moderator. The decision depends on the research question.

The variable-focused approach in relation to resilience has most commonly been aimed at defining protective factors and may be conducted within various contexts. Treating resilience as an outcome is a common permutation whereby potentially resilient factors are assessed, alone or in combination, for their enhancive or detractive action on positive adaptation. Resilience treated as a predictor of mental and physical health outcomes is aimed at determining the value of resilience to health outcomes. For both these approaches, the operationalisation of resilience requires adversity to also be assessed. Therefore, adversity is an inherent factor in the resilience determination rather than an external variable. When measures of competence are coupled with an indicator of adversity; 'high quality of life *despite* functional impairment' or 'maintenance of function *despite* disability', two essential components of resilience are assured and, as described earlier, form an adversity/competence dyad.

Thirdly, resilience may be a mediator (through which effects operate) or a moderator (through which effects change) between, for example, ill health and subjective wellbeing (Windle et al., 2010), as utilised in much of the research outlined in Chapter 4. Again, resilience must be determined a priori according to some conceptual operationalisation.

5.3 Resilience scales used as a tool for measuring resilience

The use of a resilience scale was considered for the current study because of the quantitative nature of the study and the pragmatic nature of a scale. Resilience scales have an extensive recent history in resilience work overall; however, they have been applied rarely in ageing studies.

Table 1 summarises 10 potentially useful instruments for assessing resilience in adults, including the Resilience Scale. These scales were predominantly developed to assess levels of resilience so that groups could be described and vulnerabilities and placement of interventions could be identified[3]. Two of these scales may be useful to older populations and, conceptually, criterion domains within the scales may help to understand resilience in diverse contexts.

Table 1 Resilience Instruments for Use with Adults

Instrument name	Author(s) and year	Reference population	Area of resilience	Criterion validity
Sense of Coherence Scale (SOCS)	Antonovsky, 1987	Israeli retirees	Successful coping	Cronbach alphas range 0.82-0.95 Test-retest reliability 0.54 over 2 years for retirees
Dispositional Resilience Scale (DR)	Bartone, Ursano, Wright and Ingraham, 1989	164 Adult air crash Survival Assistance Officers	Hardiness	-0.93 correlation with Kobasa Hardiness scale
Resilience Scale (RS)	Wagnild & Young, 1993	24 women aged 67-92	Multidimensional adaptation to stress	No previous gold standard exists
Ego-resiliency scale (ERS)	Block & Kremen, 1996	100 young urban adults (18-23)	Trait resiliency	Cronbach alpha of 0.76 at two time points in the development sample
Baruth Protective Factors Inventory (BPFI)	Baruth & Carroll, 2002	College students, aged 19-54	Protective factors: personality, environment, recent stress, compensating experiences	Significant correlations with sub-scales of the Multidimensional Health Profile; Psychological Functioning Scale (ranging -0.27 to 0.50)
Connor–Davidson Resilience Scale (CD-RISC)	Connor & Davidson, 2003	Adults in clinical mental health settings	Multidimensional: stress, coping and adaptation	Significant correlations with Kobasa Hardiness Scale (0.83), Perceived Stress Scale (-0.76); Sheehan Stress Vulnerability Scale (-0.32), Sheehan Social Support Scale (0.36) and Sheehan Disability Scale (-0.06)
Resilience Scale for Adults (RSA)	Friborg, Hjemdal, Rosenvinge & Martinussen, 2003	Adult psychiatric clinic outpatients and normal controls	Healthy adjustment	Discriminant validity shown between the reference groups with the patient sample having lower resilience scores than the clinical group.

[3] Details of the conceptual basis, testing and outcomes data for each scale are provided in Appendix A

Instrument name	Author(s) and year	Reference population	Area of resilience	Criterion validity
Resilience Scale for Adults (RSA) *cont.*				Significant correlations with sense of coherence (ranging 0.29 to 0.75) Significant correlations with the Hopkins Symptom Check List (ranging -0.19 to -0.61)
Brief Resilient Coping Scale (BRCS)	Sinclair & Wallston, 2004	Adults with chronic illness	'Resilient coping' behaviours	Significant correlations with six positive personal coping resources, six adaptive pain coping behaviours and four psychological well-being scales
Psychological Resilience (PS)	Windle, Markland & Woods, 2011	Older adults 50+ years	Psychological resilience: self-esteem, personal competence and interpersonal control	Cronbach alpha 0.83
Hardy Gill Resilience Scale	Hardy, Concato & Gill, 2004	Community-dwelling people 70+ years	Response to a stressful life event	Cronbach alpha 0.70. Test–retest reliability intra-class correlation coefficient 0.57. Moderately correlates with GDS scores

Appropriateness of the scales for assessing resilience in advanced age

Although item inclusion is based upon the literature, the breadth of the literature has led to qualitative decision-making about what to include in a scale and, therefore, substantial differences between them. Consequently, despite wide usage in other populations, there are a number of arguments against their applicability to the current research. These relate to the scales' generalisability to groups other than the reference group and lack of validation by other users, their length and item complexity and limitations in their sub-scale dimensions.

Scale generalisability and use in other studies

Construction of the foregoing scales has largely been based on women's responses, particularly those that were designed for older populations (RSA; 76% women in the clinical sample, CD-RISC; 65% women, RS; 62% women, although the scale factors were determined from a study including only women). The RSA found scale differences between genders (Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003). While women make up a greater percentage of the oldest-old, development with a predominantly female reference group does invite query as to the applicability of scale items to both genders.

Similarly, only the RS and CD-RISC were independently recommended for use with older adults (Lamond et al., 2009). However, differences were found in the factor analysis on the CD-RISC when applied to a very old sample (Lamond et al., 2009) indicating that resilience may reflect different processes with increasing age. Moreover, although some scales are used in populations suffering conditions older people might experience e.g. pain, fatigue and functional limitations (e.g. BRCS), resilience scales do not have a long history of use in longitudinal ageing research.

Item content and complexity

Research suggests that people in their 80's have little patience for confusing concepts (Dyall, Kerse, Hayman, & Keeling, 2011) so the length and complexity of the scales stood against their use in this study. Although the SOCS scale items were secondarily tested in a large longitudinal study with Israeli retirees and found to be reasonably completely answered, pilot testing in NZ showed that the wording of both the full and abbreviated versions was too complex for people of advanced age. Amendment of scales for pragmatic reasons is often recommended against (Antonovsky, 1993) so was not considered as an approach in this study.

Variation in subscale dimensions

Multidimensional measurement may be the best way to encapsulate resilience (Lamond et al., 2009); however, the scales above don't do this consistently nor do they include variables of particular salience to the oldest-old. The RS assesses only internal characteristics and misses the valuable contribution of social support and accessibility of other supporting operations. Previous stressors that may be applicable to older people were not assessed in the BFPI, for instance, home relocation or concern for personal safety are important aspects of life in advanced age. The creators of the Psychological Resilience Scale acknowledge that it misses dimensions of spirituality/religion and perception of ageing (Windle et al., 2008).

Although the BRCS has been used to measure coping in a resilience study (de Terte et al., 2014), resilience, as explored in the previous discussion, is likely composed of much more than just coping style. In addition, stressful events may be different in advanced age (c.f. Chapter 3). Low control events and daily hassles as well as other limitations of the ageing process may be troublesome to older people, not just those that seem to be the most problematic (Lachman et al., 2009).

5.4 Summary: rationale for the current operationalisation of resilience

Researchers have tended to apply the resilience scales that they prefer to their studies and consistent usage is hard to find. This methodological variation offers little guidance for the measurement of resilience within new projects.

The research aims for the current study lend themselves to a combination approach. Firstly, however, although resilience scales measure resilience with adequate precision (Ahern et al., 2006; Antonovsky, 1987a; Bartone, Ursano, Wright, & Ingraham, 1989; Connor & Davidson, 2003; Friborg et al., 2003; Sinclair & Wallston, 2004) they were rejected for the current study because they are either too complex or burdensome for the oldest-old undertaking a comprehensive set of analyses or do not measure indicators of resilience salient to people of advanced age. Because resilience may be understood differently according to ethnic group, how it is assessed is even more important for indigenous elders. Although at least two of the resilience scales above have been used in different cultures, they cannot be assumed to be appropriate for use with NZ Māori of advanced age.

Resource indicators can be measured using more general person-focused approaches. However, resources are only part of the resilience process. By defining resilience as competence despite adversity, a measure of resilience in terms of adversity and competence as well is possible. The empirical research that follows utilises both person-focused and variable-focused approaches: the first to group potentially protective resources in an advanced age population, the second to assess the presence of resilience as a construct; and subsequently analyse the relationship between resource clusters, adversity in relation to competence and adaptive outcomes. Approaching positive adaptation from two angles will ensure a comprehensive examination of resilience in advanced age and enable the generation of socio-historically and culturally specific outcomes for this thesis. Highlighting once more the fact that previous studies have not been consistent in operationalising resilience some confidence may be felt that this approach to measurement, based on empirical research, will contribute to the literature and may result in a better understanding about how resilience affects health outcomes for people of advanced age.

CHAPTER 6: CONTEXT: PERSONAL ASPECTS OF AGEING AND RESILIENCE

People of the same age share current experiences that relate to their life stage as well as common experiences from formative events that occurred for them at the same time. Octogenarians today were born in the 1920's and would have grown into young adulthood during the years of World War II but would also have had a connection to the traumas of World War I through their parents and would have suffered the restrictions of the subsequent Great Depression years (1929-1936). Technology and medicine have also advanced enormously during today's octogenarians' lifetimes, meaning that their lives as older adults are likely to be very different from the lives their parents lived.

This section draws a picture of two important cohorts in NZ - octogenarians of Māori and non-Māori descent. New Zealand has a comparatively high life expectancy, but, like other developed countries, having a greater number of older people and greater longevity means, also, increasing levels of frailty. This section first discusses the historical context, that is, the age groups' life course then outlines current social and health statistics[4] for these oldest-old New Zealanders, both to position them in an age-related context within contemporary society. Both contexts are argued to potentially affect the response of people of advanced age to adverse events.

6.1 Early experiences of New Zealanders of advanced age

Western countries have been through some of the same major events, and cohort effects will be evident in responses to those events. For example, major cultural events such as the Great Depression, World War II, social movement after World War II, immigration and the civil and women's rights movements have been identified by older people as important to resilience (Moore & Stratton, 2002).

[4] Unless otherwise specified, statistical data come from the 2002/03 New Zealand Health Survey and the 2001 Household Disability Survey which are the latest relevant data.

The Great Depression (1929-1930s)

The time known as the Great Depression was a significant worldwide economic depression that had major social consequences. Unemployment in NZ was high during the Depression. In 1933 the estimated number of men off work was 80,000, about 12% of the labour force (although adding women, youth and Māori would have increased this figure enormously) (Rankin, 1994). There was no unemployment benefit post World War I however relief work (road construction and drainage, and forestry development) was supplied by the government where possible, although this was less accessible to rural Māori living on small areas of ancestral land (Sutch, 1966).

Where jobs *were* available, wages were reduced. In 1933, 240,000 people were earning less than £1/week when an adequate living wage was in excess of £4/week. So even working families found life extremely challenging, with poorer families having to seek assistance from neighbours, churches and community organisations. Children were often forced to leave school early, abandoning their education in favour of earning a small wage. Mothers ran the household as economically as possible – patching clothes and preserving home-grown foods. Discord with the Government's wage and relief work rationing during the Depression led to violence and civil riots in the worst times.

From this backdrop, participants in the current study would have had experience with hardship and frugality in their childhood and teenage years. New Zealand casualties from the First World War affected the make-up of households as well, with more single parent households than ever before; during the 1930s the number women in the NZ workforce increased. New Zealand's response to financial hardship was to elect a Labour Government led by Michael Joseph Savage. The Social Security Act in 1938 was funded by a tax of a shilling in the pound (5%) and provided free at-the-point-of-care health services and an array of welfare programmes. But other major challenges were to come in the form of the second major world war.

Experiences of World War II (1939-1945)

War service

There is no doubting the challenges that World War II (WWII) would have presented. The war, fought between 1939 and 1945, is certainly a significant part of world history. More than 200,000

NZ men and women served in some capacity. Nearly 16,000 Māori enlisted in WWII at home and abroad, with 20% fighting in the 28th (Māori) Battalion. New Zealand soldiers fought overseas in Greece and Crete (1941), North Africa and Egypt (1941-1943), Italy (1943-1945), and were in the Pacific throughout most of the war (1940-1945). During the war over 800 NZ contentious objectors were sent to detention camps (Ministry for Culture and Heritage/Manatū Taonga, 2012).

Close to 12,000 men and women did not return home from WWII (Ministry for Culture and Heritage/Manatū Taonga, 2007). The greatest fatalities occurred in the Royal NZ Navy and Royal NZ Air Force; however, the NZ Expeditionary Force (armed forces) suffered the greatest casualties overall with 6.5% dead and 22% wounded or taken prisoner or interned (16% of all the forces were wounded, taken prisoner or interned). The effects of war deaths were to be felt by both returning soldiers who lost friends and brothers and all the families at home who lost close family members.

The war at home

People left at home during the war lived life with fortitude. Women and children experienced different war effects from the menfolk, as mothers had to deal with single parenting and doing jobs that would normally be undertaken by men. Life was austere again with vegetables again gardened at home and thriftiness a high priority. Nationally, NZ assisted the war effort by providing fresh produce for the consumption of the British civilian population (McGibbon, 2012).

Post-WWII effects

The transition from the war environment back to civilian life may have been one of the toughest experiences for veterans (B. Smith, Parsons, & Hand, 2014). A recent study reports how NZ aircrew veterans of WWII struggled to fit back into civilian life (B. Smith, 2011), regain jobs in a shifted job market and forge a new life. One of the most insidious outcomes of the war was a personal unrest felt by servicemen who were often seen as outsiders, had relationship troubles and, because the war had held horrors they were reluctant to talk about, were frequently misunderstood.

Compounding ongoing reminders of this saddest of experiences, health effects from the war were often long-lasting and included potentially serious direct effects such as Post Traumatic Stress Disorder (PTSD), depression and nightmares. Evidence shows that the children of veterans also suffer emotional and behavioural difficulties (Chandra et al., 2010). But positive outcomes have been observed in psychological health with resilience shown to ameliorate the negative effects. For example, a study of veterans of the Afghanistan (2001-2014) and Iraq (2003-2011) conflicts measured resilience and other psychosocial factors in relation to PTSD (Tsai, Harpaz-Rotem, Pietrzak, & Southwick, 2012). Resilience (using the CD-RISC), coping and social support mediated significant relationships between PTSD and partner satisfaction, family cohesion, social functioning and life satisfaction. Known as 'chronic combat stress reaction' (B. Smith et al., 2014), PTSD and similar conditions benefit from timely and effective psychosocial management. In another study of veterans of WWII and the Korean War, Elder and Clipp (1989) suggest that post war effects may be related to pre-war resilient characteristics as well as the war experience which lends support to life experience as a resilience resource. Little research has been done on the outcomes for war widows and orphans.

Practically speaking, surviving a major world war may have engendered a sense of capability for those in a position to start building a new life and many people demonstrated remarkable spirit. Young wives in the 1940's were often not New Zealanders and had to adapt to a new way of living with none of their old connections. But marriages seem to have lasted.

Other features of the 20th Century

Other life events as today's octogenarians were growing up may have had an impact upon their resilience. After WWII, the need to increase the declining workforce drove NZ's immigration policy so that Europeans arriving in the 1950's under assisted passage far outnumbered the country's indigenous Māori (Ward & Liu, 2012). Migrants from Pacific nations settled in the 1960s and 70s (Phillips, 2013). Asian countries provide the greatest number of immigrants to NZ in current times and NZ is now a country of considerable cultural diversity. There is a need to understand cultural differences to achieve effective health and social care.

A decade into the 21st century, people in their 80s have experienced other major social shifts over their lifetime: increasing urbanisation and social movement from rural to urban living, increasingly wider global communication networks, changing family structures and gender norms, and improving in-home care and support through community services, internet access and

assistive technology (World Health Organisation, 2015). However, while many older people can take advantage of these changes, they also offer increasing, and likely unforeseen, challenges. For example, technological advancement offers opportunities to stay connected with others yet the greater global movement it facilitates may also leave older adults without the traditional hands-on family support that they may otherwise have had access to. The world has arguably seen greater changes during the 20th century than during any century before and those who have aged through the changes, served by a personal history of hard-work, self-reliance and a community-spirited orientation, must now live amongst an increasingly more globally-connected, yet also dependent, contemporary population. Resilient adaptation may be a key to effectively negotiating the complexity of a changing world.

Historical and early experiences of Māori in New Zealand

Unique to the current study is a large indigenous cohort who, whilst of a similar age, would have lived a different life through the 20th century to those of non-Māori descent. New Zealand's indigenous Māori population have had an especially damaging recent history under European colonisation which, not surprisingly, has had an immense and lasting impact upon how contemporary Māori perceive and live in society.

Tradition, culture and values

Māori have lived in NZ for at least a thousand years, the last 250 years under European colonisation (L. T. Smith, 1999). Traditional Māori society is typically collective with decision-making a collective responsibility. Māori see themselves as a part, not only of their wider community, but of their land and ancestral connections as well. Every aspect of life is interconnected. Traditional Māori society was organised around tribal connections (Te Rangi Hiroa, 1949). Iwi are made up of multiple hapū (sub-tribes, which were based in a specific territory - rohe - which they defended as their own) with up to several hundred members each, and within hapū are whānau (extended family groups) including children, adults and elders (kaumātua). Politically, iwi are the strongest Māori tribal groups today. Iwi developed through either a connection to the waka (canoe) on which the Māori people travelled to NZ or when there was a need to break up a tribe and establish a new territory, for example when resources were scarce (Taonui, 2012).

Te Ao Māori is the name given to the Māori world. Contemporary Māori interactions are steeped in traditional values relating to the world-view that extends from Te Ao Māori (Marsden, 1992). The organisation of whānau, hapū and iwi remains today, meaning that many Māori have a continuing connection to their whakapapa (lineage descent). Knowing and recalling the place that they belong in relation to the ancestors who resided there are important to a strong Māori identity (Te Rito, 2007) and Māori acknowledge their whakapapa as a way of introducing themselves to others. Other aspects of Māori identity include te reo, tikanga (customs and traditions of Māori), whenua (land) and connection to others in the Māori world. The marae is a place of significance for hapū, and protocols guiding introductions, meetings, and funeral celebrations vary by iwi.

Historical adversity

Māori who live in NZ today are sustained by the traditions of their past (L. T. Smith, 1999). From the more recent past, however, external historical events sit alongside the traditions and influence contemporary perspectives of health, wellness and culture. Memories of European subjugation will no doubt play a part in the resilience of Māori within contemporary society.

Abel Tasman is credited as the first European to sight the NZ Islands, however, it was Captain James Cook who circumnavigated the north and south islands in 1769 and mapped the country. New Zealand was colonised in the late 18th Century, initially by whalers, traders and missionaries, and later by Britons seeking a better life. It wasn't long before the European colonisers decided that the Māori people needed stronger governance and based this governance on a European world-view. In 1840, representatives of the British Crown and Māori chiefs signed a treaty, agreeing that Māori would live with British governance but would retain guardianship over their own taonga (treasures). The Treaty of Waitangi exists to this day to ensure that policy makers, researchers and others always use an equity lens.

Despite the Treaty of Waitangi, the latter part of the 19th Century saw massive changes to the Māori population. By 1858, Māori were in minority in the country (Fitzgerald et al., 1996) and were subjected to confiscation of Māori land by the British[5] and marginalisation of many Māori traditions, including their language and customs. Māori fought against these injustices and land wars in NZ during this time of conflict were fierce and protracted (Salmond, 1997), with Māori suffering the greatest loss. The effects of the loss of land and, effectively, ancestral ties,

[5] In partial recompense for this early misappropriation of land by European against Māori, the Waitangi Tribunal was established in 1975 through the Treaty of Waitangi Act to hear and judge land grievances on behalf of iwi.

destabilised Māori social organisation and led also to destruction of food supplies and patterns of trade. Introduced infectious diseases had a major impact on the Māori population who had no immunity (Kunitz, 1994). The impact of colonisation on the health of contemporary Māori has been investigated with reports of lower quality of life for Māori compared to non-Māori suggesting an ongoing negative effect (Reid & Robson, 2006).

For the first part of the 20th Century, Māori lived essentially rurally and relied upon the land for survival during the Depression. Despite this they still suffered poor health, poverty and racial discrimination (Ward & Liu, 2012).

The position of Māori during WWII

Within Māoridom there was strong initial opposition to Māori fighting for NZ in WWII, based mainly upon heightened feelings about the European invasion and land occupation. Countering this, Sir Āpirana Ngata, a highly-respected Māori leader of the time, encouraged Māori to see war service as a 'price to pay' to signify citizenship in NZ. More importantly, paying the price was likely to facilitate and validate future involvement by Māori in NZ governance.

Although not their only contribution to the war, the fighting spirit of the 28th Māori Battalion led it to become one of the most celebrated and decorated infantry units in the NZ forces (Ministry for Culture and Heritage/Manatū Taonga, 2014). The war also served Ngata's purpose, as the national pride and respect that was subsequently felt for Māori people improved NZ race relations. In the first half of the 20th Century Sir Āpirana Ngata and other leaders made much headway in re-developing Māori as citizens of NZ, and Māori interests in the areas of cultural reinvigoration and the retention and development of Māori land (R. Walker, 1990).

Disenfranchisement post WWII

Following WWII, many Māori became more urbanised, with young Māori taking on low-paid and unskilled jobs to escape a lack of opportunities in their rural home places. By 1966, 62% of Māori lived in cities; by 1986 this increased to 80% (Fitzgerald et al., 1996). For some, however, the advantages of city living and increased job opportunities were offset by their disconnection from whānau, hapū and iwi support which had a major effect on individuals' knowledge of and connection with their tribal links, although not necessarily their personal identity as Māori

(Houkamau, 2010). Ongoing discrimination in work and home rental and ownership led to a disadvantage and health disparities (Signal et al., 2007).

The 20th century saw even more specific constraint of Maori cultural values. The Tohunga suppression act of 1908 outlawed spiritual healing practices, replacing them with the scientific method. The Māori Affairs Act was introduced in 1953 to put so called unproductive Māori land to use; with multiple landowners', different forms of land management evolved such as trusts and incorporations. Speaking te reo Māori (the language of Māori) was punished in schools between 1903 and 1909 (Spolsky, 2003) in a bid to 'civilise' young Maori, but instead, alienating them from their cultural heritage.

Through the latter 20th Century Māori have continued to protest against decreased Māori control (L. T. Smith, 1999), including starting activist movements in the 1960s and 70s against health disparity, the 1975 land march, the 1977-78 Bastion Point protest and Waitangi Day protests (Edwards, 2010). The resurgence of Māoritanga (Māori language and culture) from the 1970s onwards led to a relative recovery in positive ethnic identity however many of the older generation who had been punished for overtly demonstrating their cultural differences had mixed feelings about reconnection (Spolsky, 2003).

The participants in this study

Māori and non-Māori participants in the current research were born between 1920 and 1930. Growing up during the Great Depression would have formed a backdrop for their experience of WWII and ensuing economic, political and cultural changes. The participants would have been eligible for active duty in WWII from the age of 19 onwards thus, if not involved in the war, they were nearing enlistment age by the end of the war and many of their loved ones and friends would have been involved. Māori participants in the current study will particularly remember hardships that they experienced as children and young adults; hardships related to the war as well as to cultural inequity. The social changes immediately following the war such as increasing urbanisation, economic independence and, for Māori, a reinvigoration of their voice in society, would have been experienced as these young people were starting their adult lives. Ongoing technological and medical advances would have affected their connections with distant family and whānau.

6.2 Demographics of a New Zealand old age cohort

Demographic information positions today's octogenarians within the age context. This section draws a picture of the current social and health statistics for Māori and non-Māori of advanced age in NZ.

New Zealand population ageing

New Zealand European (64.3%) and Māori (14.1%) are the two major ethnic groups in NZ, followed by Asian (11.1%), Pacific peoples (7.0%), other European (6.9%), Middle Eastern/Latin American/African (1.1%), not elsewhere included (5.4%) and other ethnicity (1.6%) (Statistics New Zealand, 2014a)[6].

The NZ population is growing older as is the global trend in developed and developing nations (Kinsella & He, 2009). Life expectancy for New Zealanders rose considerably during the 20th Century, from 58.8 years and 63.7 years at birth for males and females respectively in 1901 to 79.5 years and 83.2 years at birth for males and females respectively in 2012-14 (Statistics New Zealand, 2015). World life expectancies are shown in Table 2. While this table only extends to 2008, United Nation estimates for NZ in 2015 show further small increases (United Nations Department of Economic and Social Affairs Population Division, 2015). New Zealand's figures are now higher than the Organisation for Economic Co-operation and Development (OECD) averages of 72.5 years for males and 82.8 years for females. Although the gender and ethnicity gaps are closing, males and Māori in NZ continue to experience lower life expectancies than females and non-Māori[7] respectively.

The population structure is also changing in NZ, manifesting a greater proportion of older people overall. This is due mainly to decreased fertility (which affects the ratio of young to old), infant mortality and deaths at age 50 and over. While there are fewer Māori in older age groups, Māori are ageing faster than non-Māori; the number of Māori aged 65 years and over is expected to more than double between 2006 and 2021, while the number of non-Māori in the same age group will increase by half (Ministry of Health/Manatū Hauora, 2006). In 2013, 3.6% of the total NZ population were aged 80 years and over (64.3% female) and, of them, 3% were Māori and 82.9%

[6] Data does not add up to 100%, as the source data has been randomly rounded to protect confidentiality
[7] Where it is used in the following text in relation to statistics, non-Māori includes all ethnicities residing in NZ other than Māori

were NZ European (Statistics New Zealand, 2014a). Those aged 85 years and over in 2013 rose by 29.4% from 2006 figures (Statistics New Zealand, 2014c).

Table 2: Life Expectancy at Birth for Selected Countries by Gender: 1900, 1950, and 2008 (In years)

Region/country	Circa 1900		Circa 1950		2008	
	Male	Female	Male	Female	Male	Female
Europe						
Austria	37.8	39.9	63.2	68.4	76.5	82.4
Belgium	45.4	48.9	65.9	70.9	75.9	82.4
Czech Republic1	38.9	41.7	64.5	69.5	73.3	80.1
Denmark	51.6	54.8	69.6	72.4	75.8	80.6
France	45.3	48.7	63.7	69.5	77.7	84.2
Germany1	43.8	46.6	65.3	69.6	76.1	82.3
Greece	38.1	39.7	64.3	67.5	77.0	82.2
Hungary	36.6	38.2	61.5	65.8	69.0	77.6
Italy	42.9	43.2	64.3	67.8	77.1	83.2
Norway	52.3	55.8	70.9	74.5	77.2	82.6
Spain	33.9	35.7	61.6	66.3	76.6	83.5
Sweden	52.8	55.3	70.4	73.3	78.5	83.1
United Kingdom	46.4	50.1	66.7	71.8	76.4	81.5
Other Developed Countries						
Australia	53.2	56.8	66.9	72.4	77.9	83.8
Japan	42.8	44.3	61.6	65.5	78.7	85.6
United States	48.3	51.1	66.1	72.0	75.3	81.1
Africa						
Egypt	(NA)	(NA)	41.1	42.7	69.3	74.5
Kenya	(NA)	(NA)	40.5	44.2	56.4	56.9
Malawi	(NA)	(NA)	35.8	36.7	43.7	43.1
South Africa	(NA)	(NA)	44.0	46.0	43.3	41.4
Uganda	(NA)	(NA)	38.5	41.6	51.3	53.4
Zimbabwe	(NA)	(NA)	47.0	50.0	40.9	38.5
Asia						
Bangladesh	(NA)	(NA)	38.3	36.7	63.1	63.3
China	(NA)	(NA)	39.3	42.3	71.4	75.2
India	(NA)	(NA)	38.1	36.6	66.9	71.9
South Korea	(NA)	(NA)	46.0	49.0	74.0	81.1
Thailand	(NA)	(NA)	49.2	52.6	70.5	75.3
Turkey	(NA)	(NA)	42.0	45.2	70.7	75.7
Latin America						
Argentina	(NA)	(NA)	60.4	65.1	72.8	80.4
Brazil	(NA)	(NA)	49.3	52.7	68.6	76.6
Chile	(NA)	(NA)	52.9	56.8	73.9	80.6
Costa Rica	(NA)	(NA)	56.0	58.6	74.8	80.1
Mexico	(NA)	(NA)	48.9	52.5	73.0	78.8
Uruguay	(NA)	(NA)	63.3	69.4	72.9	79.5

Source: US Census Bureau, Kinsella and He, 2009

(NA) Reliable estimates for 1900 for most developing countries are not available. 1 Figures for Germany and Czech Republic prior to 1999 refer to the former West Germany and Czechoslovakia, respectively. Sources: Siampos, 1990; United Nations, Department of Economic and Social Affairs, 2007b; and U.S. Census Bureau, Intern on November 9, 2007.

The most current figures for Māori and non-Māori people aged 80-84 years and 85 years and over are shown in Figure 2. Non-Māori vastly outnumber Māori in advanced age in NZ.

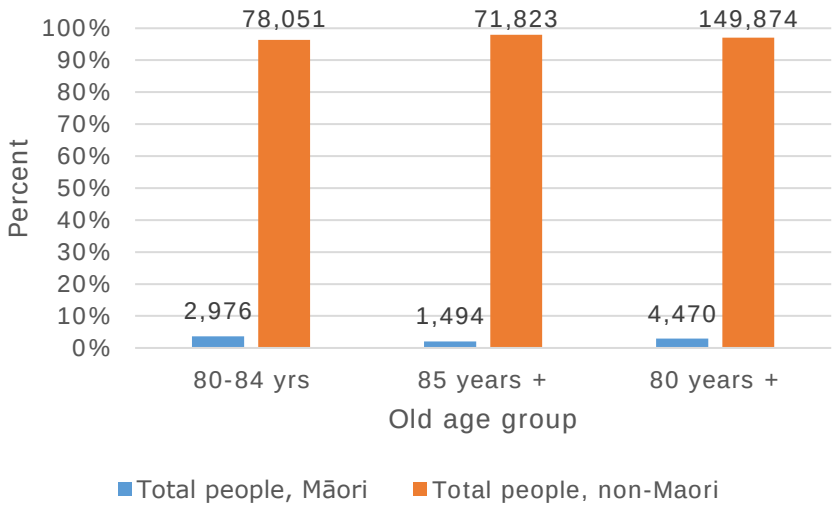

Figure 2: Percentage of Māori and non-Māori of Advanced Age in 2013

(Source: Statistics NZ: 2013 Quick Stats: Culture and Identity Tables)

Current social and health statistics

The healthcare of older New Zealanders is guided by two major government policies – the Positive Ageing Strategy 2001 and the Health of Older People Strategy 2002. These are supplemented by the Māori Health Strategy - He Korowai Oranga 2002, which outlines specific health and disability goals and outcomes for Māori (Ministry of Health/Manatū Hauora, 2002, 2014).

Healthcare in NZ is delivered through primary care (General Practitioners and mobile community and health services), public health services, aged care, and services provided by other non-government health providers, and is funded locally by District Health Boards (DHBs). In addition to mainstream primary care services, which Māori can choose to access, primary care is also delivered by Māori to Māori through approximately 275 Māori health and disability providers (Ministry of Health/Manatū Hauora, 2011). Māori health providers have grown in number 12-fold since the 1990s (Maori Innovation Fund, 2010), indicating that Māori often seek health advice from those whom they feel know them best.

The following social and health statistics for older New Zealanders compare the age groups 65-74 years, 75-84 years and 85+ years. As Māori have a lower life expectancy and there are fewer Māori aged over 65 years, the 2002/03 NZ Health Survey and 2001 Household Disability Survey statistics for Māori are provided under the two age categories of 50-64 years and 65+ years.

Health disparity between Māori and non-Māori

New Zealand exhibits a systematic disparity in the health of older Māori compared to non-Māori (Ministry of Health/Manatū Hauora, 2006). This disparity occurs in health outcomes, determinants of health, health system responsiveness and in representation in the health sector workforce (Russell, Smiler, & Stace, 2013). Differences in health outcomes and determinants of health from the 2002/03 NZ Health Survey (Ministry of Health/Manatū Hauora, 2004, 2011) include:

- higher mortality rates for Māori in most major disease categories
- more chronic disease for Māori which is a major contributor to mortality and life expectancy e.g. heart disease, stroke and diabetes (males) when age-standardised
- greater prevalence for Māori of high blood pressure, obesity (second to Pacific peoples), hazardous drinking and smoking when they are age-standardised

Whare Tapa Whā represents an approach to health service usage and implementation that reflects Māori health needs (Rochford, 2004). But wellness also relies upon opportunity and exposure (Hirini et al., 1999). Health disparity occurs through differential exposure to health determinants, access to care and the quality of care received. The NZ Government has attempted to redress disparities via the Māori Health Strategy and by funding a number of working parties and support operations. The government's aim in the application of He Korowai Oranga is to work alongside mainstream healthcare services, Māori health providers and whānau to achieve maximum health and wellbeing for Māori. With the increasing life expectancy, but still a lag behind non-Māori by close to 10 years (Ajwani, Blakely, Robson, Tobias, & Bonne, 2003), an effective approach to wellness (collaborative and respectful of cultural values) is key for older Māori[8].

[8] Māori views of health may not be as well reflected in comparisons that use the same outcomes as for non-Māori (Durie, 1985). Nevertheless, for the purpose of discussing the health of Māori and non-Māori of advanced age in this section of the thesis, the health states of Māori and non-Māori are discussed together.

Socio-demographic statistics

In the 65 years and over age group 44.3% of people lived alone in 2013 and, of those, females made up 68.7%, a proportion that rose with increasing age compared to males (Statistics New Zealand, 2014b). Five percent of the NZ population live in residential care (Office of the Auditor-General, 2013). People living in residential care are more likely to be disabled and are older than those living in private dwellings. In 2002/03, 51% of those in residential care were aged 85 years and over (Ministry of Health/Manatū Hauora, 2006) and 2.7% were Māori. Residential care-dwellers were more sedentary, had lower self-rated health and higher health service utilisation than those living in the community (Ministry of Health/Manatū Hauora, 2006).

An age effect in household crowding and motor vehicle access has emerged from the survey data (Ministry of Health/Manatū Hauora, 2006). In other socio-demographic statistics, Māori have a lower socioeconomic status (including indicators of qualifications, benefits, access to a telephone, access to a motor vehicle, owning a home, household crowding and employment) than non-Māori (Ministry of Health/Manatū Hauora, 2006). Māori males aged 85+ did more than twice as much volunteer work (12.1%) as non-Māori males (4.4%) and Māori females (5.5%) (Ministry of Health/Manatū Hauora, 2006) and Māori females aged 85+ were more likely than non-Māori females to work.

Quality of life

Broad interpretation of recent quality of life (QoL) data for NZ shows that with increasing age, physical health-related QoL markers (physical functioning, role physical, bodily pain, general health and vitality – expanded in Chapter 7) decrease markedly, but social, emotional and mental health-related QoL markers remain stable (Figure 3). Ethnic group and gender breakdown of the 2002/03 data show that Māori rated their physical health-related QoL higher and their social and emotional health-related QoL lower than non-Māori. Although this suggests general physical robustness in later life for Māori, there is debate about the applicability of the SF-36 scale as a QoL measure for Māori (Scott, Sarfati, Tobias, & Haslett, 2000).

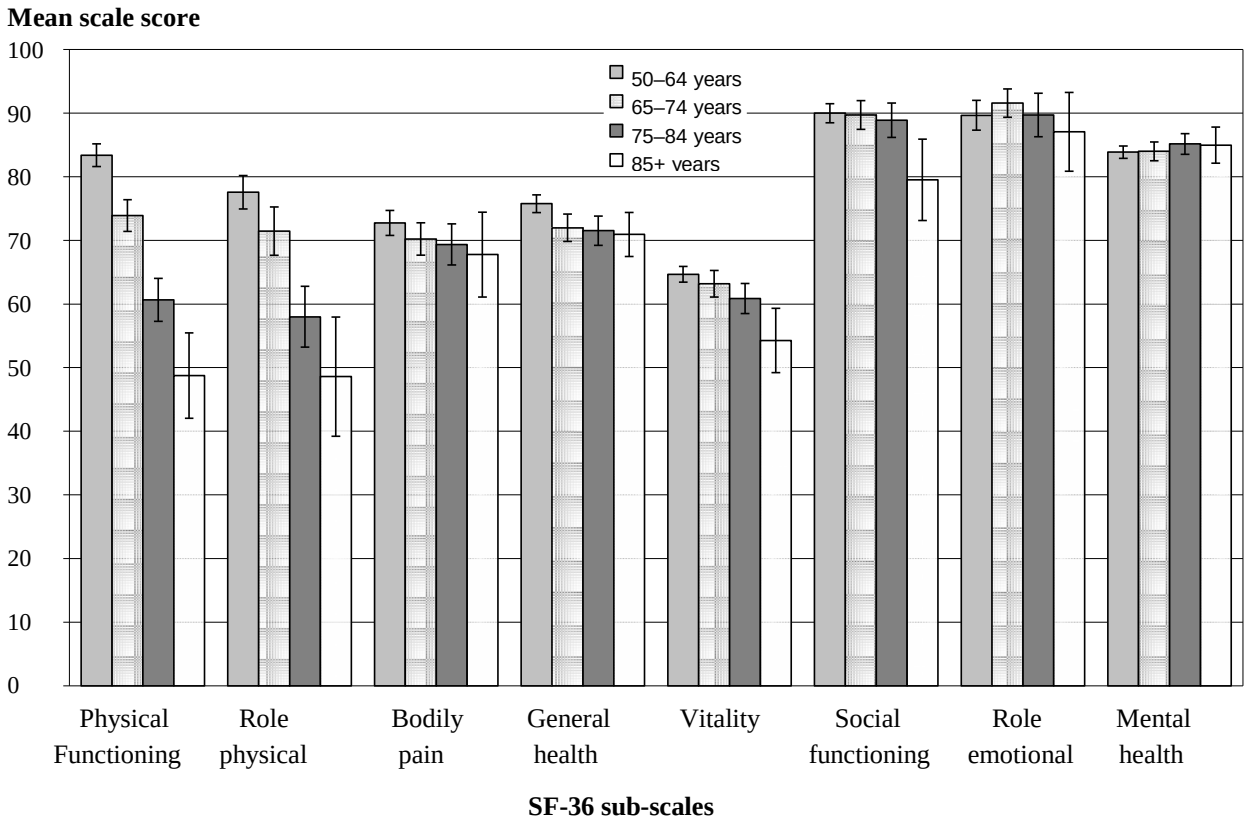

Figure 3: Mean SF-36 Scores for Each Scale, by Age, 2002/03

Source: 2002/03 NZ Health Survey

Physical and health status statistics

Physical activity decreased with age but the decrease was most marked for females (Table 3). At age 85+, males were nearly twice as likely as females to be physically active and more females were sedentary. The figures for sedentariness for Māori aged 65+ were more similar to the NZ population aged 65-74 than to NZ older age groups.

