

**The wellbeing and vulnerability of older New Zealand adults in retirement:  
a background paper prepared for the Commission for Financial Capability’s  
2019 Review of Retirement Income Policy**

This report has been prepared in response to a request from the *Commission for Financial Capability* to inform points 1 and 3 of the Terms of Reference for the *2019 Retirement Income Policy Review*.

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Code and output supporting the current report have been archived at Figshare. Data are available to researchers by contacting [hart@massey.ac.nz](mailto:hart@massey.ac.nz). Technical documentation for the Health, Work and Retirement survey and life course history interviews is available from the Health and Ageing Research Team website:

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## Glossary

HWR	Health, Work and Retirement study
ELSI-SF	Economic Living Standards Index – Short Form
PCS	SF-12 Physical Component Score
MCS	SF-12 Mental Component Score
SPS	Social Provisions Scale
Intercept	Value of the dependent variable at specified value of the predictor variable
Slope	Change in the outcome variable associated with a 1-unit change in the predictor
SD	Standard deviation
95% CI	An estimate of the plausible range of values of an estimate in the population
OR	Odds Ratio
AOR	Adjusted Odds Ratio

## Executive summary

Many adults begin a process of preparation and planning for 'retirement' in the decades prior to making age-related changes that may impact their income in later life. However, these opportunities to accumulate assets to support material wellbeing in later life are shaped by factors such as employment, income, costs of living, and events such as illness, injury, and financial shocks. Individual differences in exposure to these experiences across the life course mean that policies supporting income in retirement are likely to have diverse impacts on material wellbeing in the community.

The current report presents results of a longitudinal study tracking experiences of material wellbeing of older adults aged 55-76 with the aims to: identify the dominant trajectories of material wellbeing as New Zealand adults approach and pass age 65; to assess the association of these experiences of material wellbeing with known risk factors for financial vulnerability, including homeownership and employment, and; to assess concurrent experiences of non-material wellbeing on indices of physical, mental and social health over this period.

### There is diversity in the levels and rate of change in material wellbeing among New Zealanders as they approach and pass age 65

Analyses of material wellbeing indicate that under current retirement income policy settings, a majority of adults reach age 65 with good material wellbeing and that this group are able to maintain or improve their material wellbeing as they age. A smaller group arrive at age 65 in conditions of material hardship. While material wellbeing increased more rapidly with age for those in material hardship, on average this group continue to experience material hardship as they enter their 70's.

### These trajectories of material wellbeing in later life are predicted by homeownership and employment

Not owning a home in later life predicted experiences of material hardship in later life, along with not being in the paid workforce long term, being single, owning a house with a mortgage, having/having held a non-professional occupation, and having no tertiary qualification. Interviews regarding events associated with increased risk of financial vulnerability across the life course were used to assess the impact of timing of events in the decades prior to retirement. Although homeownership was higher among those reporting good material wellbeing in later life, rates of homeownership were highly stable between ages 45-64 for both groups. The odds of material hardship in later life also increased for those who did not have a tertiary education, those with prolonged unemployment ages 55-64, onset of prolonged illness or disability ages 55-65, and relationship loss ages 45-54.

### Material hardship in later life is associated with experiences of hardship across multiple domains of wellbeing

On average, those who experienced good material wellbeing in later life also experienced good levels of physical, mental and social health as they aged 55-76. While physical health declined with age in this group, average ratings of physical health remained comparable to those of the New Zealand population. This group also maintained ratings of mental health comparable to those of the New Zealand population across the observation period. Social wellbeing was high and declined slowly with age, but similarly remained comparable to that of the average for older adults.

Experiences of material hardship in later life were associated with hardship across core domains of non-material wellbeing. On average, those experiencing material hardship in later life experienced lower levels of physical, mental and social wellbeing. Average physical health scores were around one standard deviation below the population mean prior to age 65 and declined slowly with age. Average mental health scores in this group were also around one standard deviation below the population mean prior to age 65, however mental health increased with age. On average, social wellbeing in this group remained relatively low but stable with age.

## Implications and recommendations for retirement income policy

Although material wellbeing improves with age, those in material hardship continue to experience material hardship for some years following eligibility for retirement income support at age 65. Under current retirement income policy settings, established risk factors for financial vulnerability continue to be associated with material hardship in later life. These experiences reflect accumulation of material and non-material disadvantage in the decades prior to eligibility for retirement income support, as evidenced by poorer health, lower workforce engagement and lower rates of homeownership. As such, policies enabling accumulation of material wealth across the life course (e.g., those supporting skills training, employment, health, and homeownership) also play an important role in supporting material wellbeing in retirement.

The importance of homeownership for material wellbeing in later life and stability of homeownership over ages 45-64 indicate that declining homeownership in mid- and later- life may pose a challenge to the accumulation and maintenance of assets supporting material wellbeing in retirement. Similarly, the association of paid employment in later life with material wellbeing suggests that barriers to continued workforce participation in mid- and later- life may be meaningful points of intervention.

While adults tracked in the current research were eligible for NZ Super at age 65, potential benefits of more recent retirement income policy reforms, such as Kiwi Saver, may not be fully realised for this cohort. However, contributory superannuation schemes are similarly most likely to impact material wellbeing of those enabled to contribute in the decades prior to retirement. Future research evaluating trajectories of material and non-material wellbeing in later life may meaningfully adopt research frameworks which acknowledge the diversity of experiences of wellbeing within the general population, the dynamic nature of individual's resources with age, and that these are shaped by events throughout the life course. As the New Zealand population ages and adults lead longer lives, collection of further information on the diverse experiences of adults aged '65+' will be vital to understanding the needs of this growing section of the population.

## Section A: Vulnerability and wellbeing in retirement

Retirement is variously regarded as a stage of life, a period following receipt of an age pension, and a withdrawal from paid employment. It is discussed in terms of phases of retirement planning, decision making, transition, and adaptation. For the purposes of the 2019 review of retirement income policies, ‘retirement’ is regarded as a period of life after a person reaches age 65. At age 65, New Zealand adults broadly become eligible to draw a public aged pension (NZ Super), become eligible for other public provisions such as subsidised medical care, and, where participating, draw from contributory superannuation schemes. Policies supporting such provisions in retirement recognize older age as associated with bodily ageing and other potential barriers to maintaining resources to support basic material needs and thus maintaining a level of wellbeing valued by our society. These policies demonstrate a recognition that supporting wellbeing among older adults benefits individuals, their family/whānau, communities and wider society.

The first point of the 2019 review calls for an assessment of the efficacy of current retirement income policies for those who are financially vulnerable. One way in which the effectiveness of current retirement income policy settings may be evaluated is in terms of the material wellbeing experienced by older adults as they approach and enter ages of ‘retirement’. The third point of the review calls for an assessment the impact of factors such as the changing nature of work and declining rates of homeownership and labour market participation among those aged 65+. This latter point acknowledges a need for policies to be evaluated with reference to changes in broader society which may influence the financial situation of adults in retirement. One way in which the impact of these factors on material wellbeing in later life may be understood is by examining the level of risk to material wellbeing in later life associated with these conditions across the life course

To support the review, the current report will draw upon data on experiences of material wellbeing, risk factors for financial vulnerability, and indices of non-material wellbeing collected by the Health, Work and Retirement longitudinal study. These data will be used to examine material, and associated non-material, experiences of wellbeing among older New Zealanders as they approach and pass age 65 under current retirement income policy settings.

### Material wellbeing of New Zealanders in retirement

Non-income based approaches to assessment of material wellbeing have been widely adopted in New Zealand. These measures enable individuals to rate the adequacy of their current material resources in light of demands (e.g., resources needed to maintain a given standard of living may vary across households and scenarios within those households). This approach is perhaps particularly relevant to the assessment of material wellbeing of older adults, whose living costs may be relatively low and whose primary source of annual income may be NZ Super, regardless of prior earnings or accumulated material wealth.

Analyses of data from New Zealand national surveys utilising non-income measures of material wellbeing suggest that older adults represent a materially advantaged group relative to younger ages, with a majority reporting material living standards categorized as ‘good’ (Perry 2017). This likely represents both accumulation of assets over time, lower living costs associated with homeownership, and public income support. Indeed, results from the 2015-2017 Household Economic Survey indicate that 72% of adults aged over 65 own their house without a mortgage (Perry 2017). Following age 65, around 90.1% of persons aged 65 and over draw NZ Super or veterans pension (Statistics New Zealand 2015), providing a key source of income in this age group (Perry 2018). Paid employment as adults approach retirement age is also strong, with employment rates for New Zealand residents aged 55-59 and 60-64 among the highest in the OECD and remain relatively high for those aged 65-69 (OECD 2017). This suggests both opportunities and capacity and motivations for continued employment, although employment rates for older adults have closely tracked the age of eligibility for NZ Super (Hurnard 2005), indicating that perceived financial need plays a role in the elevated employment rates in New Zealand.