The prevalence of many chronic conditions and health determinants increase with age e.g. heart disease, stroke, arthritis, COPD, osteoporosis, cancers and high blood pressure. Gender effects are evident at older ages (Table 4), however, for both sexes the percentage of people with chronic conditions increased most markedly between those aged 65-74 and 75-84 years. There were no significant ethnic differences in the number of chronic conditions in the 65+ age group (Ministry of Health/Manatū Hauora, 2006).

Table 3: Physical Activity Indicators, by Gender, Age and Ethnic Group, 2002/03

Indicator self-reported, percent	**NZ 65–74 years**	**NZ 75–84 years**	**NZ 85+ years**	**NZ 65+ years (age- standardised)**	**Māori 65+ years**
Females					
Physically active	66.7 (61.5, 71.8)	47.7 (41.7, 53.6)	27.6 (17.9, 37.3)	55.8 (50.9, 60.7)	60.2 (46.5, 74.0)
Regularly physically active	46.3 (41.1, 51.6)	33.1 (27.7, 38.5)	19.6 (10.8, 28.3)	37.9 (33.5, 42.3)	30.3 (16.5, 44.2)
Sedentary	17.5 (13.4, 21.7)	35.1 (28.3, 41.9)	59.8 (48.7, 70.9)	27.6 (23.3, 31.9)	16.7 (8.8, 24.5)
Males					
Physically active	76.2 (70.8, 81.5)	54.9 (48.5, 61.2)	49.4 (32.5, 66.4)	64.8 (60.4, 69.1)	60.7 (42.9, 78.6)
Regularly physically active	51.5 (45.3, 57.7)	36.1 (29.1, 43.1)	35.9 (20.6, 51.3)	42.6 (38.1, 47.1)	38.3 (21.5, 55.1)
Sedentary	13.6 (9.1, 18.1)	32.7 (26.0, 39.3)	37.3 (18.7, 55.9)	23.0 (18.9, 27.0)	16.0 (4.5, 27.5)

Source: 2002/03 New Zealand Health Survey

Note:

- 'Physically active' is defined as doing at least 2.5 hours of physical activity in the last week, with exercise accumulated on one or more days of the week.
- 'Regularly physically active' is defined as doing at least 2.5 hours of physical activity in the last week, comprising at least 30 minutes of physical activity per day on five or more days of the last week.
- 'Sedentary' is defined as doing less than 30 minutes of exercise in the last week.
- Numbers in brackets indicate the range within the 95% confidence interval.

Table 4: Number of Chronic Conditions, by Gender, Age and Ethnic Group, 2002/03

Indicator self-reported, percent	**NZ 65–74 years**	**NZ 75–84 years**	**NZ 85+ years**	**NZ 65+ years (age- standardised)**	**Māori 65+ years**
Females					
0 conditions	17.2 (13.6, 20.8)	12.4 (9.2, 15.6)	18.7 (10.1, 27.4)	15.6 (13.0, 18.3)	14.8 (6.8, 22.8)
1–3 conditions	63.7 (59.0, 68.5)	61.6 (55.6, 67.6)	63.2 (51.9, 74.5)	63.8 (60.0, 67.6)	65.3 (54.6, 76.0)
4+ conditions	19.1 (14.9, 23.2)	26.0 (20.7, 31.3)	18.1 (10.0, 26.2)	20.6 (17.4, 23.8)	19.9 (10.7, 29.1)
Males					
0 conditions	17.6 (13.2, 22.1)	11.0 (6.6, 15.3)	–	14.9 (11.7, 18.1)	10.4 (3.9, 17.0)
1–3 conditions	70.0 (64.3, 75.7)	70.0 (64.4, 75.6)	73.5 (57.8, 89.3)	70.3 (66.4, 74.1)	78.8 (68.0, 89.6)
4+ conditions	12.4 (7.9, 16.9)	19.0 (13.4, 16.9)	–	14.8 (11.4, 18.2)	10.8 (1.6, 19.9)

Source: 2002/03 New Zealand Health Survey

Note:

- Chronic conditions includes conditions such as heart disease, stroke, diabetes, COPD, arthritis, spinal disorders, osteoporosis, cancer and other long-term illnesses such as epilepsy, stomach ulcers and schizophrenia.
- – indicates that the count was fewer than 10, and therefore the rate was not calculated.
- Numbers in brackets indicate the 95% confidence intervals.

By the age of 85, 84.8% of females and 91.7% of males reported a disability (disability included any limitation in activity resulting from a long-term condition or health problem), double the percentage of those aged 65-74 years. The severity of disability also increased markedly between those aged 65-74 and 75-84 years (Table 5). For Māori, there was a gender effect at all levels, with females having higher disability than males, most marked for moderate disability. Hearing and vision were twice as prevalent between those aged 65-74 and 75-84 years, with a similar trend evident for memory disability from a long-lasting condition or health problem (Table 6).

Table 5: Prevalence of Disability Severity among People Living in Households, by Gender, Age and Ethnic Group

Indicator severity of disability, percent	**NZ** **65–74 years**	**NZ** **75+ years**	**Māori** **65+ years**	**Non-Māori** **65+ years**
Females				
Mild	17.8	14.2	16.1	16.1
Moderate	18.4	40.9	34.7	28.6
Severe	5.8	9.8	15.9	7.3
Males				
Mild	16.5	13.3	15.5	15.3
Moderate	19.3	36.3	23.6	25.9
Severe	6.2	11.8	14.0	8.1

Source: 2001 Household Disability Survey

Note:

- 'Mild' disability: have a disability but do not require regular help from other people or technical aid.
- 'Moderate' disability: use or need some type of assistive device, aid or equipment and/or help with certain heavier or more difficult household tasks.
- 'Severe' disability: receive or need daily help with activities such as preparing meals, shopping, everyday housework, bathing or dressing.

Table 6: Prevalence of Sensory and Memory Disability among People Living in Households, by Gender, Age and Ethnic Group

Indicator percent	**NZ** **65–74 years**	**NZ** **75+ years**	**Māori** **65+ years**	**Non-Māori** **65+ years**
Females				
Hearing disability	12.6	24.1	21.8	17.8
Vision disability	4.5	14.0	11.7	8.8
Memory disability	3.9	6.7	14.1	4.8
Males				
Hearing disability	22.3	35.1	27.5	27.2
Vision disability	4.0	9.9	5.4	6.3
Memory disability	7.1	11.7	11.4	8.8

Source: 2001 Household Disability Survey

Depression, bipolar disorder and schizophrenia (serious mental illness) occur at a similar rate for Māori and non-Māori. Māori females aged 65+ have a lower rate of serious mental illness than do non-Mori females (Ministry of Health/Manatū Hauora, 2004).

Health service utilisation statistics

The increase in chronic conditions and disability and reduced levels of social support means that people of advanced age have greater healthcare needs than the younger-old. Public hospital and general practitioner (GP) visits are more common in old age. In 2002/03, females had more visits to their GP than males but, interestingly, older females also had a greater unmet need for GP care than older males (9.0% vs 6.7%). Māori aged 65+ were less likely to have seen their GP in the last 12 months than the NZ population aged 65+, although it might be that those who had seen a GP had gone more often. Eighteen point four percent of Māori females and 26.1% of Māori males aged 65+ had been to their GP 10 times or more compared to 13.4% and 14.2% respectively of New Zealanders the same age. The opposite trend occurred for people who had seen their GP 5-9 times. Overall, the trend was similar for Māori and the NZ population aged 65+ years.

While this selected health data, particularly the sensory disability data, shows differences between people of advanced age and the younger-old, it is likely that health is impacted by physical status rather than age itself. The differences between Māori and non-Māori appear greatest at older ages.

Māori cultural statistics

Māori cultural statistics were obtained from the QuickStats from the 2013 NZ Census, the Older People's Health Chart Book 2006 and Tatau Kura Tangata: Health of Older Māori Chart Book 2011.

Of all ethnic groups living in NZ, Māori are the most likely to identify with more than one ethnic group. Within the Māori population there are also more people who identify with two or more ethnic groups (53.3%) than with only being Māori. The Māori language (te reo Māori) is a key cultural resource for Māori. In 2013, 21.3% of the NZ population could hold a conversation in te reo, a decrease of 4.8% from the 2006 census. Only people aged 65 years and over showed an

increase in use of te reo between the census records (9.8%, up 11% from 2006). Males and females used the language equally.

Conversely, negative cultural statistics from the 2002/03 New Zealand Health Survey show that racial discrimination still exists in NZ. Māori, compared to other ethnic groups, reported high levels of racial discrimination and that it originated from multiple sources. Racial discrimination was linked to poorer health outcomes for Māori (R. Harris et al., 2006a) and is cited as a fundamental driver of ethnic inequality in health and one that must be addressed in order to improve Māori health outcomes (Reid & Robson, 2006).

6.3 Summary

A NZ cohort of octogenarians has lived through significant world and local events that have often required their fortitude. Added to this, NZ health statistics show a decline in physical ability and activity for the oldest-old compared to younger old people and a continuing, albeit deceasing, gap in health between Māori and non-Māori. Most of the health status variables considered in this section show statistics below those for people aged 50-64 years, indicating that physical wellness is likely to present an ongoing challenge for older people. Many disparities in health, however, are related to medical conditions (and also life decisions and barriers and incentives that affect opportunities and decisions about health practices) rather than to age itself (World Health Organisation, 2015). With recognition of age-related needs and an age-directional approach to healthcare such as improvements in physical activity and nutrition, effective treatment of disease and access to appropriate formal and informal support, the health of older people may improve.

Despite physical challenges however, advanced age offers opportunities to connect in multiple ways with other people and find different ways of achieving positive outcomes and may not represent the same disadvantage for everyone. Heterogeneity remains high in advanced age with potential for both positive and negative outcomes (World Health Organisation, 2015). The current research measures the existing physical and mental health status of the oldest-old to define their level of adversity. Life experiences and effective management of those experiences, which are carried by an individual into their advanced years, (their resource repertoire) will influence their responses to the health challenges they face. This thesis considers positive responses to be a demonstration of resilience.

CHAPTER 7: STUDY DESIGN AND MEASURES

The data for this research were collected from an established and on-going research project, LiLACS NZ (Life and Living in Advanced Age – a Cohort Study in New Zealand; Te Puawaitanga o Nga Tapuwae Kia Ora Tonu). Sections 7.1 and 7.2 describe the eligibility, recruitment, participation and data collection methods for the overarching LiLACS NZ research. Sections 7.3-7.6 describe the specific research questions and data collection methods for the resilience study.

7.1 Study design

LiLACS NZ is a longitudinal cohort study which is investigating the relative importance of a comprehensive range of variables to successful ageing and survivorship for Māori and non-Māori (Dyall et al., 2013; Hayman et al., 2012). The study concept, design processes and staffing were set up to value and respect the contribution of the very old participants to this research (Dyall et al., 2013; Peel & Wilson, 2008).

Ethical approval

National ethics approval was obtained from the Northern X Health and Disability Ethics Committee for LiLACS NZ baseline data collection in December 2009 (NXT/09/09/088)[9].

Eligibility

Study eligibility was based primarily upon age; that is, a 1925 year of birth for non-Māori and, for Māori, a date of birth between 1st January 1920 and 31st December 1930. A single age for non-Māori was set to minimise age effects on the results and age 85 was chosen because people of this age have, on average, a 90% chance of living another year and, thus, best represent those living in advanced age. A wider age band was sought for Māori to enable equal explanatory

[9] Approval to use LiLACS NZ data for the current research was provided upon application to the LiLACS NZ Management Group. Consultation with Māori academics (two members of the Management Group) and advisors facilitated access to Māori data. The LiLACS NZ cultural advisors were te Rōpū Kaitiaki o ngā tikanga Māori (Rōpū Kaitiaki; the protectors of the principles of conduct in Māori research), an unbiased group of six local kaumātua involved by invitation. All research processes to do with Māori enrolments were conducted with the oversight of the Rōpū Kaitiaki (Dyall et al., 2013).

power with non-Māori, given the lower life expectancy for Māori. A second eligibility criterion required that all potential participants had to have been living in the Bay of Plenty or Rotorua regions of NZ (defined by District Health Board area boundaries) for a minimum of three months.

7.2 Study procedure

Promotion and recruitment

Six study sites were located – two in Tauranga, two in Rotorua, one in Whakatane and one covering Opotiki and Te Kaha. A collaborative approach was taken to study promotion and recruitment, with local subcontractors asked to engage with eligible people in their area to tell them about the study and enrol and interview those who were willing to participate. Subcontractors were Primary Health Organisations (PHO) or iwi representatives.

Total population recruitment was attempted. In NZ, the year of birth is listed on the electoral roll for parliamentary voting. People of Māori descent are able to choose whether to be on the NZ General Electoral Roll or the Māori Electoral Roll. Electoral roll membership is compulsory so eligible people from both electoral rolls became the base population pool for the study; a total of 1639 potential participants (766 Māori and 873 non-Māori). The two electoral rolls were supplemented by GP databases, PHO lists, Māori tribal organisation lists and community group memberships. Wide community promotion in local newspapers and on the radio and television, and with posters displayed in doctor's waiting rooms, rest homes, community halls and other places that older people gather, increased local awareness and further increased the number of potential participants. The methods of promotion varied by site and are shown in Table 7.

Checking the supplementary source lists against the electoral rolls for comprehensive inclusion found 75 people to be ineligible (wrong age or ethnic group 30, lived out of the defined area 29, deceased prior to 2010 16). However, a further 72 people were identified through supplementary sources (GP 46, rest home 3, word of mouth 22, media 1) and were included to provide a total potential pool of 1636 people (Figure 4).

All eligible people were contacted and invited to participate in the study by local fieldworkers. Potential participants were phoned or, if it was more appropriate, for example with Māori participants, they were visited and a full and detailed explanation of what involvement would

require was given. The attendance of whānau or family members to hear recruitment and study information was encouraged for people who needed support to make a decision to participate.

Table 7: Methods of Recruitment by Site

	Study site											
	1		2		3		4		5		6	
	M	n-M	M	n-M	M	n-M	M	n-M	M	n-M	M	n-M
Electoral Roll mail out			✓	✓		n/a	n/a	✓				
Letter from General Practice	✓	✓	✓	✓		n/a	n/a	✓	✓	✓	✓	✓
Local networks	✓	✓	✓	✓	✓	n/a	n/a	✓	✓	✓	✓	✓
Whānau/hapū/iwi links	✓		✓		✓	n/a	n/a		✓		✓	
Local newspapers	✓	✓	✓	✓	✓	n/a	n/a	✓	✓	✓	✓	✓
Television interview					✓	n/a	n/a	✓				
Local radio			✓	✓		n/a	n/a				✓	✓
PR company						n/a	n/a				✓	✓

M = Māori, n-M = Non-Māori

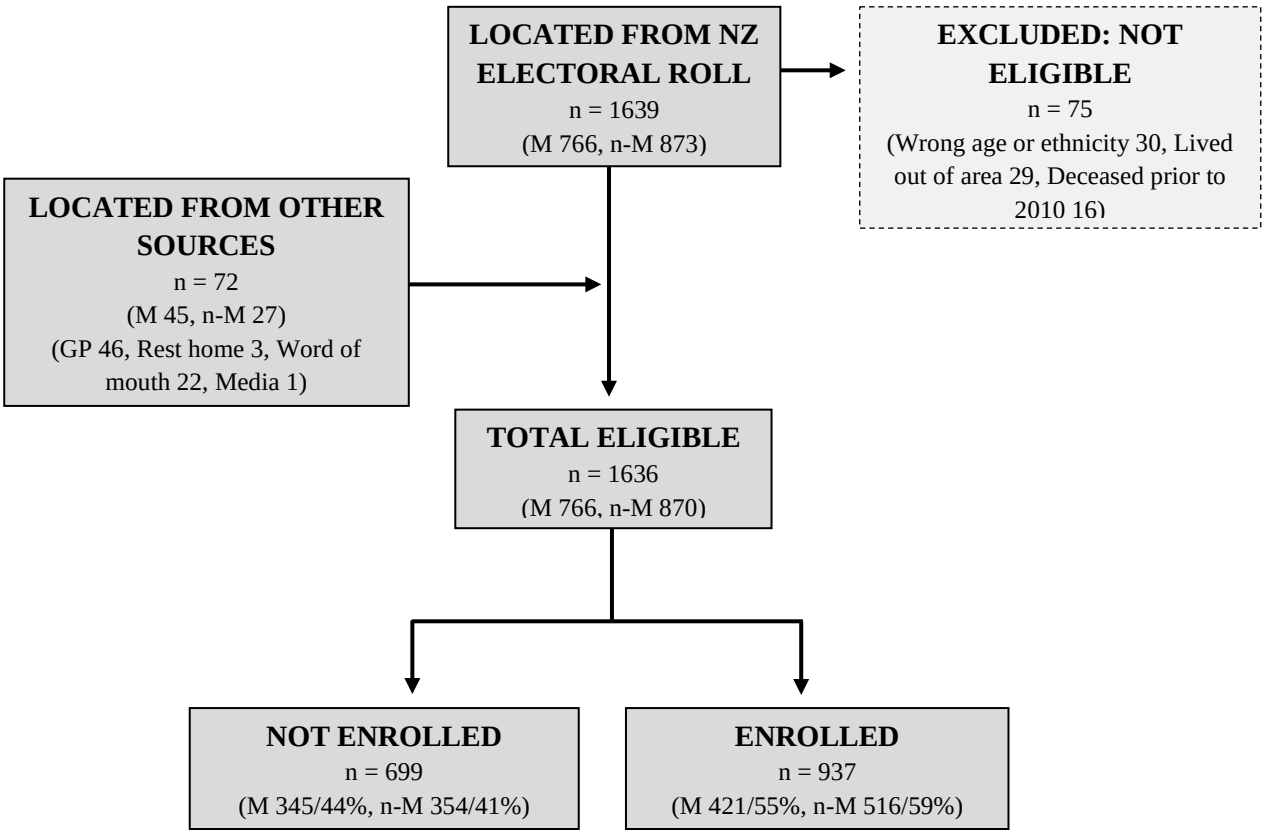

Figure 4: LiLACS NZ Response Rates

Participation

Two cohorts were enrolled between March 2010 and April 2011 (937 people; 421 Māori and 516 non-Māori). Participation in the study was voluntary and was enhanced through a number of design features. For example, the use of local field staff to contact, recruit and interview participants meant that participants' involvement in the study was with someone familiar to them. To enable participants with transport or mobility limitations to contribute, in-home interviews were offered. The summary information sent to each participant provided them with the phone number of key study investigators and a Health and Disability Advocate in case they wanted to ask questions about their rights in research.

Participation in LiLACS NZ involved answering a questionnaire and undertaking a physical health assessment and a blood test. A koha (gift of thanks) was provided to all participants at the completion of each wave of data collection.

Consent and data collection

At the first visit a comprehensive participant information sheet was left with all participants and written informed consent was obtained (Appendix B comprises the LiLACS NZ study consent form). Consent was obtained for each phase of the study separately, and was also sought for the collection of nationally-held health data including health conditions and hospitalisations. Consent by proxy was obtained at baseline for 66 participants (7%). Proxy respondents were 58 family (12 spouse, 3 sons, 36 daughters/daughters-in-law, 15 other), five formal caregivers and two friends; the relationship for one was not stated. Baseline data was collected between March 2010 and April 2011.

The majority of participants answered a comprehensive questionnaire in an interviewer-led visit of between two and four hours (average time 2.85 hours). Participants who could not complete the full questionnaire were offered a briefer version which included only core question and which took less than an hour on average to complete. The number of full and core questionnaires completed are shown in Table 8 but only data from participants completing the full questionnaire are included in the analyses[10]. Participants who completed the full questionnaire were more functionally able than those who completed the core questionnaire only ($p<0.01$) (Kerse et al.,

[10] The five participants who were enrolled in Wave 1 but did not answer any study questions are not included in data analyses.

2015). The group of local interviewers received standardised training in research questions and processes and ongoing reviews of practice. They were fully supported throughout the study by the study's Project Manager (KH), in person on-site as well as through regular email communication.

Table 8: Questionnaires Completed by Site and Subcontractor

		M	n-M	Total
Tauranga				
Western Bay of Plenty PHO	*Full*	91	328	419
	Core	73	64	137
Nga Maatapuna Oranga PHO	*Full*	29	-	29
	Core	10	-	10
Rotorua				
Rotorua Area Primary Health Services	*Full*	-	47	47
	Core	-	25	25
Te Korowai Aroha Trust and Te Rununga o Ngati Pikiao (joint subcontract)	*Full*	68	-	68
	Core	27	-	27
Whakatane				
Te Rununga o Ngati Awa	*Full*	48	24	72
	Core	14	12	26
Opotiki and Te Kaha				
Te Rununga o Ngati Pikiao	*Full*	31	5	36
	Core	27	9	36
TOTAL for all sites	*Full*	267	404	671
	Core	150	111	261
OVERALL TOTAL		417	515	932*

M = Māori, n-M = Non-Māori
PHO = Primary Health Organisation
*Total enrolled in Wave 1 was 937 people (421 M, 516 n-M) but 5 questionnaires were not received: Opotiki/Te Kaha 72/74 received; Whakatane 98/100 received; Tauranga Western Bay of Plenty PHO 555/556 received

Baseline assessments

A selection of the LiLACS NZ baseline questions and assessments were used in the current study and are elaborated on in sections 7.4 and 7.5 and in Chapters 8-10. The full complement of questions and tests conducted in LiLACS NZ are outlined in Appendix C and are further expanded in the LiLACS NZ study protocol paper (Hayman et al., 2012).

The factors measured at baseline by interview were grouped into socio-demographic characteristics, general health and health related quality of life measures, psychological and mental health factors, functional status and physical function, other specific health-related issues, health behaviours including nutrition, health services used, culture and cultural practices, social

networks and support exchanges, activities and transport, housing and environment, and politics and respect. The health assessments included height and weight measures, bioimpedence, anthropometric measures (waist and hip circumference), vision and hearing tests, blood pressure, an electrocardiogram, a respiratory spirometry and a test of grip strength. A blood test was taken after an overnight fast by the study nurse or laboratory staff on a day convenient to the participant and according to blood collection logistics for the study.

7.3 Research questions

Data obtained from participants enrolled in LiLACS NZ are used to answer seven research questions about resilience. The current work is undertaken in three stages.

STAGE 1:

1. Can people of advanced age be characterised according to psychosocial resources?
2. How does the health of people of advanced age vary based upon psychosocial clustering?

STAGE 2:

3. Can Māori of advanced age be characterised according to cultural and non-cultural resources?
4. How does the health of Māori of advanced age vary based upon sociocultural clustering?

STAGE 3:

5. How resilient are people of advanced age?
6. How does the health of people of advanced age vary according to their level of resilience?
7. How does the resilience of people of advanced age vary according to psychosocial clustering?

7.4 Measurement of independent and dependent variables

Demographic data

Demographic data consisted of participant's date of birth (dd/mm/yyyy), gender (male, female), ethnic group (Māori, non-Māori), marital status (never married, married, widowed/separated/ divorced,), education level (primary, secondary, completed secondary, trade, tertiary), living

situation (alone, with spouse/partner only, with others), living arrangement (own home, rest home, private hospital, residential care), NZ Deprivation Index according to residential location (low, medium, high), perception of current financial situation (can't make ends meet, just enough, comfortable), smoking status (never smoked, current or past), driving status (doesn't drive, current driver), prescription medication use (no, yes), falls (none, one, more than one), loneliness (feels lonely, never feels lonely), satisfaction with life (dissatisfied, neither satisfied nor dissatisfied, dissatisfied), instrumental support (no, yes, don't need help), emotional support (no, yes, don't need help), satisfaction with social relationships (extremely dissatisfied to satisfied all the time).

Ethnic group is an important variable to highlight as it was self-derived using the 2006 NZ Census question. Participants were asked to state which ethnic group(s) they belonged to. Those who self-identified as Māori (Māori only or Māori plus any other ethnic group) were coded as Māori and those who identified as any other ethnic group or mix of ethnicities (not including Māori) were coded as non-Māori. Individuals were excluded where a mismatch in ethnic status between recruitment and enrolment made them no longer eligible.

Cluster variables

The variables used in the cluster analyses were generated from items from the LiLACS NZ baseline questionnaire. Sixty-three items (see Appendix D) were aggregated into 27 resource indicators (20 psychosocial resource indicators for the psychosocial cluster analysis and seven cultural resource indicators added for the sociocultural cluster analysis). Table 9 lists the psychosocial and cultural items and the resource indicators they reference. The importance of each resource domain to the current research are discussed below. The numbers in brackets alongside each resource domain heading refer to the number of items within the domain and the number of resource indicators that were eventually used in the analyses. Decisions made about collapsing and re-coding the cluster variables are elaborated on in Appendix E.

Table 9: Psychosocial and Cultural Items and Resource Indicators

Research domain	Item	Resource indicator	Reliability (where available)
PSYCHOSOCIAL[#]			
Social support – formal and informal	Has help with daily tasks	Informal support - instrumental	
	Has emotional support	Informal support - emotional	
	Receives formal social support	Formal support	
	Satisfaction with family relationships Satisfaction with friend relationships	Satisfaction with social relationships	
Social network	Distance to nearest child Distance to nearest brother or sister Distance to nearest other relative Speak with children or relatives Speak with friends Speak with neighbours Attended meetings of any community, neighbourhood or social groups* Attended any religious meetings *	Social network (Practitioner Assessment of Network Type)	
Social participation [a]	Gone to the shops Visited family and friends Attended meetings of any community, neighbourhood or social groups* Attended any religious meetings * Been a spectator at a sports event Gone to an entertainment or arts event Gone to a restaurant, café, pub or bar Gone to a TAB or casino Attended a family event Attended a social occasion	Social participation	
Purpose and engagement in life	Does paid work Does unpaid/volunteer work	Formal role	
	Spent time on hobby last 4 weeks	Keeping busy – meaningful activity	
	Perception of enough to do [b]	Keeping busy - perception	
	Has a role in family Has a role in community	Informal role	
	Experience of growing older [c]	Attitude to own ageing	
Stressors	Major injury/health event ever [d] Major psychological event ever [e] Long-term disability [f] Past relationship loss (bereavement/ break-up)	Past adult stress	
	Financial poverty in childhood [g]	Past financial strain	
	Material standard of living	Current financial strain	
Coping self-efficacy	Perception of coping with life overall Perception of coping with times of loss Perception of coping with financial hardship Perception of coping with health problems Perception of coping with times of trouble for family/friends	Coping self-efficacy	Cronbach α 0.78
Mastery	Control over things Solve problems Change important things Helpless in dealing with problems Being pushed around Future depends on me Can do just about anything	Mastery (Pearlin and Schooler Perceived Mastery Scale)	Cronbach α 0.74

Research domain	Item	Resource indicator	Reliability (where available)
Mastery *cont.*	There is a lot you can do to keep healthy in old age	Perception of agency	
Faith	Religious affiliation	Religious affiliation	
	How important is faith to your wellbeing?	Spirituality	
Culture	I have a strong sense of belonging to my own ethnic group(s)	Sense of belonging to ethnic group	
CULTURAL•			
Whakapapa	Knows name of hapū Knows name of iwi Knows name of rohe	Knows Whakapapa	
Tikanga	Understanding of tikanga	Understanding of tikanga	
Marae links	Ever been to a marae Frequency of visit last 12 months	Number of visits to Marae in the last 12m	
Whānau	Importance of whānau to wellbeing	Importance of whānau	
Whenua links	Importance of nature to wellbeing	Importance of nature	
Whanangatanga	Has a role in a Māori organisation	Role in Māori society	
Te reo Māori	Speaks te reo Māori is mother tongue	Te reo Māori	

[#] Psychosocial resource indicators were used in both the main cluster analysis reported in Chapter 8 and the Māori cluster analysis reported in Chapter 9, [•] cultural resource indicators were used only in the Māori cluster analysis, * these two items are included in two resource indicators because they are unique and important components of both.

Question prefixes and questions not reported in the text:

[a] Question prefix "During the last 4 weeks how often have you? …,

[b] Thinking of how you spend your time, would you say, "Most days I …" Don't have enough to do; Just keep busy enough; Always have more than enough to do?

[c] On the whole, has growing older been a positive or negative experience for you?

[d] Have you ever had a major injury or health event that has affected you in the long term?

[e] Have you ever had a major psychological stress event that has affected you in the long-term?

[f] Do you have a disability or handicap that is long-term (lasting six months or more)?

[g] Thinking of your money situation before you left home, that is growing up, including your adolescence, would you say 'We couldn't make ends meet', 'We had just enough to get along on' or 'We were comfortable'

Social relationships (13-5)

The most comprehensive support systems are believed to be a combination of 1. the function of support, i.e. the degree to which different types of support (instrumental, emotional and formal) are present, 2. the individual's perception of the available support, and 3. the structural make-up of the social network (its size and type). This study measured all three areas. Participation in social activities is also an important social aspect of ageing and is discussed in a separate section.

A. *Function and Perception of Social Support (5-4).* Although some have analysed specific types of social support, studies do not prioritise which type, instrumental or emotional, is more effective, rather highlighting that both are important. Moreover, the quality of support received is as important as the type and degree of connection a person has with other people (Matz-Costa, Besen, Boone James, & Pitt-Catsouphes, 2012). This is partly because the perception of need may differ between the giver and receiver. Noting

different effects from different types of support (Glass & Maddox, 1992), ageing studies commonly assess instrumental and emotional support as separate factors. Instruments used to measure the presence or frequency of types of social support include single questions (Cherry et al., 2013), social support scales using Likert responses (Glymour, Weuve, Fay, Glass, & Berkman, 2008) or dichotomous ratings of the presence/absence of support (Hildon et al., 2009). People's satisfaction with support is generally assessed as a single variable, commonly on a Likert scale.

Measurement of social support: Noting different effects from different types of support the receipt of informal and formal support and satisfaction with social support were measured. *Informal support* was assessed by the presence of instrumental and of emotional help, which were coded as yes/no/I don't need help (Seeman & Berkman, 1988). Regular use of *formal support services* was coded as present/absent. Thirdly, in line with social network and ageing studies (Hildon et al., 2009), two questions, adapted from the Duke Social Support Index (Koenig et al., 1993), assessed *satisfaction with relationships* with family and with friends. The scores were added and averaged to generate a six-point Likert coding, ranging from 'Extremely dissatisfied' to 'Satisfied all the time'.

B. Social network (8-1). In resilience research, the structure of support has been assessed through categorised network typology or the density or size of a social circle typically using a count of close friends and family e.g. (Hildon et al., 2009). A social network is usually understood to be a combination of the proximity to, and relationships between, members. A number of theorists have defined social network operationally; the most notable being Clare Wenger who developed the Practitioner Assessment of Network Type; PANT (Wenger, 1997a) which is used in this study. The PANT has a complex coding system that generates five social networks based on the availability of informal support. *Locally integrated* networks are those in which people are reciprocally involved with close family, friends and the community, including community groups. *Wider community focused* networks see help offered by close-living friends and neighbours rather than family. People with this network are also heavily involved in the community. In *local self-contained* networks people rely primarily upon neighbours, as well as kin living close but not in the same neighbourhood; these people are private and have little involvement in the community. *Local family dependent* people rely predominantly upon their family and have few other social contacts. Finally, *private restricted networks* are

those in which family does not live close by but may provide help from afar, there is limited local support, and little contact with the community. According to Wenger, the locally integrated group is the most common and most robust and people living in private restricted networks are the most at risk (Wenger, 1997b). Wenger suggests ordering networks from more to less vulnerable, vis-a-vis *private restricted, local family dependent, local self-contained, wider community focused, locally integrated.* But she also notes that only 75% of people code unequivocally into one PANT category. The others span borderline (split between two networks; 20%) and unclassified (split between more than two networks; 5%) characteristics. According to Wenger, people with very unclear networks (lots of ties) also have greater cognitive impairment, implying greater vulnerability (Wenger, 1997a).

Measurement of social networks: The network types used were: five unequivocal categories - locally integrated, wider community focused, local self-contained, local family dependent and private restricted; three borderline categories based on tied responses and Wenger's hierarchy - robust/robust, robust/vulnerable and vulnerable/ vulnerable; and one unclassified category that depicted a tie between three or more networks. A computer algorithm generated all permutations of category mixes which was secondarily coded according to these categories.

Social participation (10-1)

In longitudinal ageing studies, social participation has been measured according to the number of community activities undertaken (Fiori et al., 2007; Hildon et al., 2009) or the degree or frequency of active participation in activities (Netuveli et al., 2008). The types of activities have also varied with some studies assessing multiple domains such as solitary, group and neighbourly activities (Walter-Ginzburg, Blumstein, Chetrit, & Modan, 2002), intimate and organisational ties (Glymour et al., 2008), and active and passive leisure activities (House, Robbins, & Metzner, 1982).

Measurement of social participation: This study measured the frequency of undertaking a list of 10 activities which were combined into a single social participation item. The activity list was modified from one used in NZLSA (Stevenson, 2014). Responses ranged from participating 'Every day' through to 'Not at all' and 'Occasionally'. Resulting scores were summed and averaged. Social participation was coded as low, moderate or high.

Purpose and engagement in life - meaning making (7-5)

Despite definitions of successful ageing that highlight the importance of productivity, activities have different meanings to different people which may be related to the extent of roles held (Matz-Costa et al., 2012). Conversely, it may be possible to have a positive outlook on life without substantial involvement in community activities. Believing that one's perspective of life as well as the degree of engagement in life are both important aspects of meaning-making, the current study expands on longitudinal studies of ageing that have reported the psychosocial aspect of finding meaning in life but haven't examined the extent of activities and roles undertaken. Overall, the concept of finding meaning in life is assessed in this study through three avenues:

A. *Undertaking formal paid and unpaid work – being productive (engagement in life; 4-3).* In contrast to activities that just have social utility to the individual doing them, productive activities have social benefit as well for the people to whom they are directed, and, in later life, include work and volunteering (Morrow-Howell, 2000).

   Measurement of formal engagement in life: *Formal roles* were assessed by the undertaking of paid and unpaid work, each coded as present/absent. The codes were added to provide three levels of formal role commitment. To capture more individually meaningful activities participants were asked if they had *spent time on a hobby* in the last 4 weeks and responses were coded on a five-point Likert scale (Stevenson, 2014). *Keeping busy* was coded categorically as low, satisfactory and high engagement in life.

B. *Undertaking specific informal roles (purpose in life; 2-1).* In longitudinal studies of ageing, the focus on purpose and meaning-making and its relationship to resilience has been investigated by examining participants' purpose in life (Hedberg, Gustafson, & Brulin, 2010; Nygren et al., 2005) which equates to goal-directedness or being intentional in action; their personal life investment, which measures the degree to which people think about different life domains (Staudinger & Fleeson, 1996); and their valuation of life (Lawton et al., 2001), that is, the experienced worth of and active attachment to one's life. Space limitations in the questionnaire in this study, as well as the participant's age, discounted the inclusion of a long, structured measurement scale so the undertaking of informal roles via a single question was chosen to reflect purpose in life.

Measurement of informal purpose in life: Participants were asked if they held a specific role within their immediate or extended family group or in their local community or neighbourhood. The two resulting binary variables were added so that a low, medium or high informal role commitment was obtained.

C. *Having a positive attitude to ageing (1-1).* Satisfaction with ageing is different to satisfaction with life in general (L. Harris, 1975) but is a known resilience resource as it contributes to wellbeing by sustaining other resilience resources such as social activity and engagement, self-esteem and optimum biophysiological functioning (Kleinspehn-Ammerlahn et al., 2008).

Measurement of attitude to ageing: Attitude to ageing is not easily measured but is commonly assessed with a single question. Participants were asked to rate their experience of growing older from very negative to very positive.

Stressors (6-3)

The longitudinal Health and Retirement Study (HRS), measured eight chronic stressors – own health problems; spouse or child's physical or emotional problems; family member's problems with alcohol or drug use; difficulties at work; financial strain; housing problems; problems in a close relationship; and helping at least one sick, limited, or frail family member or friend on a regular basis, coded by their impact (J. Smith et al., 2013). Scores were summed so that a higher score indicated greater upset from the stressors. Participants were younger than in the current study for whom work, and alcohol and drug issues are likely to be less relevant. Adversity experienced during childhood (i.e. before they moved out of the house) has also been measured in a younger sample to assess its contribution to psychiatric disorder risk (Turner & Lloyd, 1995). Although, assessing a younger age group overall, Turner and Lloyd noted that the memory of past adverse events was not compromised with age; kappa values for reporting replication of 18 out of 20 of their items after 1 year reached 0.06 and were mostly higher. Stressors across multiple domains were assessed to account for the multidimensional nature of stress (Jeon & Dunkle, 2009).