However, around 16% of New Zealand adults aged 45-64 and 6-7% of adults over the age of 65 experience levels of material wellbeing classified as representing material ‘hardship’ (Krishnan, Jensen et al. 2002, Perry 2013, Perry 2018). Previous reviews have highlighted risk and explanatory factors for experiences of material hardship among older adults in New Zealand (Cunningham, Durie et al. 2002, Perry 2013). These include

adverse life events such as relationship breakdown (separation or divorce), long term illness or disability, and ongoing expenses associated with rental or mortgage repayments. Opportunities to maintain engagement in the workforce also play a role in material wellbeing in retirement, with lower wellbeing associated with not holding a tertiary qualification, lower occupational socioeconomic status, unemployment in the decades prior to age 65, and not holding full-time employment. Increased risk of material hardship in older age has also been highlighted for diverse groups of individuals, likely reflecting accumulation of advantage and disadvantage across the life course, including female gender, Māori ethnicity and those not in a married or *de facto* relationship (Cunningham, Durie et al. 2002, Perry 2013).

## Non-material wellbeing of older adults

Implicit in public income support for material wellbeing of older adults in retirement is an acknowledgement that material goods support aspects of non-material wellbeing valued by society. Thus, ideally evaluation of the efficacy of retirement income policies will entail some assessment of the non-material conditions associated with material wellbeing in retirement. National discussions are ongoing around the conceptualization and measurement of wellbeing in New Zealand at individual, community and societal levels (i.e., McLeod 2018, Te Puni Kōkiri 2019). However, wellbeing of individuals has long been recognized as multi-dimensional in nature, with ‘health’ defined as a state of physical, mental and social wellbeing adopted by the World Health Organization<sup>1</sup>.

Although core aspects of wellbeing are acknowledged and a definitive accounting and ranking of its dimensions not generally considered useful (Sen 2004), social justice perspectives advocate that an equitable understanding of wellbeing must acknowledge the capacities of an individual to act in ways in which are valued, given their social, environmental and cultural context (Sen 1993). Such ‘capabilities’ approaches to wellbeing acknowledge variations in both levels of wellbeing and its components among individuals, and that these variations are shaped by the contexts in which individuals have lived, such as opportunities, policies, social norms and physical environments. This approach is perhaps particularly useful in assessing wellbeing in older age, a time in which material and non-material resources available to individuals diverge as shaped by experiences across their life course and physical health declines naturally with bodily ageing (Stephens 2017).

## Aims of current report

While rates of material hardship are lower among older age groups and NZ Super is a key source of income for older adults, there is relatively little information on material wellbeing outcomes for different groups of older adults in New Zealand. Given apparent disparities in material wellbeing among older adults, it is likely that policies supporting retirement income have a distinct impact on material wellbeing of older adults who are financially vulnerable. Further, while it is acknowledged that both opportunities for financial accumulation and exposure to financial shocks over the life course influence material wellbeing in later age, there is little data on the impact of the timing of these events. Similarly, while there is significant data on material wellbeing of older adults in New Zealand, there are relatively few indicators of the non-material wellbeing associated with these experiences.

To contribute to the evaluation of the efficacy of retirement income policies for financially vulnerable older adults, the current work aims to characterise experiences of material wellbeing among a sample of adults aged 55-76 as they approach and pass the age of ‘retirement’ in New Zealand. Adopting a capabilities framework for assessing wellbeing in older age, we expect that there will be diversity in both the level and rate of change in material wellbeing as older adults reach and pass the age of pension eligibility. To assess the impact of risk factors for financial vulnerability on experiences of material wellbeing in later life, we assess how material circumstances in later life are associated with known risk factors for financial vulnerability and the impact of the timing of these events across mid and later life. Finally, to provide further context to the efficacy of

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<sup>1</sup> Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946

retirement income policies, we explore the experiences of non-material wellbeing as adults approach and pass the age of retirement.

To characterise this diversity in material wellbeing as adults approach and pass the age of ‘retirement’ (age 65), we adopt a growth mixture modelling approach to identify groups of older adults displaying common levels of material wellbeing prior to pension eligibility and changes in material wellbeing with age. The analysis will assess material wellbeing using a non-income-based assessment of material wellbeing (ELSI-SF). The ELSI-SF was developed by the Ministry for Social Development for the assessment of living standards in the New Zealand context and items have been administered in population surveys including the Living Standards Survey (2000, 2004 and 2008) the Household Economic Survey (2006-2007 and 2011-2012) and General Social Survey (2008, 2010 and 2012). This report will examine the association of these outcomes with known risk factors for financial vulnerability in New Zealand and assess the impact of related circumstances of illness, relationship loss, unemployment and homeownership in mid and later life. Finally, to assess the efficacy of current policies for financially vulnerable older adults, this report will examine the non-material wellbeing outcomes across three key domains (physical, mental and social) associated with experiences of material wellbeing as adults approach and pass retirement age. Thus, aims of the following analyses are to:

- 1) Describe the dominant profiles of material wellbeing with age among older New Zealanders aged 55-76
- 2) Describe the association of these profiles with known risk factors for financial vulnerability;
- 3) Describe the association of these profiles with mid- and late-life experiences of vulnerability;
- 4) Describe these material wellbeing profiles in terms of their experiences of non-material wellbeing.



## Section B: Data sources and key indicators of material wellbeing, non-material wellbeing, and risk factors for financial vulnerability

### Health, Work and Retirement surveys 2006-2018

Data from the 2006-2018 New Zealand Health, Work and Retirement (HWR) longitudinal surveys (Allen, Alpass et al. 2019) were used to assess levels and changes in material wellbeing with age from 55-76. Participants were recruited from multiple random samples of older adults drawn from the New Zealand electoral roll in 2006 (ages 55-70, born 1936-1952), 2009 (ages 49-89, born 1920-1960), 2010 (ages 48-53 born 1962-1957 and ages 73-83, born 1927-1937), 2014 (ages 55-65, born 1949-1959), and 2016 (ages 55-65, born 1951-1960). To ensure adequate representation of older Māori, persons indicated on the electoral roll as being of Māori descent were sampled at a higher rate. Sampled adults were sent a postal survey assessing a range of key issues for older adults in New Zealand, including indices of material and non-material wellbeing, demographic characteristics and labour force participation. Figure 1 illustrates years of cohort recruitment and survey.

Year cohort recruited	2006	2008	2010	2012	2014	2016	2018
2006	✓	-	✓	-	✓	-	✓
2009			✓	✓	-	✓	-
2010			✓	-	✓	-	-
2014					✓	-	✓
2016						✓	✓

**Calendar year HWR survey administered (✓)**

Figure 1 Health, Work and Retirement postal survey waves by year of cohort recruitment and year of survey.

### Participants and inclusion criteria

To assess changes in material wellbeing as adults approached and passed the age of eligibility for NZ Super, participants recruited to the HWR between 2006 and 2016 were included in the current analyses if they had provided information on their material wellbeing (ELSI-SF) in at least two biennial surveys (2006-2018) between the ages of 55 and 76. Of the  $n = 10,574$  adults who responded to the survey between 2006 and 2016,  $n = 9,844$  were observed at least once between the ages of 55-74. Of these,  $n = 4,909$  responded to two or more surveys between ages 55-76 (surveys 2006-2018) and  $n = 4,811$  provided adequate data on the ELSI-SF at least twice during this period. This sample of  $n = 4,811$  adults who responded to surveys over a 2-12 year period between ages 55-76 formed the analysis sample for the current report

### Health, Work and Retirement life course history interview

To assess the impact of events and circumstances of mid- and later life on material wellbeing as adults approached and passed age 65, data from life course history interviews completed by included participants were assessed. Participants who were recruited to the study in the 2006 cohort who remained active in the study in 2017, were invited to participate in a structured telephone interview regarding events and conditions experienced across the course of their lives, including events related to illness, relationships, employment and housing tenure.  $N = 787$  adults (aged 66-81) participated in this interview.

## Measures

### Material wellbeing (survey)

<i>Economic Living Standards Index Short Form</i>	<i>Assesses aspects of material wealth with reference to desired levels of consumption in domains of owned goods, restrictions, and economizing as well as overall ratings of perceived adequacy. Scores range from 0-31, with scores 16 and below considered to indicate material hardship.</i>
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Material wellbeing was assessed using the Economic Living Standards Index short form (ELSI-SF), a non-incomes approach to material wellbeing (Jensen, Spittal et al. 2005). This form has been included in all Health, Work and Retirement surveys conducted 2006-2018. Respondents rate aspects of their material wealth in terms of needed/desired levels of consumption, restrictions, economising behaviours, and personal possessions as well as the perceived adequacy of their material wealth. Items and domains of the ELSI-SF are outlined in Appendix 1. Scores range from range 0-31 with higher scores indicating better living standards. Scores are commonly categorised as indicative of 'Severe', 'Significant' or 'Some' hardship, 'Fairly comfortable' or 'Comfortable' and 'Good' or 'Very good', with the first three categories considered to indicate 'material hardship' (Figure 2).

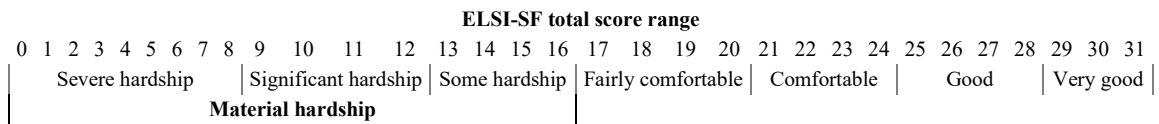


Figure 2 material wellbeing categories for ELSI-SF total scores

### Non-material wellbeing (survey)

<i>SF-12 Physical Health Component score</i>	<i>Score reflects the impacts of impacts of physical health and bodily pain on ability to carry out everyday activities. A score of 50 indicates an average level of physical health among New Zealand adults.</i>
<i>SF-12 Mental Health Component score</i>	<i>Score reflects mental health, social functioning and the impact of emotional problems on ability to carry out everyday activities. A score of 50 indicates an average level of mental health among New Zealand adults.</i>

Physical and mental health were measured using the Australian and New Zealand form of the SF-12 (Ware, Kosinski et al. 2002). Items of the SF-12 have been included in all Health, Work and Retirement surveys 2006-2018. The SF-12 is a 12 item self-report measure developed to assess physical and mental health and their limiting impact on a person everyday activities. Items and subscales of the SF-12 are illustrated in Appendix 1. Standardized total scores for the physical and mental health domains are calculated with reference to normative subscale scores for the New Zealand population, derived from the 2008 General Social Survey, and factor score coefficients derived from the 2006-2007 New Zealand Health Survey (Frieling, Davis et al. 2013). These scores may be interpreted relative to a New Zealand adult population average score of 50, with a standard deviation of 10.

<i>Social Provisions Scale total score</i>	<i>Assesses perceived adequacy and benefits of an individual's interpersonal relationships. Scores standardized to have a mean of 50 and SD of 10, with reference to a large sample of adults aged 48-92.</i>
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Social wellbeing was measured using the Social Provisions Scale (SPS: Cutrona and Russell 1987). This is a 24 item scale assessing six aspects of social needs which may be fulfilled by social relationships: reliable alliance, attachment, guidance, opportunity for nurturance, social integration, and reassurance of worth. Participants endorse their agreement of each item on a scale of 1-4, with total summed scores ranging 24-96. Items and domains of the Social Provisions Scale are illustrated in Appendix 1. To facilitate communication of average levels of social wellbeing and comparison with other aspects of non-material wellbeing, a grand mean and SD based on SPS total scores observed in Health, Work and Retirement surveys 2006-2018 and a sub-study assessing preparedness for retirement were calculated. These values were used to standardize Social Provisions Scale total scores relative to a mean score of 50 with a standard deviation of 10. Overall,  $n = 23,375$  observations contributed by  $n = 10,739$  New Zealand residents aged 48-92 ( $\text{Mean}_{\text{age}} = 62.40$ ,  $\text{SD}_{\text{age}} = 6.52$ ) were summarized. As each participant contributed 1-6 observations over the 2006-2018 surveys, observations were weighted to account for number of observations contributed by an individual. Equation 1 illustrates the grand mean and SD, and the calculation of standardized scores.

*Equation 1 Calculation of normative scores for social wellbeing.*

$$z = \frac{x - \bar{x}}{s}$$

$$\text{SPSz} = (z + 50) * 10$$

$z$ :  $z$  - score (mean 0 and SD of 1).  
 $x$  = raw Social Provisions Scale total score.  
 $\bar{x}$  = grand mean Social Provisions Scale total score ( $\bar{x} = 78.09$ ).  
 $s$  = grand standard deviation of Social Provisions Scale total score ( $s = 10.03$ ).  
 $\text{SPSz}$  = Standardized Social Provisions Scale total score (mean = 50, SD = 10).

## Risk factors for financial vulnerability (survey)

### *Demographic factors and mortality*

Age, gender, ethnicity, highest level of education, and marital status were assessed at each survey wave. Ethnicity was classified based on participant-report of ethnic group(s) they belonged to. Reported ethnic identities changed for some individuals over time where more than one ethnic group was indicated. For purposes of description a prioritized ethnicity procedure was utilized (Allan 2001) to broadly describe participants as identifying as European, Māori, Pacific peoples, Asian, or other ethnicity. As participant marital status was highly stable over the observation period, marital status was utilised as a constant in the current models. Where change was observed, the most frequent marital status for an individual was used, else status at first observation was used. Participant mortality between ages 55-76 was based on notification by nominated contact/family/whānau of the deceased, and national mortality records at May 14, 2018.

### *Homeownership*

Participants were asked to report their tenure and ownership related to their primary residence. As housing tenure was highly stable within the sample over the observation period, homeownership was treated as a constant and the most secure tenure or ownership status indicated by a respondent was used as an indicator of homeownership (i.e., if a person indicated that they owned their house with a mortgage and subsequently indicated that they owned their house without a mortgage, the respondent was classified as owner without a mortgage). Questions related to tenure varied over surveys and included free text responses where participants did not feel that the options provided represented their tenure arrangements. Responses were grouped based on conceptual understanding of ownership structures for a person's primary place of residence are presented in Table 1.

Table 1 Classification of homeownership and housing tenure

<i>Owned without a mortgage</i>	Owned by themselves and/or spouse/partner without a mortgage; owned in a family trust; owned themselves and another person ('no mortgage' specified); owned with a reverse/Sentinel mortgage; on business premises owned by respondent; Joint Tenants or Tenants in Common ('no mortgage' specified)
<i>Owned with a mortgage</i>	Owned by themselves and/or spouse/partner with a mortgage; owned themselves and another person ('with mortgage' or mortgage status not specified); Joint Tenants or Tenants in Common ('with mortgage' or mortgage status not specified).
<i>Rented or other arrangement</i>	Owned by family or whanau; private rental; retirement village; license to occupy; housing provided by employer; living with family (ownership not otherwise specified); State, Council or Kaumātua housing; Boarder; house sitting; house truck; rent to own.

*Labour market participation and occupation*

Participants were asked to indicate whether they were employed in full-time paid employment, part-time paid employment, or no paid employment, and the number of hours worked per week in each survey. Participants were asked to nominate their current and past occupations with reference to eight major occupation groups identified by the Australian and New Zealand Standard Classification of Occupation. Where a person was no longer in paid employment and/or current occupation was not provided, main occupation during ages 30-65 was used to classify occupation. Where an individual did not provide occupation or past occupation and reported not being in paid employment during the study period, long term unemployment or absence from the workforce was confirmed using occupation based on the electoral roll occupational status. Occupation groups were amalgamated to indicate professional, non-professional, or not in workforce long-term (Table 2). Where a participant indicated holding both professional and non-professional occupations, the participant was classified as having a non-professional occupation.

Table 2 Classification of occupation

<i>Professional</i>	Manager; professional
<i>Non-professional</i>	Labourer; machinery operator; sales worker; clerical or administrative worker; community or personal service work; technician or trades worker
<i>Not in workforce long-term</i>	No paid employment reported in study period and no paid occupation indicated on electoral roll. Includes beneficiaries, home makers etc.

## Mid- and later life risk factors for financial vulnerability (life course history interviews)

Data on mid- and late-life risk factors for financial vulnerability by age were obtained for a subsample of  $n = 787$  participants who completed a telephone interview on conditions and events experiences during their life to date. Data for ages 45-64 were examined for the purpose of the current analyses.

*Prolonged illness and disability*

Onset of prolonged period(s) of illness or disability were determined by responses to the question: '*As an adult, how many periods of ill health or disability have you had that lasted for more than a year? This includes serious illnesses that lasted less than one year, but influenced your daily life for more than a year, like cancer or diabetes*'. Participants were asked to indicate the age(s) at which each period of illness or disability began and ended.