Negative, rather than positive, stressors were assessed in the current study as past (relationship loss, financial strain and disability) and current (current material standard of living) stress events.

Chronic stressors (disruptive major injury or health event, disruptive psychological event, and chronic disability) were a focus for the past events rather than short-term daily hassles.

A. *Past stressful events (4-1).*

   Measurement of past stressful events: *Chronic stress* was coded with two binary items and *chronic disability* with a 2006 NZ Census question (Statistics New Zealand, 2006). A question written for the study to assess *past loss* asked about previous significant relationships. Significant relationships that had ended in death/widowhood, separation or divorce were considered a relationship loss. In line with studies showing that the accumulation of stressors plays a larger part in facilitating resilience than single stress events the four codes were summed.

B. *Financial stress (2-2).*

   Measurement financial stress: Past and current financial strain were assessed separately. To assess *past financial strain* participants were asked about financial hardship when they were growing up. The participant's rating of their *current material standard of living* was assessed on a five-point Likert scale ranging from 'high' to 'low' standard of living.

Coping self-efficacy (CSE) (5-1)

The concept of CSE is particularly relevant to resilience for its role in the perception and cognitive processing of threatening situations (Benight & Bandura, 2004). It is related to mastery but is situation-specific. Thus, CSE scales are commonly designed and adapted to fit specific research populations. For example, scales have been developed for Dutch military recruits handling stress during training (Delahaij, 2009), bereaved women coping with the death of their spouse (Benight, Flores, & Tashiro, 2001), and older adults adjustment to ageing (Holahan & Holahan, 1987). Aggregated Likert scales are a common question format.

Measurement of CSE: As no specific questions were available for people of advanced age, a five-item scale of coping self-efficacy was developed specifically for this study. The variables chosen reflect the age of participants and concerns that they could face in daily life. The participants' perception of their ability to cope with each item was coded on a five-point Likert scale, with coding options ranging from coping "Not at all" well to coping "Extremely" well (range 5-25). CSE scores were re-coded to identify low, moderate and high levels of CSE. Cronbach alpha of this scale is 0.78, representing acceptable internal consistency.

Perception of self-mastery (control) (8-2)

Mastery (also called locus of control) is a common global assessment in health research. This study used two measures of perception of mastery:

A. *Mastery (Pearlin & Schooler, 1978); (7-1)*. The Personal Mastery Scale (Pearlin & Schooler, 1978) is well-used in studies of psychosocial aspects of ageing (Burns et al., 2011; Cooper, Huisman, Kuh, & Deeg, 2011; Gadalla, 2009; Jeon & Dunkle, 2009; Lachman et al., 2009; Milaneschi et al., 2010; Steunenberg et al., 2007). However, despite its common use in resilience work, the Personal Mastery Scale has not been coded consistently as optimal scoring instructions were not given in the original publication. Jeon and Dunkle assessed the mediation effect of psychosocial resources on depression following stress with people 85 years and over and coded the mastery questions on a four-point Likert rating (Jeon & Dunkle, 2009) but others have used a five or seven-point rating. The full scale has seven items but it is also often abridged to suit the research. The total score can be used as a continuous measure with higher scores indicating a higher sense of control. Two notable longitudinal studies of ageing, the Health and Retirement Study and ELSA, used single questions about mastery. Although they were answered on a six-point Likert scale, final scores were dichotomized. Using a five-point Likert response format, a study with ageing combat war veterans achieved an alpha of 0.83 in (King, King, Vickers, Davison, & Spiro III, 2007) and in the LASA Cronbach alpha was 0.78 (Jonker, 2010). In a study of Canadians aged 75+ years, the reliabilities for five items were 0 .75 for men and 0.71 for women (Gadalla, 2009). Face validity is best demonstrated by wide-spread usage across multiple cultural and age groups

   Measurement of mastery: The full seven items of the Personal Mastery Scale were used for this study with a five-point Likert response format (range 5-35). Total scores were recoded to identify low, moderate and high levels of mastery. Cronbach alpha in the current study was 0.74.

B. *Personal agency (1-1).*

   Measurement of personal agency: Keeping healthy in old age captured *personal agency* and responses were coded on a five-point Likert scale. Agency to keep healthy and was negatively correlated with the Personal Mastery Scale (-0.196), showing that the items are qualitatively different.

Faith (2-2)

Religiosity and spirituality are not the same thing as understood by both theorists (Kapuscinski & Masters, 2010) and research respondents (Zinnbauer et al., 1997). Spirituality refers to a personal expression of faith, whereas religious institutions provide the forum for spiritual expression, usually with others. Although in research religion and spirituality are often assessed as one concept it is more commonly believed that the true complexity of 'faith' or 'transcendence' involves multiple aspects such as belief, value, practice, and impact. There are upwards of 100 different religious or spirituality scales available. However, they are generally lengthy and cumbersome and, without consistent usage, provide no construct validity (Kapuscinski & Masters, 2010). Moreover, many of the studies specifically assessing religion and resilience are qualitative e.g. (Manning, 2013; Ramsey & Blieszner, 2000), further limiting psychometric data on which to effectively evaluate a scale.

Measurement of faith: Religion and spirituality were assessed separately. *Religious affiliation* was coded as present/absent (Statistics New Zealand, 2006). The broader concept of the importance of spirituality in the respondent's life was treated as a proxy for *spirituality* in the sense that 'faith' denotes a more personal evaluation of belief than religion and therefore may reasonably measure a more central and internalized concept. A five-point Likert response format elicited answers ranging from 'Not at all' important to 'Extremely' important (Kasen, Wickramaratne, Gameroff, & Weissman, 2012).

Culture – sense of belonging (11-8)

It is thought that one's identity is affected when a significant other dies, for example, a spouse with whom one's own identity is closely tied (Bonanno, Papa, & O'Neill, 2002). On the other hand, multiple sources of identity exist so, although one identity may be shattered, the strength of others, related to, for instance, family or culture may help to buffer loss experiences. Culture is a key mechanism that underpins social identities (Deaux, 2001) as it defines a sense of shared beliefs and belonging. In the current study, one's sense of belonging to their ethnic group was considered to be a measure of attachment or connection to a wider cultural network. In the absence of other cultural variables, this served as a single resource indicator for non-Māori, with other cultural variables added for the cluster analysis for Māori.

Measurement of culture: The respondents sense of belonging to their own ethnic group (Statistics New Zealand, 2006) was coded on a five-point Likert scale, from strongly disagree to

strongly agree. ‘Belonging’ in a cultural sense was whichever ethnic group(s) participants identified with.

Māori culture (11-7)

Variables in this domain attempt to capture important aspects of Māori cultural identity (CI) and were added to the psychosocial resource indicators for the cluster analysis for Māori. Questions relating to cultural values were only asked of Māori participants. We acknowledge that the variables chosen below are assimilated with, but not definitive of, Māori cultural identity. Previous work in NZ and overseas highlights historical, environmental and values-based elements that are important to cultural identity. For example: language, behaviour/familiarity and values/attitude were assessed in Latino youth (Felix-Ortiz, Newcomb, & Myers, 1994). A group in California highlight aspects of ethnic identity – positive ethnic attitudes and sense of belonging, ethnic identity achievement and ethnic behaviours and practices (Phinney, 1992). Much previous work on cultural identity has been conducted with youth because they are actively developing their identities. But, as identity is also important to coping with adversity (Grandbois & Sanders, 2009) and because of Māori’s history of discrimination (Healey, 2006), cultural identity is a key factor to measure in resilience work. Little research in this field has been done with older adults. This study assessed concepts of: whakapapa, tikanga, marae links, whānau, whenua links, whānaungatanga and te reo Māori, which are described below (for a more specific elaboration of cultural identity, see Chapter 9).

A. *Whakapapa (3-1)*

   Measurement of whakapapa: The names of known hapū, iwi and rohe were recorded. Where any were not known, a ‘don’t know’ code was assigned. To score each category, any named responses were coded as 1 and a combined variable was generated, such that knowing either hapū, iwi or rohe, alone or in combination, elicited a code of yes for the ‘knows whakapapa’ item. A code of 0/no was given if none of hapū, iwi or rohe were known.

B. *Understanding of Tikanga (1-1)*

   Measurement of understanding of tikanga: Participants were asked: *How well do you understand your tikanga?* Answers were coded on a five-point Likert scale, ranging from ‘Not at all’ to ‘Extremely’ well.

C. *Marae links (2-1)*

Measurement of marae links: A variable assessing the frequency of visiting a marae in the last 12 months was obtained from two study questions: *Have you ever been to a marae?* And *If yes, how often over the last 12 months?* Scores ranged from 0 (never been or not over the last 12 months), through 1 (once), 2 (a few times), 3 (several times) to 4 (more than once a month).

D. *The importance of whānau to wellbeing (1-1).* The importance of whānau was considered to be a variable of 'being Māori' as whānau provide links back in time and forward to future generations. Cultural identity measures for Māori commonly include a whānau/kinship variable.

Measurement of whānau: This study assessed whānau links through the question "*How important is whānau to your wellbeing?"* Answers were coded on a five-point Likert scale, ranging from 'Not at all' to 'Extremely' important.

E. *Whenua links (1-1)*

Measurement of whenua links: Whenua links relate to the land. The question was worded *How important is nature and the outdoors to your wellbeing?* Scores coded from 'Not at all' to 'Extremely' important were used in analyses.

F. *Whānaungatanga (1-1).* The collective nature of the Māori world links each individual to all other Māori. Whānaungatanga depicts a relationship built through shared experiences and working together and which provides people with a sense of belonging. Kinship rights and obligations are reciprocal so while some define whānaungatanga as responsibilities and relationships individuals have with their kin group (Houkamau & Sibley, 2010; Pere, 1988) it is also about the person's own interpretation of what it means to be Māori (Houkamau, 2011) p 307.

Measurement of whānaungatanga: In this study whānaungatanga was measured with a variable depicting participation in Māori society as this may represent an aspect of 'being Māori' *Do you have a specific role in [other] Māori organisations in wider society?* Answers were coded No/Yes.

G. *Te reo Māori (2-1)*

Measurement of the strength of te re Māori: Two variables represent the strength of te reo Māori: that Māori was considered to be the participant's mother tongue and that the participant spoke te reo in everyday life. An answer of 'Māori' for the first question was coded 1 whether other languages were spoken or not, and all other answers were coded 0. For the variable about mother tongue, if Māori was mentioned, the question was coded 1, if not, it was coded 0. These two 0/1 codes were summed to give a score out of 2; 'poor', 'moderate' and 'good' labels were assigned to the codes (0-2 respectively), that is both speaking Māori and feeling that it was their mother tongue was required for te reo to be a strong cultural indicator.

Health variables

Outcome variables include health-related quality of life (using the physical and mental health components of the SF-12 Short-Form Health Survey), depression (using the Geriatric Depression Scale), functional status (using the Nottingham Extended Activities of Daily Living scale), cognition (using the Modified Mini Mental State Examination) and physical performance (using the Short Physical Performance Battery). All the variables were used in analyses as continuous measures. Descriptive details on the measurement of these variables are discussed below. Operationalisation and reliability statistics, where available, are outlined.

Modified Mini Mental State Examination (100 items)

The Modified Mini Mental State Examination; 3MS (Teng & Chui, 1987) extends a well-used scale, the Mini Mental State Examination; MMSE (Folstein, Folstein, & McHugh, 1975), which was developed to assess cognitive functioning and measure change in cognitive status.

Reliability and validity: Psychometric evaluation against the MMSE suggests improvement in psychometric properties of the 3MS from the MMSE. The 3MS shows high Cronbach alpha coefficients; 0.82 for people with no cognitive impairment and 0.88 for people with Alzheimer's disease (Tombaugh, McDowell, Kristjansson, & Hubley, 1996). Both internal consistency and discriminant validity have shown consistently good results in other studies of older subjects (Jones et al., 2002).

Measurement of the 3MS: The 3MS has 26 questions, contained in 16 subtests - date and place of birth, registration, mental reversal, word recall and delayed recall, temporal orientation, spatial

orientation, naming, four-legged animals, similarities, repetition, reading and obeying, writing, copying, three-stage command and word fluency. Scores are assigned to each question according to a structured protocol with a maximum score of 100. The MMSE has a maximum score of 30 and can also be calculated from a single 3MS administration. The 3MS can be administered by trained non-clinicians. Cronbach alpha in the current study was 0.93.

Short Physical Performance Battery (3 items)

The Short Physical Performance Battery (SPPB) tests *objective* physical performance using three aspects of lower body performance – standing balance, gait speed and chair stands (Guralnik, Ferrucci, Simonsick, Salive, & Wallace, 1995). The three measures combined allow for identification of grades of functioning (Melzer, Gardener, Lang, McWilliams, & Guralnik, 2006).

Reliability and validity: This objective physical performance measure is a complement to subjective ratings of physical functioning (Reuben et al., 2004). However, despite lower body function being a base indicator of health state and predictive of future health in older people (Vasunilashorn et al., 2009; Volpato et al., 2011), the SPPB has not been used extensively in physically compromised populations. Careful administration and a revision of the scoring has shown safe and reliable use in hospitalized patients (Fisher, Ottenbacher, Goodwin, Graham, & Ostir, 2009). Because the battery is extremely common in measuring physical functioning in older adults, psychometric data are extensive and positive. In older people the measure has shown test-retest reliability of 0.87; and convergent validity is shown by positive relationships to self-rated health, physical limitations and disability measures (Gómez, Curcio, Alvarado, Zunzunegui, & Guralnik, 2013). Cronbach alpha in the current study was 0.78.

Measurement of objective physical performance: The time to achieve each test provides the data for analysis. The standing balance test has three graded standing levels - feet side by side, feet beside each other but offset (semi-tandem stance), and one foot directly in front of the other (tandem stance). If a stance is achieved within 10 seconds the next balance test is done. To assess gait participants are asked to walk ahead three meters at their normal walking pace. The gait speed test is done twice and the fastest speed is used in analyses. The chair stand test involves participants starting from a seated position to stand up/sit down five times as fast as they can without using their arms to help them. Individual safety is assessed prior to each test. All tests were administered using standardized equipment and a dining chair with arm rests.

Geriatric Depression Scale – 15 item (15 items)

The original 30-item Geriatric Depression Scale was developed specifically for older people to measure symptoms of depression (Yesavage et al., 1983). It places less weight on somatic symptoms than do other generic depression scales, and the short versions are quick and simple to use so as not to tire the respondent. The 15-item version of the scale; GDS-15 (Sheikh & Yeasavage, 1986) is more effective at detecting clinically significant symptomatology than the 10 or four item versions (Almedia & Almedia, 1999). It was also chosen for this study because it has been used extensively across the world, and used with advanced age populations. A score greater than four is considered indicative of depression (Sheikh & Yeasavage, 1986). Scores greater than nine indicate possible major depression. These cut points have been shown to yield a good combination of high sensitivity (91%) with a minimal drop in specificity (72%) (D'Arth, Katona, Mullan, Evans, & Katona, 1994).

Reliability: Cronbach's α is 0.80 (Almedia & Almedia, 1999). The GDS-15 shows high concordance with clinical depression (DSM-IV and ICD-10) as well as other depression scales (e.g. the Hamilton Rating Scale for Depression). The individual items had high correlations with depressive symptoms in validation studies (Sheikh & Yeasavage, 1986).

Measurement of depression: Responses are given as 'yes/no' answers in terms of how the person has felt in the past week. Ten of 15 questions indicate depression when answered positively and five indicating depression when answered negatively. The negatively-coded items are reverse-scored for analyses. Cronbach alpha in the current study was 0.40. A low level of resilience was found overall in these studies (see Chapter 10).

Short Form Health Survey – 12 item (12-items)

General health measures complement disease-specific measures in assessing outcomes that have an impact on quality of life (Dittmar, 1997). The original Short-Form Health Survey (SF-36) has been used extensively since its development in almost every field of health to measure general quality of life (Ware & Sherbourne, 1992). The SF-12 is a shorter version, useful for comparing the concomitants of physical and mental health for people of any age and at any level of wellness (J. E. Brazier & Roberts, 2004). The scales generate eight sub-scale scores; physical functioning (limitations in mobility, agility and self-care), role physical (limitations in role fulfilment because of physical health problems), bodily pain (the intensity of and interference with everyday activities caused by bodily pain), general health (overall health), vitality (energy levels), social

functioning (the extent to which health problems interfere with social activities), role emotional (limitations in role fulfilment because of mental health problems) and mental health (levels of anxiety and depression). The authors encourage the calculation of Mental and Physical Component Summary scores (MCS and PCS respectively) based on the sub-scales as robust summary descriptions of an individual's scores without substantial loss of information (Ware, Snow, Kosinski, & Gandek, 1993). Each of the sub-scales, including MCS and PCS, yield a score between zero and 100 when using the standardized scoring protocol, with higher scores indicating a more favourable health state.

Reliability and validity: Among the most beneficial aspects of the scale to research is its brevity, comprehensiveness and good psychometric properties. Each of the eight sub-scales has good internal consistency - 0.78 or greater - the highest being the physical function sub-scale (0.91) (McHorney, 1996). The NZ Ministry of Health calculated the psychometric properties of the SF-36 from the 1996/97 Health Survey (Ajwani et al., 2003). All sub-scales demonstrated acceptable discrimination from other scales. Convergent validity between scales, however, is not as clearly shown in studies, partly because quality of life is a multidimensional construct. The SF-12 measure is particularly useful for group level analyses.

Measurement of quality of life: The scale contains eight core multi-item sub-scales scored individually – physical function, role limitations - physical, role limitations - emotional, pain, social function, general mental health, vitality and general health perceptions. This study reports the two component summary scores (range 0-100), standardised to a mean of 50, which signify physical (PCS) and mental (MCS) HRQoL. Higher scores indicate a more favourable health state. Cronbach alpha in the current study was 0.85.

Nottingham Extended Activities of Daily Living Scale (22 items)

The Nottingham Extended Activities of Daily Living scale (NEADL) is another generic measure, recording performance on a wide range of daily activities (Essink-Bot, Krabbe, Bonsel, & Aaronson, 1997). It is assumed in ADL (activities of daily living) scales that limitation in ability to a do a particular activity reflects disability. The NEADL was designed in 1987 as a self-report postal response questionnaire for stroke patients but since its inception has been used widely and often with older patients with other chronic or disabling conditions.

Reliability and validity: Cronbach's α is 0.90. In a study by Harwood and Ebrahim (2002) only the leisure section had an alpha below 0.80 (this was 0.64). The scale has very good face validity.

It is strongly correlated with the London Handicap Scale and the physical and social sub-scales of the SF-36, showing good construct and concurrent validity (Harwood & Ebrahim, 2002). Although the authors cautioned that care be taken when generalising to populations other than the originally intended stroke patients as it was shown to be poor at measuring changes in function following hip arthroplasty, adopting a Likert-type scoring method helped to minimise this problem.

Measurement of subjective functional status: The Nottingham Extended Activities of Daily Living scale comprises 22 items in four sections – mobility, kitchen activities, domestic tasks and leisure activities. Responses are dichotomised into 'independent' (on their own, on their own with difficulty), or 'not independent' (with help, not at all); the totals of which are added to give a value between zero and 22. Lower scores indicate greater functional difficulty. Cronbach alpha in the current study was 0.90.

Health impairment (20 items)

To obtain a measure of health impairment, the presence of selected medical conditions obtained from a number of sources were weighted by medical opinion of their severity or average health impairment. Few studies have weighted medical conditions in this way. However, in previous ageing research medical conditions are commonly assessed and have been summed in studies of resilience (Consedine et al., 2004), coping (Jonker et al., 2009), successful ageing (Montross et al., 2006; Strawbridge et al., 2002), age identity (Westerhof, Barrett, & Steverink, 2003) and survival (Ben-Ezra & Shmotkin, 2010). Medications were weighted in a study of the relationship between disability and disease severity and depression (Rovner & Casten, 2002). The conditions summed and weighted in the current study are consistent with the types of conditions assessed in previous work and include 18 chronic physical and two chronic psychological conditions. The list includes epilepsy, Parkinson's disease, congestive heart failure, coronary artery disease, atrial fibrillation, stroke, peripheral vascular disease, high blood pressure, asthma or chronic lung disease, osteoporosis, diabetes, cancer, rheumatoid arthritis, osteoarthritis, kidney problems, eye condition (cataract, ARMD, glaucoma, diabetic eye disease), thyroid disease, anaemia, depressive symptomology, and dementia. Lower scores indicate lower health impairment.

7. 5 Analytic plan

IBM SPSS Statistics, version 22, was used to conduct analyses. Details of the methods below are given in the chapters describing study results, as are descriptive statistics and Pearson's correlation coefficients where relevant. A summary of the variables and methods used at each stage are as follows:

STAGE 1 - Variability in Physical and Mental Health in Relation to Psychosocial Characteristics for People of Advanced Age: LiLACS NZ

Independent variables …….. social network, social support, social participation, purpose and engagement in life, stressors, coping self-efficacy, mastery faith, culture

Dependent variables ……. depression, physical HRQoL, mental HRQoL, cognition, physical performance, functional status

Covariates ……..... gender, age, ethnic group

Method ……..Hierarchical Cluster Analysis run in two steps (generation of clusters), adjusted GLM (cross-sectional outcomes)

STAGE 2 - Variability in Physical and Mental Health in Relation to Sociocultural Character Patterns for Māori of Advanced Age: LiLACS NZ

Independent variables …….. social network, social support, social participation, purpose and engagement in life, stressors, coping self-efficacy, mastery faith, culture, cultural identity

Dependent variables ……. depression, physical health related QoL, mental health related QoL, cognition, physical performance, functional status

Covariates ……..... gender, age

Method ……..Hierarchical Cluster Analysis run in two steps (generation of clusters), adjusted GLM (cross-sectional outcomes)

STAGE 3 - Prediction and Correlates of Resilience in Advanced Age: LiLACS NZ

Independent variables ……functional status, health impairment, psychosocial cluster

Dependent variables ……. depression, physical HRQoL, mental HRQoL, cognition
Covariates ……..... gender, age, ethnic group
Method …….. standardised residuals (resilience score), 2x2 cross tab (categorical resilience), GLM x 4 (cross-sectional outcomes), GLM (comparison with clusters)

Generation of psychosocial and sociocultural clusters

Cluster analysis is utilised to describe character profiles, based upon multiple variables that then represent varying levels of factors which may influence positive adaptation and health outcomes. That is, cluster analysis groups people based upon the spread of variables they have in common and the obtained clusters can be interpreted according to the variable make-up within them. This approach provides a 'face' to a potentially resilient person.

Specifically, the resource indicators chosen for the study (psychosocial: social support, social network, social participation, purpose and engagement in life, perception of growing older, past and current stressors, coping self-efficacy, perception of self-mastery, religious and spiritual faith and cultural belonging; and sociocultural: whakapapa, tikanga, marae links, whānau, whenua links, whānaungatanga and te reo Māori) were utilised in a 2-step hierarchical cluster analysis. A hierarchical cluster analysis can handle multiple types of variables.

The first step in the cluster analysis is to determine the number of clusters. The analysis starts with all cases (individuals) on their own and progressively groups them together. This creates a structure resembling an animal classification taxonomy. The method of joining subsequent cases or clusters to existing clusters varies and algorithms are complex and were handled by the SPSS programme in this study (IBM SPSS Statistics 22). The researcher must nevertheless determine the method of grouping and whether to transform variables. Four measures of proximity are possible: a) join to the cluster where the minimum distance from the members is smallest (single linking rule), b) join to the cluster where the maximum distance from the members is smallest (complete linkage rule), c) join to the cluster where the average distance from the members is smallest (average linkage) and d) join to the cluster in which the addition will minimise the error sum of squares of the cluster from its central point (Ward's method).

The parameters can be tested and the decision about which is most appropriate is somewhat arbitrary as the researcher is seeking overall the most *meaningful* groupings. Outputs to aid in the

final decision about the optimal number of clusters include a graph (dendrogram) which shows the size of the clusters and a numerical schedule of the distances between the clusters (agglomeration schedule). Using these aids, the researcher looks for the clusters that retain their membership for the longest time.

The second step in a cluster analysis involves rerunning the analyses to obtain final group membership. The decisions made in this study about group membership are further defined in Chapters 8 (psychosocial clusters) and 9 (sociocultural clusters).

Generation of the resilience score

An empirically-derived adversity/competence dyad is utilised to examine resilience and the relationship between resilience and health outcomes. Resilience scores were obtained from standardised residuals using a univariate general linear model. The residuals represent the degree of variation between the observed and predicted values of the dependent variable (functional status) given the value of the independent variable (health impairment). In order to conceptually understand the resilience scores (i.e. higher values denote higher impairment for both variables), NEADL scores were reversed. The obtained residual score, therefore, does not measure a ratio between the variables but, instead, is a measure of the degree of variation between the observed and predicted values of the dependent variable given the value of the independent variable.

In this study resilience is operationalised as functional status relative to health impairment using the NEADL scale to define functional status and a weighted measure of medical severity over 20 chronic conditions to define health impairment.

Outcome analyses

Multivariate regressions as General Linear Models (GLM) were conducted to assess cross-sectional relationships with physical and mental health, where the main effects were significant at $p < 0.05$. Significant pairwise comparisons between the clusters were conducted to determine where any differences between clusters lay. Multiple liner regressions were conducted to assess the relationship between resilience and psychological outcomes; ANCOVA analyses were conducted to assess the relationship between resilience and psychosocial profiles. Post hoc analyses of differences between the clusters are reported.

7.6 Analyses in two contexts

The inclusion of both Māori and non-Māori people of advanced age in reasonable numbers in the research as a whole allows something meaningful to be said about both the advanced age and cultural contexts. Obtaining comprehensive data from a cohort of 250 Māori is extensive for any research project. Moreover, data on resilience for Māori of advanced age is unique. The most ethnically sensitive approach to interpreting how Māori are situated in terms of resilient resources is to analyse Māori data separately. But that means that Māori then sit aside from the overall cohort. While it is more ideal for a Māori researcher to conduct and interpret Māori data, I am non-Māori. Inevitably, the views of ageing and health described in this thesis conform to a Western model and may not be entirely relevant for Māori. Acknowledging this, this section aims to justify analysis of Māori data from a non-Māori, Western research orientation.

The context of advanced age in relation to Māori culture

For the majority of analyses, Māori data are analysed alongside non-Māori data in a full age-based cohort. New Zealand is a multi-cultural society and, as such, people live in the same neighbourhoods, use the same social services and interact with each other locally and as members of the community. People are ageing together, attending the same schools, churches and public hospital system. In the NZ health system, differences between Māori and non-Māori lie in the access to and usage of services and in the utilisation by Māori of alternative Māori-directed health care which is designed around the Māori world-view, uses Māori methodology and capitalises on Māori professionals to deliver Māori-centred care.

In group analyses in this thesis, Māori data is included with non-Māori data and statistical differences that are valid to the research question are discussed. The decision to discuss Māori outcomes in this way was driven by pragmatism and theoretical direction. Sub-group analysis are not done and outcomes are discussed by ethnic group only when the data calls for it. No comparative results are presented.

The context of Māori culture in relation to advanced age

Differences already outlined in terms of perceptions of ageing, health and potential resilience indicators suggests that a different mix or resilience resources may emerge for Māori. Data for

the Māori sample are analysed in a separate cluster analyses in an attempt to acknowledge these differences. To assist me in making culturally sensitive decisions about variable choice, analysis decisions and interpretation, the Rōpū Kaitiaki was consulted and ongoing Māori academic advice was sought. Following recommendations by the Rōpū Kaitiaki about what to ask older Māori overall about ageing, and how to word questions for the LiLACS NZ study, cultural advice specific to the current research was initiated in the early phases of study development. That included presentation of the intended research questions to the Rōpū Kaitiaki and Māori academic advisors. The Rōpū Kaitiaki offered comment, in particular on early outputs relating to spirituality and on the broader conceptualisation of culture which resulted in a greater conceptual understanding for me on the concept of spirituality for Māori. The meaning of resilience was debated and whether it was a function of culture or whether culture was a function of resilience. Further consultation with Māori academics guided the meaning of the resources chosen to represent cultural identity that were then used to answer the research questions.

The question of whether to analyse non-Māori data separate to Māori data was not addressed until late in the thesis development; too late in fact to implement. I acknowledge that completely separate analyses would have been more culturally sensitive.

CHAPTER 8: RESULTS OF STAGE 1

8.1 Comment on the chapter

This chapter outlines the first of the results. It is written in the form of a research manuscript, which is in the process of resubmission for publication. The manuscript answers the research questions:

1. Can people of advanced age be characterised according to psychosocial resources?
2. How does the health of people of advanced age vary based upon psychosocial clustering?

This representation of the manuscript has been altered somewhat from its submitted form in order to retain the flow and cohesion of the thesis. An outline of person-focused vs variable-focused approaches to measuring resilience are not included in the introduction as this is discussed already in Chapter 5. Operationalisations of the measures used in the cluster analysis have also been removed as these are discussed already in Chapter 7. The cluster analysis method is retained in this chapter as it sits well alongside the results.

8.2 Manuscript 2: Variability in Physical and Mental Health in Relation to Psychosocial Profiles for People of Advanced Age: LiLACS NZ

Introduction

The oldest-old are the fastest growing age group in developed countries (Kinsella & Phillips, 2005) and as the ratio of working age people to dependents continues to increase, the wellbeing of older people will have a growing impact upon the overall wellbeing of societies. Their physical health is frailer in general than the younger old; that is, they are more vulnerable and more dependent, yet quality of life is high (Jopp & Rott, 2006). Psychosocial factors are often missing from phenotypes of successful ageing (Depp & Jeste, 2009), yet they are integral to older people's perceptions and experience of ageing well, particularly when they talk about effectively adapting to age-related stressors (Reichstadt, Depp, Palinkas, Folsom, & Jeste, 2007). Using an

array of resources that may ameliorate some of the challenges associated with ageing, this paper characterizes patterns of psychosocial ageing in advanced age in a population of NZ Māori and non-Māori people and examines the relationship between psychosocial profiles and adaptive outcomes.

The importance of ageing well

Ageing well is being seen, increasingly, as a valid and purposeful focus for research. People are living longer and are living at home for longer. Consequently, a range of health states exist for people living alone (Statistics New Zealand, 2004). In NZ, 'ageing in place', that is, in one's own home, is encouraged (Ramage, 2006). To ease the fiscal burden of increasing home-care needs, families and whānau are encouraged to also provide care and are often major supporters of elder relatives (Ministry of Social Development/Te Manatū Whakahiato Ora, 2009). On the other hand, lack of social support coupled with functional decline predicts institutionalisation (Brock & O'Sullivan, 1985).

Self-perceptions of ageing often belie health states. That is, despite various incapacities, people can still feel good about their health and feel that they are ageing well (Albrecht & Devlieger, 1999). Numerous works conclude that ageing well is as much about self-perception as functional ability (Chapman, 2004; Montross et al., 2006; Staudinger & Fleeson, 1996; Strawbridge et al., 2002; von Faber & van der Geest, 2010; Wurm, Tomasik, & Tesch-Römer, 2008). For example, one's self-perception of ageing may resist existing negative ageing stereotypes (Pinquart, 2002), and overall, retaining a positive sense of self is thought to mitigate the conception of ageing as a period of decline (Brandtstadter & Greve, 1994), and affect health in a positive way (Levy & Myers, 2004). Other positive psychosocial factors that contribute to adaptation in later life include religion and spirituality (Blieszner & Ramsey, 2003; Krause, 2010; Manning, 2013; Shaw, Joseph, & Linley, 2005), coping self-efficacy (Karel, 1997), perceived personal control and a stoicism related to historical adversity. Evidence shows that both positive and negative experiences throughout life contribute to meaning-making (Elder & Clipp, 1989) and can influence later reactions to stressful events. The perceived meaning of activities has become as salient to ageing successfully as self-reported health status (Stuckey, 2006). Understanding the correlates of positive physical and mental health has a potential to impact the lived experience of ageing well.

Psychosocial resources and health outcomes

Adaptive resources have been shown to impact health for older people in positive ways. Religion and spirituality, for example, show a positive relationship to mental and physical health (Koenig, 2004). For indigenous peoples, including NZ Māori, spirituality is often a central, and sometimes, *essential*, part of everyday life (Houkamau & Sibley, 2010; Pere, 1988), conferring, perhaps, greater health benefit than for non-indigenous people (Koenig, 2004). Similarly, the benefits of social support and social participation for good physical and mental health are robust (Blane et al., 2011; Hildon et al., 2009; Mayer, Maas, & Wagner, 1999). In longitudinal ageing studies the effects of functional decline have been minimised by psychosocial resources (Jonker et al., 2009; Staudinger & Fleeson, 1996), and mastery and other psychosocial variables are found to be mediators between physical function and improved psychological health (Chan, Anstey, Windsor, & Luszcz, 2011; Holahan & Holahan, 1987; Knight, Davidson, McCabe, & Mellor, 2011; Kunzmann et al., 2002). The findings above were predominantly conducted with old but not specifically in very old people. In a study enrolling only the oldest-old, physical and mental health, disease, social and demographic variables explained 27.5% of the variance in resilience score, with health variables (the absence of depressed mood and psychological symptoms, and not being on medication) being the greatest predictor (Nygren, 2006). Taken together, these studies suggest that psychosocial and health variables are valuable components of ageing well potentially also acting as buffers to the negative effects of functional decline for older people. Similar factors may be effective in advanced age.

To advance research that has a focus on salutogenesis as opposed to pathogenesis, the aims of the current research were to determine whether Māori and non-Māori people of advanced age could be grouped using age-relevant psychosocial resource indicators. To address the shortcomings of lack of analysis in heterogenous and culturally diverse samples and limited selections of variables, we conducted a hierarchical cluster analysis in a bicultural NZ sample of people of advanced age. This study describes the development of the cluster analysis and examines and interprets the obtained cluster profiles in relation to health variables within the context of the advanced age life-stage.

Method

The data for this research were collected at baseline from participants enrolled in LiLACS NZ. Methods of participant recruitment and data collection are outlined in Chapter 7. Based on

predictors from the advanced age literature, fifty psychosocial items were aggregated to create 20 psychosocial resource indicators and are listed in Table 9 in section 7.4. The resource indicators include social support (4), social network (1), social participation (1), purpose and engagement in life and perception of ageing (5), past and current stressors (3), coping self-efficacy (1), perception of self-mastery (2), religious and spiritual faith (2) and cultural belonging (1).

Statistical analysis

Significant differences between the means of continuous variables were explored using two-way ANOVAs and missing data was replaced with gender or ethnic specific means or intra-individual scale means (see Appendix E). For categorical variables, the difference between scores for males and females and for Māori and non-Māori was investigated using Chi Square analyses. Where significant differences were found, mode values for specific groups were imputed for missing values. Missing data was replaced before aggregation.

Correlations between the variables were calculated to determine if they were measuring different concepts. Although there were significant correlations between variables at the 0.01 and 0.05 levels, the strength of all correlations, bar three, were below 0.30 ('religion' was correlated with 'importance of faith to wellbeing' 0.32; 'agency to keep healthy' was correlated with 'experience of growing older' 0.30; and 'coping' was correlated with 'mastery' 0.30), indicating low levels of shared variance.

Cross-sectional outcome statistics are reported as significance (p-value at the 0.05 level) from ANOVA analyses using the raw scores and adjusted for age, gender and ethnic group. Significant pairwise comparisons between the clusters are reported.

Cluster method

The analyses were undertaken using IBM SPSS Statistics 22 in a two-step approach. In step one, hierarchical cluster analysis (HCA) was applied to the dataset using Single, Average, Complete and Ward's linkage methods. Three to eight clusters were requested for each method as a manageable number of groups to be looking for. In order to see if imputation made a difference to cluster obtainment all methods were applied to both the full dataset (n = 671) and the full dataset minus those who had more than 25% of their scores imputed (n = 641).

The most ideal cluster groupings were obtained from the reduced dataset using Ward method, untransformed variables and CHISQ as the distance measure. Examination of the agglomeration schedule and dendrograms indicated that either four or eight clusters would be optimal. Examination of the spread of the cluster characteristics showed less variability for four clusters than for eight, indicating fewer significant differences between the groups. Random split-half reliability tests (320 cases vs 321 cases approximately equal for gender and ethnic group) determined the validity of cluster membership, showing a greater match between the random halves for four clusters than for eight. While not all clusters demonstrated high concordance (≥ 75%) between the split halves and the all-cases reduced dataset, there was still a clear match for all clusters. In step two, a second HCA was undertaken to obtain final cluster membership for the four-cluster grouping.

Results

Participants with full data numbered 641 (250 Māori, 391 non-Māori; 284 male, 357 female). Demographic characteristics are shown in Table 10.