*Relationship loss: Separation, divorce or death of a partner*

Relationship status was identified by responses to questions on whether the respondent had ever been married or had ever lived together with someone else as a couple. Participants were asked to indicate the age at which these relationships began, if they were ongoing, or had ended due to death, divorce or separation. If the relationship was not still ongoing, participants were asked their age when the relationship was lost.

*Homeownership*

Participants were asked to indicate whether they ever established their own home if so, whether they lived in each primary residence as owners, tenants, members of a cooperative, or rent-free and the year at which they moved to and left this residence. Homeowners were asked to indicate whether they purchased each residence with or without a mortgage.

*Labour market participation and occupation*

Participants were asked for their employment history with reference to ages at which each job began and ended, whether hours were full- or part-time and their occupation with reference to eight major occupation groups identified by the Australian and New Zealand Standard Classification of Occupation. Employment and occupation groups were amalgamated to indicate professional (manager/professional), non-professional (labourer/machinery operator/sales worker/clerical or administrative worker/community or personal service work/technician or trades worker) or as not in workforce.

**Analysis plan**

Statistical software Mplus version 8.3 (Muthén and Muthén 1998-2017) was used for all growth and regression analyses. SPSS version 25.0 was to generate descriptive statistics. Categories for material wellbeing (ELSI-SF) observed for participants between ages 55-64 and 65-76 are presented, with cases weighted by number of observations provided by the individual within each age bracket. To illustrate the impact of the increased probability of sampling older Māori in the HWR design on material wellbeing (ELSI-SF) scores and descriptive statistics for the sample, a design weight ( $D_w = 0.19$ ) representing the inverse of the probability of selection for adults indicated as Māori on the electoral roll 2006-2018 was applied. As core surveys were conducted on a biennial basis and in light of the current report's focus on change in material wellbeing with age, survey data were restructured into eleven 2-year age bands (55-56, 57-58, 59-60... 75-76) to represent increments in wellbeing with age/time for all growth models (*cf.* accelerated longitudinal design). Growth model intercepts were specified to describe participants at age 63-64.

*Dominant trajectories of material wellbeing 55-76*

An unconditional Latent Growth Curve Model was conducted to assess the overall functional form of change in material wellbeing with age and variability of individuals around the associated growth parameters in the sample overall. Model fit was assessed with reference to the Sample Size Adjusted Bayesian Information Criteria (SSABIC), Root Mean Square Error of Approximation (RMSEA), comparative fit index (CFI) and Standardized Root Mean Square Residual (SRMR). Acceptable fit indices were determined as RMSEA values less than or equal to 0.06, and CFI values close to or greater than 0.95 and SRMR values less than or equal to 0.08 (Hu and Bentler 1999).

To identify and characterize the material and non-material wellbeing among older adults 55-76, a series of growth mixture models of change in material wellbeing with age were examined to identify sub-populations with common levels and trajectories of material wellbeing with age. The optimal model and number of classes (groups) was determined with reference to class size, class interpretability, Entropy and Average Posterior Probabilities of class separation, sample-size adjusted Bayesian information criterion (SSABIC), and the Sample Size Adjusted Lo-Mendell-Rubin likelihood ratio test (Adj. LMR-LRT) assessing improvement in model fit between  $k$  and  $k-1$  classes (Muthén 2004, Nylund, Asparouhov et al. 2007). Entropy values of 0.40, 0.60, and 0.80 were considered to represent low, medium, and high class separation (Clark and Muthén 2009). To assess the impact of number of follow up observations on the number and character of classes indicated, a model restricted to cases contributing three or more follow up observations ( $n = 3,260$ ) was estimated. These analyses exclude respondents who were recruited in the 2010 and 2016 Health, Work and Retirement study participant cohorts, as they had been surveyed only twice at the time of the 2018 survey (see Figure 1).

*Mid- and later-life risk factors associated with trajectories of material wellbeing 55-76*

Logistic/multinomial regression were used to assess the association of known risk factors for financial vulnerability with membership of the dominant material wellbeing trajectory profiles aged 55-76. To acknowledge imprecision associated with class membership these associations were assessed using the AUXILIARY R3STEP procedure in Mplus (Vermunt 2010). To examine the impact of timing of risk factors

on membership of the material wellbeing trajectories, life course history interview data were used to construct chronographs plotting the proportion of persons displaying assessed risk factors (employment and occupation; illness onset and duration; marital status; housing tenure and purchase arrangements) by age 35-64. Indices of these experiences as occurring in mid-life (ages 45-54) and later life (ages 55-64) prior to retirement age were constructed.

#### *Experiences of non-material wellbeing associated with material wellbeing profiles 55-76*

To assess the experiences of non-material wellbeing associated with material wellbeing, unconditional multi-group Latent Growth Curve Models of physical, mental and social wellbeing with age were examined. Model fit was evaluated as per the unconditional Latent Growth Curve Model for material wellbeing in the sample overall.

### Sample characteristics

Demographic characteristics of the sample are reported in the second column of Table 3. On average, participants provided information on their material wellbeing at four of the eleven two-year age brackets considered in the current analyses. Participants were observed at an average age of 63.9 and around 37.4% of the sample identified as Māori, reflecting over-sampling of persons of Māori descent in the HWR study design. With the exception of self-reported ethnicity, demographic characteristics were highly similar when cases were weighted for the increased probability of sampling persons of Māori descent. The greatest differences indicate a 4.2% increase in the proportion of persons with no qualifications, a 3.8% increase in person not in a married or *de facto* relationship, and a 3.7% increase in the proportion of persons with rental housing tenure.

Table 3 Demographic characteristics of the sample overall and when weighted for sampling design.

	Overall 55-76	Design weighted
Participant <i>N</i>	4811	3251
#observations of ELSI-SF (mean, SD)	4.0 (1.9)	4.0 (1.8)
Age (mean, SD) <sup>†</sup>	63.9 (4.6)	63.8 (4.9)
<b>Ethnicity</b>		
% European	57.2	81.0
% Māori	37.4	11.6
% Pacific peoples	2.7	3.5
% Asian	0.7	1.1
% Other ethnicity	1.9	2.8
<i>missing n = 4</i>		
<b>Sex</b>		
% Male	45.1	45.0
% Female	54.9	55.0
<b>Marital status</b>		
% Married or <i>de facto</i>	74.8	78.2
% Not married or <i>de facto</i>	25.6	21.8
<i>missing n = 2</i>		
<b>Qualification</b>		
% No qualification	20.3	16.1
% Secondary school	22.2	22.0
% Post-secondary or trade	36.9	38.4
% University qualification	20.7	23.5
<i>missing = 3</i>		
<b>Occupation</b>		
%Professional	25.6	27.9
%Non-professional	68.6	66.8
%Not in workforce long-term	5.8	5.3
<b>Homeownership</b>		
%Owned without a mortgage	73.3	77.5
%Owned with mortgage	16.3	15.6
%Rental or other tenure	10.5	6.8
<i>missing n = 68</i>		
<b>%Mortality</b>	7.8	5.8

Note: <sup>†</sup> Average age of individual over observations.

Figure 3 illustrates the proportion of ELSI-SF category scores reported between ages 55-64 and 65-76. As observed in other surveys of material wellbeing in New Zealand, results indicate that the majority of older adults reported levels of material wellbeing categorised as ‘good’ or ‘very good’, with relatively small proportions reporting material hardship. Further, compared to ages 55-64, greater proportions of persons aged 65-76 were represented in higher ELSI-SF categories, with smaller proportions indicating hardship. Lower panels indicate that this trend remained stable when cases were weighted to account for the increased probability of sampling for Māori in the HWR study design, with changes in proportions between 0-3% across the weighted and unweighted proportions.