Table 10: Demographic Summary of Participants

	Māori			**Non-Māori**		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Age m (sd) – Māori n = 250, non-Māori n = 391						
	82. (2.5)	82.5 (2.6)	82.3 (2.6)	84.6 (0.5)	84.6 (0.5)	84.6 (0.5)
Marital status n (%) – Māori n = 247, non-Māori n = 389						
Married	49 (50.5)	32 (21.3)	81 (32.8)	118 (64.1)	54 (26.3)	172 (44.2)
Never married	2 (2.1)	3 (2.0)	5 (2.0)	8 (4.3)	5 (2.4)	13 (3.3)
Widowed/ separated/ divorced	46 (47.4)	115 (76.7)	161 (65.2)	58 (31.5)	146 (71.2)	204 (52.4)
Living situation n (%) – Māori n = 250, non-Māori n = 391						
Alone	27 (27.3)	78 (51.7)	105 (42.0)	60 (32.4)	132 (64.1)	192 (49.1)
Spouse only	39 (39.4)	29 (19.2)	68 (27.2)	105 (56.8)	48 (23.3)	153 (39.1)
Other	33 (33.3)	44 (29.1)	77 (30.8)	20 (10.8)	26 (12.6)	46 (11.8)
Deprivation n (%) – Māori n = 250, non-Māori n = 391						
Decile 1-4 (Low)	13 (13.1)	25 (16.6)	38 (15.2)	47 (25.4)	54 (26.2)	101 (25.8)
Decile 5-7 (Med)	30 (30.3)	33 (21.9)	63 (25.2)	78 (42.2)	86 (41.7)	164 (41.9)
Decile 8-10 (High)	56 (56.6)	93 (61.6)	149 (59.6)	60 (32.4)	66 (32.0)	126 (32.2)
Top education level n (%) – Māori n = 244, non-Māori n = 387						
Primary	31 (32.3)	38 (25.7)	69 (28.3)	32 (17.5)	29 (14.2)	61 (15.8)
Secondary	35 (36.5)	60 (40.5)	95 (38.9)	58 (31.7)	76 (37.3)	134 (34.6)
Completed secondary	17 (17.7)	27 (18.2)	44 (18.0)	38 (20.8)	46 (22.5)	84 (21.7)
Trade	5 (5.2)	7 (4.7)	12 (4.9)	20 (10.9)	26 (12.7)	46 (11.9)
Tertiary	8 (8.3)	16 (10.8)	24 (9.8)	35 (19.1)	27 (13.2)	62 (16.0)

The mean age of the Māori sample was 82.3 years. Males were more than twice as likely to be married and 46% of individuals were living alone (29% male, 71% female). Twice as many Māori as non-Māori were living with others (not only with the spouse and not alone). Māori were nearly twice as likely to live in areas of high socioeconomic deprivation (60% Māori, 32% non-Māori).

Psychosocial profiles

Four clusters were identified (Table 11). Cluster 1, the largest group (n = 309/48.2%), was the most externally supported – they had a high level of engagement in hobbies and a predominantly locally integrated social network which means they were reciprocally involved with close family, friends and the community, including community groups. According to Wenger, this is the most common and most robust social network. Receipt of support from others was reflected by more than 80% of this cluster being able to count on someone for practical and emotional support. They had a positive experience of ageing and we called this cluster the *external resource rich* cluster (ERR). Individuals in cluster 2 (n = 187/29.2%) had the lowest levels of social support. Sixty-three percent of members of this cluster had borderline social networks which means they did not have a single clear network; and 10 percent had social networks that were classified as vulnerable. We called this cluster the e*xternal resource poor* cluster (ERP).

The next two clusters were smaller in number. Cluster 3 (n = 70/10.9%) members were more disconnected socially although they had the highest standard of living (ns)**.** More people in this cluster than the others felt they didn't need help. They had a low level of formal and informal roles and also lived in diverse social networks which, in their case, was a mix of vulnerable and robust network types. Fifty six percent said they followed no religion (compared to 12% of the sample overall) and 81% said that faith was not important to their well-being. Because low levels of resource indicators spanning both internal and external resources were observed, we called this cluster the *all resource poor* cluster (ARP). Conversely, the final cluster, cluster 4 (n = 75/11.7%), was the most connected to social support systems and psychological and attitudinal reserves. We called this the *all resource rich* cluster (ARR). Members had a strong sense of belonging to their ethnic group, 100% identified with a religion, they reported the lowest number of stresses and had the highest sense of mastery whereas mastery scores varied little across the other clusters. Thirty six percent reported a very positive experience of ageing. Individuals in this cluster were also the most widely connected; they upheld the highest level of informal and formal

roles and all of them were satisfied with their social relationships. The predominant social network type of cluster 4 was locally integrated.

Table 11: Spread of Psychosocial Resource Indicators across the Psychosocial Clusters

Resource indicator	**Resource indicator levels**	**Psychosocial cluster**				**p-value**
		ERR n = 309	**ERP n = 187**	**ARP n = 70**	**ARR n = 75**	
		n (%)				
Sense of belonging to ethnic group	*Strongly disagree*	3	0	0	0	
	Disagree	8 (2.6)	10 (5.3)	6 (8.6)	0	
	Neutral	52 (16.8)	34 (18.2)	22 (31.4)	6 (8.0)	
	Agree	151 (48.9)	103 (55.1)	30 (42.9)	36 (48.0)	
	Strongly agree	95 (30.7)	40 (21.4)	12 (17.1)	33 (44.0)	0.000
Religious affiliation	*Object to answering*	3 (1.0)	2 (1.1)	1 (1.4)	0	
	No religion	22 (7.1)	16 (8.6)	39 (55.7)	0	
	Any religion	284 (91.9)	169 (90.4)	30 (42.9)	75 (100)	0.000
Spirituality	*Not at all*	0	3 (1.6)	57 (81.4)	0	
	A little	19 (6.1)	16 (8.6)	11 (15.7)	1 (1.3)	
	Moderately	49 (15.9)	43 (23.0)	2 (2.9)	16 (21.3)	
	Very	155 (50.2)	87 (46.5)	0	23 (30.7)	
	Extremely	86 (27.8)	38 (20.3)	0	35 (46.7)	0.000§
Informal support - instrumental	*Don't need help*	42 (13.6)	27 (14.4)	12 (17.1)	11 (14.7)	
	No	7 (2.3)	20 (10.7)	3 (4.3)	3 (4.0)	
	Yes	260 (84.1)	140 (74.9)	55 (78.6)	61 (81.3)	0.008
Informal support - emotional	*Don't need help*	47 (15.2)	20 (10.7)	13 (18.6)	5 (6.7)	
	No	10 (3.2)	21 (11.2)	2 (2.9)	1 (1.3)	
	Yes	252 (81.6)	146 (78.1)	55 (78.6)	69 (92.0)	0.001
Keeping busy – meaningful activity	*Less than monthly*	7 (2.3)	7 (3.7)	3 (4.3)	7 (9.3)	
	Not at all	53 (17.2)	62 (33.2)	30 (42.9)	25 (33.3)	
	Once	11 (3.6)	7 (3.7)	4 (5.7)	3 (4.0)	
	Every week	68 (22.0)	37 (19.8)	12 (17.1)	12 (16.0)	
	Every day	170 (55.0)	74 (39.6)	21 (30.0)	28 (37.3)	0.000
Attitude to own ageing	*Very negative*	2 (0.6)	3 (1.6)	1 (1.4)	0	
	Mainly negative	14 (4.5)	16 (8.6)	7 (10.0)	4 (5.3)	
	Neither positive nor negative	43 (13.9)	27 (14.4)	18 (25.7)	8 (10.7)	
	Mainly positive	168 (54.4)	111 (59.4)	34 (48.6)	36 (48.0)	
	Very positive	82 (26.5)	30 (16.0)	10 (14.3)	27 (36.0)	0.004
Social participation	*Low*	0	1 (0.5)	0	0	
	Moderate	207 (67.0)	101 (54.0)	40 (57.1)	48 (64.0)	
	High	102 (33.0)	85 (45.5)	30 (42.9)	27 (36.0)	0.038
Informal role	*Low*	67 (21.7)	69 (36.9)	29 (41.4)	2 (2.7)	
	Moderate	177 (57.3)	90 (48.1)	38 (54.3)	41 (54.7)	
	High	65 (21.0)	28 (15.0)	3 (4.3)	32 (42.7)	0.000§
Formal role	*Low*	220 (71.2)	133 (71.1)	46 (65.7)	35 (46.7)	
	Moderate	82 (26.5)	48 (25.7)	24 (34.3)	35 (46.7)	
	High	7 (2.3)	6 (3.2)	0	5 (6.7)	0.002
Past adult stress (number of stressors)	*4*	11 (3.6)	5 (2.7)	0	0	
	3	42 (13.6)	33 (17.6)	5 (7.1)	2 (2.7)	
	2	113 (36.6)	69 (36.9)	24 (34.3)	1 (1.3)	
	1	124 (40.1)	34 (18.2)	27 (38.6)	6 (8.0)	
	0	19 (6.1)	46 (24.6)	14 (20.0)	66 (88.0)	0.000

Resource indicator	Resource indicator levels	Psychosocial cluster				p-value
		ERR n = 309	ERP n = 187	ARP n = 70	ARR n = 75	
		n (%)				
Mastery	*Low*	7 (2.3)	5 (2.7)	5 (7.1)	0	
	Moderate	120 (38.8)	80 (42.8)	26 (37.1)	16 (21.3)	
	High	182 (58.9)	102 (54.5)	39 (55.7)	59 (78.7)	0.003
Social network	*Unclassified*	17 (5.5)	0	4 (5.7)	0	
	Borderline: V/V	1 (0.3)	19 (10.2)	4 (5.7)	0	
	Borderline: V/R	1 (0.3)	69 (36.9)	17 (24.3)	0	
	Borderline: R/R	10 (3.2)	30 (16.0)	3 (4.3)	0	
	Private restricted	12 (3.9)	26 (13.9)	8 (11.4)	1 (1.3)	
	Family dependent	32 (10.4)	2 (1.1)	3 (4.3)	6 (8.0)	
	Locally self-contained	22 (7.1)	7 (3.7)	10 (14.3)	4 (5.3)	
	Wider community focused	45 (14.6)	25 (13.4)	4 (5.7)	11 (14.7)	
	Locally integrated	169 (54.7)	9 (4.8)	17 (24.3)	53 (70.7)	0.000
Satisfaction with social relationships	*Has no friends/family*	0	1 (0.5)	0	0	
	Extremely dissatisfied	0	0	1 (1.4)	0	
	Very dissatisfied	2 (0.6)	1 (0.5)	3 (4.3)	0	
	Somewhat dissatisfied	3 (1.0)	4 (2.1)	1 (1.4)	0	
	Satisfied most of the time	92 (29.8)	76 (40.6)	24 (34.3)	29 (38.7)	
	Satisfied all of the time	212 (68.6)	105 (56.1)	41 (45.5)	46 (61.3)	0.042

Cluster labels: ERR = external research rich, ERP = external resource poor, ARP = internal and external resource poor, ARR = internal and external resource rich

[§]Fisher's exact p-values are presented except for variables identified with this symbol, where chi square values are presented

Social network typology: R/R = robust/robust, V/R = vulnerable/robust, V/V = vulnerable/vulnerable

Chi square analyses showed that 14 out of 20 psychosocial resource indicators were significantly different across the clusters. In order to see where the differences lay Hays's standardised residuals were generated (Hays, 1994), with cell values greater than 1.96 indicating a significant difference (more than one standard deviation) from the other groups. The six indicators that were not significantly different are not shown and were: regular formal support, having enough to do, adolescent financial status, agency to keep healthy, material standard of living and CSE.

As shown in Table 12, age, ethnic group and gender varied across the clusters (p-values respectively: 0.022 <0.000 and 0.028). ARR individuals comprised a greater proportion of Māori than non-Māori while the opposite was found in all other clusters. ARP individuals had the greatest proportion of non-Māori and also an older average age. The ARP cluster also had the opposite gender profile to the other clusters with more males than females. The clusters did not vary on other demographic characteristics.

Table 12: Psychosocial Cluster Characteristics

Variable	Variable levels	Psychosocial cluster				p-value[§]
		ERR n = 309	**ERP n = 187**	**ARPARP n = 70**	**ARRARR n = 75**	
Age (mean)		83.70	83.83	84.09	83.71	0.022
		n (%)				
Ethnic group	*Māori*	120 (38.8)	70 (37.4)	14 (20.0)	46 (61.3)	0.000
	Non-Māori	189 (61.2)	117 (62.6)	56 (80.0)	29 (38.7)	
Gender	*Male*	127 (41.1)	88 (47.1)	41 (58.6)	28 (37.3)	0.028
	Female	182 (58.9)	99 (52.9)	29 (41.4)	47 (62.7)	
Marital status	*Never married*	5 (1.6)	10 (5.4)	3 (4.4)	0	
	Married	120 (39.0)	78 (41.9)	26 (38.2)	29 (39.2)	
	Widowed/separated/ divorced	183 (59.4)	98 (52.7)	39 (57.4)	45 (60.9)	ns
Living situation	*Alone*	151 (48.9)	81 (43.3)	35 (50.0)	30 (40.0)	
	With spouse/partner only	110 (35.6)	65 (34.8)	21 (30.0)	25 (33.3)	
	With others	48 (15.5)	41 (21.9)	14 (19.9)	20 (26.7)	ns
Socioeconomic deprivation	*1-4 (low)*	73 (23.5)	43 (23.0)	12 (17.2)	11 (14.7)	
	5-7 (medium)	119 (38.6)	59 (31.5)	26 (37.2)	23 (30.7)	
	8-10 (high)	117 (37.9)	85 (45.5)	32 (45.7)	41 (54.7)	ns
Drives		211 (68.5)	127 (67.9)	44 (63.8)	52 (70.3)	ns
Takes prescribed medications		284 (92.5)	170 (90.9)	68 (97.1)	64 (87.7)	ns
Falls in the last year	*None*	189 (61.8)	125 (66.8)	45 (65.2)	53 (71.6)	
	One	63 (20.6)	30 (16.0)	10 (14.5)	11 (14.9)	
	More than one	54 (17.7)	32 (17.1)	14 (20.3)	10 (13.6)	ns
Loneliness	*Never feels lonely*	203 (65.9)	125 (66.8)	46 (65.7)	58 (77.3)	
	Feels lonely	105 (34.1)	62 (33.2)	24 (34.3)	17 (22.7)	ns
Satisfaction with life	*Dissatisfied*	7 (2.3)	8 (4.3)	3 (4.3)	1 (1.3)	
	Neither satisfied nor dissatisfied	20 (6.5)	11 (5.9)	7 (10.1)	1 (1.3)	
	Satisfied	280 (91.2)	168 (89.8)	59 (85.5)	73 (97.4)	ns

Cluster labels: ERR = external research rich, ERP = external resource poor, ARP = internal and external resource poor, ARR = internal and external resource rich

[§]Fisher's exact p-values or chi square values

ANOVAs from individual GLMs showed that on mental and physical health parameters, ARR individuals were doing better, with more advantageous means for all variables. In adjusted models (Table 13), the clusters remained significant predictors for all variables apart from mental HRQoL, although only a small amount of variance was accounted for by the clusters over and above the covariates (partial eta squared ranged from 0.002 to 0.028).

In pairwise comparisons, significant differences were found between the ARR cluster and the others for depression (lower in ARR), physical HRQoL (higher in ARR), functional status (better in ARR than ERP and ARP) and physical performance (better in ARR than ARP). Individuals in the ARP cluster also had significantly poorer physical performance than individuals in the ERR cluster.

Table 13: Variation in Psychosocial Cluster Means and Standard Errors for Mental and Physical Health Parameters

	Psychosocial cluster M (SE)				Partial Eta squared	p-value
	ERR	ERP	ARP	ARR		
Depression	2.41 (0.12)	2.67 (0.15)	2.56 (0.25)	1.60 (0.24)	0.023	0.002
Cognition	90.15 (0.60)	88.17 (0.76)	87.70 (1.25)	91.51 (1.19)	0.014	0.028
Physical HRQoL	41.96 (0.68)	41.23 (0.86)	41.51 (1.44)	47.69 (1.35)	0.028	0.001
Mental HRQoL	54.24 (0.50)	54.10 (0.64)	53.70 (1.07)	55.08 (1.00)	0.002	0.801 (ns)
Functional status	17.73 (0.23)	17.09 (0.29)	16.86 (0.47)	18.78 (0.45)	0.020	0.006
Physical performance	7.97 (0.17)	7.72 (0.22)	6.85 (0.36)	8.64 (0.34)	0.022	0.004

Cluster labels: ERR = external research rich, ERP = external resource poor, ARP = internal and external resource poor, ARR = internal and external resource rich
Adjustment for multiple comparisons: Sidak
HRQoL = health-related quality of life

Discussion

While many people of advanced age experience limitations in their health status and social connections, this trajectory of physical and psychological decline is not universal. Rather, the oldest-old are increasingly being seen as more heterogeneous than homogeneous (Blood & Bamford, 2010; Wu et al., 2012). Variance factors may nevertheless group in cohesive ways. Psychosocial factors, including perspective of ageing, meaning-making and social support are key elements in ameliorating challenges faced by older people as they age. In this research, a hierarchical cluster analysis method using 20 psychosocial resource indicators uncovered four psychosocial profiles that varied by social connections and community engagement as well as internal psychological and attitudinal characteristics, supporting a character profile approach to describing variation in health status. The psychosocial profiles varied on outcomes of depression, cognition, functional status, physical performance and HRQoL (physical).

Psychosocial profiles

Individuals in the ERR and ERP clusters showed somewhat opposite patterns of reliance upon social support. Positive effects from social support might result from satisfaction derived from increased social opportunities or by others' validation of one's ageing. Indeed, individuals in the ERR cluster who had high levels of support, also regularly engaged in leisure hobbies and felt good about their ageing. Meaningful ageing is echoed in contrasting perspectives of vulnerability. Individuals in the ERP cluster had low levels of instrumental and emotional support compared to the other clusters. Moreover, we found that more individuals in the ERP cluster lived in

borderline networks with a substantial number of those being of a less robust type. Wenger's work on social network types ranks borderline cases (20% of people; tied between two networks) as the most vulnerable to institutionalisation. People living in vulnerable social networks rely primarily on selective contacts; either neighbours, close-at-hand family, or family who don't live close by, with few other real connections. Coupled with a perception of inadequate support, the risk of poor health outcomes might be more likely for these people (White, Philogene, Fine, & Sinha, 2009). Our results are somewhat difficult to interpret, however, because the health of these cluster members was not significantly lower than it was for people in the other clusters. One explanation for the low perception of support for those in the ERP cluster is that they may have wanted greater social contact than they received. Individuals in the ERR cluster on the other hand, who spent a lot of time on hobbies and also undertook more informal roles, may have considered their lives more meaningful, explaining their more positive perception of ageing.

People with limited personal connections may have fewer opportunities to spend time assisting others. Individuals in the ARP cluster, undertaking low to moderate formal and informal role activities, included more males and more non-Māori living in diverse social networks, thus constraining their helping opportunities. By contrast, individuals in the ARR cluster were connected to others in multiple ways. Māori made up the majority of people in this most connected, religious and socially satisfied cluster, which is unsurprising as Māori as an ethnic group espouse a holistic collective, rather than individualistic world-view (O'Connor & MacFarlane, 2002). Although younger Māori sometimes report feeling disconnected from their people, this may not be the case for older Māori who tend to be more entrenched in Māori society and, within that space, carry "*the status, tradition and integrity of their people*" (Durie, 1999, p. 102). Māori, in our study, were four times less likely than non-Māori to say they did not follow a religion (4% vs 17%).

Connections for Māori are also heavily tied up with culture and reciprocity is commonly cited as an aspect of 'being Māori'. Mason Durie's work with older Māori describes both the respect accorded kaumātua (a status given to older people) as well as their obligation to fulfil roles that he suggests are enhanced by their commitment (Durie, 1999). Notwithstanding ethnic differences, better health and younger age, which are characteristics of the ARR cluster, are associated more often with giving than with receiving help.

Older people report higher levels of religious attendance compared to younger groups (Statistics New Zealand, 2014a), although with increasing immobility spiritual practice often becomes

essentially personal and home-based (Lowis et al., 2005). The importance of spirituality to wellbeing and identification with a religious denomination was clearly identified in two of the clusters. Compared to the others, the ARP cluster was low on both and the ARR cluster was high on both. While the psychosocial profiles do not support a directional influence, individuals in the ARR cluster had better functional status, HRQoL and physical performance suggesting that multiple settings for spiritual expression would be possible. Individuals in the ARP cluster weren't necessarily any less happy with their social relationships but, due to restricted social networks, may have been more separated from the support and meaning that can be attained from social relationships, including support from church members (Lund et al., 1993).

Attitudinal factors appear important for transcendence into a successful and engaged advanced age (Brown & Lowis, 2003) and psychological variables are commonly cited as contributing positively to wellbeing. However, a combination of psychosocial factors may be most important (Friedman, 2000); intra-personal and inter-personal factors together, moreover (Bennett & Soulsby, 2014; Kinsel, 2005). Indeed, multiple theorists have aligned internal and external factors in models of wellbeing which include disablement (Verbrugge & Jette, 1994), adaptation (Heyl & Wahl, 2001) and resilience (de Terte et al., 2010; Richardson, 2002; Wiles et al., 2012).

Cross sectional outcomes

In contrast to other ageing studies that employed psychosocial clustering (Klabbers et al., 2014; J. Smith & Baltes, 1997), we found significant health differences between clusters; individuals in the ARR cluster, who had the most desirable resource indicators, had better cognitive and functional status. Moreover, the findings show that psychosocial resources interact together to represent the most advantageous outcomes. Although our cross-sectional results could be interpreted bi-directionally, being involved in and happy with one's life seems to have an effect on wellness.

Our results also concur with studies that have shown positive relationships with health for social participation and engagement, religion and attitudinal variables. In post-stroke participants, greater cognitive improvement was found to be related to emotional support (Glymour et al., 2008); and in adults over age 90, social engagement, adjusted for age, gender and demographic factors, predicted objective and self-perceived physical health status (Cherry et al., 2013). In the assisted living environment, social relationships were related to higher life satisfaction and fewer depressive symptoms (Park, 2009). Volunteering is one of the most common 'productive'

activities of older age and linkage with physical and mental health is robust (Matz-Costa et al., 2012; Morrow-Howell, 2000; Musick, Herzog, & House, 1999; Tang, 2009). With 53% of individuals in the ARR cluster (36% overall) upholding moderate or high 'formal' roles, productive activities seem to be good for one's health for the longer term. Our results overall suggest that older people want to be helpful and are capable of maintaining complex lives.

In terms of religion, the literature shows relatively consistent beneficial effects on both physical and mental health (Kasen et al., 2012; Kirby, Coleman, & Daley, 2004; Koch, 2008; McIntosh, Poulin, Silver, & Holman, 2011) although religion can also have negative effects on medical decision-making (George, Larson, Koenig, & McCullough, 2000). Extending positive findings longitudinally, Hybels et al found that religious attendance was protective against functional decline over time for older adults (mean age 73 years) (Hybels, Blazer, George, & Koenig, 2012). Religious attendance was more predictive than personal practice or use of religious media, which somewhat contradicts the notion that spirituality in advanced age is an individual pursuit. However, the social connections made as part of religious practice are important in advanced age (Moore & Stratton, 2002) and their impact may function independently of the religious experience per se. Significantly, as we measured them, religious affiliation, level of participation in formal religious groups and spiritual commitment (the importance of spirituality to other areas of life) are key domains of religion/spirituality in relation to health (George et al., 2000).

Strengths and limitations

Our study is important in that it is one of the largest cohorts of the oldest-old, adding detail to what is already known about advanced-age heterogeneity. The validity of self-report data was enhanced by interviewer-led administration. A major limitation of our study, though, is that, although significant differences were found between our clusters for physical HRQoL, our mean scores were all below the population norm of 50. However, advanced age study participants typically have lower physical HRQoL than population norms and our means were consistent with those of other longitudinal ageing studies (Nygren et al., 2005). Low levels of depressive symptomotology (Cherry et al., 2013; Mehta et al., 2008; Nyqvist, Gutavsson, & Gustafson, 2006) and cognitive impairment (Femia et al., 2001; J. D. Walker, Maxwell, Hogan, & Ebly, 2004) have also been found in the age group suggesting that advanced age participants are generally psychologically and cognitively well.

Our study includes a substantial sample of indigenous NZ Māori (n=250, 39% of the sample). Indigenous peoples feature in small numbers in similar studies. Yet, in an increasingly culturally interactive world, where ageing and health services are proposed to benefit all, cultural background is important. In contrast to Western models of health and ageing, which highlight individual agency, NZ Māori consider that an individual's health stems from the health of their whānau and wider tribal associations. Spirituality, reciprocity and whānau links are important social and personal ties that impact upon the understanding of ageing and health status for Māori.

It is possible that internal resources provide additional benefit over external resources for both older Māori and non-Māori (61% and 39% of the ARR cluster). The authors of this study are not Māori so, despite presenting findings for two cohorts, the view of ageing in this chapter necessarily has a Western slant. Moreover, it is inappropriate and culturally unsafe for non-Māori researchers to interpret the results through a Māori lens. Cultural difference in concepts of ageing well is nevertheless important and is a key focus of this research. A Māori cohort analysis using additional cultural variables to determine cluster profiles is presented next. The cultural variables were chosen and are described with Maori oversight.

Implications for practice and further research

Heterogeneity within older age groups is becoming better understood, even in respect to successful ageing (Weir, Meisner, & Baker, 2010). Our study features two points of relevance in respect to this. First, multiple factors are evident in psychosocial profiles. The mix of factors, described by the variable spread, made sense in relation to the way older people live although other patterns may have emerged if more groups had been chosen from the HCA. Interpretations other than ours of relationships between the clusters are possible. For example, CSE did not differ between the clusters, a surprising result given that coping style has been found to differ amongst older adults in other studies of old (Hildon et al., 2009) and oldest-old people (Cherry et al., 2009). Coping self-efficacy may be somewhat more stable within the oldest-old age group than other resource indicators. The relationship between CSE and coping may be worth further investigation.

The benefit of our method of analysis, nevertheless, is that interesting combinations emerged, offering multiple insights into ageing and potential avenues for further investigation and intervention. While activity theory may have limited scope (Adams et al., 2011), in the long term, people who remain actively engaged in life, productive, and connected to other people may be

more likely to age successfully. The oldest-old need particular attention paid to the availability of varied avenues for social engagement and accessible geographical spaces that facilitate this as well as access to primary and secondary health care professionals and services and community support agencies.

Our second point is that psychosocial profiles show differential relationships with health status. Further analysis using these cluster profiles may be able to elucidate the relationship between psychosocial variables and health status over time. Another line of research is to consider whether some psychosocial profiles confer resilience to health adversity. There is some evidence that psychosocial factors may buffer the deleterious effects of life challenges (Ott et al., 2007). In this age group, in this study, the main advantage of cluster 4 (ARR) over cluster 1 (ERR) seems to lie in their access to psychological and attitudinal resources. Resources such as self-mastery and a sense of spirituality could be drawn from life experiences over and above external resources such as social support, participation and formal and informal role undertakings. Extrapolating health benefits to a potential resistance to poorer health states, it might be that both facilitating the development and availability of personal characteristics and maximising the access to external support (de Terte et al., 2010) may be the most effective avenue to successful ageing and resilience. Additionally, an awareness of who is most vulnerable could show communities where local and social support resources should be focused.

Conclusion

This study utilised a compilation of social, psychological, and attitudinal resource indicators, chosen for their salience to advanced age, to describe profiles of functioning and relationship to health. The 'best' cluster comprised more Māori who were well connected to their community, church, whānau and friends. Other profiles showed varying social engagement but must be taken as support for heterogeneity in advanced age and an opportunity to offer age-relevant services that may contribute to the total experience of ageing well. These psychosocial profiles have significant associations with health outcomes. The increasing longevity and numbers of people of advanced age globally highlights a need to maintain health and wellness in the age group

CHAPTER 9: RESULTS OF STAGE 2

9.1 Comment on the chapter

This chapter reports results from a second cluster analysis using the same approach as in Chapter 8 but with an expanded variable mix. More specifically, the research is interested in whether a mix of sociocultural resilience resources differentiates character patterns for Māori and which non-cultural resources combine with cultural resources in that differentiation. The chapter was written as a manuscript and is intended for an Australasian audience. The research questions are:

3. Can Māori of advanced age be characterised according to cultural and non-cultural resources?
4. How does the health of Māori of advanced age vary based upon sociocultural clustering?

As in the previous chapter, operationalisations of the measures used in the sociocultural cluster analysis are not described in detail as they are discussed already in section 7.4. The manuscript introduction has been reduced and references provided to the sections of the thesis that discuss relevant Māori views of health and ageing.

The description of the cluster analysis method in the current manuscript refers to manuscript 2. The reader is reminded in reading the following manuscript that this analysis and interpretation of Māori data is undertaken with Māori guidance so a Māori cultural perspective is present but inevitably the findings are discussed through a non-Māori lens.

9.2 Manuscript 3: Variability in Physical and Mental Health in Relation to Sociocultural Character Patterns for Māori of Advanced Age: LiLACS NZ

Introduction

Māori are the indigenous people of Aoteoroa/NZ, exclusive dwellers of the country before European colonisation (circa late 18th Century) and the signing of the Treaty of Waitangi in 1840.

Recognising that a Māori view of health and ageing may differ from a wider population view, the following research utilises a dataset from Te Puawaitanga o Ngā Tapuwae Kia Ora Tonu (LiLACS NZ; Life and Living in Advanced Age: a Cohort Study in New Zealand) to extend the findings of a cluster analysis reporting the relationship between psychosocial profiles and health for people of advanced age (Hayman, Kerse, & Consedine, submitted). Additional items were analysed to investigate the contribution of cultural resources to positive health outcomes.

The research is underpinned by both the notion of a collective Māori world view and the concept of cultural identity. Contemporary Māori are affected by the stresses and demands of contemporary society as any people living in a developed and globally-connected environment would be, but historic grievances also hold substance for many. Post-colonial marginalisation of the Māori people has had a major and ongoing impact upon where Māori see themselves as a culture in NZ society (L. T. Smith, 1999) although this may have had less of an impact on the identity of older Māori within their own culture (Houkamau, 2010). Māori culture values a collective sense of humanity and fosters community interconnections to recognise and remember the shared history. Although, in reality, the Māori world-view is not easily compartmentalised (Marsden, 1992) it emphasises the interrelationship of physical, spiritual, philosophical and psychological orientations (Royal, 1998). The Māori world-view, holistic and constructed on tradition and legend, also creates a framework for defining action and, as discussed below, informs cultural identity and subsequent perceptions of health and ageing.

The interrelationship of health, culture and ageing

Maori views of health and ageing are discussed in sections 1.2 and 2.2 respectively. However, health and culture are interrelated for kaumātua. This comes partly from the understanding that Māori cultural identity incorporates key elements of wellness that reflect the Māori world-view. For example, Māori believe that an individual is only well if their whānau are well. Māori culture relies heavily upon reciprocity between generations and this reciprocity is even more important for kaumātua if they are to be able to remain healthy and active members of society (Durie, 1999). Good health is expressed in community participation; however, at older ages, roles and responsibilities must be negotiated to ensure that kaumātua can effectively share their wisdom as a taonga for future generations. With acceptance and support for community participation, however, Māori of advanced age remain well (Waldon, 2004). Health research in NZ is required to take account of cultural influences (L. T. Smith, 1999).

Cultural identity

Since cultural identity is multidimensional and heterogeneous (Durie, 1994; Houkamau, 2010), multiple domains of connection, awareness and practice are used to describe it. A secure cultural identity results from individuals being able to access Te Ao Māori and to participate in institutions, activities and systems that form the basis of Māori society (Durie, 2006). Within these dimensions (background, environment and values), Durie described five domains of cultural identity.

- *Participation in Te Ao Māori:* This is described as active participation in the Māori world such as knowledge of whakapapa and involvement in Māori networks. Ancestral knowledge informs activities in the present.
- *Participation as Māori:* This puts 'being Māori' at the forefront and is reflective of the living environment within which Māori are active. Indicators include enrolment on the Māori electoral role and participation in Māori designated roles within areas such as employment and cultural programmes. This category overlaps with participation in Te Ao Māori but is more closely tied to the grounding motives and directions of whānau.
- *Te Reo Māori:* There is evidence that when the reo is spoken in only a few places there is a potential disincentive to its use so the more connected the individual to their language, the more ingrained te reo is as a cultural indicator. Using the reo also relates to 'being Māori' and as such is a form of identity handed down through generations.
- *Culture, values and knowledge:* This is about practicing culture and internalising values. Although tikanga varies across hapū and iwi, knowledge of tikanga is important to all Māori who have a strong cultural identity. Other indicators demonstrate the integration of Māori values and practice into everyday life such as marae attendance.
- *The environment:* A Māori world view places high value on the environment as it serves to ground individuals and wider whānau networks, reflecting a connection to place. This includes access to and the quality of the land.

Traditional Māori values are associated with strong intra-community bonds. Indeed, prior to colonisation, identity was based on tribal origin, whānau and area of residence. Rangimārie Rose Pere, discusses land, spirituality, ancestral ties, tikanga, kinship and humanity as important for cultural identity (Pere, 1988). More contemporary Māori researchers conclude that whānaungatanga, te reo Māori, tikanga and engagement in Māori activities are key elements of Māori cultural identity (Houkamau & Sibley, 2010). Te Hoe Nuku Roa, a major NZ longitudinal

project assessing Māori development in cultural, social and economic terms, identified whakapapa, marae participation, whānau, land, contacts and language as key identity measures (Te Hoe Nuku Roa, 1996).

Cultural identity may be strong for older Māori. The Oranga Kaumātua project reported strong levels of cultural identity for participants aged 60 plus (Waldon, 2004). Higher HRQoL was associated with the ability to carry out kaumātua duties. Conversely, lower HRQoL was associated with lack of marae involvement and having no or few kaumātua roles. Lower physical and mental HRQoL was also associated with poorer health. Another emergent factor was an association with speaking te reo as a first language. However, because this was only true for urban dwellers, the authors theorised greater role demands placed upon urban Māori who spoke te reo.

These data uphold the notion that involvement in community and cultural activities overall has positive health benefits for older Māori. In seeking to understand the protective nature of cultural identity factors, we include aspects of whānau, whakapapa, whānaungatanga, te reo Māori, tikanga, marae links and whenua links in a cluster analysis research design. We do not specifically attempt to define the concepts of culture or cultural identity, instead, utilising these variables as cultural identity resource indicators and interpret the outcomes from a Māori cultural perspective.

Sociocultural clustering

Examining how people are grouped according to selected resources is a way to consider which attributes work together. Cluster analysis has been used to assess how combinations of factors contribute to good health outcomes in aged and advanced age participants. But this work has been predominantly either European or cross-cultural and studies have rarely been conducted in single ethnic populations (Consedine, Magai, & Horton, 2005; Consedine, Magai, & Krivoshekova, 2005). Moreover, few studies included cultural resources and none have been found that assessed grouped cultural resources in relation to health status for Māori.

The positive associations found between cultural identity and health in the Oranga Kaumātua project suggest that a mix of culturally important variables contributes to good health for kaumātua. The oldest-old life stage in ethnic populations has received little attention in positive ageing research but, with increasing disability and decreasing functional status with age for Māori

(Hirini et al., 1999), research that investigates positive cultural resources in relation to health status for Māori of advanced age is warranted. Oranga Kaumātua participants were also mostly young-old and were relatively strongly immersed in customary Māori society. Other work in NZ has found that different levels of cultural connection exist (Durie, 1995).

The current study addresses these shortcomings by utilising a person-centred statistical clustering method to assess sociocultural character patterns and relate these to health outcomes in a sample of Māori of advanced age. Participants were recruited using a multi-method strategy to obtain a population-based cohort.

Method

Recruitment procedure and measures

Data was obtained from interviewer-led, home-based interviews from Māori participants of LiLACS NZ and was collected in 2010 and 2011 (Dyall et al., 2013). Methods of participant recruitment and data collection are outlined in Chapter 7. Twenty psychosocial resource indicators were obtained from the following resource domains: social support (4), social network (1), social participation (1), purpose and engagement in life and perception of ageing (5), past and current stressors (3), coping self-efficacy (1), perception of self-mastery (2), religious and spiritual faith (2) and cultural belonging (1). Seven cultural resource indicators were chosen from a subset of cultural values items that were only offered to Māori participants of LiLACS NZ. Each cultural resource domain measures one resource indicator which include: whakapapa, tikanga, marae links, whānau, whenua links, whānaungatanga and te reo Māori. Spirituality was measured as a psychosocial resource but because connection to the spirit world, including forebears and ancestors, is integral to the Māori world-view, to health, and to cultural identity (Durie, 1985; Mark & Lyons, 2010), spirituality is discussed below as a cultural indicator. See Table 9 in section 7.4 for a list of the variables used for the hierarchical cluster analysis.

Cluster analysis

Missing data Of 250 participants, who self-identified as Māori and had full data for the psychosocial resource indicators, 245 are included in these analyses. Five individuals were removed from the dataset because they were missing more than 25% of cultural variables (treatment of missing values for the psychosocial variables is described in Chapter 8). None of

the individuals removed spoke Māori or considered it to be their mother tongue. For participants with fewer missing variables, gender-based mode values were calculated and substituted for missing data. Imputation for missing data to the questions about understanding of tikanga and the importance of hapū, iwi or rohe to wellbeing for participants who had not indicated their hapū, iwi or rohe, was made using mode scores from people who had answered the missing questions but also could not name their hapū, iwi or rohe. Following calculation of the cultural resource indicators as described, examination of the item distributions showed that all indicators apart from 'knows whakapapa' were normally distributed with a skewness of no more than +/- 1.6. The skewness for 'knows whakapapa' was -4.956 but, as this reduced to only -4.012 when 'knows hapū' and 'knows iwi' were considered together without 'knows rohe', it was included unchanged.

Cluster analysis Statistical analyses were undertaken using IBM SPSS Statistics 22. The hierarchical cluster analysis (HCA) was undertaken in a two-phase approach using all variables. The same method was used as for the psychosocial HCA; that is Ward method, untransformed variables, and CHISQ as the distance measure. The first phase in the sociocultural HCA was to identify the most parsimonious number of clusters and the second was to determine cluster membership**.** The dendrogram at the end of the first phase suggested four clusters would be ideal.

Reliability testing Using a random ID assigned in the Microsoft Windows Excel programme the sample was split into two halves: 121 cases in one half (male; n=42, 35%) and 124 cases in the other (male; n=55, 44%). The gender difference between the random halves was not significant, Pearson Chi Square 2.382, df = 1, p = 0.123.

Results

Participant characteristics

Demographic characteristics are described in Table 14. Participants' mean age was 82.3 years. More than one third lived alone and just less than one third lived with others (not only with their spouse). More than half of the participants lived in areas of high socioeconomic deprivation and one third had stopped their schooling at primary school.