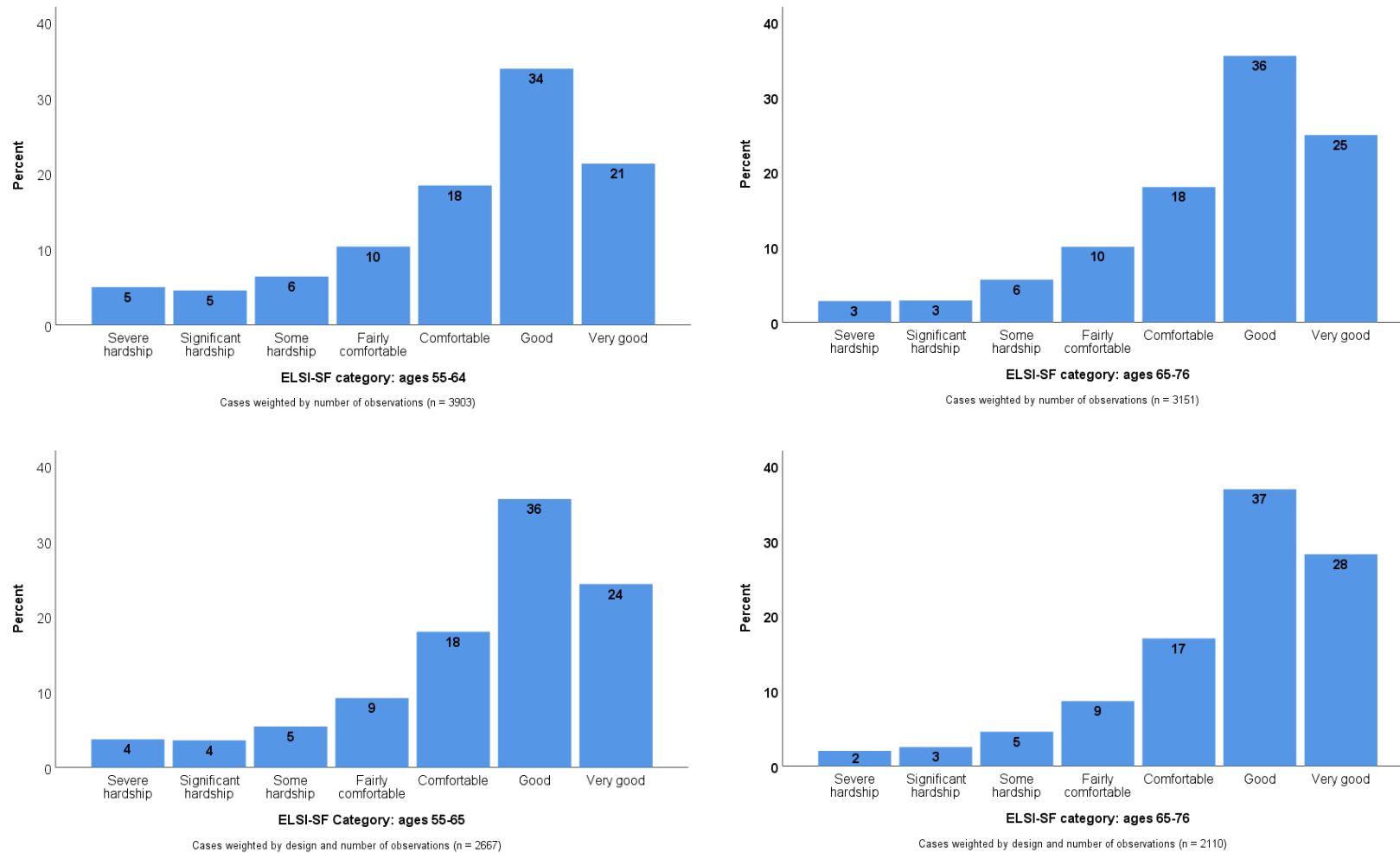


Figure 3 Proportion of the sample represented within material wellbeing (ELSI-SF) category scores between ages 55-64 (left) and 65-76 (right). Upper panels represent sample weighted by number of observations and lower panels represent proportions additionally weighed for over-sampling design.



## Section C: Dominant trajectories of material wellbeing with age 55-76

### Overall profile of material wellbeing with age

To visualize differences in levels and changes in material wellbeing over time in the sample, individual ELSI-SF scores over time are plotted for a random selection of  $n = 1000$  cases (Figure 4). This plot illustrates the heterogeneity in both the level and rate of change in material wellbeing among individuals. Scores indicative of ‘material hardship’ are shaded in red. Inspection of this figure reiterates that a majority cases reported good levels of material wellbeing that were highly stable over time. The decreased density of observations at the lower right quadrant suggests a decrease in material hardship in later ages.

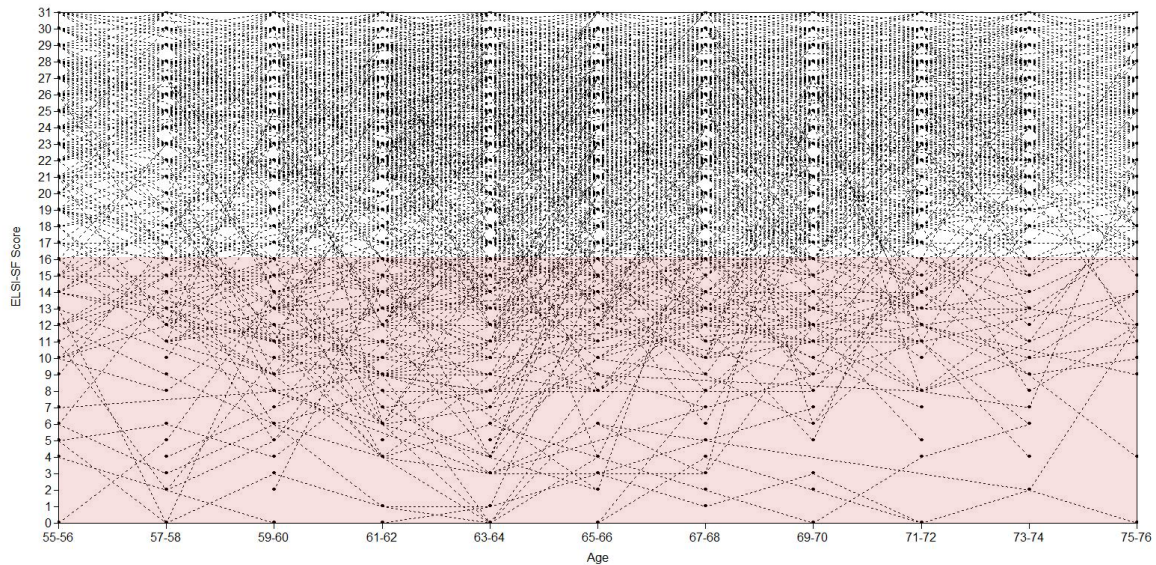


Figure 4 Observed individual trajectories for a random sample of  $n = 1000$  participants reporting material wellbeing (ELSI-SF) with age. Scores 16 or lower (shaded) indicate experiences of material hardship.

An unconditional latent growth curve model was estimated to describe the change in ELSI-SF scores with age overall. Indices of model fit, presented in Table 4, indicate that a linear model of change in material wellbeing with age displayed acceptable fit to the data. A quadratic growth function was estimated and resulted in very good model fit (not reported). However the quadratic function was not significant in the overall model and the more parsimonious linear model of change in material wellbeing with age was retained.

Table 4 Overall model fit statistics for a linear model of change in material wellbeing (ELSI-SF) with age 55-76

Model fit information	
Chi-square Test of Model Fit	451.85 (61), $p < .001$
No. estimated parameters	16
SSABIC	107405.91
RMSEA (95% CI)	0.04 (0.03 - 0.04), $p = .100$
CFI	0.98
SRMR	0.07

Parameter estimates for the overall unconditional linear latent growth curve model are presented in Table 5. These estimates indicate that, on average, adults reported a ‘comfortable’ level of material wellbeing at age 63-64, which increased slowly with age. The significant negative association of model slope and intercept indicates that those with higher material wellbeing displayed a slower increase in material wellbeing with age. This may reflect a decreased sensitivity to change in material wellbeing among higher ELSI-SF scores and/or a greater increase in material wellbeing with age among those with lower material wellbeing. As suggested by individual

growth curves in Figure 4, individuals displayed significant variation around these estimates both in terms of the level and rate of change in material wellbeing with age.

*Table 5 Estimates from the overall linear growth curve model of economic wellbeing (ELSI-SF) with age, 55-76.*

	<b>Est. (95% CI)</b>	<b>SE</b>	<b>Est./SE</b>	<b>p</b>
<b>Mean</b>				
Intercept	23.50 (23.35, 23.64)	0.09	265.62	<.001
Slope	0.25 (0.23, 0.28)	0.02	16.42	<.001
<b>Covariance</b>				
Slope-Intercept	-0.94 (-1.09, -0.78)	0.10	-9.68	<.001
<b>Variance</b>				
Intercept	34.03 (32.77, 35.30)	0.77	44.20	<.001
Slope	0.33 (0.30, 0.37)	0.02	16.24	<.001

Note: model intercept indicates ELSI-SF estimates at ages 63-64; LCI = lower and upper values of the 95% confidence interval; SE = standard error;  $p$  =  $p$  value.