Table 14: Demographic Summary of Māori Participants

		Gender		
		Male	**Female**	**Total**
		n = 97	**n = 148**	**n = 245**
Age; m (sd)		82.0 (2.6)	82.5 (2.6)	82.3 (2.6)
Marital status; n (%)	*Married*	47 (49.5)	31 (21.1)	78 (32.2)
	Never married	2 (2.1)	3 (2.0)	5 (2.1)
	Widowed/separated/divorced	46 (48.4)	113 (76.9)	159 (65.7)
Living situation; n (%)	*Alone*	27 (27.8)	76 (51.4)	103 (42.0)
	Spouse only	37 (38.1)	28 (18.9)	65 (26.5)
	Other	33 (34.0)	44 (29.7)	77 (31.4)
Socioeconomic deprivation; n (%)	*Decile 1-4 (Low)*	12 (12.4)	24 (16.2)	36 (14.7)
	Decile 5-7 (Med)	30 (30.9)	31 (20.9)	61 (24.9)
	Decile 8-10 (High)	55 (56.7)	93 (62.8)	148 (60.4)
Top education level; n (%)	*Primary*	31 (33.0)	36 (24.8)	67 (28.0)
	Secondary	33 (35.1)	60 (41.4)	93 (38.9)
	Completed secondary	17 (18.1)	27 (18.6)	44 (18.4)
	Trade	5 (5.3)	7 (4.8)	12 (5.0)
	Tertiary	8 (8.5)	15 (10.3)	23 (9.6)

Sociocultural clusters

The HCA yielded four sociocultural clusters. Chi square analyses showed that 11 out of 20 psychosocial resource indicators and four out of seven cultural resource indicators were significantly different across the clusters (Table 15). In order to see where the differences lay standardised residuals were generated, where cell values greater than 1.96 indicated a difference from the other clusters of more than one standard deviation. Differences lay predominantly within the domains of culture, support, and engagement in life (connections held with others and roles undertaken). Table 9, Chapter 7 expands on these research domains.

Based on their differences across these domains, we labelled the character patterns: *restrained culture/high support* (RC/HS; n=48, 20% | cluster 1) – these individuals had few cultural connections, poor but supported health, and low formal and informal roles; *moderate culture/low support* (MC/LS; n=88, 36% | cluster 2) – these individuals had a moderate connection to Māori culture but fairly unsupported life in terms of social connections; *active culture/high engagement* (AC/HE; n=73, 30% | cluster 3) – these individuals were active members of their community with reciprocal roles and responsibilities; and *restrained culture/low engagement* (RC/LE; n=36, 15% | cluster 4) – these individuals had the best health status and independent living despite somewhat low cultural connections.

Table 15: Spread of Resource Indicators across the Sociocultural Clusters

Resource indicator	Resource indicator levels	Sociocultural cluster				p-value
		RC/HS	MC/LS	AC/HE	RC/LE	
		n = 48	n = 88	n = 73	n = 36	
		n (%)				
Sense of belonging to ethnic group	*Strongly disagree*	0	0	0	0	0.000§
	Disagree	1 (2.1)	4 (4.5)	1 (1.4)	0	
	Neutral	9 (18.8)	12 (13.6)	2 (2.7)	5 (13.9)	
	Agree	30 (62.5)	47 (53.4)	27 (37.0)	19 (52.8)	
	Strongly agree	8 (16.7)	25 (28.4)	43 (58.9)	12 (33.3)	
Religious affiliation	*No religion*	2 (4.2)	8 (9.1)	0	1 (2.8)	0.027§
	Any religion	46 (95.8)	80 (90.9)	72 (98.6)	34 (94.4)	
	Object to answering	0	0	1 (1.4)	1 (2.8)	
Spirituality	*Not at all*	0	9 (10.2)	0	1 (2.8)	0.000§
	A little	2 (4.2)	9 (10.2)	1 (1.4)	6 (16.7)	
	Moderately	8 (16.7)	12 (13.6)	2 (2.7)	9 (25.0)	
	Very	27 (56.3)	38 (43.2)	33 (45.2)	13 (36.1)	
	Extremely	11 (22.9)	20 (22.7)	37 (50.7)	7 (19.4)	
Informal support - instrumental	*No*	6 (12.5)	5 (5.7)	3 (4.1)	2 (5.6)	ns§
	Yes	36 (75.0)	67 (76.1)	65 (89.0)	31 (86.1)	
	Don't need help	6 (12.5)	16 (18.2)	5 (6.8)	3 (8.3)	
Informal support - emotional	*No*	2 (4.2)	6 (6.8)	3 (4.1)	2 (5.6)	ns§
	Yes	40 (83.3)	68 (77.3)	66 (90.4)	27 (75.0)	
	Don't need help	6 (12.5)	14 (15.9)	4 (5.5)	7 (19.4)	
Regular formal support	*No*	15 (31.3)	54 (61.4)	44 (60.3)	28 (77.8)	0.000
	Yes	33 (68.8)	34 (38.6)	29 (39.7)	8 (22.2)	
Keeping busy	*Every day*	24 (50.0)	24 (27.3)	18 (24.7)	19 (52.8)	0.005§
	Every week	4 (8.3)	19 (21.6)	16 (21.9)	8 (22.2)	
	Once	2 (4.2)	4 (4.5)	8 (11.0)	1 (2.8)	
	Not at all	18 (37.5)	33 (37.5)	24 (32.9)	8 (22.2)	
	Less than monthly	0	8 (9.1)	7 (9.6)	0	
Enough to do	*Don't have enough to do*	4 (8.3)	2 (2.3)	3 (4.1)	1 (2.8)	ns§
	Just keep busy enough	26 (54.2)	54 (61.4)	49 (67.1)	16 (44.4)	
	Has more than enough to do	18 (37.5)	32 (36.4)	21 (28.8)	19 (52.8)	
Adolescent financial status	*Couldn't make ends meet*	2 (4.2)	8 (9.1)	3 (4.1)	0	0.026§
	Just enough to get along	35 (72.9)	39 (44.3)	42 (57.5)	20 (55.6)	
	Comfortable	11 (22.9)	41 (46.6)	28 (38.4)	16 (44.4)	
Agency to keep healthy	*Strongly agree*	12 (25.0)	32 (36.4)	25 (34.2)	13 (36.1)	ns§
	Agree	33 (68.8)	51 (58.0)	44 (60.3)	22 (61.1)	
	Unsure	1 (2.1)	2 (2.3)	4 (5.5)	1 (2.8)	
	Disagree	1 (2.1)	3 (3.4)	0	0	
	Strongly disagree	1 (2.1)	0	0	0	
	Don't know	0	0	0	0	
Attitude to own ageing	*Very positive*	11 (22.9)	23 (26.1)	23 (31.5)	11 (30.6)	ns§
	Mainly positive	27 (56.3)	52 (59.1)	37 (50.7)	15 (41.7)	
	Neither positive nor negative	8 (16.7)	8 (9.1)	9 (12.3)	9 (25.0)	
	Mainly negative	2 (4.2)	4 (4.5)	3 (4.1)	1 (2.8)	
	Very negative	0	1 (1.1)	1 (1.4)	0	
Material standard of living	*High*	2 (4.2)	5 (5.7)	3 (4.1)	1 (2.8)	ns§
	Fairly high	12 (25.0)	25 (28.4)	11 (15.1)	11 (30.6)	
	Medium	32 (66.7)	57 (64.8)	57 (78.1)	24 (66.7)	
	Fairly low	2 (4.2)	1 (1.1)	1 (1.4)	0	
	Low	0	0	1 (1.4)	0	

Resource indicator	Resource indicator levels	Sociocultural cluster				p-value
		RC/HS	MC/LS	AC/HE	RC/LE	
		n = 48	n = 88	n = 73	n = 36	
		n (%)				
Social Participation	*Low*	0	0	0	0	ns
	Moderate	29 (60.4)	46 (52.3)	43 (58.9)	22 (61.1)	
	High	19 (39.6)	42 (47.7)	30 (41.1)	14 (38.9)	
Informal Role	*Low*	9 (18.8)	21 (23.9)	5 (6.8)	8 (22.2)	0.000
	Moderate	36 (75.0)	46 (52.3)	14 (19.2)	23 (63.9)	
	High	3 (6.3)	21 (23.9)	54 (74.0)	5 (13.9)	
Formal Role	*Low*	41 (85.4)	62 (70.5)	37 (50.7)	17 (47.2)	0.000§
	Moderate	7 (14.6)	22 (25.0)	30 (41.1)	16 (44.4)	
	High	0	4 (4.5)	6 (8.2)	3 (8.3)	
Past Adult Stress (number of stressors)	*0*	5 (10.4)	26 (29.5)	27 (37.0)	10 (27.8)	0.000§
	1	8 (16.7)	29 (33.0)	27 (37.0)	11 (30.6)	
	2	20 (41.7)	21 (23.9)	15 (20.5)	11 (30.6)	
	3	14 (29.2)	11 (12.5)	3 (4.1)	4 (11.1)	
	4	1 (2.1)	1 (1.1)	1 (1.4)	0	
Coping Self Efficacy	*Low*	3 (6.3)	0	3 (4.1)	0	0.016§
	Moderate	24 (50.0)	29 (33.0)	26 (35.6)	9 (25.0)	
	High	21 (43.8)	59 (67.0)	44 (60.3)	27 (75.0)	
Mastery	*Low*	1 (2.1)	3 (3.4)	0	1 (2.8)	ns§
	Moderate	23 (47.9)	25 (28.4)	21 (28.8)	10 (27.8)	
	High	24 (50.0)	60 (68.2)	52 (71.2)	25 (69.4)	
Social network (Practitioner Assessment of Network Type)	*Locally integrated*	3 (6.3)	0	2 (2.7)	0	0.000§
	Wider community focused	4 (8.3)	0	19 (26.0)	5 (13.9)	
	Locally self-contained	21 (43.8)	6 (6.8)	48 (65.8)	29 (80.6)	
	Family dependent	4 (8.3)	5 (5.7)	2 (2.7)	2 (5.6)	
	Private restricted	6 (12.5)	11 (12.5)	2 (2.7)	0	
	Borderline: R/R	4 (8.3)	8 (9.1)	0	0	
	Borderline: V/R	1 (2.1)	15 (17.0)	0	0	
	Borderline: V/V	2 (4,2)	11 (12.5)	0	0	
	Unclassified	3 (6.3)	32 (36.4)	0	0	
Satisfaction with social relationships	*Has no friends/family*	0	0	0	0	ns§
	Extremely dissatisfied	0	0	1 (1.4)	0	
	Very dissatisfied	0	1 (1.1)	1 (1.4)	0	
	Somewhat dissatisfied	2 (4.2)	1 (1.1)	0	0	
	Satisfied most of the time	25 (52.1)	53 (60.2)	37 (50.7)	16 (44.4)	
	Satisfied all of the time	21 (33.8)	33 (37.5)	34 (46.6)	20 (55.6)	
Knows Whakapapa	*No*	2 (4.2)	6 (6.8)	1 (1.4)	0	ns§
	Yes	46 (95.8)	82 (93.2)	72 (98.6)	36 (100)	
Understanding of tikanga	*Not at all*	20 (41.7)	9 (10.2)	1 (1.4)	2 (5.6)	0.000§
	A little	12 (25.0)	13 (14.8)	0	7 (19.4)	
	Moderately	10 (20.8)	24 (27.3)	12 (16.4)	15 (41.7)	
	Very	2 (4.2)	29 (33.0)	29 (39.7)	8 (22.2)	
	Extremely	4 (8.3)	13 (14.8)	31 (42.5)	4 (11.1)	
Number of visits to Marae in the last 12m	*0*	41 (85.4)	8 (9.1)	0	1 (2.8)	0.000§
	1	6 (12.5)	14 (15.9)	2 (2.7)	9 (25.0)	
	2	0	21 (23.9)	4 (5.5)	10 (27.8)	
	3	1 (2.1)	31 (35.2)	34 (46.6)	13 (36.1)	
	4	0	14 (15.9)	33 (45.2)	3 (8.3)	

Resource indicator	Resource indicator levels	Sociocultural cluster				p-value
		RC/HS	MC/LS	AC/HE	RC/LE	
		n = 48	n = 88	n = 73	n = 36	
		n (%)				
Importance of whānau to wellbeing	*Not at all*	0	2 (2.3)	0	0	ns§
	A little	1 (2.1)	0	0	0	
	Moderately	3 (6.3)	5 (5.7)	1 (1.4)	1 (2.8)	
	Very	24 (50.0)	54 (61.4)	39 (53.4)	23 (63.9)	
	Extremely	20 (41.7)	27 (30.7)	33 (45.2)	12 (33.3)	
Importance of nature and the outdoors to wellbeing	*Not at all*	0	2 (2.3)	2 (2.7)	1 (2.8)	ns§
	A little	1 (2.1)	2 (2.3)	1 (1.4)	1 (2.8)	
	Moderately	7 (14.6)	14 (15.9)	8 (11.0)	3 (8.3)	
	Very	35 (72.9)	52 (59.1)	46 (63.0)	27 (75.0)	
	Extremely	5 (10.4)	18 (20.5)	16 (21.9)	4 (11.1)	
Role in Māori society	*No*	46 (95.8)	78 (88.6)	30 (41.1)	29 (80.6)	
	Yes	2 (4.2)	10 (11.4)	43 (58.9)	7 (19.4)	0.000
Te reo Māori	*Low*	30 (62.5)	36 (40.9)	1 (1.4)	28 (77.8)	0.000
	Moderate	10 (20.8)	25 (28.4)	17 (23.3)	7 (19.4)	
	High	8 (16.7)	27 (30.7)	55 (75.3)	1 (2.8)	

§Fisher's exact p-values are presented except for variables identified with this symbol, where chi square values are presented
Cluster labels: RC/HS = low cultural connections/high support, MC/LS = moderate cultural connections/low support, AC/HE = active cultural connections/high engagement in life, RC/LE = low cultural connections/low engagement in life
Social network types: R/R = robust/robust, V/R = vulnerable/robust, V/V = vulnerable/vulnerable

To describe the cluster characteristics, cross tab & chi square analyses were conducted for categorical variables, and one-way ANOVAs were conducted for continuous variables (Table 16). No significant differences were found between the sociocultural clusters for age, marital status, driving, taking prescribed medications, current financial situation, loneliness, mental HRQoL or functional status. Significant differences were found between the clusters for: gender (more women in the RC/HS cluster), living situation (individuals in the AC/HE cluster more likely to live with others, individuals in the RC/LE cluster more likely to be married or live alone), socioeconomic deprivation (more individuals in the RC/HS cluster lived in lower deprivation areas and were less likely to have been comfortable growing up), and falls in the last year (individuals in the RC/HS cluster had more falls).

Individuals in the RC/HS cluster received regular formal support and had lower formal and informal roles, more stressors and lower CSE than individuals in the other clusters. Cultural resource indicators were few for individuals in the RC/HS cluster compared to the other clusters; people's understanding of tikanga was much less and 85% of them didn't visit marae. Individuals in the MC/LS cluster were more likely to be non-religious and were more likely to have borderline social networks or a wider rather than local network focus. Although personal aspects of culture were moderate, they had few formal or Māori roles.

Table 16: Sociocultural Cluster Characteristics

Variable	Levels	Sociocultural cluster				p-value
		RC/HS n = 48	MC/LS n = 88	AC/HE n = 73	RC/LE n = 36	
		n (%)				
Gender	*Male*	11 (22.9)	43 (48.9)	29 (39.7)	14 (38.9)	0.033
	Female	37 (77.1)	45 (51.1)	44 (60.3)	22 (61.1)	
Marital status	*Never married*	1 (2.1)	3 (3.4)	0	1 (2.8)	ns§
	Married	17 (35.4)	29 (33.3)	17 (23.9)	15 (41.7)	
	Widowed/separated/divorced	30 (62.5)	55 (63.2)	54 (76.1)	20 (55.6)	
Living situation	*Alone*	22 (45.8)	39 (44.3)	24 (32.9)	18 (50.0)	0.000
	With spouse/partner only	15 (31.3)	24 (27.3)	11 (15.1)	15 (41.7)	
	With others	11 (22.9)	25 (28.4)	38 (52.1)	3 (8.3)	
Socioeconomic deprivation	*1-4 (low)*	13 (27.1)	11 (12.5)	6 (8.2)	6 (16.7)	0.019
	5-7 (medium)	11 (22.9)	17 (19.3)	19 (26.0)	14 (38.9)	
	8-10 (high)	24 (50.0)	60 (68.2)	48 (65.8)	16 (44.4)	
Drives		25 (52.1)	51 (58.6)	39 (54.9)	28 (77.8)	ns
Takes prescribed medications		45 (95.7)	79 (90.8)	64 (90.1)	34 (94.4)	ns§
Falls in the last year	*None*	23 (48.9)	71 (82.6)	47 (66.2)	26 (72.2)	0.004
	One	10 (21.3)	7 (8.1)	12 (16.9)	7 (19.4)	
	More than one	14 (29.8)	8 (9.3)	12 (16.9)	3 (8.3)	
Current financial situation	*Can't make ends meet*	0	1 (1.1)	0	0	ns§
	Just enough to get along on	17 (35.4)	25 (28.4)	26 (35.6)	7 (19.4)	
	Comfortable	31 (64.6)	62 (70.5)	47 (64.4)	29 (80.6)	
Loneliness	*Never feels lonely*	31 (66.0)	52 (59.1)	39 (53.4)	25 (69.4)	ns
	Feels lonely	16 ((34.0)	36 (40.9)	34 (46.6)	11 (30.6)	
		M (sd)				
Age		82.60 (2.88)	82.26 (2.71)	82.29 (2.48)	81.94 (2.32)	ns
Cognitive status (3MS)		89.04 (9.76)	84.45 (14.99)	87.36 (10.37)	90.75 (11.95)	0.029
Nutritional status (SCREEN II)		46.19 (7.76)	46.93 (5.55)	44.68 (5.96)	49.47 (6.24)	0.003
Physical performance (SSPB)		6.93 (3.17)	7.81 (3.23)	7.54 (2.51)	9.39 (2.09)	0.002
Physical HRQoL (SF-12 PCS)		36.21 (11.29)	45.19 (10.10)	43.93 (9.59)	47.02 (8.46)	0.000
Mental HRQoL (SF-12 MCS)		53.77 (10.41)	53.33 (9.17)	51.58 (7.34)	55.57 (6.83)	ns
Functional Status (NEADL)		16.23 (4.44)	17.35 (4.45)	17.90 (3.89)	18.39 (3.93)	ns
Depression (GDS-15)		3.19 (2.79)	2.55 (2.40)	2.64 (1.79)	1.78 (1.74)	0.044

§Fisher's exact p-values or chi square values

Cluster labels: RC/HS = low cultural connections/high support, MC/LS = moderate cultural connections/low support, AC/HE = active cultural connections/high engagement in life, RC/LE = low cultural connections/low engagement in life

3MS: Modified Mini Mental State examination, SCREEN II: Seniors in the Community Risk Evaluation for Eating and Nutrition Version II, HRQoL: Health related quality of life, SPPB: Short Physical Performance Battery, SF-12 PCS: Short-form Medical Outcomes Study Physical Component Score, SF-12 MCS: Short-form Medical Outcomes Study Mental Component Score, NEADL: Nottingham Extended Activities of Daily Living scale, GDS-15: Geriatric Depression Scale – 15 item.

The individuals with the greatest number of desirable cultural resource indicators were in the AC/HE cluster; they had a strong sense of belonging to their ethnic group, a very strong understanding of tikanga, multiple marae visits, high use of and connection with te reo, and they were much more likely to have a role in Māori society. Individuals in this cluster were the most spiritual and fulfilled much higher informal roles than those in the other clusters. Although scoring consistently better on the outcome variables, individuals in the RC/LE cluster had generally low scores on cultural resource indicators. In relation to psychosocial resources, their social network was highly locally integrated, they had fairly good coping self-efficacy and they possibly did hobbies more often than those in the MC/LS or AC/HE clusters.

The best physical, psychological and cognitive health was found for individuals in the RC/LE cluster. Compared to the other clusters, cognition was poorest for individuals in the MC/LS cluster and physical HRQoL was lowest for people in the RC/HS cluster.

Discussion

The aim of this study was to generate character patterns across sociocultural variables for Māori of advanced age and investigate their association with physical and mental health outcomes. This research is unique in that, to the authors' knowledge, no one has investigated the spread of cultural and psychosocial factors, or interactions between them, for Māori of advanced age.

The first thing to acknowledge is that Māori of advanced age are a diverse group. We found differences in descriptive and sociocultural variables and health status across four clusters. We describe the clusters in terms of culture, support and engagement, recognising that relationships and meaning are key aspects of wellbeing in advanced age (J. Smith, 2000). Two clusters seem to describe positive cultural connections and two clusters describe lower cultural connections. Psychosocial connections also define the clusters.

Patterns of cultural and non-cultural resources

Cultural connections

The patterns that emerged in terms of *cultural* variables are, firstly, that three resource indicators - knowledge of whakapapa, and the importance of whānau, and of nature and the outdoors, to wellbeing - were consistently highly regarded. One interpretation of this uniformity is that the variables represent important aspects of the Maori world-view. Whakapapa represents ancestry and connection between the past and present; whānau represents the united connection to the

Māori world and security in attachment; and nature and the outdoors represent the connection to a 'collective' place of importance. The cultural unity that underpins these dimensions is important to all Māori and symbolises the fluid nature of the Māori world where all is one (Durie, 1985).

Secondly, six out of nine cultural resource indicators were inconsistently spread. That Māori traditions are not espoused to the same degree by all (Durie, 1994) supports the measurement of cultural resources as an indicator of the strength of cultural connection. The Māori language, for example, declined in use over the first half of the 20th century as English was pressed as a means of everyday communication. There is a resurgence in use of te reo (Spolsky, 2003) but, as many older Māori lived for years without the resource, knowledge of te reo Māori was passed down inconsistently through the following generations. As well as being discouraged in speaking Māori when they were growing up, te reo usage may have declined latterly in this population due to increasing urbanisation and the movement of whānau away from elders (Spolsky, 2003). In the current study, one cluster showed a much stronger affiliation with their language than the others (AC/HE); 75% vs 40% overall. This identity value accompanied other active cultural connections.

Other cultural resource indicators differed across the clusters, which prompted labels of low and moderate cultural connection. Sense of belonging to one's ethnic group was highest in the AC/HE cluster, although very few individuals had no sense of belonging. Tikanga was understood moderately to extremely well by 74% of participants; 40% of these were in the AC/HE cluster. Eighty five percent of individuals in the RC/HS cluster had not been to a marae in the last year where, in the other clusters, 66% had been at least twice and 92% of individuals in the most connected cluster had been 3 or 4 times. Roles in Māori society were held by 25% of older Māori but this varied widely across the clusters also, with nearly 60% of individuals in the AC/HE cluster holding a role in Māori society. Religious affiliation was high for all; no-one in the AC/HE cluster had no religious affiliation. The importance of faith to wellbeing was also strongest for individuals in the AC/HE cluster. Ten percent of individuals in the MC/LS cluster said faith wasn't important at all suggesting that, in this study, spirituality was not as closely aligned to culture as expected. Nevertheless, the cultural variation we found supports spirituality as a personally held construct and part of a descriptive cultural character framework.

This study does not intend to say that the variables chosen define cultural identity. They were chosen because they are aspects found in other work. Qualitative work upholds the importance of language for a secure identity, such that those who have not grown up with te reo purposely learn

it as adults (Jahnke, 2002). Our results support the importance of marae attendance but, more so, the importance of multiple cultural resources. Conclusions about the cultural resource indicators are that a) two thirds of participants had moderate to high levels of cultural connections suggesting diversity amongst kaumātua, b) all cultural resource indicators showed importance for some individuals**,** c) predominantly, those high in cultural connections were also high in psychosocial connections.

Psychosocial connections

Taking the psychosocial resource indicators on their own, there seem to be four major social patterns – high and low social support and high and low social engagement. The *'high support'* label subsumes social connection and dependence together as it is clear that these people had relationships with others, the *'low support'* label subsumes social disconnection and independence together. Highly engaged individuals reported greater contributions in informal and formal roles and were more spiritually inclined than individuals in the other clusters. Individuals who were active culturally seemed also to be defined more by social indicators, such as informal roles, than physical ones, and individuals who had low to moderate cultural connectedness seemed also to be defined more by physical dependence indicators, such as falls and receiving formal support, than social ones.

The most dependent group were the least culturally connected (RC/HS). Kaumātua often receive care from whānau as shown by their low participation in formal aged care services (Hirini et al., 1999). However, as most individuals in this cluster lived alone and did receive formal support such support may have been because there were few close family connections. Alternatively, it is possible that whanau were paid caregivers which would add complexity to the finding. The RC/HS cluster also included three times as many females as males, whereas the M:F ratio for the sociocultural clusters overall was 2:3, however, age was not a significant variable so individuals in this cluster weren't noticeably older.

Other key psychosocial differences between the clusters include differences in living arrangement (individuals in the AC/HE cluster were more likely to live with others, individuals in the RC/LE cluster were more likely to be married or live alone) and economic status (more individuals in the RC/HS cluster lived in lower deprivation areas and were less likely to have been comfortable growing up). As a collective society, the health of one impacts the health of all and Māori would not see other Māori doing without (Houkamau, 2011). The age of our participants suggests a

predominantly rural upbringing where sharing capabilities would have been both more needed and more possible (Dyall, unpublished work). Similarly, respect and care within Māori society for older members is expected (Durie, 1999), which is one reason that homecare may be chosen for dependent elders ahead of residential care. The low uptake of homecare support by Māori is further complicated by issues of access (Russell et al., 2013).

Overall, the patterns emerging from this data for those who were culturally connected seem consistent with a traditional perspective of Māori values and identity. But cultural connections appeared low for about a third of participants. Life experiences inform one's world-view and contribute to perceived identity. Even in older Māori, diversity exists as contemporary expectations and pressures influence what is important (Houkamau, 2011). The mix of cultural and psychosocial variables we found supports this diversity.

Sociocultural profiles and health outcomes

Internationally, the strength of cultural heritage factors have been assessed in relation to adversities such as poverty (Eggerman & Panter-Brick, 2010), acculturative stress (R. L. Walker, Wingate, Obasi, & Joiner Jr., 2008) and chronic illness (Becker & Newsom, 2005). For Māori, cultural efficacy has been related to personal wellbeing (Houkamau & Sibley, 2011) and self-rated health (Waldon, 2004). Our results are contrary to studies that show positive associations between cultural identity and health. However, contrary effects have been found in other work as well as ours. For example, NZ's Ministry of Social Development reports a lower material wellbeing for older Māori with a secure cultural identity compared to those with a less secure cultural identity. It was postulated that historical processes reduced the capacity for financial preparedness for retirement (Cunningham et al., 2002). In the current study, lower material standard of living was not reported for participants with greater cultural connections. On the other hand, the objective measure of socioeconomic deprivation (obtained from participants' residential address) does imply an inverse relationship between socio-economic standing and cultural connection. Our question about financial standing was answered positively by most participants and may indicate a response bias.

We remind the reader, also, that the cluster groupings in this study included cultural resource indicators engaged *with* psychosocial resource indicators and that the patterns found therefore have no precedence. In our sample of advanced age Māori culture, age and health interacted in surprising ways. We found the greatest positive association with health for people in the RC/LE

cluster, which indicates that few of the cultural factors we measured contributed to physical and mental health. Ethnic identification is, for some, situational (Robson & Reid, 2001), with some situations warranting greater acknowledgement of cultural identity than others (Teh, Dyall, & Kerse, 2013). It is reasonable to wonder whether a research project conducted through a predominantly Western academic institution is one of those occasions. Alternatively, these individuals were independent and may have chosen to minimise their level of cultural involvement. Māori who espouse fewer cultural values may perceive other values to be as important to their wellbeing (Durie, 1995), for example, contributing to more mainstream community recreations and activities.

The converse finding is more worrying. Of our sample, the poorest self-rated health outcomes were found for individuals in the AC/HE cluster. Not only did they have high cultural connections, they were also more socially connected, which suggests that the mix of cultural and social variables was not protective of health decline for Māori of advanced age. However, self-report surveys of health status are commonly based on a Western construction of health; Māori ratings of health may be poorly related to the scale used in this study. The Oranga Kaumātua study found that older Māori seem to have an optimistic view of their own health when compared with self-reported levels of morbidity. Another possible explanation is that these individuals, 52% living with others (compared to an average of 20% for the other clusters), were providing care or making contributions to others at their own expense. Seventy four percent of people in this cluster, compared with only 15% in the other clusters combined had high informal role commitments - roles held within the family group or community (Hayman et al., 2012). Key amongst the types of informal productive activities older people undertake are volunteering and caregiving (Morrow-Howell, 2000). Whilst volunteering has generally positive health benefits (Tang, 2009), the degree of benefit differs by the level of contribution that is made (Matz-Costa et al., 2012). Caring for a dependent spouse often exerts a toll on health (Morrow-Howell, 2000). While the current findings are insufficient to determine if role demands were excessive; had they been, it could explain the poorer health of the culturally and socially connected older Māori.

Strengths and limitations

The major strength of this study is the high number of Māori of advanced age included in the research which provides previously unknown information about ageing NZ. The Oranga Kaumātua Study included 429 older Māori; only 45% aged 70 years and older. Other studies of older adults do not focus on advanced age specifically. Although Māori are few overall in this

age group, they are ageing faster than non-Māori and remain of poorer health. Attempts to decrease the health disparity in NZ will be aided by knowledge of its correlates.

Limitations of the study include potentially missed variables that might contribute to cultural identity and may have shown a more intuitive relationship to health, and the appropriateness of the outcome measures for Māori, which may also have a bearing on the equivocal health findings. A review of the literature suggests kai (food) preferences (Stevenson, 2001), status (Palmer, 2004), traditional healing (Fleming & Ledogar, 2008), and ethnic exploration and commitment (Phinney & Ong, 2007) as possible cultural resource indicators. However, little data could be found in these areas in relation to health so we returned to the core cultural identity values identified in key NZ research (Houkamau & Sibley, 2010; Jahnke, 2002; Phinney & Ong, 2007; Te Hoe Nuku Roa, 1996). We believe the variables chosen are reliable indicators tempered, nevertheless, by the self-report nature of the study and potential bias towards Western questioning.

Western bias is also possible in relation to the second limitation; that the outcome measures we used may not be culturally appropriate for Māori due to culturally-defined perspectives of health. For example, the SF-36 may not generate both physical and mental composite scores (PCS and MCS) for older Māori who ascribe to a mind-body unity (Scott et al., 2000). Despite the use of a bilingual questionnaire and interview-led administration, one could still question the applicability of the SF-36, and by extension, the SF-12 to older Māori. However, the sociocultural HCA (and the psychosocial HCA as well) did not generate significant differences across clusters for the MCS, and cluster means for the MCS were similar, offering greater confidence that the questions were understood. Similarly, tools to measure cultural identity have varied across studies. While the variable choices were empirically-based, we acknowledge that other researchers have made different choices. Whānaungatanga, for instance is often taken to mean kin relationships but may also be more personally interpreted (Houkamau, 2011).

Finally, to return to a point made earlier, cultural identity was not measured as a single entity in this study. Such a measure may have provided greater direction in interpreting the sociocultural clusters for older Māori. Indeed, nor was an attempt made to weight the resource indicators for importance so we cannot state that one mix of resources is better than another. That the resource indicators were based upon individual variables used in other work, however, affords us greater confidence to speak about world-view and values as key aspects of Māori wellbeing. Moreover, by giving each resource the same weight in terms of their influence on wellbeing, the study

acknowledges personal perceptions of what it means to be Māori, in line with Houkamau who suggests that whānaungatanga, in a wider sense (family relationships), "*points to an alternative definition of Māori identity as the person's unique interpretation of what it means to be Māori which provides them with a sense of belonging and reflects their own social background, relationships and circumstances.*" (Houkamau, 2011, p. 307).

Conclusion

An important finding of this research, concurring with other Māori researchers, is that Māori culture is not homogeneous. The most enduring traditional values may be a sense of unity and belonging, represented by connection to whakapapa, whānau, and place. However, all cultural resource indicators showed importance for some individuals and two thirds of participants rated cultural resources highly. Overall, a complex mix of factors was found to determine health. That is, Māori cultural values *in conjunction* with psychosocial values are likely to contribute to the health of older Māori. Our findings suggest that Māori octogenarians are diverse in character, living situation and community participation and also in cultural connections. We are not unique in this (Stevenson, 2001). The extent of our data collection offers possible explanations for this complexity that relate to expectations of care, participation in society and perceived health status.

CHAPTER 10: RESULTS OF STAGE 3

10.1 Comment on the chapter

This chapter presents the third manuscript and aims to answer these questions:

5. How resilient are people of advanced age?
6. How does the health of people of advanced age vary according to their level of resilience?
7. How does the resilience of people of advanced age vary according to psychosocial clustering?

The manuscript has been included here in the form it was written.

10.2 Manuscript 4: Prediction and Correlates of Resilience in Advanced Age: LiLACS NZ

Introduction

A holistic and positive approach to the ageing process (Brandtstadter & Greve, 1994; Jopp & Rott, 2006), is underpinned by evidence that increasing age also comprises a slowing of physical faculties and a decline in strength (Paul B. Baltes & Mayer, 1999; Femia et al., 2001; Ostir et al., 1999; Wallhagen, Strawbridge, Shema, Kurata, & Kaplan, 2001). Despite increasingly compromised health status, however, self-belief and quality of life can remain high (Albrecht & Devlieger, 1999). But the relationship between resources that enhance wellbeing and adaptive outcomes is complex (Brandtstadter, 1989) because previously useful resources can become diminished by advancing biological processes as time extends into the fourth age (Paul B. Baltes, 1997). This is not to say that resources become redundant; rather, the shifting demand:gain ratio of age means that the efficiency of resource mobilisation wanes. Indeed, advanced age (age 85+) can remain a time of change, development and adaptation (Paul B. Baltes et al., 1999), and is defined also by active strategic behaviours that utilise resources in different ways. While ‘successful ageing’ has generated criticism for distancing itself from those of poorer health, ‘resilient ageing’ which factors subjective meaning into behavioural responses is a realistic goal for many people of advanced age (P. B. Harris, 2006).

When asked about what contributes to resilience, older people cite multiple factors (Wiles et al., 2012), which suggests that later life continues to hold many opportunities for constructively handling life events (Wright-St Clair et al., 2011). It is thought that resilience resources interact with life experience and are differentially mobilized in specific situations (Luthar et al., 2000). This paper describes a measure of resilience, pertinent to people of advanced age, and investigates the relationship between resilience and salient psychosocial resource indicators and mental health factors and quality of life. We consider higher resilience to be defined by competence in the face of adversity. That is, for resilience to exist, there must be an adverse situation and a positive adaptive outcome (Masten, 2001). The aim of the paper is to shed light on the correlates of this dyad within the context of advanced age. We approach this task from a robust literature that links physical health and mental state (Femia et al., 2001; Kendig, Browning, & Young, 2000; Lundman et al., 2012; Windle et al., 2010).

The resilience literature also shows robust positive effects between resilience and health. Resources which are proposed to enhance resilience, such as meaning-making, perception of control, and optimism, have been shown to be protective against decline in both mental and physical health for people facing trauma such as AIDS (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000), bereavement, chronic illness and disability (Becker & Newsom, 2005; Paúl, Ayis, & Ebrahim, 2007). Positive correlates with resilience from ageing studies have included mastery (Jeon & Dunkle, 2009), social support (Netuveli et al., 2008), coping and personal life investment (Staudinger & Fleeson, 1996). We hypothesise that advantageous resources will be related to resilience and that resilience will be related to positive health outcomes.

Resilient adaptation in advanced age

The process of resilience follows multiple trajectories (Masten & Reed, 2002). In relation to the need for older people to ‘get by’, resilience may best denote achieving equilibrium after a challenge (Wagnild & Young, 1990), that is *management of losses* to attain a state that ‘works’ (Greve & Staudinger, 2006). For example, at the same time as revealing need, the ordinary ways of 'being in the everyday’ are comforting to those in late life (Wright-St Clair et al., 2011). Alternative trajectories of resilience may be more relevant to younger populations (Paul B. Baltes, 1997). For example, adults might be more likely to return to a level of homeostasis following adversity (O'Leary & Ickovics, 1995) whereas children may be more likely to improve or thrive (Hochhalter et al., 2011; Polk, 1997). An *age-related* manifestation of resilience is

supported by lifespan developmental theory which suggests that a) development does not have an upper threshold (Kail & Cavanaugh, 2007) and b) older people are skilled at adapting activities to achieve competence (Paul B. Baltes & Baltes, 1990). Competence, as stated, is defined subjectively.

Following age-specific conceptualisations of resilience that offer insight into the situational components of the ageing context (Felten & Hall, 2001; Grenier, 2005; Greve & Staudinger, 2006; Hoge et al., 2007; Wiles et al., 2012), we highlight three features of advanced age that have relevance to effectively adapting to adversity in this life stage. First, resilience is available to all people (Bonanno et al., 2006); there is evidence that resilience may even be higher in the oldest-old compared to younger age groups (Cherry et al., 2009; Staudinger & Fleeson, 1996). Some suggest that a longer life affords an increase in psychosocial resources that counters a decrease in other resources (Jopp & Rott, 2006). Second, current understanding in clinical and research settings is increasingly pointing to variability in physical and psychological health even into the 3rd and 4th ages. Third, variation in health and wellbeing, activity and ability at all stages of old age suggests the influence of different social, psychological and attitudinal factors in formulating adaptive responses. The literature describes key resilience-conferring resource indicators that are salient in advanced age, including perception of ageing, social support and participation variables, past experience, coping and mastery. Particular attention is given in ageing studies to resources that enhance age-associated competencies while recognizing age-associated needs and compromises in behaviour and function.

The conceptual features above form the basis for the operationalisation of resilience that we use in the following study. The fact that ageing carries daily challenges such as housework, transport issues and the like in addition to major setbacks, suggests that advanced age is a time of common adversity. In this study, we operationalise resilience as functionality relative to health impairment and call this relationship an *adversity/competence dyad*. The same measurement approach has identified resilience in older people and distinguished adaptive differences between ethnic groups (Consedine et al., 2004; Consedine, Magai, & Krivoshekova, 2005) but has not been used, as far as we know, in a sample of people of advanced age. Resilience research has also yet to adequately assess the correlates of the resilience process in the oldest-old. This paper is concerned with the resilience of octogenarians, of which little is known at present. We discuss how an adversity/competence dyad relates to psychological health factors important to people of advanced age.

Method

Sample and procedure

Data for these analyses were obtained from two cohorts of people of advanced age enrolled in LiLACS NZ (Dyall et al., 2013; Hayman et al., 2012; Kerse et al., 2015), a longitudinal cohort study assessing the predictors and trajectories of successful ageing in NZ. Baseline recruitment succeeded in enrolment of 57% of all eligible older people (Dyall et al., 2013). Participants in this sub-study are 250 Māori who were aged 80-90 years in the 2010 calendar year and 391 non-Māori who were aged 85 years. Māori ethnicity was obtained by self-identification, with identification as Māori taking precedence over secondary ethnicities in cohort allocation. The 641 participants in this sub-study represents 68% of the total of 937 people enrolled in the main study, where 266 people completed only core questions that did not provide sufficient information for these analyses and 30 people had incomplete data (Figure 5). Study eligibility also entailed living in the Bay of Plenty or Lakes (excluding Taupo) District Health Board areas in the central North Island of NZ. All participants completed a comprehensive interviewer-led questionnaire, with a bilingual version available for use with Māori participants.

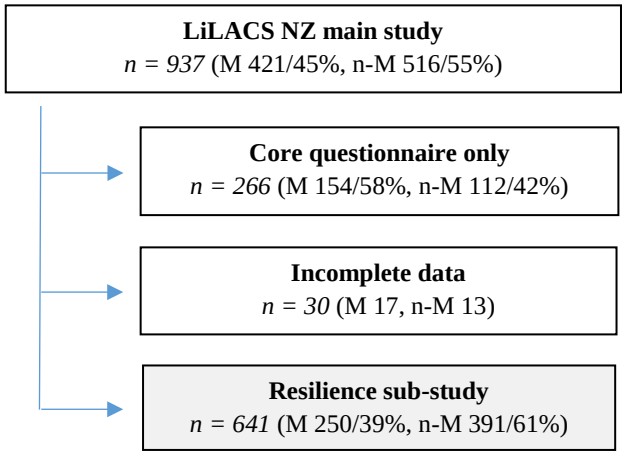

Figure 5: Enrolment Numbers

Measures

Resilience

Resilience was operationalized as functional status relative to health impairment (Magai et al., 2003), where functional status was defined as the level of independence in activities of daily living and health impairment was defined as the severity of present medical conditions.

Functional status was measured using the Nottingham Extended Activities of Daily Living scale; NEADL (Nouri & Lincoln, 1987). The NEADL is a commonly used scale of functional status measuring whether respondents do 22 instrumental activities 'on their own', 'on their own with difficulty' (both coded 0), 'with help', or 'not at all' (both coded 1).

The health impairment measure utilized data on the presence of 20 chronic physical and psychological medical conditions, obtained from: self-report during the questionnaire, the usage of relevant medication, records of GP, NZ Health Information Service (NZHIS) and hospitalisations, and study health assessment or biochemistry analysis (Table 17). Conditions were weighted by severity. Although the relationship between disease and disability the older one gets is unclear weighting gives a finer measure of the impact of health impairment. Severity weightings of between one and three were assigned independently by three gerontology physicians for each condition then evaluated for consistency and differences were discussed and agreed upon (total range 0-41.5).

Table 17: Source of Medical Conditions

Medical condition	Obtained from	Weighting
Epilepsy	GP record	2
Parkinson's Disease	Questionnaire [a], GP record	3
Congestive Heart Failure	Questionnaire, GP record, NZHIS	3
Coronary Artery Disease	Questionnaire, GP record, NZHIS	2
Atrial Fibrillation	Questionnaire, NZHIS, health assessment [b]	1
Stroke	Questionnaire, GP record, NZHIS	3
Peripheral Vascular Disease	Questionnaire, GP record , NZHIS	2
Hypertension	Questionnaire, GP record, NZHIS, health assessment [c]	1
Asthma or Chronic Lung Disease	Questionnaire [d], GP record, NZHIS	2.5*
Osteoporosis	Questionnaire, GP record	1
Diabetes	GP record, health assessment [e]	2
Cancer	GP record	3
Rheumatoid arthritis	Questionnaire	3
Osteoarthritis	Questionnaire	2
Kidney problems	Health assessment [f], hospital record	1
Eye condition - cataract, ARMD, glaucoma, diabetic eye disease	Questionnaire [g]	2.5*
Thyroid Disease	Questionnaire [h], NZHIS	1
Anaemia	Health assessment [i]	1
Depressive symptomology	Questionnaire [j]	2.5*
Dementia	Questionnaire [k], GP record	3

GP: General Practitioner; NZHIS: NZ Health Information Service, ARMD: age related macular degeneration

* The gerontology physicians couldn't come to consensus so the scores were averaged

[a] Self-reported use of prescribed medicines

[b] 12-Lead electrocardiogram
[c] Average of three lying blood pressure Systolic/diastolic blood pressure ≥140/≥90 or ≥140/<90
[d] Self-reported use of prescribed medicines
[e] Fasting serum glucose ≥7.0 mmol/L
[f] Estimated glomerular filtration rate <30 mL/min/1.73 m^2
[g] Questionnaire ‘‘Have you ever been told by a doctor or optician that you have had cataract, age related macular degeneration, glaucoma, diabetic eye disease?” and self-reported use of prescribed medicines
[h] Self-reported use of prescribed medicines
[i] Haemoglobin is <130 g/L for men and <120 g/L for women
[j] Questionnaire ‘‘Have you ever been told by a doctor that you have had depression?’’ or Geriatric Depression Scale ≥5
[k] Adjusted Modified Mini-Mental Status for vision impairment <75

Descriptive variables

Participant characteristics include demographic (marital status, education, living situation and arrangement), socioeconomic (deprivation, financial status), lifestyle (smoking, driving), health (medication use, falls), and psychosocial (loneliness, life satisfaction, practical and emotional support, and satisfaction with relationships) factors.

Resource indicators

Twenty psychosocial resource indicators were entered into a hierarchical cluster analysis to obtain psychosocial character profiles (Hayman, Kerse, & Consedine, 2016). The resource indicators included sense of belonging to ethnic group, religious affiliation and the importance of spirituality, social network, support and participation, purpose and engagement in life, past adversity, coping self-efficacy, mastery and perception of ageing. Four psychosocial profiles were generated – external resource rich (ERR, n=309; high level of engagement in hobbies and support from others, predominantly reciprocal social networks, positive experience of ageing), external resource poor (ERP, n=187; lacking social support, living in diverse social networks, low role responsibility), all resource poor (ARP, n=70; faith not important, living in diverse social networks), and all resource rich (ARR, n=75; 100% religious, clear reciprocal social networks, high role responsibility, mastery, and sense of belonging to ethnic group, low stress).

Covariates

Physical and mental health-related quality of life (HRQoL) were measured using the SF-12 (J. E. Brazier & Roberts, 2004) and we report the scale’s physical and mental component summary scores (Ware et al., 1993). Cognition was measured with the Modified Mini Mental State Examination (3MS), which, although not fully validated for older people, is a recognised cognitive assessment tool used with people of all ages (Teng & Chui, 1987). Depression was measured with the Geriatric Depression Scale (GDS-15), a 15 item scale of depressive

symptomotology, specifically developed for use in older populations (Sheikh & Yeasavage, 1986).

Statistical analysis

Resilience scores are reported as standardised residuals (Hays, 1994) that were obtained from a univariate General Linear Model (GLM) where health impairment was the dependent variable and functional status was a covariate. The standardised residuals represent the degree of deviation in the individuals' functional status from that expected given their health impairment. Scores were reversed so that better than expected function represented higher resilience and poorer than expected function represented lower resilience. In order to characterise and describe psychosocial functionality in very advanced age, a categorical grouping for resilience was obtained using a 2x2 cross tabulation (median split of NEADL score: high/low function x median split of weighted medical conditions: high/low health impairment). Both categorical and continuous measures are used in the following analyses.

The characteristics of study participants according to the resilience groups are described as number (n) and percent (%) and differences are reported as Chi Square ($\chi 2$) or Fisher's Exact p-values, significant at the 0.05 level (p-value). To describe the cross-sectional relationship between resilience and psychological outcomes we report ANCOVA statistics obtained from a GLM for psychosocial predictors and a multiple linear regression for health outcomes. Post Hoc tests used for categorical outcomes utilised Tukey HSD.

We adjusted our models for gender, age and ethnic group. Gender differences have been found for psychosocial variables; women report higher depression (Bergdahl, Allard, Alex, Lundmana, & Gustafson, 2007; Seplaki, Goldman, Weinstein, & Lin, 2006), and subjective wellbeing (J. Smith, Fleeson, Geiselmann, Settersten, & Kunzmann, 1999): and women and men differ in the source and importance of social care (Walter-Ginzburg et al., 2005). Gender differences in other resilience work are equivocal, perhaps because of the gendered life experiences of this cohort (Aléx & Lundman, 2011). Ethnic group adjustment was made to account for the difference in the cohorts' age ranges. The subscales of the SF-36 have been found to be less discriminatory for older Māori (Scott et al., 2000). Differences have been found between young-old and old-old age groups for psychosocial variables in the past (Mehta et al., 2008; Scheetz et al., 2012), although adaptive resources do not always show an age-related decline (Staudinger & Fleeson, 1996).

Results

Of 641 participants with full data, 284 were male and 357 (56%) were female; 250 (39%) were Māori. The mean age was 83.7 years. Table 18 shows the mean resilience scores, obtained from the standardised residuals of the GLM, for the resilience groups, which ranged from 0.87 to -0.77. Given our operationalisation of resilience as better than expected function, we labelled the group of people who had high function despite high health impairment *resilient* (n=136/21%, mean resilience 0.87) and the group who had high function but low impairment, i.e. those who were functioning well but were in good health, *robust* (n=207/32%, mean resilience 0.40). The group with low function and high health impairment was labelled *debilitated* (n=180/28%, mean resilience -0.62); and the group with low function and low impairment, i.e. those who did not function well when they might be expected to, given their low level of health impairment, was labelled *under-functioning* (n=118/18%, mean resilience -0.77). These four groups were significantly different from one another ($\chi 2 = 27.48$, df 1, $p<0.001$) and all generated significant standardised residuals. The individual resilience scores ranged from -4.92 to 1.6, mean 0, sd 1.00.

Table 18: Characteristics of Study Participants by Resilience Group

Variable		Resilience score±	Resilience group				p-value
			Resilient n = 136	Robust n = 207	Debilitated n = 180	Under-functioning n = 118	
Resilience score M (sd)		0.00 (1.00)	0.87 (0.31)	0.40 (0.29)	-0.62 (1.17)	-0.77 (0.87)	0.001
		M (sd)	**n (%)**				
DEMOGRAPHIC FACTORS							
Gender	*Male*	-0.04 (0.95)	60 (44.1)	79 (38.2)	84 (46.7)	61 (51.7)	ns
	Female	0.03 (1.04)	76 (55.9)	128 (61.8)	96 (53.3)	57 (48.3)	
Ethnic group	*Māori*	-0.06 (1.10)	53 (39.0)	77 (37.2)	69 (38.3)	51 (43.2)	ns
	Non-Māori	0.04 (0.93)	83 (61.0)	130 (62.8)	111 (61.7)	67 (56.8)	
Marital status	*Never married*	0.09 (1.22)	5 (3.7)	7 (3.4)	3 (1.7)	3 (2.6)	ns§
	Married	-0.04 (0.90)	43 (31.9)	88 (42.9)	75 (41.9)	47 (40.2)	
	Widowed/separated/divorced	0.02 (1.06)	87 (64.4)	110 (53.7)	101 (56.4)	67 (57.3)	
Education level	*Primary*	-0.02 (1.06)	32 (23.7)	29 (14.1)	38 (21.7)	31 (26.7)	0.012
	Secondary	-0.04 (1.02)	52 (38.5)	69 (33.7)	67 (38.3)	41 (35.3)	
	Completed secondary	0.12 (0.78)	21 (15.6)	51 (24.9)	36 (20.6)	20 (17.2)	
	Trade	-0.19 (1.13)	8 (5.9)	17 (8.3)	19 (10.9)	14 (12.1)	
	Tertiary	0.22 (0.83)	22 (16.3)	39 (19.0)	15 (8.6)	10 (8.6)	
Living situation	*Alone*	0.26 (0.69)	76 (55.9)	108 (52.2)	66 (36.7)	47 (39.8)	0.000
	With spouse/partner only	0.02 (0.80)	37 (27.2)	82 (39.6)	60 (33.3)	42 (35.6)	
	With others	-0.65 (1.53)	23 (16.9)	17 (8.2)	54 (30.0)	29 (24.6)	
Living arrangement	*Rest home*	-2.48 (1.40)	0	0	11 (6.2)	1 (0.9)	0.000§
	Private hospital	-2.44 (1.97)	0	0	3 (1.7)	2 (1.7)	ns§

Variable		Resilience score±	Resilience group				p-value
			Resilient	Robust	Debilitated	Under-functioning	
			n = 136	n = 207	n = 180	n = 118	
		M (sd)	n (%)				
SOCIOECONOMIC FACTORS							
Socioeconomic deprivation	*1-4 (low)*	-0.01 (0.90)	25 (18.4)	54 (26.1)	36 (20.0)	24 (20.3)	
	5-7 (medium)	0.10 (0.86)	50 (36.8)	73 (35.3)	62 (34.4)	42 (35.6)	ns
	8-10 (high)	-0.08 (1.14)	61 (44.9)	80 (38.6)	82 (45.6)	52 (44.1)	
Current financial situation	*Comfortable*	-0.19 (1.01)	104 (76.5)	168 (81.2)	123 (68.3)	84 (71.2)	
	Just enough to get along on	-0.01 (0.95)	32 (23.5)	38 (18.4)	56 (31.1)	34 (28.8)	0.038§
	Can't make ends meet	0.00 (1.02)	0	1 (0.5)	1 (0.6)	0	
LIFESTYLE FACTORS							
Current or past smoker		0.07 (1.03)	67 (49.3)	85 (41.5)	105 (58.3)	66 (57.4)	0.004
Drives		0.32 (0.64)	111 (81.6)	181 (87.9)	77 (43.0)	65 (55.6)	0.000§
HEALTH FACTORS							
Takes prescribed medications		-0.01 (1.02)	130 (95.6)	175 (85.4)	176 (98.3)	105 (89.7)	0.000
Falls in the last year	*None*	0.09 (0.90)	88 (64.7)	153 (74.6)	98 (54.4)	73 (63.5)	
	One	-0.02 (1.08)	29 (21.3)	28 (13.7)	35 (19.4)	22 (19.1)	0.001
	More than one	-2.26 (1.14)	19 (14.0)	24 (11.7)	47 (26.1)	20 (17.4)	
SOCIAL FACTORS							
Loneliness	*Feels lonely*	0.04 (1.08)	52 (38.2)	62 (30.1)	63 (35.0)	31 (26.3)	ns
	Never feels lonely	-0.02 (0.96)	84 (61.8)	144 (69.9)	117 (65.0)	87 (73.7)	
Satisfaction with life	*Dissatisfied*	-1.11 (1.90)	3 (2.2)	6 (2.9)	8 (4.5)	2 (1.7)	
	Neither satisfied nor dissatisfied	-0.25 (1.18)	6 (4.4)	11 (5.3)	15 (8.4)	7 (5.9)	ns§
	Satisfied	0.06 (0.90)	127 (93.4)	189 (91.7)	155 (87.1)	109 (92.4)	
Count on someone for daily tasks	*No*	0.43 (0.61)	10 (7.4)	13 (6.3)	3 (1.7)	7 (5.9)	
	Yes	-0.07 (1.02)	102 (75.0)	148 (71.5)	168 (93.3)	98 (83.1)	0.000
	Don't need help	0.24 (0.93)	24 (17.6)	46 (22.2)	9 (5.0)	13 (11.0)	
Count on someone for emotional support	*No*	0.24 (0.94)	9 (6.6)	10 (4.8)	12 (6.7)	3 (2.5)	
	Yes	-0.01 (1.00)	111 (81.6)	170 (82.1)	142 (78.9)	99 (83.9)	ns
	Don't need help	-0.03 (1.03)	16 (11.8)	27 (13.0)	26 (14.4)	16 (13.6)	
Satisfaction with social relationships	*No friends/family*	-1.49*	0	0	1 (0.6)	0	
	Extremely dissatisfied	0.79*	0	1 (0.5)	0	0	
	Very dissatisfied	-0.16 (1.40)	2 (1.5)	1 (0.5)	2 (1.1)	1 (0.8)	
	Somewhat dissatisfied	-0.24 (1.33)	2 (1.4)	2 (1.0)	4 (2.2)	0	ns§
	Satisfied most of the time	-0.11 (1.12)	47 (34.5)	61 (29.4)	66 (36.7)	47 (39.8)	
	Satisfied all of the time	0.07 (0.91)	85 (62.5)	142 (68.6)	107 (59.5)	70 (59.3)	

± the score as obtained from the standardised residuals of the General Linear Model

§ Fisher's Exact p-value

*no sd as there is only one person in the group

There was no difference between the resilience scores or resilience groups for gender, age or ethnic group. No significant group differences were found for marital status, deprivation, or for four out of five psychosocial factors. The main significant differences appear to be between the robust and debilitated groups. However, both the resilient and robust groups reported higher scores than the other two groups for education, living situation and lifestyle factors. More individuals living alone were in the resilient and robust groups, and no-one in either of the more

resilient groups lived in a rest home or private hospital, in contrast to 8% of individuals in the debilitated group living in a rest home or private hospital. More drivers were in the resilient and robust groups. The robust group also had fewer individuals who'd fallen, nearly half as many as in the debilitated group. Individuals in the robust group were more likely to say they didn't need practical help, as were a high proportion of individuals in the resilient group despite their high health impairment.

Relationship between resilience score and psychosocial and health factors

To examine the predictive utility between the psychosocial profiles and resilience, the resilience score was used rather than the categorical resilience groups because a continuous measure yields the most information about a relationship. First, we assessed whether psychosocial profiles could predict resilience. Mean (sd) resilience scores for the clusters are shown in Table 19. An ANOVA with psychosocial clusters as the independent variable and resilience score as the dependent variable produced a significant result. After adjusting for gender, age and ethnic group, the difference in resilience scores across the clusters remained significant F (3, 634) = 3.45, p = 0.02 (partial eta square = 0.02). Pairwise comparisons showed that the difference lay between the ERP and the ARR psychosocial clusters (p = 0.03).

Table 19: Resilience Scores across Psychosocial Clusters

Variable	**Psychosocial cluster**				**p-value**
	ERR	**ERP**	**ARP**	**ARR**	
	n = 309	**n = 187**	**n = 70**	**n = 75**	
Resilience score m (sd)	0.05 (0.98)	-0.13 (1.09)	-0.14 (1.05)	0.23 (0.69)	0.02

Cluster labels: ERR = external research rich, ERP = external resource poor, ARP = internal and external resource poor, ARR = internal and external resource rich

Next we assessed whether resilience contributed to better health outcomes. Depression scores had a mean of 2.3 and sd 2.1, suggesting a low level of depression overall; only 12% of individuals scored above 4 (moderate to severe depressive symptoms). Cognition scores had a mean of 89.62 and sd 10.53. Physical HRQoL scores had a mean of 42.1 and sd 11.7; mental HRQoL scores had a mean of 54.4 and sd 8.5. Both these QoL measures are standardized to a mean of 50, suggesting that in this study QoL related to physical health was lower, and mental health, higher, than average. Resilience was moderately correlated with depression (-0.38), cognition (0.34) and physical HRQoL (0.33) and had a low correlation with mental HRQoL (0.19) (Figure 6).

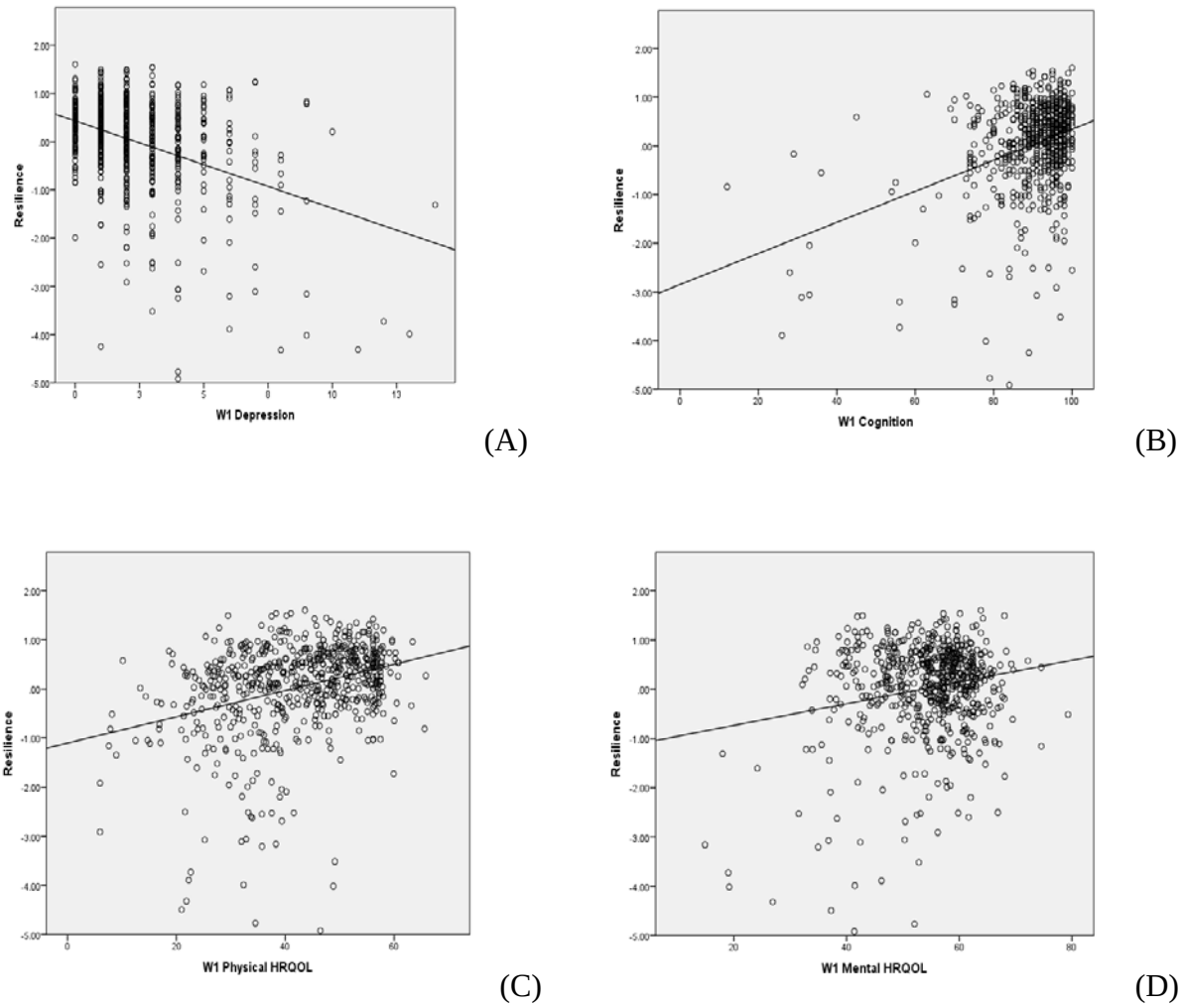

Figure 6: Scatter Plots Showing the Strength of the Correlation between Resilience and Health Outcomes

(A) = Depression and resilience score, r = -0.38; (B) = Cognition and resilience score, r = 0.34; (C) = Physical HRQoL and resilience score, r = 0.33; (D) = Mental HRQoL and resilience score, r = 0.19

All correlations were significant at the 0.01 level. All mental health variables varied with resilience score (Table 20), after adjusting for gender, age and ethnic group, Higher resilience was associated with lower depression, $p<0.000$, higher physical HRQoL, $p<0.000$, higher mental HRQoL, $p<0.000$, and higher cognition, $p<0.000$. Squared part correlations show that resilience score accounted for the largest portion of the variance in all models.

Table 20: Effect of Resilience on Mental Health Outcomes, Adjusted for Gender, Age and Ethnic Group

		B	SE	Beta	Squared Part Correlation
Depression	Resilience score	-0.796*	0.078	-0.377	0.140
	Gender, *Female*	-0.039	0.154	-0.009	0.000
	Ethnic group, *Māori*	0.360	0.189	0.084	0.005
	Age	0.017	0.046	0.016	0.000
Cognition	Resilience score	3.677*	0.413	0.329	0.107
	Gender, *Female*	1.892*	0.781	0.089	0.008
	Ethnic group, *Māori*	-3.960*	0.960	-0.184	0.023
	Age	-0.125	0.232	-0.024	0.000
Physical HRQoL	Resilience score	4. 113*	0.456	0.3409	0.114
	Gender, *Female*	-3.006*	0.883	-0.128	0.016
	Ethnic group, *Māori*	2.744*	1.084	0.115	0.009
	Age	0.029	0.264	0.005	0.000
Mental HRQoL	Resilience score	1.667*	0.347	0.190	0.036
	Gender, *Female*	-0.463	0.673	-0.027	0.001
	Ethnic group, *Māori*	-1.179	0.826	-0.068	0.003
	Age	0.144	0.201	0.034	0.001

*p-value was significant at 0.05 level
B = unstandardised regression coefficient; SE= standard error of the regression coefficient; beta = standardised regression coefficient

Discussion

Adversity in advanced age is inherently linked to changes in physical ability and social support (J. Smith, 2000) and the relationships between physical, social and mental health factors are well-known. This study investigated the relationship between resilience and psychological variables and outcomes of mental and physical HRQoL in a sample of octogenarians. Resilience was defined as the derivation from the expected relationship between functional status and health impairment and further grouped using a 2x2 crosstab to obtain descriptive categories.

Descriptive groupings are of value to the interpretation of resilience in a 'real world' conceptualisation since no gold-standard resilience measure exists and therefore resilience scores cannot be compared. In addition, resilience measured in terms of the relationship between adversity and competence makes the construct clearly relevant to the oldest-old, enabling, as it does, investigation of whether adaptation to physical limitations in advanced age is associated with psychosocial profiles and health factors. Physical limitations are present in 88% of people over the age of 85 (Ministry of Health/Manatū Hauora, 2006) and the functional correlates of dependence have an impact on mental health and quality of life (Scaf-Klomp, Sanderman, Ormel, & Kempen, 2003). In this regard the current study is novel because we are not aware of others

that have measured resilience in terms of both psychosocial profiles and positive adaptive outcomes. Although Magai et al (2003) measured hardiness in the same way that we measured resilience and compared the groups obtained with socioemotional cluster profiles, they did not relate hardiness to mental health outcomes (Magai et al., 2003). Our measure is also in line with process models of resilience in which resilience is defined by adaptation to adversity (Masten, 2007).

Physical health decline is not the case for all people so multiple functional patterns are likely (J. Smith & Baltes, 1997). In our study, four groups, demonstrating four levels of resilience, were found to be significantly different from one another on several measures, validating our operationalisation. For two groups (*resilient* and *robust*) the means for resilience were above the overall resilience score mean, and for two groups (*debilitated* and *under-functioning*) the means were below the overall resilience score mean. Unsurprisingly, medication use and falls were higher in the debilitated and resilient groups who had a greater number of health impairments. However, resilience was demonstrated by the resilient group participants being less likely than those in the debilitated group to be living in a rest home or private hospital. They also reported less need for practical daily help (5% vs 18%).

Resilience and health

Consistent with younger cohorts, resilience in our advanced age sample was strongly related to mental health outcomes. We found better cognition and HRQoL and lower levels of depression according to resilience scores. In a study of people aged 65-93 (23% aged 80 or over), Caltabiano and Caltabiano (2005) found that resilience had a main effect on physical and mental HRQoL, irrespective of age-associated adverse events. In a study of the oldest-old, Nygren et al. (2005) found a correlation between resilience and higher mental HRQoL. Although they didn't find a correlation with physical HRQoL, half their sample were older than 85 years and physical HRQoL scores were substantially lower (37 ± 10.9) than ours. This demonstrates increasing variability with increasing age.

We were able to show that higher resilience is related to demographic, socioeconomic, lifestyle, and social factors. Specifically, living alone, being financially comfortable, driving and not smoking were amongst variables higher in the more resilient groups. The psychosocial profiles we reported from our earlier study also showed better physical and mental health (Hayman et al., submitted) for individuals who had the most advantageous psychosocial profile (higher social

support, faith, engagement in life and role commitments). When resilience scores were applied to the psychosocial clusters, the same cluster had the highest resilience. The positive influence of psychosocial variables on health complements the data in this study in relation to resilience.

Moreover, prediction of resilience from psychosocial profiles supports other work that shows a relationship between resilience and psychosocial variables in the oldest-old (J. Smith & Baltes, 1997). Rating the psychosocial clusters pragmatically in terms of characteristics generated a ranking from most to least advantageous of: ARR, ERR, ERP, ARP (Hayman et al., submitted). The resilience score means for the clusters mirrors this ranking. That is, the clusters have the same order when ranked by resilience score, with the ARR cluster having the highest resilience mean and the ARP and ERP clusters scoring below the mean. The psychosocial resource indicators used in the cluster analysis were based upon empirical studies of resilience. This work upholds them as potential resilience conferring factors. Character profiling may be another method of measuring resilience.

Implications

Because of the need of people of advanced age for physical fitness to manage everyday tasks and the importance of physical, mental and social factors to perceived wellness in advanced age, improvement in these areas has potential to improve successful ageing. Extending this to the resilience domain, although physical function is not given the highest ranking according to the oldest-old (von Faber et al., 2001), it is consistently mentioned as one aspect of successful ageing and here, its demonstrated relationship with adversity has an inherent implication to the potential for adaptation.

Demonstrated variation in resilience across functional and socio-demographic variables suggests that multiple factors contribute to wellbeing and that multiple avenues should be utilised to enable older people to remain living independently. Moreover, the variable make-up of the psychosocial clusters matches the predictive relationship between the psychosocial clusters and the resilience criterion scores. Factors such as social support, faith, engagement in life and role commitments are ones to consider in attempts to increase resilience. Interventions can improve social connections and productivity. Specific projects to enable connections between older people with a productive purpose have potential to also improve resilience to health decline. People over 85 years are more likely to be living alone or in residential care and this dependence contributes to an increased need for informal and formal support from others (Bowling & Browne, 1991).

Contrary to research definitions, older adults do not rate good mental health as a strong component of successful ageing, however, they do consider challenging oneself intellectually and keeping mentally active to be important (Reichstadt et al., 2007) suggesting the implementation of mentally-stimulating activities in seniors centres could be effective. As noted by Windle (2011), resources should be appropriate to alleviating the adversity and the outcome should be appropriate to demonstrating adaptation to the specific adversity.

Strengths and limitations

Our study is one of the largest of people of advanced age, with equal gender representation, adding to the understanding of resilience of the oldest-old. Having a population-based sample allowed us to test outcomes over urban and rural, and home and supported-care settings, however few people lived in residential care or rest homes, limiting the generalizability of our findings to more disabled people. Measuring health outcomes in relation to both resilience and psychosocial resources makes it possible to compare variable-focused and person-focused approaches to adaptation.

The biggest limitation in this study is the inability to compare results directly with other studies. However, our method of measuring resilience has face validity given the increase in health impairments and functional decline in advanced age. The measure we used supports the position that adversity should be understood in relation to competence. By accounting for the severity of medical conditions within our resilience measure we make a stronger case for resilience as an adaptive response to adversity. That is, the measure discriminates between two people who can do the same functionally and have the same number of conditions; if, for one, there is greater potential impact (severity). In other words, we have a more confident measure generating a more robust spread of scores.

A favourable comparison of resilience prevalence across studies might further validate our measure, however, as the items we used were unique to the study that is less possible. Prevalence rates for resilience in old age seem to be placed anywhere between 14% and 60% (Demakakos et al., 2008; Netuveli et al., 2006; Surtees et al., 2003), with ours, 21% in the most resilient group. Few studies share resilience scoring methods, but resilience seems to be possible in advanced age. In addition, the measure of NEADL inherently gives those who live alone a higher score as they are required to complete instrumental activities of daily living independently, whereas those living with others have shared roles. Thus, the associations observed for those living alone may

be more due to measurement of the numerator of the resilience measure than the living arrangement of the individual. Finally, despite significant associations proven here between the psychosocial profiles and resilience and also with health outcomes, caution must be observed in interpreting the findings as significance may be masking a Type 1 error due to different sized groups. Nevertheless, the spread of psychosocial resource indicators suggests an advantageous resilience ranking.

Conclusion

Older people view health and independence as important factors in their wellness and aspire to a good quality life, ‘successful ageing’ in its many permutations, whilst also acknowledging limitations in their abilities. Improving specific areas of social support, alleviating loneliness or improving financial resources, and thus resilience, is likely to be useful to older people recovering from disease, falls and changes in their level of independence. Set against a backdrop of the need to negotiate challenges on a daily basis (Jeon & Dunkle, 2009; Ong et al., 2006), individual resilience has the potential to contribute to a more fulfilling life.

CHAPTER 11: DISCUSSION AND IMPLICATIONS

Resilience is a complex construct. Data from a wide range of studies suggests that resilience is more common than previously thought (Bonanno, 2004). It is certainly a salutogenic construct that is aligned with positive psychology, wellbeing and ageing well (Harrop, Addis, Elliott, & Williams, 2009). Comparative prevalence statistics are hard to find for resilience in advanced age as empirical methodology is so varied and as there is so little research of any type with the oldest-old. The field of resilience itself is rather young as well. From the current work, I can say that 21% of people of advanced age were grouped as functionally well despite high health impairment and, by this operationalisation, could be classified as resilient.

Much of what is known about resilience in advanced age comes from qualitative studies. Older people cite multiple sources for their wellbeing and multiple factors that they consider important to 'bounce back' from adversity (Wiles et al., 2012). The work of this thesis adds to this underserved area of resilience by measuring resilience in an advanced age sample of Māori and non-Māori and also measuring resilience resources in the sample. It responds to a call to increase empirical research about resilience in the age group. Within one research study, three stages of work provide answers to what groups of factors hang together and collaboratively predict positive health outcomes through psychosocial profiles and sociocultural profiles, what the relationship is between resilience and positive health outcomes, and how resilience scores compare with psychosocial profiles. The work was undertaken in two contexts - age and culture – which are separate and have aspects distinct from one another.

To begin this summing-up of the findings from the work, it seems sensible to first sum up the concepts that have been discussed. In doing this the themes that underpin the research can be examined. In Chapter 2 of this thesis, four phases of complementary research approaches to investigating resilience research were summarised. At that stage, a process orientation seemed a sensible way to understand resilience in advanced age. It still seems so. Using this orientation, resilience is seen as a progression from adversity (challenge, stress, hardship, etc.) to adaptation (resilience or competence). In the centre are resources (resource indicators). For resilience to be achieved, the resources must be protective. Although traits or attributes that a person has within them contribute to the expression of resilience, external resources are just as important. In advanced age, they may be more so because people start to focus on life outside themselves as

they age (Brown & Lowis, 2003). Older people become more concerned with family (Aldwin & Yancura, 2010), meaningful activities (Folkman, 1997) and functional behaviours rather than the achievement of new goals (Ebner et al., 2006). My goal in Chapters 2 and 3 was to introduce these sorts of concepts and discuss how ageing fitted the paradigm. I have used the process orientation as a theme throughout the thesis by reference to adversity, resources and adaptation (also termed competence in the thesis).

The concept of context was expanded in Chapter 2 and resource utilisation and the concomitants of resources were explored. Adversity and competence within an age context were explored more deeply in Chapter 3, where a considered and literature-driven conceptualisation of resilience in advanced age was offered. I saw chapter 3, therefore, as a lynchpin, using the theories introduced in Chapter 2 to provide a foundation for discussion of the previous research about resilient ageing (Chapter 4) and the later empirical chapters. The synthesis arrived at therein pointed to four themes, more relevant to advanced age than other ages, which were explored further on. Namely, that resilience in advanced age is about meaningful activities, that alteration of the importance of activities necessitates a different weighting of some variables and that maintenance of function is the most salient outcome. An adaptive outcome is one best understood by its relationship to the situation that creates the challenge and the arsenal of resources that have the potential to mitigate potential damage (Masten, 2001) but what is most important in advanced age seems to be that all stages of resilience be age-specific.

The foundations to both my conceptualisation and the new data generated in the current study are that the meanings of adversity, resources and competence differ according to the contexts in which they are perceived, and that all stages of resilience are influenced by the space in which individuals currently sit and the past that spans behind them. These dominions may be likened in a *socio-historical* context to life stage and cohort factors, and in a *socio-cultural* context to cultural values and identity and world-view. For Māori who are willing to conceive of resilience as a possibility and not an indicator of decreased worth, there may be value in understanding how their cultural identity and world-view are incorporated into adaptive outcomes.

11.1 What does the research add to current understandings of resilience?

The research around adversity in relation to resilience in advanced age suggests that adversity is predominantly about physical function and social relationships. Adversity in advanced age is inherently tied up with changes in physical ability and social support and accumulation of medical conditions (J. Smith, 2000). Increasing age comes with the slowing of physical faculties and decline in strength so that people in advanced age are likely to experience lower health status than the younger-old (Femia et al., 2001; Wallhagen et al., 2001). Physical health decline and acquisition of chronic conditions means that activities that require balance, limb strength, dexterity, stamina and other physical attributes are more demanding in advanced age and even common daily activities can provide great challenges (Jeon & Dunkle, 2009; Ong et al., 2006). However, although some consider advanced age to be defined by such decline, both 'resilient ageing' (P. B. Harris & Keady, 2008) and developmental growth (Brown & Lowis, 2003) are possible. Behavioural responses to challenges point to a life course influence (Paul B. Baltes, 1987) and the value of amending activity to achieve an adaptive outcome relates to the meaning of the outcome to an individual. Resilient outcomes in advanced age are posited to be more about maintenance than growth.