## Dominant profiles of material wellbeing with age 55-76

Given the expected and observed variability in both levels and rate of change in material wellbeing as adults approach and pass age 65, we examined a series of Growth Mixture Models to identify groups whose material wellbeing displayed distinct levels and rates of change with age. Models specifying two, three and four of these latent classes (profiles) were estimated.

Indices of model fit and class membership are presented in Table 6. Model fit to the observed data improved with the number of classes estimated, and class separation was high for all models. The two-class model displayed significantly better fit to the data than the overall model, and the three-class model displayed better fit than the two-class model. The four-class model did not significantly improve model fit. The range of average posterior probabilities associated with class membership in each model (Table 5) indicate the two-class model displayed greater certainty in membership of individuals to classes compared to the three-class model.

*Table 6 Growth Mixture Model fit statistics, class sizes indicating the optimal number of classes representing diversity in material wellbeing with age 55-76 ( $n = 4,811$ )*

<i>Fit statistics</i>	<b>2 Classes (C2)</b>	<b>3 Classes (C3)</b>	<b>4 Classes (C4)</b>
Log-Likelihood value	-53012.76	-52780.06	-52629.49
No. estimated parameters	19	22	25
<i>Information criteria</i>			
SSABIC	106126.23	105676.74	105391.51
<i>Class reliability</i>			
Entropy	0.87	0.86	0.83
Av. Posterior Probabilities range	0.90-0.97	0.78-0.97	0.73-0.95
<i>k vs k-1 classes</i>			
Adj. LMR-LRT ( $p$ )	1246.57 (.000)	447.79 (.000)	289.74 (.054)
<i>Class size (%)</i>			
C <sub>1</sub>	4076 (84.7%)	4001 (83.1%)	3690 (76.7%)
C <sub>2</sub>	735 (15.3%)	496 (10.3%)	603 (12.5%)
C <sub>3</sub>		314 (6.5%)	219 (4.6%)
C <sub>4</sub>			299 (6.2%)

Note: SSABIC = Sample Size Adjusted Bayesian Information Criteria; Adj.LMR-LRT = Adjusted Lo-Mendell-Rubin Likelihood Ratio Test;  $p$  =  $p$ -value.

Model estimates for the two- and three-class models are presented in Table 7. The two-class model identified two sub-populations with distinct combinations of levels and changes in material wellbeing with age. The largest group (C2<sub>1</sub>, 84.7% of the sample) were characterized by a mean ELSI-SF scores indicative of a ‘good’ level of material wellbeing at age 63–64, which increased slowly with age. The second group (C2<sub>2</sub>, 15.3% of the sample) was characterised by mean ELSI-SF scores indicative of ‘significant hardship’ at age 63–64, and a steeper increase material wellbeing with age. In the three-class model, the largest group (C3<sub>1</sub>, 83.1%) remained consistent with that observed in the two-class model. The second group (C3<sub>2</sub>, 10.3%) were characterized by scores indicating ‘some-significant hardship’ at age 63–64, and a steeper increase in material wellbeing with age. The third group (C3<sub>3</sub>, 6.5%) indicated the emergence of a small subset of the sample characterized by ‘some-significant hardship’ at age 63–64 whose material wellbeing declined with age. A descriptive comparison of demographic and risk factors across groups in the three-class model suggest C3<sub>2</sub> and C3<sub>3</sub> displayed highly similar profiles (Appendix 2).

Table 7 Mean (95% CI) growth parameters for two and three class Growth Mixture Models of material wellbeing with age 55–76.

Class	N	Intercept (I)		Linear slope (S)		Factor covariance (I-S) <sup>§</sup>	Description
		Mean (95% CI)	Variance <sup>§</sup>	Mean (95% CI)	Variance <sup>§</sup>	Mean (95% CI)	
<b>Two-class model</b>							
C2 <sub>1</sub>	4076	25.61 (25.47, 25.75)	11.12	0.15 (0.11, 0.18)	0.30	0.03 (-0.32, 0.37)	Good, ↑ MW
C2 <sub>2</sub>	735	12.43 (11.84, 13.02)	11.12	0.73 (0.50, 0.96)	0.30	0.03 (-0.32, 0.37)	Hardship, ↑ MW
<b>Three-class model</b>							
C3 <sub>1</sub>	4001	25.75 (25.62, 25.89)	10.85	0.15 (0.12, 0.17)	0.12	-0.11 (-0.22, 0.00)	Good, ↑ MW
C3 <sub>2</sub>	496	13.59 (12.77, 14.41)	10.85	1.58 (1.41, 1.74)	0.12	-0.11 (-0.22, 0.00)	Hardship, ↑ MW
C3 <sub>3</sub>	314	12.47 (11.12, 13.82)	10.85	-0.75 (-0.98, -0.52)	0.12	-0.11 (-0.22, 0.00)	Hardship, ↓ MW

Note: <sup>§</sup>partially restricted Growth Mixture Model with between-class invariant variances and covariance; LCI/UCI = lower and upper 95% confidence intervals; C = Class; MW = material wellbeing; ↑ = slope indicates increase with age; ↓ = slope indicates decrease with age; Unstandardized coefficients are shown.

To assess the impact of the number of observations available for an individual on optimal model selection, models were replicated when restricted to persons contributing three or more observations (4–12 years observation,  $n = 3260$ ). Under this restriction, results for the two and three class models (not reported) were consistent with those reported above. Given the small size of the C3<sub>3</sub> group, the overlap in estimated level of material wellbeing prior to age 65 with the C3<sub>2</sub> group, and the similar risk profiles for the C3<sub>2</sub> and C3<sub>3</sub> groups, the two-class model was identified as providing an optimal model of material wellbeing and vulnerability among older adults in the sample, facilitating examination of its correlated and concurrent experiences of non-material wellbeing as adults approach and pass age 65.

Figure 5 presents observed individual trajectories of material wellbeing with age for the C2<sub>1</sub> and C2<sub>2</sub> groups. Shaded areas highlight scores indicative of ‘material hardship’, and dotted lines indicate average estimated trajectories of material wellbeing with age for each group. Figure 6 illustrates the mean observed and estimated material wellbeing scores by age for each of these material wellbeing profiles. These plots illustrate that while there is a steeper increase in material wellbeing with age among the group characterized by material hardship prior to age 65 (C2<sub>2</sub>), estimates remain indicative of hardship until participants enter their 70’s.

Figure 5 Observed individual trajectories of material wellbeing with age and estimated linear trajectory by material wellbeing profile classes. Shading indicates ELSI-SF scores indicative of material hardship.

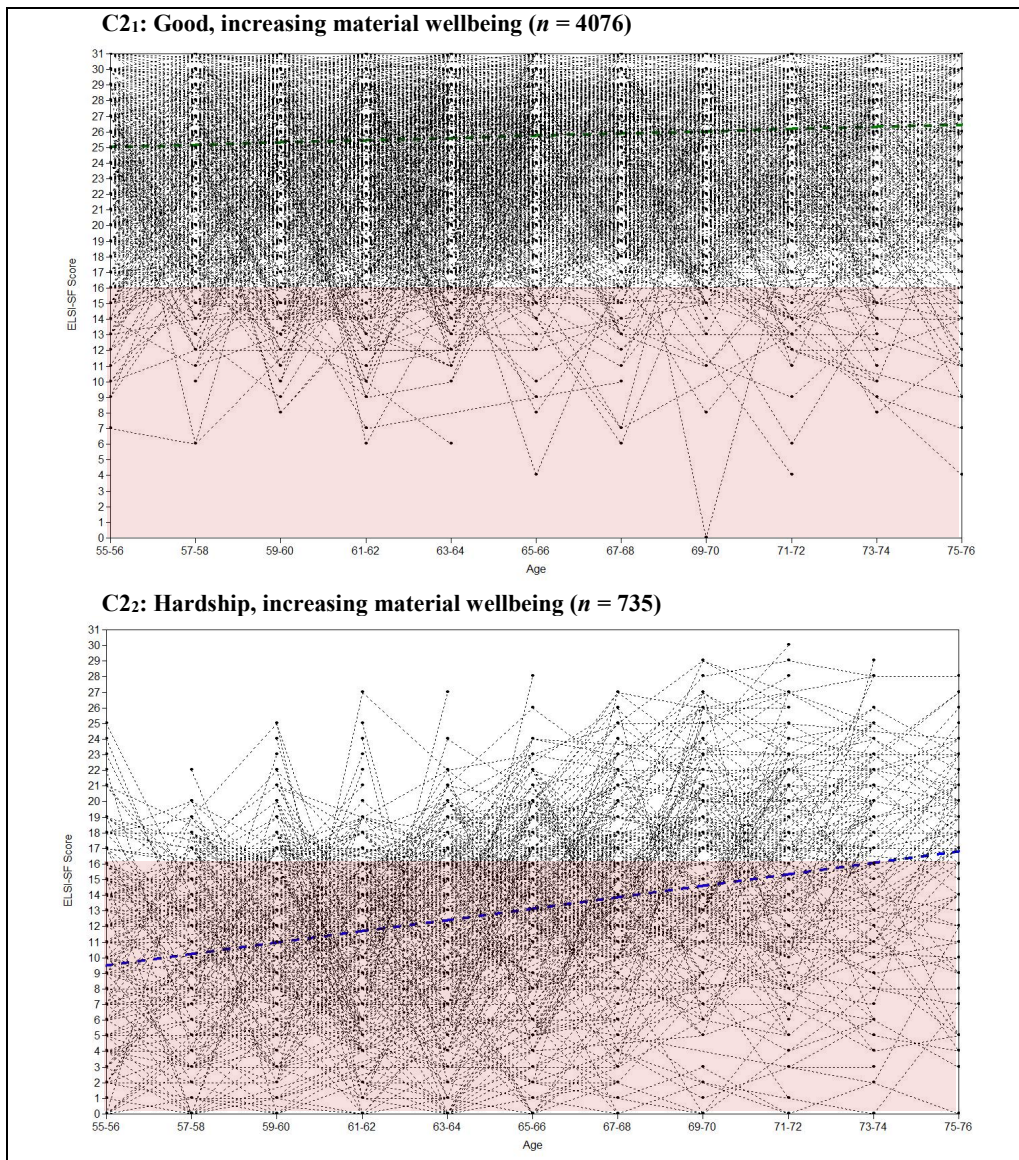
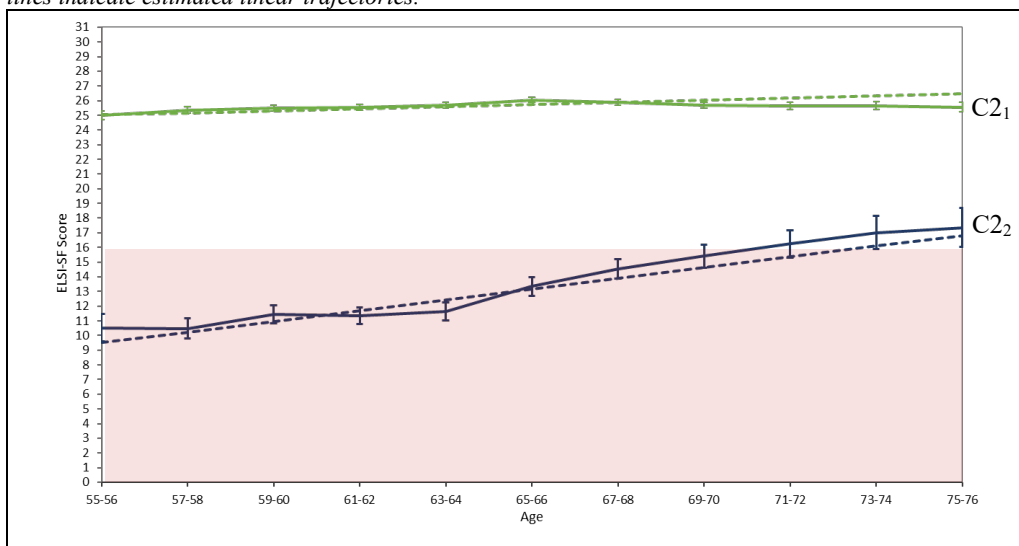


Figure 6 Mean and 95% CI for observed ELSI-SF score by age and material wellbeing class. Dotted lines indicate estimated linear trajectories.



## Risk factors for financial vulnerability and material wellbeing 55-76

In light of the material hardship reported by the C2<sub>2</sub> group, we explored how this profile of material wellbeing pre-post retirement was associated with known risk factors for financial vulnerability. Table 8 presents the demographic and risk characteristics of the two material wellbeing profiles. Bivariate comparisons indicated that those in the C2<sub>2</sub> group were more likely to display risk factors for financial vulnerability than those in the C2<sub>1</sub> group. The groups did not differ in terms of average age across observations and displayed a small difference in the number of points of observation of material wellbeing contributed to the analysis ( $\eta^2 = 0.005$ ). The odds of mortality aged 55-76 (for observations to date) were greater for those in the material hardship (C2<sub>2</sub>) profile: OR = 2.55 (95% CI 2.03, 3.21).

Table 8 Demographic profile ages 55-76 of material wellbeing groups

	(C2 <sub>1</sub> ) Good, ↑MW	(C2 <sub>2</sub> ) Hardship, ↑MW
N	4076	735
#observations of ELSI-SF (mean, SD)	4.0 (1.9)	3.7 (1.8)
Age (mean, SD)	63.9 (4.6)	63.7 (4.6)
%Female	53.7	61.9
%Māori	34.1	55.1
%No tertiary education	77.6	89.3
<b>%Marital status</b>		
<i>Not married or de facto</i>	20.1	52.5
<i>Missing (n)</i>	1	1
<b>%Occupation</b>		
<i>Professional</i>	27.9	12.4
<i>Non-professional</i>	67.5	75.0
<i>Not in workforce</i>	4.6	12.6
<i>Missing (n)</i>	10	3
<b>%Homeownership</b>		
<i>Owned w/o mortgage</i>	77.8	47.7
<i>Owned w/ mortgage</i>	15.6	20.2
<i>Rental or other tenure</i>	6.6	32.1
<i>Missing (n)</i>	10	18
<b>%Mortality</b>	6.6	14.0

Note: % values indicate proportion of persons with observed characteristic within a Class; MW = material wellbeing; ↑ = increase in material wellbeing with age.

Table 9 presents the odds ratios for factors predicting membership of the C2<sub>2</sub>, compared to C2<sub>1</sub> group, when adjusting for other risk factors. This model confirms that the C2<sub>2</sub> group had similar demographic predictors to those previously observed for financial vulnerability. Female gender was not associated with greater risk of material hardship in older age when other risk factors are modelled. In the current model of survey data, odds of material hardship in older age were higher for Māori, those who have no tertiary qualifications, and those not in a married or *de facto* relationship. Compared to those who held or had held a professional occupation, the odds of material hardship were greater for those who held or had held a non-professional occupation or who were not in the workforce. Finally, compared to those who owned their home without a mortgage, the odds of material hardship were greater for those who were observed to own their house with a mortgage and those who were renting.

Table 9 Odds Ratios for association of factors predicting hardship but increasing material wellbeing in later life (C2<sub>2</sub> vs C2<sub>1</sub>) and Adjusted Odds Ratios for full model (total n = 4,728).

Risk Factor	Hardship, increasing MW			
	OR (95% CI)	AOR (95% CI)	SE	(Est – 1)/SE
Female	<b>1.48 (1.26, 1.72)</b>	1.21 (1.00, 1.46)	0.14	1.51
Māori	<b>2.69 (2.31, 3.15)</b>	<b>1.79 (1.49, 2.15)</b>	0.20	4.01
No tertiary qualification	<b>2.85 (2.19, 3.71)</b>	<b>1.64 (1.24, 2.18)</b>	0.28	2.28
Not married or <i>de facto</i>	<b>5.36 (4.56, 6.30)</b>	<b>3.78 (3.13, 4.55)</b>	0.43	6.46
<i>Professional</i>	[REF]	[REF]		
Non-professional	<b>3.02 (2.34, 3.88)</b>	<b>2.08 (1.57, 2.75)</b>	0.36	3.03
Not in workforce	<b>8.27 (5.92, 11.55)</b>	<b>4.51 (3.06, 6.64)</b>	1.06	3.31
<i>Owned w/o mortgage</i>	[REF]	[REF]		
Owned w/ mortgage	<b>2.40 (1.95, 2.95)</b>	<b>2.51 (2.01, 3.13)</b>	0.34	4.49
Rental or other tenure	<b>10.68 (8.65, 13.16)</b>	<b>5.76 (4.51, 7.35)</b>	0.86	5.56

Note: OR = odds ratio for univariate models; AOR = adjusted odds ratio; 95% CI = 95% confidence interval; SE = standard error of the estimate; REF = reference category for categorical indicator comparison; bolded estimates indicate greater odds of material hardship; MW = material wellbeing.

## Mid- and late-life risk factors for financial vulnerability and material wellbeing 55-76

A subsample of  $n = 787$  participants who were included in the primary analyses of survey data (above) also participated in a life course history interview. Of this subsample, around 11.7% were classed as displaying the material hardship profile (C2<sub>2</sub>) in the two-class growth mixture model (analysis above). To assess the risk associated events in mid- and later-life associated with financial vulnerability, trends in risk factors aged 35-64 as they occurred in this data were described and examined for change and stability.