Resilient outcomes have been found when resilience is defined as a positive adaptation relative to adversity; which was termed earlier as an adversity/competence dyad. To assess resilience in a variable-focused way in this study, resilience was defined by an age-specific competence and age-specific adversity – thus, functional status relative to health impairment (which was rated for severity to provide a more useful measure). The measure I chose here is theoretically sound as the same approach has been used multiple times in resilience research with older populations. In stage 3 of this study, this operationalisation of resilience was positively associated with mental health and quality of life measures, validating it as important to outcomes in advanced age. To provide descriptive precision I also categorised resilience into four groups and found realistic resilience mean scores for the groups based on their level of function. Twenty-one precept of people were in the most resilient group. In addition, ranking psychosocial clusters that were generated in stage 1 by their mean resilience scores mirrored their ranking by psychosocial resources. This suggests that psychosocial resources are measuring an aspect of resilience.

The person-focused cluster analysis research method used in stages 1 and 2 shows which resources work together best in Māori and non-Māori of advanced age and their spread across the clusters shows which resources are associated with good health outcomes. As stated, resilience resources are ones which facilitate positive adaptation to adversity. The resources chosen for this study are ones that were found to impact adaptation in both variable- and person-focused approaches to measurement as well as from qualitative enquiry (Wiles et al., 2012) and were both internal and external in origin. The types of resources effective against age-related adversity include: coping style in relation to flexible coping methods, spirituality in terms of support, social connections in terms of formal and informal care and discretional choices, social participation in terms of productivity, mastery in terms of agency in action, life experience in terms of accumulated stressors and cultural identity in terms of cultural protection. The comparison of these resources and resilience described in Chapter 10 answers the question of which combinations of resources operate adaptively in advanced age.

Because meaning and experience were posited as key components of an age-related context, the following discussion uses these concepts to illustrate how the resources might reflect resilience.

How do Meaning and Experience Inform Resilience in the Contexts of Advanced Age and Culture?

… through reciprocal social connections

Responding to the increased reliance upon social resources in advanced age, social variables were weighted highly in the cluster analyses with the inclusion of six variables that measured four aspects of social connection – contact with others (social network), functional relationships (giving and receiving support), productive activities (social participation) and social capital (value of support). The three stages all generated outcomes that were predominantly related to social connections. The main finding in relation to social variables is that multiple connections seem most advantageous to positive health outcomes and to resilience. The ARR cluster from the psychosocial HCA characterised positive social connections potentially linked to religious practice, informal support from others and engagement in life via undertaking community roles, and from reciprocal social networks that generated satisfaction for the individual. Māori predominated in this more socially connected cluster, which can be understood as a reflection of the Māori world view. Social connections, moreover, seem important to good physical and

mental health as evidenced by higher scores for physical HRQoL, functional status, physical performance and cognition and lower depression.

Informal role commitment was a feature of the most advantageous clusters in both the psychosocial and the sociocultural cluster analyses. The reciprocal relationship within advanced age has not received a great deal of attention although caregiving and volunteering have been identified as features of productivity in later life (Opie, 1991). The health benefits of volunteering is also known (Matz-Costa et al., 2012; Morrow-Howell, 2000; Musick et al., 1999; Tang, 2009), although, as stated in Chapter 3, levels of care provision that are higher than desired might affect health negatively. Older people make up the majority of volunteers in community care groups such as meals on wheels and senior citizen's centres. For Māori elders, roles are often held in retirement to support the functional operations of the iwi. As a good proportion of participants held roles within both the community and extended family, it is likely that some participants also cared for live-in dependents (e.g. spouses) or for family or whānau as child-minders (Dyall, unpublished work). Older adults are important volunteers because they have more time available after retirement. It is not surprising then, that the most socially connected groups had the highest resilience scores as social variables are commonly cited as contributors to resilience. For example, being productive, keeping busy, attending community groups, having wide social networks and reciprocity all feature in either qualitative or quantitative work. Our results overall suggest that older people want to be helpful and are capable of maintaining complex lives (60% of participants comprised the two most advantageous psychosocial clusters).

… *through positive perception of ageing*

Social connections may have an impact on perceptions of ageing; 84% of people in the cluster with the most advantageous social connections had a positive attitude to their ageing (compared to an average of 70% across the other clusters), and they had the best health. The converse was true as well, as those with the least positive attitude to ageing had the poorest health by the measures assessed in this study. Positive social connections can validate the ageing experience (Moore & Stratton, 2002). Alternatively of course, because the analyses were cross-sectional, a positive perception of ageing may have affected the likelihood of maintaining social connections. The perspective that advanced age is a time of decline was not supported in this study as most participants (78%) rated their ageing as very or mainly positive. Both the current HCAs also found high ratings of agency to keep healthy with no significant differences found between the clusters. Older people believe that they can control some aspects of their physical ageing such as

weight gain, increased blood pressure and muscle strength, although more work could go into encouraging people to actually adopt behaviours they believe could facilitate healthier ageing (Pennington, Saywell, & Stephens, 2005). Such a focus could lead on to improved resilience. Along with social connections, a positive perception of ageing informed good health. The measure used to assess resilience in this work considered good ageing (high functioning despite poor health) to define high resilience and less than ideal ageing to define low resilience. The positive attitude the participants had about their ageing reinforces this 'resilient ageing' approach. The psychosocial profiles identified here that match this measure of resilience also show the breadth of aspects of social and spiritual connections that are potentially related to resilience.

… through cultural connections

Cultural resource indicators were assessed for Māori and showed some distinct resource interactions. Although some cultural resource indicators were high for all Māori, as a group of resources, cultural connections were not highly associated with health which contrasts with other work conducted in NZ (Houkamau & Sibley, 2011; Waldon, 2004). If the result is an aberration, this finding might be related to the nature of the study in that this study was not assessing cultural outcomes. Hence, participants' beliefs about how they should answer questions may have been influenced by the overall study direction. The outcome measures used may be less valid for Māori than non-Māori, or the cultural resource indicators chosen may not truly reflect cultural values. While the current research did not measure cultural identity as a construct, the choice of variables is still likely to impact the outcomes. Ethnic-specific measures of cultural identity are recommended over general measures (Deaux, 2001) so it is encouraging that three cultural resource indicators, specific to Māori, were associated with health in this study. Knowledge of whakapapa, and whānau and nature being of high importance to wellbeing were high for all older Māori. These three are common in measures of cultural identity. The current studies at least reflect that association. It is argued in this thesis that consistency of these resource indicators across the clusters highlights their importance as cultural values for this group of older Māori as they seem to reference unity and connection to place. Connection to whānau, in particular, is one of the most commonly cited indicators of cultural connection (Houkamau, 2010), of wellness (Durie, 1985), and of resilience (Gifford, 2010) for Māori. Whānau connections are also an important aspect of fulfilling kaumātua roles (Edwards, 2010).

… through religion/spirituality

In both the HCAs religion and spirituality were associated with other positive resource indicators and with better health outcomes. The question that was asked about religion, in particular, appears to have been well understood in the study because 87% of people reported high religious affiliation. Non-Māori were more likely to report non- or low religious affiliation but for Māori, affiliation with a religion was consistently high. The concept of spirituality will have been more personally understood. However, as two thirds of participants said that spirituality was very or extremely important to their wellbeing, they appeared to have connected with the concept on some level. In addition to general usage as a correlate of good health, religion/spirituality have been proposed in definitions of successful ageing (Crowther, Parker, Achenbaum, Larimore, & Koenig, 2002). The studies reported here support that literature via the diversity in religion and spirituality responses across both HCA cluster grouping and association of those high in spirituality with better health. The studies also support the call to include religion/spirituality in studies of empirical resilience outcomes (Windle et al., 2008).

… but not through coping self-efficacy

It was surprising that CSE did not demonstrate a difference between the psychosocial clusters in the stage 1 analyses as coping style has been found to differ amongst older adults in other studies of old (Hildon et al., 2009) and oldest-old people (Cherry et al., 2009). CSE incorporates individual agency in the processing of challenging situations (Benight & Bandura, 2004). On the basis that CSE is related to coping style, with high CSE indicating a task-focused coping style as opposed to an emotion-focused style (Delahaij, van Dam, Gaillard, & Soeters, 2011), a rather low level of CSE would be expected amongst all participants. However, the scores for CSE in my work were predominantly high (two thirds of participants). Although the scale used was developed specifically for this study and therefore has no precedent, the coping situations were chosen for their salience to people of advanced age so should have demonstrated variation is efficacy. CSE (as opposed to coping style) is not commonly measured in advanced age populations so it is unclear how my scale compares to others. It appears that CSE, as opposed to coping style, may be somewhat more stable within the oldest-old age group than other resource indicators.

Diversity

The three stages of this work support diversity in advanced age, adding to the literature on heterogeneity amongst old age groups. The two HCAs each generated four distinct clusters of individuals that could be described according to significant differences in the resource indicators that characterised them and the influences of psychosocial and cultural resources on resilience. So, while combinations of factors described differences between people, consistency was found in relation to health outcomes and resilience. People over 85 years are more likely to be living alone or in residential care. Disability contributes to a need for informal and formal social support to remain independent but also increased GP and hospital visits when independence is compromised. People of advanced age view their independence as an important factor in their wellness. But success is about more than physical health, and independence includes keeping the brain active, being useful or caring for others and maintaining relationships that have meaning. People in advanced age perceive wellness within their lived experience of declining health and that means that multiple factors are likely to contribute to success. Māori perceive wellness within a unity model of health and that means the interaction between factors and community living are important.

Summary of meaning and experience in advanced age and cultural contexts

In summary, the variables assessed as resource indicators that might contribute to resilience uphold other work conducted in NZ. Qualitative work by Wiles et al found that a positive attitude, appreciating the good things in life, having purpose and keeping busy, interaction with others, support from family and friends, engagement in culture, and a feeling of connection to the local community were important to resilience (Wiles et al., 2012). The three stages of the current work support many of these psychosocial factors and, moreover, show that there needs to be a concentration on social, psychological, attitudinal and cultural resources to maximise outcomes when older people face physical health decline. Resilience may be demonstrated by the utilisation of resources to facilitate the process of adaptation.

Decline in health affects the ability to access normal activities, connect with other people and retain independence in care. For some, functional meaning is applied to physical health decline, such that normalising physical changes may become complicated by negative social outcomes; if it is not the physical health per se that contributes to lower mental health, it may be the compromises required to valued social functions that cause more distress. But, while social

relationships are integral to ageing well, it is not just relationships that have been fostered over time, but also functional social relationships, that serve health outcomes. This research suggests that people who have multiple social connections may be better protected from adversity. Loss of too many social opportunities could be potentially detrimental to health and may not be amenable to compensatory behaviours. Similarly, personal strengths such as a spiritual faith, a sense of personal mastery and a positive perception of ageing can offer additional protection to an older person, especially when opportunities to access external sources of support are limited. This is particularly important for those living alone or those who are no longer driving.

Cultural indicators were also important and support the cultural identity literature. Older Māori traditionally undertake important community functions and we also found high levels of informal role commitment for some older Māori. The contrary finding here was that a high level of informal roles did not contribute to good health. The imprecision of Western health measures for indigenous groups may have masked good health which may have been better stated otherwise. On the other hand, for some Māori, Western values may be as important to good health as Māori cultural resources. New Zealand society is interconnected; half the participants would have lived in urban environments where Western influences, such as attending mainstream health practices, may have been higher.

11.2 Strengths and limitations of the study

Strengths and limitations within each stage of the study have been discussed in Chapters 8, 9 and 10. The strongest case for the validity and usefulness of this research is that the sample is contextually unique. Resilience research has thus far been sparse in advanced aged populations and is even less common in indigenous populations. Measuring a population-based sample informs how the construct plays out in these specific contexts.

Nevertheless, the sample was purposefully aligned with the purposes of the research and although the methods were appropriate for people of advanced age there are two important methodological and sample-related limitations. First, a cluster analysis method is descriptive only. A cluster analysis groups people according to patterns they have in common. While a goal of this research was to link resources with resilience through the association of psychosocial profiles and an adversity/competence dyad, such a link is tested only through grouped resource indicators. New work would be needed to determine which individual resources contribute the most to a measure

of functional status relative to health impairment. As stated nevertheless, that resources are combined is key in itself as it helps to form a 'picture' of who might do well and who might be more vulnerable. That is, resources do not exist in isolation. The dialogue in this documents is based upon these associations. The methodological limitations of a clustering approach in servicing the assessment of Māori resilience have also been acknowledged.

Second, there may be a survivor bias such that the study participants, by virtue of their age, may all have had some resilience. Indeed, resilience has been found to contribute to survivorship (Surtees et al., 2006; Surtees et al., 2003; Walter-Ginzburg et al., 2005). The diversity found at all levels of analysis in this study does, however, suggest variation in physical function, positive health outcomes and in the mix of resource indicators. Although this may represent variation at the upper level of adaptation, a population-based sample attempted to maximise this variation and thus contribute to the developmental psychology literature.

11.3 Implications for older New Zealanders

By identifying factors that contribute to positive ageing, this study suggests some avenues to offset the negative implications of health decline. Because resilience appeared evident in the third stage of the study it might also be possible to increase resilience to health adversity. Implications of the research findings are discussed below under the headings of research, practice and policy.

Implications for research

Resilience is a multi-disciplinary, multi-level construct and assessment of variables in combination has been recommended (Luthar, 1993). This series of studies has validated taking a person-focused approach to measuring combinations of resources as well as the more common variable-focused approach. Low correlations between the resource indicators shows that they measured different things and yet they were intuitively connected in the clusters. For example, people who were socially connected also felt good about their ageing and people for whom spirituality was important had more informal and formal role commitments. Further research that is able to group people by common characteristics has value for understanding combinations and their impact on outcomes as well as complex outcomes such as individual resilience and greater applicability in the real world where identities converge and meld. Moreover, choosing predictor variables that are context-specific is most likely to elucidate valid interactions.

In an increasingly culturally interactive world, where ageing and health services are designed to benefit all, cultural background is particularly important, so research must consider cultural background in choosing appropriate variables. This poses a dilemma, however, in finding culturally reliable outcome instruments. In this study the problem was partly offset by bypassing formal resilience instruments in favour of an age-related adversity/competence dyad. However, the finding that strong cultural identification was not associated with health, contrary to other local work, suggests that close attention should be paid to outcome scales. As stated earlier, the SF scales have undergone assessment for their appropriateness for Māori. The 3MS and GDS-15 may benefit from similar attention in a NZ context, particularly when they are administered using the Māori language. The recall section of the 3MS, for instance, requires memory of words that are similar in English but are not similar in te reo. Bilingual interviewing is recommended for ethnically-sensitive research so not being able to do this questions the validity of the instrument for ethnic populations.

Implications for practice

Understanding that resilience is a process has implications for practice. That new experiences (or new value ascribed to resources) can be incorporated into the existing resource picture suggests that resilience can be enhanced at any age. Studies of people with low resilience suggest, in fact, that resilience might be more hidden than lost completely (Aléx & Lundman, 2011). In Chapter 3, the conceptualisation summarised feedback operations between resource accumulation and resilient outcomes. If positive resources can be enhanced by this feedback, then low resilience may be enhanced by the same process and existing positive aspects of life can be worked up to grow areas that are lacking. Understanding what resources and resource mixes contribute to resilience suggests a myriad of opportunities and interventions that can facilitate resilient outcomes. Many of these have been mentioned in the implications following the research discussions in Chapters 8 and 9.

Interventions and opportunities can be applied at both the community level and in residential care settings. Interventions need to recognise individual strengths so that selective, optimisation and compensatory approaches are facilitated. For example, following a fall, the ability to play floor bowls at a ‘Communicare’ social day may be as resilient an outcome as being able to continue shopping independently. Interventions in both residential care and communities need to be person-centred and aimed to where the individual desires to be. Goals tend to be more

conservative in advanced age (Ebner et al., 2006) and aspiring to regaining the previous level of health may not be possible.

Interventions also need to maximise social opportunities as multiple social connections were found to be important to wellness and to resilience. Social networks suffer with ageing but there is continual opportunity to engage socially with others through formal support agencies as well as through leisure pursuits and, despite falls, the need for care, and residential care living, resilience is possible. Social connections are modifiable also which means that there is potential to improve health if resources are improved. For instance, people will engage socially if opportunities are offered.

Maintaining a resilient profile in older age is a shared responsibility for older persons and their environment (Janssen, Van Regenmortel, & Abma, 2011). No-one exists independent of their environment. Rather, we are "*active participants, in constant interaction with our environment*." (deMuth, 2004, p. 67), and communities have some measure of responsibility in maximising the ageing experience (Sen, 1979). This could include encouraging attendance at senior citizen's centres and community groups or churches offering activities to older community members. There is some evidence that engagement in multiple roles makes a greater contribution to wellbeing than having a single role (Morrow-Howell, 2000).

Resilience is not a term used often when speaking of the Māori people. Rather, the qualities of strength are enmeshed within concepts such as Rangitiratanga (self-determination of the Māori collective). Māori concepts of health similarly do not separate the components - mental processes are connected to physical, family and spiritual processes. Te Whare Tapa Wha model of health sees these elements as essential and interconnected cornerstones to personal wellbeing. Thus, any notion of Māori psyche is supported by the body, the family and faith. Moreover, all Māori share a history of tribal interconnections and protection and European colonisation. Whānau is a key support system for older Māori ageing well particularly when they don't routinely utilise homecare support.

Implications for policy

With a greater number of older people, living to a greater age, but who continue to demonstrate diversity in health status, investment in health care must span multiple domains to achieve the best wellness and capability. Similarly, achieving the goals of NZ's Positive Ageing Strategy

means both acknowledging older people as individuals and respecting them as valuable members of society. As well as being care recipients, older people who remain in better health contribute in multiple ways to their community; the studies here found high levels of informal and formal role commitments. Older people may be working or volunteering in their community, providing care to spouses or looking after younger members of their family/whānau. In 2002/3 Māori men 85+ had higher volunteer profiles than women of their cohort or non-Māori men (Ministry of Health/Manatū Hauora, 2006). Māori women also undertook a high level of work. If the need to work demonstrates a financial need, this disparity is a concern (Cunningham et al., 2002). The Māori Health strategy still has a way to go to redress health disparity and improve wellness (Hirini et al., 1999). An awareness of who is most vulnerable could show communities where local and social support resources should be focused. But easy access to care is important. They also need to facilitate access to primary and secondary health care professionals and services and community support agencies. There are opportunities under the Māori health strategy to maximise whānau involvement in care at home.

11.4 Overall thesis conclusion

Today we live in a global society and that means interconnections economically and politically between governments, and socially and culturally between peoples living together. Acculturation and enculturation are common adversities as nations volley for one-upmanship. Racism still exists and a concomitant outcome, health disparity, is common. Such global adversities do not affect everyone, but everyone is affected by something. People of older age have lived through complex world negotiations and conflicts and suffer alongside the rest of society with major environmental challenges, health demands, losses and daily hassles. The importance of any of these to one person is a function of the life they have lived and the space they live in currently (economically, physiologically, psychologically, socially, culturally and spiritually). This thesis has been about adversity, resources and resilience. The study contained herein found evidence of resilience in Māori and non-Māori of advanced age and found that connections and active ageing contributed to wellness and resilience. Cultural resources interacted with psychosocial resources to contribute to wellness. Advanced age remains a time of development that sees the resilience process adjusted to accommodate need and values and perceptions altered to fit ageing bodies. People in advanced age don’t just stop learning but continue to see their lives as dynamic and are able to incorporate new resources into an existing arsenal of factors that protect them against adversity. But the individual is not the only actor in this arena. Positive outcomes will be

maximised with the help of other society members and this is particularly the case for older members of society and for those who espouse collective notions of wellness and responsibility.

Knowledge of the particularities of any context is key to informing resilient outcomes. Resilience is only one outcome, with non-optimal outcomes possible when resilience is compromised. But, for all people, resilience is possible. The extension from 1) understanding that resilience is possible for anyone and 2) perceiving the processional nature of the themes above (that is, adversity > resources > resilience) is that interventions can be applied to enhance a person's adaptive capability. For people in advanced age, the value gained is likely to arise from acceptance of them *at the age they are* and opportunities provided for them to contribute to the society they live in. This can only serve a society well, given the increasing lifespan and disability rates globally. The value gained for Māori in advanced age is likely to arise from acceptance of the fact that culture plays a strong part in their conduct but that, living in a multicultural society has influenced that cultural story in a way that is individual and complex. Despite higher physical and social loss in advanced age, resilience may constitute a process by which people can make the most of their longer lives and live them out with dignity.

APPENDIX A: ADULT RESILIENCE SCALES

Sense of Coherence Scale; SOCS: (Antonovsky, 1987b)

Developed to assess successful coping mechanisms, the SOCS is based on Antonovsky's salutogenic model of health (Antonovsky, 1990b).

Items: 29 items measuring one's sense of coherence, or a healthy way of seeing the world and include comprehensibility (11 items), manageability (10 items) and meaningfulness (eight items). The items are complex sentences, each one including four stimulus facets and a sense of coherence facet[11]. A briefer 13-item version is available.

Scoring: items are scored on a seven-point semantic differential scale and intended as a global measure. Some researcher have calculated sub-scale scores.

Outcomes: the SOCS has been used in a multitude of studies. Decrease in sense of coherence is correlated with an increase in negative life events (Lövheim et al., 2013)

Applicability: useful for interview or self-completion. Antonovsky argues for the scale's cultural acceptability (Antonovsky, 1993).

Dispositional Resilience Scale; DR: (Bartone et al., 1989)

Adapted from Kobasa's concept of hardiness (Kobasa, Maddi, & Kahn, 1982).

Items: 45 items measuring commitment (15 items), challenge (15 items) and control (15 items). There is also a shorter 30-item version.

Scoring: sub-scale scores or an overall score can be calculated

Outcomes: in the initial scale testing study, hardiness was shown to be protective against subsequent psychological and physical morbidity

Applicability: adults

Resilience Scale; RS: (Wagnild & Young, 1993).

Developed to define mechanisms of flexibility and the ability to restore balance in life (Wagnild & Young, 1990)

Items: 25 items measuring purpose (perceiving adversity as meaningful), perseverance (remaining engaged in life), equanimity (having life balance), self-reliance (believing in one's capabilities), and existential aloneness (understanding one's uniqueness). A 14-item version is available.

[11] Facet theory in scale development is described in (Guttman & Greenbaum, 1998)

Scoring: items scored on seven-point Likert scales. The items can be utilised independently as points for exploration or summed to obtain a total resilience score.
Outcomes: in the scale development, the total score was positively associated with wellbeing and inversely associated with depression and stress. The RS was found to moderate psychological distress from daily hassles but the effect lessened over time (Pinquart, 2009).
Applicability: middle aged and older adults. The RS has been translated into other languages.

Ego Resiliency Scale; ER-89: (J. Block & Kremen, 1996).
Developed to measure trait resilience. The Ego Resilience Scale has undergone numerous iterations that were "empirically driven" although the empirical evidence is not recorded (J. Block & Kremen, 1996).
Items: 14 items measuring nuances of intelligence
Scoring: each item answered on a four-point Likert scale
Outcomes: no outcomes found
Applicability: originally developed for use in non-psychiatric contexts but it has been used rarely

Baruth Protective Factors Inventory; BFPI: (Baruth & Caroll, 2002)
Developed from the available literature
Items: 16 items measuring an adaptable personality (four items), a supportive environment (four items), fewer stressors (four items) and compensating experiences (four items)
Scoring: five-point Likert gauge; higher scores indicate greater resilience. Total and sub scale scores can be calculated.
Outcomes: no outcomes found
Applicability: potentially useful to clinical educators aiming to enhance resilience

Connor–Davidson Resilience Scale; CD-RISC: (Connor & Davidson, 2003)
Developed from currently available assessment items measuring hardiness, goal-orientation, coping skills, patience and faith
Items: 25 items measuring personal competence, high standards and tenacity (eight items), trust in one's instincts, tolerance of negative affect and strengthening effects of stress (seven items), the positive acceptance of change and secure relationships (five items), control (three items) and spiritual influences (two items)
Scoring: each subscale scores a maximum of five points, higher scores indicate greater resilience

Outcomes: an increase in CD-RISC score was associated with greater improvement for PTSD patients undergoing pharmacological treatment and is associated with decreased mortality risk (Shen & Zeng, 2011)
Applicability: designed for use in general and clinical populations to quantify resilience and assist with the evaluation of clinical interventions

Resilience Scale for Adults; RSA: (Friborg et al., 2003).
Developed to assess both internal and external resources related to resilience
Items: 37 items measuring personal competence (10 items), social competence (seven items), family coherence (seven items), social support (eight items) and personal structure (five items)
Scoring: scores are summed; higher scores indicate greater resilience
Outcomes: tracked the occurrence of stressful events for students – higher scores related to fewer depressive and anxiety symptoms (Hjemdal Friborg Stiles Rosenvinge & Martinussen, 2006)
Applicability: for use in general populations and clinical and health psychology. Has been used in a cross-cultural sample (Turner & Lloyd, 1995).

Brief Resilience Coping Scale; BRCS: (Sinclair & Wallston, 2004)
Developed to create a more time-efficient measurement tool for adults than those available at the time. Based on Polk's situational pattern.
Items: items measure cognitive appraisal skills, problem-solving ability, and attributes that indicate a capacity for action
Scoring: high scores indicate an active problem solving coping pattern, seen as one of the most productive coping patterns (Jopp & Schmitt, 2010)
Outcomes: high scores were significantly and positively related to psychological and physical outcomes after a cognitive-behavioural intervention and were related to lower depression
Applicability: reported as useful for identifying individuals in need of interventions to enhance resilient coping skills

Psychological Resilience: (Windle et al., 2008)
Developed through secondary data analysis in response to the inconsistency of previous resilience conceptualisations and the common inter-correlation between them.
Items: 19 items measuring self-esteem, inter-personal control and personal competence
The scale creators note that the Psychological Resilience Scale does not compose a complete psychological resilience, missing both religion/spirituality and a perception of one's ageing.

Scoring: items are scored on Likert rating scales, collapsed into the factors, standardised and a final score is calculated. Higher scores indicate higher resilience.
Outcomes: resilience moderated the effect of ill health on wellbeing in people aged 60-90 (Windle et al., 2010).
Applicability: no clinical applications are suggested. Can assess change over time.

Hardy-Gill Resilience Scale: (Hardy, Concato, & Gill, 2004)
Developed to assess the response to stressful life events.
Items: six items assess the subjects' subjective acute experience of and long term recovery from the most stressful life event that the subject identified as having occurred in the past 5 years
Scoring: scores range from 0–18, higher scores indicating greater resilience.
Outcomes: independence in IADLs, good to excellent self-rated health, and few depressive symptoms were independently associated with high resilience (Mehta et al., 2008)
Applicability: adults

APPENDIX B: STUDY CONSENT FORM

Consent Form (MAIN STUDY) for Participants in the LILAC study

Project title:
Life and living in advanced age: a cohort study
Te Puāwaitanga O Nga Tapuwae Kia ora Tonu
The LILAC study

Researcher Name:
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	REQUEST FOR INTERPRETER		
Deaf	I wish to have a New Zealand sign language interpreter, if one available	Yes	No
English	I wish to have an interpreter.	Yes	No
Māori	E hiahia ana ahau ki tetahi kaiwhakamāori/kaiwhaka pakeha korero.	Ae	Kao
Samoan	Oute mana'o ia iai se fa'amatala upu.	Ioe	Leai
Tongan	Oku ou fiema'u ha fakatonulea.	Io	Ikai
Cook Island	Ka inangaro au i tetai tangata uri reo.	Ae	Kare
Niuean	Fia manako au ke fakaaoga e taha tagata fakahokohoko kupu.	E	Nakai

I have read and I understand the Information Sheet 5 October 2009 for older people invited to participate in the interview study about living to advanced age. I have had the opportunity to discuss this study with the researcher. I am satisfied with the answers I have been given.
I understand that my taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time and this will in no way affect my continuing or future health care.
I understand that I may withdraw any part of my information from the study up until <date>
I understand that my participation in this study is confidential and that no material that could identify me will be used in any reports on this study. I am aware that the exception to confidentiality will be if the interviewer has significant concerns about the safety of myself or others.
I understand that the interview or assessment will be stopped if it should appear harmful to me.

I understand the compensation provisions for this study.
I have had time to consider whether to take part.
I know whom to contact if I have any questions about the study.

I indicate my approval (or otherwise) for the following:

I wish to participate in the full interview and health assessment	Yes / No
The research team will inform my GP of any unusual findings	Yes / No
I wish to receive a copy of the results. I understand that there may be a significant delay between data collection and the publication of the study results.	Yes / No
Use of my photograph for promotion and talking about the study results – if my photograph is taken.	Yes / No

I give permission to view my medical records held by, the following agencies for study purposes now and in the future, that is up to 15 years after the study. I understand this will involve using my National Health Index, a number that identifies me within the health system.

My GP	Yes / No
The hospital and local District Health Board	Yes / No
The government-held routine health data collection organisations	Yes / No

Blood for analyses

I give permission to take a sample of my blood and conduct analyses.	Yes / No
I give permission to store a sample of my blood for future analyses appropriate for the study for up to 15 years.	Yes / No
If my blood is stored, I give permission for my blood to be analysed as part of other research projects outside of this study to improve the health of older people. Further use of my blood would be guided by a separate application to an ethics committee and I would not be able to be identified individually in any further studies	Yes / No
I wish to receive back any blood not used in analyses (other than that stored for later analyses).	Yes / No

Further studies

I give permission for my results to be combined with other studies to improve health of older people. Further studies would be guided by a separate application to an ethics committee and I would not be able to be identified individually in any further studies	Yes / No

Follow up

I give permission to be contacted again to continue with the Lilac study	Yes / No

I _____ hereby consent to participate in the LILAC study.

Signature ……..……

Date: ……..……..……..……..……

Project explained by ……..……..……

Project role ……..……..……..……

Signature ……..……..……

Signature of witness……..……..……

Name of witness……..……..……

Date ……..……..……

Note: A copy of the consent form is to be retained by participant.

APPENDIX C: LILACS NZ ASSESSMENTS AND QUESTIONS

Socio-demographic characteristics

Standard demographic enquiry (age, ethnic group and current marital status) was expanded to include the length of time participants had been widowed/separated/divorced and the duration of other important relationships. An adapted version of the 2006 NZ Census questions for the highest education level achieved was used (Statistics New Zealand). Past and current paid and voluntary work was queried. Standard of living was asked by using part of the Health Work and Retirement Study/New Zealand Longitudinal Study of Ageing (NZLSA) questionnaire (Stevenson, 2014). Food security questions were included from the NZ National Nutrition Survey of 1997 (Quigley & Watts, 1997) and childhood food deprivation was recorded. Family make up and survivorship was recorded after specifying "Who raised you?" For Māori, whangai is when a child is given to a couple who have no children to raise, similar to an open adoption. The age of biological parents at death was recorded if known and the number of brothers, sisters, sons and daughters ever and currently alive was asked including age at death or current age. Exact questions were adapted from the Newcastle 85+ study protocols (Collerton et al., 2007).

General health and health related quality of life

General health status and health related quality of life was assessed with the Medical Outcomes Study Short Form Health Survey (SF 12) (J. Brazier et al., 1992; J. E. Brazier & Roberts, 2004; Franks, Lubetkin, Gold, Tancredi, & Jia, 2004). Self-rated health compared with others of the same age was also asked. Two questions from the 2006 NZ Census asked about disability arising from a health condition (Statistics New Zealand). Two questions from the NZLSA questionnaire measured global life satisfaction and quality of life (Stevenson, 2014).

Past significant health and psychological events were recorded with the following two questions "Have you ever had a major injury or health event that has affected you in the long term?" and "Have you ever had a major psychological stress event that has affected you in the long term?" Answers were recorded verbatim for later coding. Cardiovascular disease (CVD) was recorded by self-report from a list of standard diagnoses and family history of CVD was coded using items from the Cardiovascular Health Study (Linda. P. Fried et al., 1991). Items from the Manchester

Respiratory Activities of Daily Living Scale (Yohannes, Roomi, Winn, & Connolly, 2000) were added to the measure of functional status (below) to assess disability related to respiratory disease. The Borg Rating of Perceived Exertion Scale (Borg, 1970, 1985) was used to assess breathlessness at time of rest and after exertion.

Psychological and mental health

Cognition was assessed using the modified Mini-Mental State Examination (3MS) (Teng & Chui, 1987) and the clock drawing test (Nishiwaki et al., 2004), with depressive symptoms assessed using the Geriatric Depression Scale (Sheikh & Yeasavage, 1986). Mastery was assessed using the Pearlin and Schooler Sense of Mastery Scale (Pearlin & Schooler, 1978). Five original items were prepared for the study to assess perceived coping ability. Participants rated the question "Thinking about .... how well do you cope?" in regard to a) life overall, b) times of loss, c) financial hardship, d) on-going health problems and e) family troubles. Responses on a five-point Likert scale ranged from 'not at all' to 'extremely' well.

Functional status and physical function

Function was measured by direct observation; by timed walking speed, leg strength and balance using the Short Physical Performance Battery (Guralnik et al., 1995). The Nottingham Extended Activities of Daily Living (NEADL) Scale (Essink-Bot et al., 1997) was used to assess self-reported functional status. Additional activities of daily living items, added in the same format as the NEADL, included grooming, toileting, transferring in and out of bed, showering/bathing and dressing. Two frailty measures were able to be constructed from interview items; the Fried frailty scale (Linda P. Fried et al., 2001) and the Edmonton Frail Scale (Rolfson, Majumdar, Tsuyuki, Tahir, & Rockwood, 2006).

Other specific health related issues

All medication (prescribed, over the counter, supplements and vitamins) were viewed by the trained interviewers and recorded by generic name as seen on the bottles and packets. Non-adherence was assessed. Trouble with sleep quality was assessed with a positive response at least three nights a week such that it "interferes with your activities the following day" (4th Survey for Women over 75). Participants were asked whether sleep problems were present when they were younger. They were asked if they had fallen or sustained fractures over the last 12 months and

one question assessed confidence in completing daily activities without falling. The Study of Osteoporotic Fractures osteoporosis screening tool was used to establish fracture risk (Fractures).

Urinary and faecal continence were each assessed with a question about losing control of urine/bowels. One question sought to determine how much of a problem urinary incontinence was.-Pain was assessed using a numerical pain rating scale ranging from 0-no pain to 10-worst possible pain, and assessing current and typical pain and pain at its best and worst. Pain drawings are accepted assessment tools for chronic (Margolis, Tait, & Krause, 1986) and acute (Gagliese, Weizblit, Ellis, & Chan, 2005) pain and so participants were also asked to locate the site(s) of identified pain on a pain diagram. Disability caused by poor hearing and vision was assessed using modified questions from the Cognitive Function and Ageing Studies (The Cognitive Function and Ageing Studies, 1989) i.e. "How much does your hearing [vision] interfere with normal day-to-day functioning?" Hearing aid use and self-reported causes of visual impairment were recorded.

Health behaviours including nutrition

Smoking status was asked in a series of questions, ever smoked, when started, when stopped, how many cigarettes on average, to enable a pack year history to be calculated. The first two questions of the Alcohol Use Disorders Identification Test (AUDIT) were used to establish alcohol use (AUDIT: The Alcohol Use Disorders Identification Test). Nutrition risk was determined using the 14-item validated questionnaire SCREEN II (Seniors in the Community: Risk Evaluation for Eating and Nutrition, Version II). (H. Keller, Goy, & Kane, 2005; H. Keller, Hedley, Wong, & Brownlee, 2000). Whether participants had dentures or their own teeth and a reason for difficulties chewing, if any, supplemented the nutrition risk items. Physical activity was assessed with the Physical Activity Scale for the Elderly (PASE) validated in community-dwelling older adults (Washburn, McAuley, Katula, Mihalko, & Boileau, 1999).

Health services used

An inventory of primary and secondary health care providers was compiled for the feasibility project and modified in the main study; respondents were asked to recall the frequency of use over the last year.

Culture and cultural practices

Ethnic group was ascertained by self-identification, including languages spoken, hapū, iwi and rohe (Statistics New Zealand). Questions about Māori ancestry included whether parents and grandparents were born Māori or lived as Māori. Questions used in the NZLSA Study and adapted from the Te Hoa Nuku Roa (Stevenson, 2004) scale of cultural identity were used to assess level of contact with Māori culture, including marae visits and contact with Māori people.

Other questions about cultural activities had been generated from discussion groups with older Māori and included: roles within the whānau, community and Māori society and satisfaction with those roles; the importance of hapū and iwi to wellbeing and the understanding of tikanga; special foods that were important to practising culture; the importance of nature and the outdoors; and whether participants were living in the same area as their hapū. The use of te reo Māori or other non-English language was recorded and questions ensued to find out where these languages were spoken and whether and how often the participant sought out opportunities to listen to the language. The importance of language/culture and values to wellbeing was asked with a five point categorical response scale ranging from ‘not at all’ to ‘extremely’ important. Religious affiliation was recorded and the importance of faith to wellbeing via a similar scale (Statistics New Zealand).

Social networks and support exchanges

The MacArthur Studies of Successful Ageing (Unger, McAvay, Bruce, Berkman, & Seeman, 1999) questions were used as a base to measure availability of emotional and practical support. Wenger’s Network Assessment Instrument was used to establish the type of support network participants had (Stephens & Noone, 2008; Wenger, 1997b). Participants’ satisfaction with the contact they had with family and friends was asked by adapting questions from the Duke Social Support Index (Koenig et al., 1993). The frequency of receiving meal services, home help, help for personal care and other services as used on a weekly basis was questioned and the funding source recorded.

Activities and transport

A question was adapted from the Melbourne Longitudinal Studies on Healthy Ageing Program (MELSHA) (Healthy Ageing Research Unit Melbourne Longitudinal Studies on Healthy Ageing

Program (MELSHA)), to assess the frequency of engaging in 'important' activities. Change in activity over the last five years was assessed, particularly which activities had been dropped (Haggblom-Kronlof, Hultberg, Eriksson, & Sonn, 2007). Nine activities from the Enhancing Wellbeing in an Ageing Society (EWAS) Study (Koopman-Boyden & Waldegrave, 2009) were used to record activities and the frequency of participation in them over the last four weeks. An adaptation of the Modified NPS Interest Checklist (I. Nilsson & Fisher, 2006) provided an additional eight clusters of activities and used the same response format. The perception of spending time was asked with two questions: "Thinking of how you spend your time would you say "most days I. . ." with responses being 'don't have enough to do', 'just keep busy enough', and 'always have more than enough to do'. Spending time alone was asked about with four categories to choose from, ranging from 'always alone' to 'never alone'. Feelings of loneliness were asked about with a similar spread of responses; 'always feel lonely' to 'never feel lonely'. Questions about driving, being driven, use of public transport and satisfaction with getting around examined transport for older people.

Housing and environment

Questions about housing, neighbourhood and the environment were developed from interviews with older people in the control arm of the DeLLITE Trial (Hayman et al., 2010) and analysed with respect to place and space (Wiles et al., 2009). Connection to current place, neighbourhood and community was asked with a five-category Likert scale ranging from 'not at all' to 'extremely' connected. Pets were counted. Housing type, ownership, size and age were recorded with structured questions adapted from the English Longitudinal Study of Ageing (Institute for Fiscal Studies, 2002). Satisfaction with the home and its warmth in winter was assessed with a five level response ranging from 'very satisfied' to 'very dissatisfied'. A Brannan Mini Twin Dial meter was used at home interviews to record the ambient temperature and humidity of the room the participant spent most time in. Problems moving around inside the house were asked about via a menu of responses. Questions about renovations included the age of completed renovations and future desired renovations, including reasons for not completing these to date.

The likelihood and enthusiasm of participants for moving in the future were asked about with a five-category response set ranging from 'not at all' to 'extremely' likely/enthusiastic. Why participants chose the home they were in was asked and a menu of reasons offered. We asked whether participants 'liked' their home and their neighbourhood and then specifically what they liked most and least about the neighbourhood. Reasons for choosing the neighbourhood was also

asked about with a menu of choices. Difficulty getting to the shops and amenities was asked about with a set menu of responses. The importance of nature and the outdoors for a) wellbeing, b) recreation and c) children/grandchildren was asked.

Politics and respect

Participants were asked about their views on NZ Government policies for health services, social services and transport options for older people; the economy and race relations. Responses ranged on a five point scale from ‘very happy’ to ‘very unhappy’. Questions from the 2002/2003 New Zealand Health Survey (R. Harris et al., 2006b) about the respect participants felt others gave them were asked to elicit older peoples’ views of their place in society and autonomy in making decisions. Finally general perspectives on growing older were asked and qualitative responses recorded verbatim.

APPENDIX D: QUESTIONS USED IN THE STUDY

Questions used in the cluster analyses

Social network (PANT)

AF20. How far away in distance does your nearest: *(record one for each line)*

	Same house / within 1 ½ km	1 ½ – 8 km	8 – 25 ½ km	25 ½ – 80 km	80+ km/ overseas	Not applicable or none living	
a. Child live?	1	2	3	4	5	6	
b. Brother or sister live?	1	2	3	4	5	6	
c. Relative live? (not including your spouse/child/siblings)	1	2	3	4	5	6	

JA7. How often do you speak or do something with: (tick one on each line)

	Daily	2-3 times a week	At least weekly	At least monthly	Less often	Never/ I have none	
a. Any of your children or other relatives?	1	2	3	4	5	6	
b. Any friends in your community/neighbourhood?	1	2	3	4	5	6	
c. Any of your neighbours?	1	2	3	4	5	6	

JA11. During the last 4 weeks how often have you …..?

	Every day	Every week	Once	Not at all	*If less than monthly* Occasionally	
f) Attended meetings of any community /neighbourhood or social groups, such as old people's clubs, lectures or anything like that?	1	2	3	4	5	
g) Attended any religious meetings?	1	2	3	4	5	

Social support – formal and informal

GC1. When you need some extra help, can you count on anyone to help with daily tasks like grocery shopping, cooking, house cleaning, telephoning, give you a ride?

No	Yes	I don't need help	
0	1	2	

GC4. Can you count on anyone to provide you with emotional support? (talking over problems or helping you make a difficult decision)

No	Yes	I don't need help	
0	1	2	

GC10. Do you receive any regular support service (such as home help)? 0 = No 1 = Yes

GC8. How satisfied are you with the kinds of relationships you have with your family?

Extremely dissatisfied	Very dissatisfied	Somewhat dissatisfied	Satisfied most of the time	Satisfied all of the time	
1	2	3	4	5	

GC9. How satisfied are you with the kinds of relationships you have with your friends?

Extremely dissatisfied	Very dissatisfied	Somewhat dissatisfied	Satisfied most of the time	Satisfied all of the time	
1	2	3	4	5	

Social participation

JA11. During the last 4 weeks how often have you …..?

	Every day	Every week	Once	Not at all	*If less than monthly* Occasionally	
b) Gone to the shops	1	2	3	4	5	
c) Visited or been visited by family and friends	1	2	3	4	5	
f) Attended meetings of any community /neighbourhood or social groups, such as old people's clubs, lectures or anything like that?	1	2	3	4	5	
g) Attended any religious meetings?	1	2	3	4	5	
h) Been a spectator at a sports event	1	2	3	4	5	
i) Gone to an entertainment or arts event (such as concert, theatre or cinema)	1	2	3	4	5	
j) Gone to a restaurant, café, pub or bar	1	2	3	4	5	
k) Gone to a TAB (betting shop) or casino	1	2	3	4	5	
l) Attended a family event	1	2	3	4	5	
m) Attended a social occasion (such as a barbeque or hangi)	1	2	3	4	5	

Purpose and engagement in life

AG7. Are you in paid work now? 0 = No 1 = Yes ☐

AG9. Do you do any unpaid/voluntary work outside the household now? 0 = No 1 = Yes ☐

JA11. During the last 4 weeks how often have you …..?

	Every day	Every week	Once	Not at all	*If less than monthly* Occasionally	
a) Spent time on a hobby (including handcrafts)	1	2	3	4	5	☐

JA12. Thinking of how you spend your time, would you say, "Most days I……"

Don't have enough to do	Just keep busy enough	Always have more than enough to do	
1	2	3	☐

JC1. Do you have a specific role in your family/whānau/hapū? 0 = No 1 = Yes ☐

JC2. Do you have a specific role in your local community/ neighbourhood? 0 = No 1 = Yes ☐

MA2. On the whole has growing older been a positive or negative experience <u>for you</u>?

Very positive	Mainly positive	Neither positive nor negative	Mainly negative	Very negative	
1	2	3	4	5	☐

Stressors

FD1. Have you ever had a major injury or health event that has affected you in the long term?
0 = No 1 = Yes ☐

FD2. Have you ever had a major psychological stress event that has affected you in the long term?
0 = No 1 = Yes ☐

BB2. Do you have any DISABILITY or HANDICAP that is long-term (lasting six months or more)?
0 = No 1 = Yes ☐

AF24. Have you had any relationships prior to the current relationship you have just described?

0 = No 1 = Yes ☐

Year Beginning	Year Ended	Total Number of Years	Result (Separated, Widowed, Divorced)

KA8. Thinking of your money situation before you left home, that is growing up, including your adolescence, would you say:

We couldn't make ends meet	We had just enough to get along on	We were comfortable	
1	2	3	☐

KB9. Generally, how would you rate your material standard of living? Would you say that it is:

High	Fairly high	Medium	Fairly low	Low	
1	2	3	4	5	☐

Coping

	Not at all	Somewhat	Moderately	Very	Extremely	
FB1. In general, thinking about life overall, how well do you cope?	1	2	3	4	5	☐
FB2. Thinking about times of loss, how well do you cope?	1	2	3	4	5	☐
FB3. Thinking about times of financial hardship, how well do you cope?	1	2	3	4	5	☐
FB4. Thinking about ongoing health problems, how well do you cope?	1	2	3	4	5	☐
FB5. Thinking about times of trouble for your family and friends, how well do you cope?	1	2	3	4	5	☐

Mastery

MA1. How much do you agree or disagree with the statement *There is a lot you can do to keep healthy in old age?*

Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Don't know	
1	2	3	4	5	6	☐

We are interested in how much control you feel you have over your circumstances. Please answer the following questions by saying how much you agree with each statement. Do you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	
FC1. I have little control over the things that happen to me	1	2	3	4	5	☐
FC2. There is really no way I can solve some of the problems that I have	1	2	3	4	5	☐
FC3. There is little I can do to change many of the important things in my life	1	2	3	4	5	☐
FC4. I often feel helpless in dealing with the problems in life	1	2	3	4	5	☐
FC5. Sometimes I feel that I am being 'pushed around' in life	1	2	3	4	5	☐
FC6. What happens to me in the future mostly depends on me	1	2	3	4	5	☐
FC7. I can do just about anything I really set my mind to do	1	2	3	4	5	☐

Culture and faith

AB3. How much do you disagree or agree with this statement: *I have a strong sense of belonging to my own ethnic group(s)*

Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
0	1	2	3	4	☐

AD1. What is your religion/denomination? (Select up to three)

a. ☐
b. ☐
c. ☐

0 = No religion
1= Anglican
2 = Catholic
3 = Presbyterian
4 = Methodist
5 = Ratana
6 = Ringatu
7 = Destiny
8 = Paimarire
9 = Mormon/Latter Day Saints
21= Hindu
22 = Muslim
23 = Jewish
24 = Other religion/denomination……
30 = Object to answering this question

AD2. How important is faith to your wellbeing?

Not at all	A little	Moderately	Very	Extremely	
0	1	2	3	4	☐

Cultural questions used in the Māori cluster analysis

Whakapapa

AB8. Please tell me the name(s) of your hapū, your iwi (tribe or tribes), and your rohe (iwi area)

HAPŪ	IWI	ROHE
Don't know hapū ☐	Don't know iwi ☐	Don't know rohe ☐

Tikanga

	Not at all	A little	Moderately	Very	Extremely	
AB11. How well do you understand your tikanga?	1	2	3	4	5	☐

Marae visits

AB5. Have you ever been to a Marae? 0 = No 1 = Yes ☐

AB5a. If yes how often over the last 12 months

Once	A few times	Several times	More than once a month	
1	2	3	4	☐

Whānau

AF21. How important is your whānau/family to your wellbeing?

Not at all	A little	Moderately	Very	Extremely	
1	2	3	4	5	☐

Whenua

ID1. In what ways are nature and the outdoors important to you? How important is it …

	Not at all	Somewhat	Moderately	Very	Extremely	
a For your wellbeing	1	2	3	4	5	☐

Whānaungatanga

JC4. Do you have a specific role in other Māori organisations in wider society?

0 = No 1 = Yes ☐

Strength of te reo Māori

AC1. In which language(s) could you have a conversation about a lot of everyday things?

(read all options and mark answers with a 0 = No 1 = Yes)

1 = Māori 2 = English
3 = Samoan 4 = New Zealand Sign Language
5 = Cook Island Māori 6 = Niue
7 = Tokelau 8 = Other Pacific Language
9 = Other language(s), for example GUJARATI, CANTONESE, GREEK ☐
……..…….

AC2: Which of these languages is your mother tongue? ☐

APPENDIX E: DATA DECISIONS

This section presents method data that is not included in the limited space in the chapters based on manuscripts. Including data pertaining to all variables together as it is done here, is deemed a pragmatic way to outline data manipulation methods.

Standard codes

If not otherwise accounted for, three standard coding options were available for all questions; 777 = don't know, 888 = refuse to answer and 999 = not applicable.

- 777 values were considered to be missing data and were imputed. That is unless a code of don't know was applicable in recoding e.g. for the Māori variable 'Whakapapa'
- 888 values were examined individually. Where an individual had refused only one question or question type (e.g. AG7 and AG9 which asked about undertaking paid and volunteer work were treated as equivalent), the answer was imputed using the gender and ethnic group derived mode scores as below. No individual refused to answer more than one question.
- 999 values were examined individually. Where the value was used inappropriately, the data was considered to be missing and values were imputed. Where a coding option was truly not applicable, e.g. for question GC8, where there were no family or friends so the satisfaction with relationships could not be answered, a new code was created. A code '6 = has no family' was added to the GC8 variable (satisfaction with relationships with family) and a code '6 = has no friends' was added to the GC9 variable (satisfaction with relationships with friends). Note that adding these choices is consistent with the intention of the social support category to capture the extent of social support.

Missing data

Psychosocial resource indicators

Missing values analyses listed every score for each individual for every resilience variable. Missing values were coded with a dot. The SPSS lists were imported into an excel spread sheet,

visually scanned and missing values added up. Collation of the variables by resilience domain also assisted in the decision to consider removal of variables or removal of respondents. All variables, bar one, had fewer than 38 missing values (5.6% of 671 participants). This gives confidence that all variables could potentially be included, following appropriate decisions about imputation of missing values, which are mentioned below.

Seventy seven individuals were missing answers for the variable FB3 (one of five items in the coping scale). Of these, 24 individuals had no answers for the scale at all, two individuals were missing two additional values, eight were missing one additional value and 43 individuals were missing only FB3. A further 15 individuals were missing one value from the scale that was not FB3. For the mastery scale with seven items, 11 individuals were missing only one value, six were missing two values, one was missing three values, and 29 individuals were missing all seven values.

Missing values were also calculated overall for each participant and were organised by variable and by resilience domain (Table E1). Twenty nine people had more than 12 missing values out of a total of 50 independent variables for the full participant analyses. Of these, three individuals had a score for both coping and mastery but were missing too many other variables. One further individual had 9 variables missing but refused to answer the mastery scale so no values could be imputed. These 30 individuals were removed from the dataset (Tables E2 and E3).

Table E1: Number of Participants with at Least One Missing Value According to Resilience Domain

	No. of resilience domains with missing data							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**Any**
Participants with missing values, n	*215*	*57*	*12*	*8*	*8*	*5*	*10*	*315*

Table E2: Gender and Ethnic Group of Individuals Removed from Psychosocial Cluster Analyses

	Māori		**Non-Māori**		**Site**					
	M	F	M	F	1	2	3	4	5	6
Participants removed, n (%)	*8*	*9*	*5*	*8*	*0*	*11/72 (15%)*	*7/68 (10%)*	*0*	*0*	*12/419 (3%)*

Table E3: Number of Participants Removed from Psychosocial Cluster Analyses According to Resilience Domain

	No. of resilience domains with missing data							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
Participants removed, n	*0*	*0*	*3*	*4*	*8*	*5*	*10*	*30*

Socio-cultural resource indicators

Five people were missing more than 25% of Māori cultural resource items. None of these people spoke Māori or considered it to be their mother tongue. They were removed from the analyses.

Other dependent and independent variables

Less than 10% of data was missing for each of the dependent variables of GDS-15, SF-12 PCS, SF-12 MCS 3MS, SPPB and NEADL and so imputation was not necessary; GDS-15 was missing <1% (4/637), SF12-PCS was missing 2.5% (16/625), SF12-MCS was missing 2.5% (16/625), 3MS was missing 1.1% (7/634), SPPB was missing 6.8% (41/600), and NEADL was missing <1% (1/640). The number of medical conditions was missing 0 values. Total scores were calculated for all participants.

Imputation was not conducted for descriptive variables.

Imputation

Psychosocial resource indicators

A. *Mean scores by gender and ethnic group for continuous variables.* Significant differences between the means of the Mastery and Coping variables were explored using two-way ANOVA. For both variables, the differences between gender means were non-significant (coping: p = 0.759; mastery p = 0.586) but the differences between ethnic group means were significant (coping: p = .001; mastery p = 0.000). One way ANOVAs showed that for both variables the difference lay in the interaction between gender and ethnic group and was not a factor for ethnic group alone. Having no difference in means scores for either Māori/non-Māori or male/female meant that the overall means for the sub-groups could be substituted for missing item totals. Although two individuals were missing all

values for both scales, they were retained in the dataset because they were missing less than 25% of the variables overall. For these individuals, mastery and coping scale scores were imputed using the gender and ethnic group specific mastery and coping means.

Intra-individual means should be used to replace missing values in scale variables. For example, if a scale has five items with coding options ranging 1-5, and a respondent answered 2, 2, 1, <missing>, 3; then the mean of the four items that were answered is 2. The missing value should be coded with this mean, even if a mean overall for all respondents with completed scale scores is something different. An intra-individual mean score was calculated for all respondents who had at least one available value within the coping and mastery scales. Their intra-individual mean was substituted for all their missing values within that scale.

B. *Mode scores by gender and ethnic group for nominal/ordinal variables.* The difference between scores for males and females and Māori and non-Māori was investigated using a series of chi square analyses. Where significant differences were found, mode values for specific groups were obtained using the SPSS frequency procedure and these were used for imputation.

Socio-cultural resource indicators

All variables were nominal or ordinal so mode values were obtained for imputation. The difference between scores for males and females was investigated using a series of chi square analyses. Where significant differences were found, mode values for each gender were obtained using the SPSS frequency procedure and these were used for imputation; where there was no difference, the overall mode was imputed. For the questions about the importance of hapū and iwi to wellbeing and understanding of tikanga, mode scores for those participants who could not name their hapū, iwi or rohe were imputed for people who could not name their hapū, iwi or rohe.

Other dependent and independent variables

Because less than 10% of data per variable was missing, original data was used at an analysis level for all survival and outcome analyses. However, imputation was conducted to validate some analyses. This was done as follows: as gender differed across the clusters, missing values were imputed using gender-based cluster means (for continuous outcome variables) or medians (for

categorical variables). Means and medians were not sought at a gender x ethnic group level because the number of participants in smaller clusters was too few. Following this, the SF-12 PCS and SF-12 MCS were left as continuous measures and gender-based cluster mean values to two decimal places were imputed. Gender-based cluster mean values for other continuous variables were rounded up (≥ 0.5) or down (<0.5) before imputation. Cluster medians did not vary by gender.

Recoding

Maximum and minimum values, ranges and histograms were observed for each variable to elicit the spread of answers and visualise any low scored codes. Scanning the frequency tables and histograms informed decisions about re-coding independent variables. Unless it was necessary, the original coding was not changed.

Table E4 shows the final variable list included in the cluster analyses and Table E7 shows the final outcome and descriptive variables. For the psychosocial cluster analyses, 14 of 50 individual items were used as single resource indicators and the other 36 items were re-coded to create seven combination resource indicators. For the Māori cluster analyses, four items remained single resource indicators and the other seven items were re-coded to create three combination resource indicators. Where variables are identified in Table E4 as combined, the re-coding treatment is described in Table E5.

Table E4: Re-coding Decisions for Individual Variables

Resilience domain	**Variable**	**Original coding[@]**	**Re-code**	**Variable**
Culture and faith	Sense of belonging	Strongly disagree (0) Disagree (1) Neutral (2) Agree (3) Strongly agree (4)	*No change*	1
	Religion	No religion (0) Named religious denomination (any) Object to answering (30)	No religion (0) Any named religion (1) Object to answering (2)	1
	Importance of faith to wellbeing	Not at all (0) A little (1) Moderately (2) Very (3) Extremely (4)	*No change*	1
Social network	Distance to nearest child	Same house/within 1 ½ km (1) 1 ½ – 8 km (2) 8 – 25 ½ km (3) 25 ½ – 80 km (4) 80+ km or overseas (5) Not applicable/none living (6)	*No change*	1
	Distance to nearest brother or sister			
	Distance to nearest other relative			
	Speak with children or relatives	Daily (1) 2-3 times a week (2) At least weekly (3) At least monthly (4) Less often (5) Never/ have none (6)	*No change*	
	Speak with friends			
	Speak with neighbours			
	Attends social groups	Done during the last 4 weeks: Every day (1) Every week (2) Once (3) Not at all (4) Less than monthly (5)	*No change*	
	Attends religious meetings			
Social support – formal and informal	Has help with daily tasks	No (0) Yes (1) Don't need help (2)	*No change*	1
	Has emotional support	No (0) Yes (1) Don't need help (2)	*No change*	1
	Receives formal social support	No (0) Yes (1)	*No change*	1
	Satisfaction with family relationships	Extremely dissatisfied (1) Very dissatisfied (2) Somewhat dissatisfied (3) Satisfied most of the time (4) Satisfied all of the time (5)	Has no family (0) Extremely dissatisfied (1) Very dissatisfied (2) Somewhat dissatisfied (3) Satisfied most of the time (4) Satisfied all of the time (5)	1
	Satisfaction with friend relationships	Extremely dissatisfied (1) Very dissatisfied (2) Somewhat dissatisfied (3) Satisfied most of the time (4)	Has no friends (0) Extremely dissatisfied (1) Very dissatisfied (2) Somewhat dissatisfied (3)	

Resilience domain	Variable	Original coding[@]	Re-code	Variable
		Satisfied all of the time (5)	Satisfied most of the time (4) Satisfied all of the time (5)	
Social participation	Goes to the shops	Done during the last 4 weeks: Every day (1) Every week (2) Once (3) Not at all (4) Less than monthly (5)	*No change*	1
	Visits family and friends			
	Attends social groups *			
	Attends religious meetings *			
	Watches sports in public			
	Goes to arts events			
	Goes to restaurants			
	Goes to TAB/casino			
	Attends family events			
	Attends social occasions			
Purpose and engagement in life	Does paid work	No (0) Yes (1)	*No change*	1
	Does unpaid/volunteer work			
	Does a hobby	Done during the last 4 weeks: Every day (1) Every week (2) Once (3) Not at all (4) Less than monthly (5)	*No change*	1
	Perception of enough to do	Don't have enough to do (1) Just keep busy enough (2) Always have more than enough to do (3)	*No change*	1
	Has a role in family	No (0) Yes (1)	*No change*	1
	Has a role in community			
	Experience of growing older	Very positive (1) Mainly positive (2) Neither positive nor negative (3) Mainly negative (4) Very negative (5)	*No change*	1
Stressors	Major injury/health event ever	No (0) Yes (1)	*No change*	1
	Major psychological event ever			
	Long-term disability			
	Past relationship loss (bereavement/ break-up)	Result – string answer (using information from variables: Year beginning, Year ended, Total number of years)	<u>No relationship loss</u> (0): result missing (where no further information), 777 (where no further information), 888, parents separated <u>Relationship loss</u> (1): result missing (where dates are provided), 777 (where dates are provided), widowed, divorced, died, separated, relationship split, ended, engagement ended, he left Te Kuiti	

Resilience domain	Variable	Original coding[@]	Re-code	Variable
	Financial poverty in childhood	We couldn't make ends meet (1) We had just enough to get along on (2) We were comfortable (3)	*No change*	1
	Material standard of living	High (1) Fairly high (2) Medium (3) Fairly low (4) Low (5)	*No change*	1
Coping	Perception of coping with life overall	Not at all (1) Somewhat (2) Moderately (3) Very (4) Extremely (5)	*No change*	1
	Perception of coping with times of loss			
	Perception of coping with financial hardship			
	Perception of coping with health problems			
	Perception of coping with trouble: family/friends			
Mastery	Control over things	Strongly agree (1) Agree (2) Neither agree nor disagree (3) Disagree (4) Strongly disagree (5) (FC6, FC7: reverse scored)	*No change*	1
	Solve problems			
	Change important things			
	Helpless in dealing with problems			
	Being pushed around			
	Future depends on me			
	Can do just about anything			
	Perception of agency to keep healthy	Strongly agree (1) Agree (2) Unsure (3) Disagree (4) Strongly disagree (5) Don't know (6)	*No change*	1
Māori culture (Māori only)	Knows name of hapū	Don't know … (1) Otherwise … is named	Doesn't know … (0) Knows … (1)	1
	Knows name of iwi			
	Knows name of rohe			
	Understanding of tikanga	Not at all (1) A little (2) Moderately (3) Very (4) Extremely (5)	*No change*	1
	Ever been to a Marae	No (0) Yes (1)	*No change*	1
	Frequency of visit to a Marae in the last 12m	Never (0) Once (1) A few times (2) Several times (3) More than once a month (4)	*No change*	

Resilience domain	Variable	Original coding[@]	Re-code	Variable
	Importance of whānau to wellbeing	Not at all (1) A little (2) Moderately (3) Very (4) Extremely (5)	*No change*	1
	Importance of nature to wellbeing	Not at all (1) A little (2) Moderately (3) Very (4) Extremely (5)	*No change*	1
	Has a role in a Māori organisation	No (0) Yes (1)	*No change*	1
	Speaks te reo	(Multiple answers allowed): Māori (1) English (2) Samoan (3) NZ Sign Language (4) Cook Island Māori (5) Niue (6) Tokelau (7) Other Pacific Language (8) Other language(s) e.g. ……..(9)	<u>Speaks about everyday things in te reo</u> Māori only or Māori + any other (1) All other answers (0)	1
	Māori is mother tongue		<u>Mother tongue</u> Yes (Māori or Cook Island Māori; 1) No (All other answers; 0)	

[@] All variables have coding options 777 (don't know), 888 (refused to answer), 999 (not applicable)

Table E5: Re-coding of Combination and Scale Psychosocial Resource Indicators

Resilience domain	**Description**	**Combined /Scale variables**	**Treatment**	**Computed variable**
Social network	Practitioner Assessment of Network Type (PANT)	Distance to nearest child Distance to nearest brother or sister Distance to nearest other relative Speak with children or relatives Speak with friends Speak with neighbours Attends social groups Attends religious meetings	**(coding algorithm)** Higher score = more isolated	Family oriented (1) Locally dependent (2) Locally self-contained (3) Wider community focused (4) Private restricted (5) Borderline R/R (6) Borderline: R/V (7) Borderline: V/V (8) Unclassified (9)
Social participation	Activities undertaken during the last 4 weeks	Goes to the shops Visits family and friends Attends social groups* Attends religious meetings* Watches sports in public Goes to arts events Goes to restaurants Goes to TAB/casino Attends family events Attends social occasions	Add scores (10-50)/10 **Recode scores (1-5)** High = 1-2 Moderate = 3 Low = 4-5	**Reverse scores for analyses** Low participation (1) Moderate participation (2) High participation (3)
Social support	Satisfaction with relationships	Satisfaction with family relationships Satisfaction with friend relationships	Add scores (0-10)/2	Has no friends/family (0) Extremely dissatisfied (1) Very dissatisfied (2) Somewhat dissatisfied (3) Satisfied most of the time (4) Satisfied all of the time (5)
Engagement in life	Formal work undertaken	Does paid work Does unpaid/volunteer work	Add scores (0-2)	Low engagement (0) Moderate engagement (1) High engagement (2)
	Informal role undertaken	Has a role in family Has a role in community	Add scores (0-2)	Low engagement (0) Moderate engagement (1) High engagement (2)
Stressors	Past adult health or psychological adversity	Major injury/health event ever Major psychological event ever Long-term disability Past relationship loss (bereavement/ break-up)	Add scores (0-4)	Number of past adult stressors: (0-4)
Coping Self Efficacy (CSE)	Perception of coping	Perception of coping with: … life overall … times of loss … financial hardship … health problems … trouble with family/ friends	Add scores (5-25) **Recode scores (5-25)** Poor (1 = 5.00-12.49) Mod (2 = 12.5-17.49) Well (3 = 17.50-25.00)	Low CSE (1) Moderate CSE (2) High CSE (3)
Mastery	Pearlin and Schooler Perceived Mastery Scale	Little control over things No way to solve problems Can't change important things Helpless in dealing with problems	FC6/7 reverse scored Add scores (7-35) **Recode scores (1-3)** Low (1 = 7.00-17.49) Mod (2 = 17.50-24.49)	Low mastery (1) Moderate mastery (2) High mastery (3)

Resilience domain	Description	Combined /Scale variables	Treatment	Computed variable
		Feel like I'm being pushed around Future depends on me Can do just about anything	High (3 = 24.50-35.00)	
Māori culture	Whakapapa	Knows name of hāpu Knows name of iwi Knows name of rohe	**Recode** 777 as 0 Add scores (0-3) No (0) Yes (1-3)	Doesn't know whakapapa (0) Knows whakapapa (1)
	Frequency of visiting a Marae in the last 12 months	Ever been to a Marae Frequency of visiting a Marae in the last 12 months	**Re-code** Ever been to a Marae = 0 as 0 Add scores (0-4)	Not in the last 12m (0) Once in the last 12m (1) A few times in the last 12m (2) Several times in the last 12m (3) More than once a month (4)
	Strength of te reo Māori	Speaks te reo Māori is mother tongue	Add scores (0-2)	Poor te reo (0) Moderate te reo (1) Strong te reo (2)

Table E6: Final Psychosocial Resource Indicators: Question Codes, Names and Data Type

Resilience domain	Variable	Variable name	Type	Levels	+ve Direction
Culture and faith	Sense of belonging	AB3_imputed	Likert	5 (0-4)	low > high
	Religion	AD1a_imputed_recode	Categorical	3 (0-2)	low > high
	Importance of faith to wellbeing	AD2_imputed	Likert	5 (0-4)	low > high
Social network	Distance to nearest child	PANT2_imputed	Categorical	5 (1-5)	high > low
	Distance to nearest brother or sister				
	Distance to nearest other relative				
	Speak with children or relatives				
	Speak with friends				
	Speak with neighbours				
	Attends social groups				
	Attends religious meetings				
Social support – formal and informal	Has help with daily tasks	GC1_imputed	Nominal	3 (0-2)	low > high
	Has emotional support	GC4_imputed	Nominal	3 (0-2)	low > high
	Receives formal social support	GC10_imputed	Nominal	2 (0-1)	low > high
	Satisfaction with family relationships	SocSpt_Satis_total	Likert	6 (0-5)	low > high
	Satisfaction with friend relationships				
Social participation	Goes to the shops	SocParticip_total_OwnMean_recode	Categorical	3 (1-3)	low > high
	Visits family and friends				
	Attends social groups *				
	Attends religious meetings *				
	Watches sports in public				
	Goes to arts events				
	Goes to restaurants				
	Goes to TAB/casino				
	Attends family events				
	Attends social occasions				
Purpose and engagement in life	Does paid work	FormalRole_total	Categorical	3 (0-2)	low > high
	Does unpaid/volunteer work				
	Spent time on hobby last 4 weeks	JA11a_imputed	Likert	5 (1-5)	high > low
	Perception of enough to do	JA12_imputed	Likert	3 (1-3)	low > high
	Has a role in family	InformalRole_total	Categorical	3 (0-2)	low > high
	Has a role in community				
	Experience of growing older	MA2_imputed	Likert	5 (1-5)	high > low
Stressors	Major injury/health event ever	PastAdultStress_total	Sum of stressors	4 (0-4)	high > low
	Major psychological event ever				
	Long-term disability				
	Past relationship loss (bereavement/ break-up)				
	Financial poverty in childhood	KA8_imputed	Likert	3 (1-3)	low > high
	Material standard of living	KB9_imputed	Likert	5 (1-5)	high > low
Coping Self Efficacy	Perception of coping with life overall	Coping_2_imputed _all_ recode	Categorical	3 (1-3)	low > high
	Perception of coping with times of loss				
	Perception of coping with financial hardship				
	Perception of coping with health problems				
	Perception of coping with trouble: family/friends				
Mastery	Control over things		Categorical	3 (1-3)	low > high

Resilience domain	Variable	Variable name	Type	Levels	+ve Direction
	Solve problems	Mastery_2_imputed_all_recode			
	Change important things				
	Helpless in dealing with problems				
	Being pushed around				
	Future depends on me				
	Can do just about anything				
	Perception of agency to keep healthy	MA1_imputed	Likert	6 (1-6)	high > low
Māori culture	Knows name of hapū	Know_whaka	Nominal	2 (0-1)	low > high
	Knows name of iwi				
	Knows name of rohe				
	Understanding of tikanga	AB11_imputed	Likert	5 (1-5)	low > high
	Ever been to a marae	Marae_visit	Likert	5 (0-4)	low > high
	Frequency of visit last 12m				
	Importance of whānau to wellbeing	AF21	Likert	5 (1-5)	low > high
	Importance of nature to wellbeing	ID1a	Likert	5 (1-5)	low > high
	Has a role in a Māori organisation	JC4_imputed	Nominal	2 (0-1)	low > high
	Speaks te reo	Strength_TeReo	Categorical	3 (0-2)	low > high
	Māori is mother tongue				

Table E7: Outcome and Descriptive Variables (without Imputation)

Item		**Descriptives**	**Original coding[@]**	**Re-code**
SPPB higher = better (better function)	*Range* *Mean* *SD*	0-12 7.91 2.950	Scored in seconds **Computer algorithm**	*Continuous variable: No change*
PCS higher = better (better health-related quality of life)	*Range* *Mean* *SD*	6-66 42.06 11.680	From SF-12 Scores aggregated to 8 subscales: Physical function, Role Physical, Bodily Pain, General Health, Vitality, Role Emotional, Social function, Mental Health **Computer algorithm**	*Continuous variable: No change*
MCS higher = better (better health-related quality of life)	*Range* *Mean* *SD*	15-79 54.43 8.482	From SF-12 Scores aggregated to 8 subscales: Physical function, Role Physical, Bodily Pain, General Health, Vitality, Role Emotional, Social function, Mental Health **Computer algorithm**	*Continuous variable: No change*
NEADL higher = better (more independent)	*Range* *Mean* *SD*	0-22 17.71 3.894	1. Activities of daily living (original): Doesn't do (0) Does with help (1) Does on own or own w difficulty (2) 2. Recoded Dependent – doesn't do or does with help (0) Independent –does on own (1) **Recode summed to a total out of 22**	*Continuous variable: No change*
GDS-15 higher = worse (more depressive symptoms)	*Range* *Mean* *SD*	0-14 2.33 2.081	No (0) Yes (1) **15 items summed to a total out of 15** (5 items reverse scored)	*Continuous variable: No change* None or mild depression equivalent to scores 0-4 Moderate or severe depression equivalent to scores 5-15
3MS higher = better (better cognition)	*Range* *Mean* *SD*	12-100 89.62 10.527		*Continuous variable: No change*
Number of medical conditions	*Range* *Mean* *SD* *Median* *Mode*	0-13 4.83 2.252 5 5	No (0) Yes (1) **20 items summed**	(Weighted score used - see below)
Weighted medical conditions	*Range* *Mean* *SD*	0-26.5 9.676 4.8473	Weightings for health impairment: None/mild (1) Moderate (2) Severe (3) **Weightings calculated for each of 20 conditions, presence multiplied by weight, summed for each participant (max 60)**	*Continuous variable created*
Prescription medications taken (CA1)	*Range* *Mode* *Median*	0-1 1 1	No (0) Yes (1)	*No change*
Life satisfaction (FA1)	*Range* *Mode*	1-5 4	Very dissatisfied (1) Dissatisfied (2)	Dissatisfied (0)

Item		Descriptives	Original coding[@]	Re-code
	Median	4	Neither satisfied nor dissatisfied (3) Satisfied (4) Very satisfied (5)	Neither dissatisfied nor satisfied (1) Satisfied (2)
Marital status (AF22)	*Range* *Mode* *Median*	1-5 3 3	Never been married (1) Married/partnered (2) Widow/widower (3) Separated (4) Divorced (5)	Never married (1) Married (2) Widowed/separated/divorced (3)
Living situation (AA3)	*Range* *Mode* *Median*	1-6 1 2	Lives: .. alone (1) ..with spouse/partner only (2) ..with spouse & child/other relative (3) ..with spouse & non-relatives (4) ..with child, not spouse (5) ..with other(s), not spouse or child (6)	Alone (1) With Spouse/partner only (2) With others (3)
Living arrangement (AA4)			Private house (1) Private unit/apartment (2) Unit/apartment on family land (3) Retirement village – own unit (4) Rest home (5) Private hospital (6) Marae/iwi-based housing (7) Other (8)	Private family/iwi-based – 1, 2, 3,7 (1) Retirement village – 4 (2) Rest home – 5 (3) Private hospital – 6 (4) Other – 8 (5)
Deprivation index	*Range* *Mode* *Median*	1-10 10 7	Range 1-10; higher = more deprived	*10 categories: No change* <u>3 categories</u> Low deprivation - decile 1-4 (1) Med deprivation – decile 5-7 (2) High deprivation – decile 8-10 (3)
Drives (BC4f)	*Range* *Mode* *Median*	0-2 2 2	Doesn't drive (0) Drives with help (1) Drives on own or own w difficulty (2)	Doesn't drive (0) Drives alone or with help (1)
Falls in the last year (CF1)	*Range* *Mode* *Median*	0-3 2 2	None (0) One (1) Two or three (2) Four or more (3)	None (0) One (1) More than one (2)
Loneliness (JA14a)	*Range* *Mode* *Median*	1-4 4 4	Always feel lonely (1) Often feel lonely (2) Sometimes feel lonely (3) Never feel lonely (4)	Never feels lonely (0) Feels lonely (1)
Top education level (AG3)	*Range* *Mode* *Median*	0-4 1 1	Primary (0) Secondary (1) Completed secondary (2) Trade (3) Tertiary (4)	*No change*
Current/past smoker (CC1)	*Range* *Mode* *Median*	0-2 0 1	Never smoked (0) Current smoker (1) Past smoker (stopped > 12m ago) (2)	Never smoked (0) Current/past smoker (1)
Current financial situation (KA6)	*Range* *Mode* *Median*	1-3 3 3	I can't make ends meet (1) I have just enough to get along on (2) I am comfortable (3)	*No change*

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