Figure 7 illustrates employment rates in the subsample for ages 35-64 by full- and part-time employment and occupational class and material wellbeing profile. To assess the impact of unemployment in mid (45-55) and later (55-65) life, indices categories indicating as displaying 3+ years of unemployment in these decades were calculated.

Figure 8 illustrates housing tenure and purchase arrangements for ages 35-64 by material wellbeing profile. Both groups appear to display an increase in purchase of primary residence without a mortgage with age, however housing tenure ownership was highly stable across these decades. To assess the association of non-homeownership in mid (45-54) and later (55-64) life on later life material hardship, indices identifying participants as having 1 or more observation of homeownership in these decades were calculated.

Figure 9 illustrates material status between ages 35-64. Higher rates of being in a married or *de facto* relationship were observed for those in good material wellbeing in later life across all ages, although this appeared to decline with age for both groups. To assess the association of relationship loss in mid- (45-54) and later- (55-64) life with later life material hardship, indices identifying participants as having 1 or more relationship loss in these decades were calculated.

Finally, Figure 10 illustrates the onset and duration of serious illness and disability ages 35-64. A small proportion of participants in each group experienced onset of illness or disability before age 35. Rates of illness or disability increase with age. To explore the impact of onset of illness in mid (45-54) and later (55-64) life on later life material wellbeing, indices identifying participants as having 1 or more observation of observation of illness or disability in these decades were calculated. Indices of illness duration were not explored in the current analyses.

Figure 7 Chronograph illustrating labour force participation by occupation and material wellbeing group, ages 35-64.

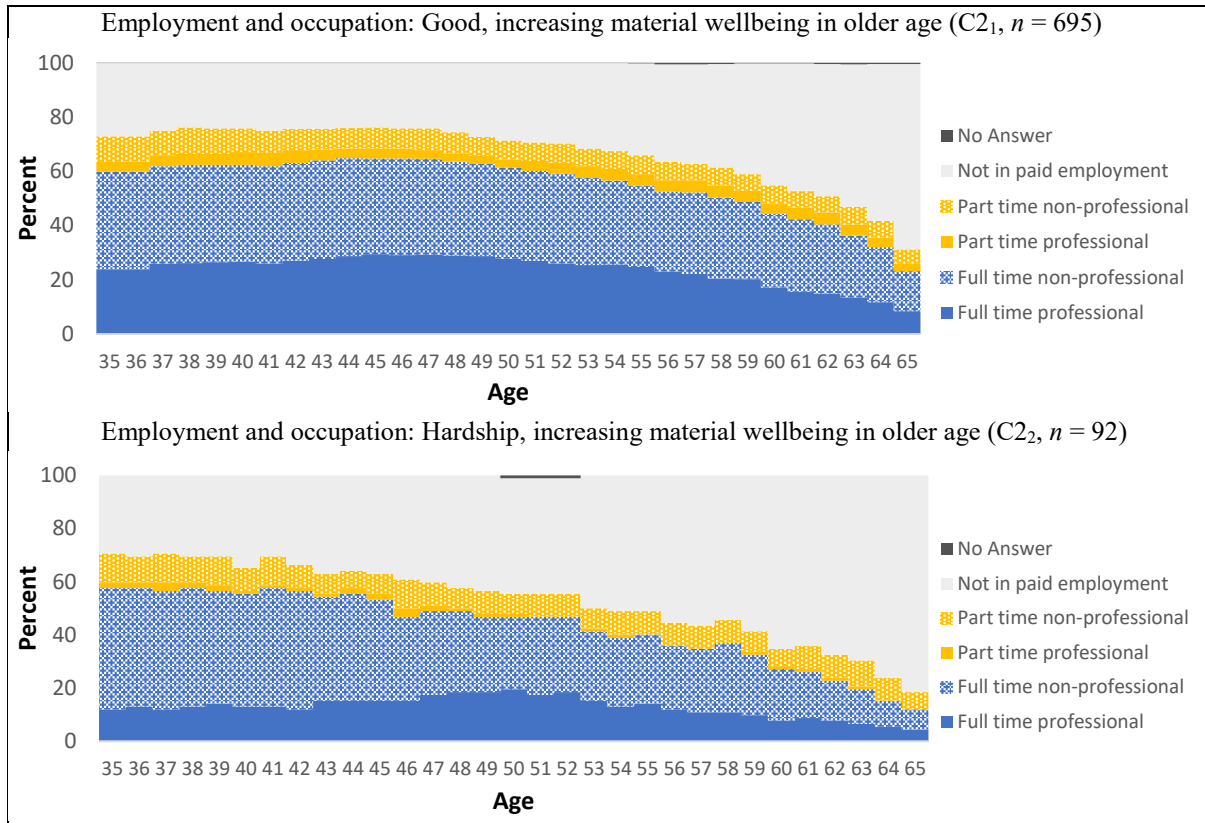


Figure 8 Chronograph illustrating housing tenure by purchase arrangement and material wellbeing group, ages 35-64.

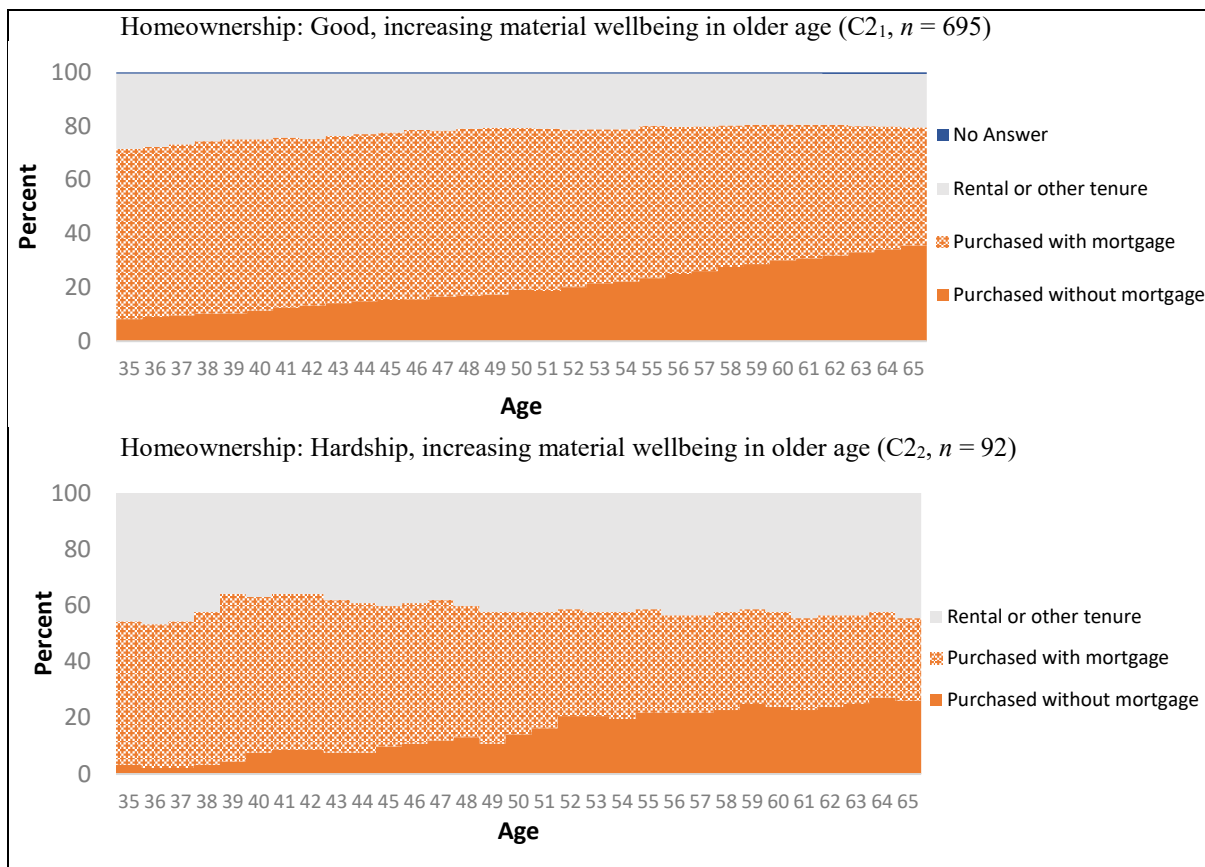


Figure 9 Chronograph illustrating relationship status by material wellbeing group, ages 35-64.

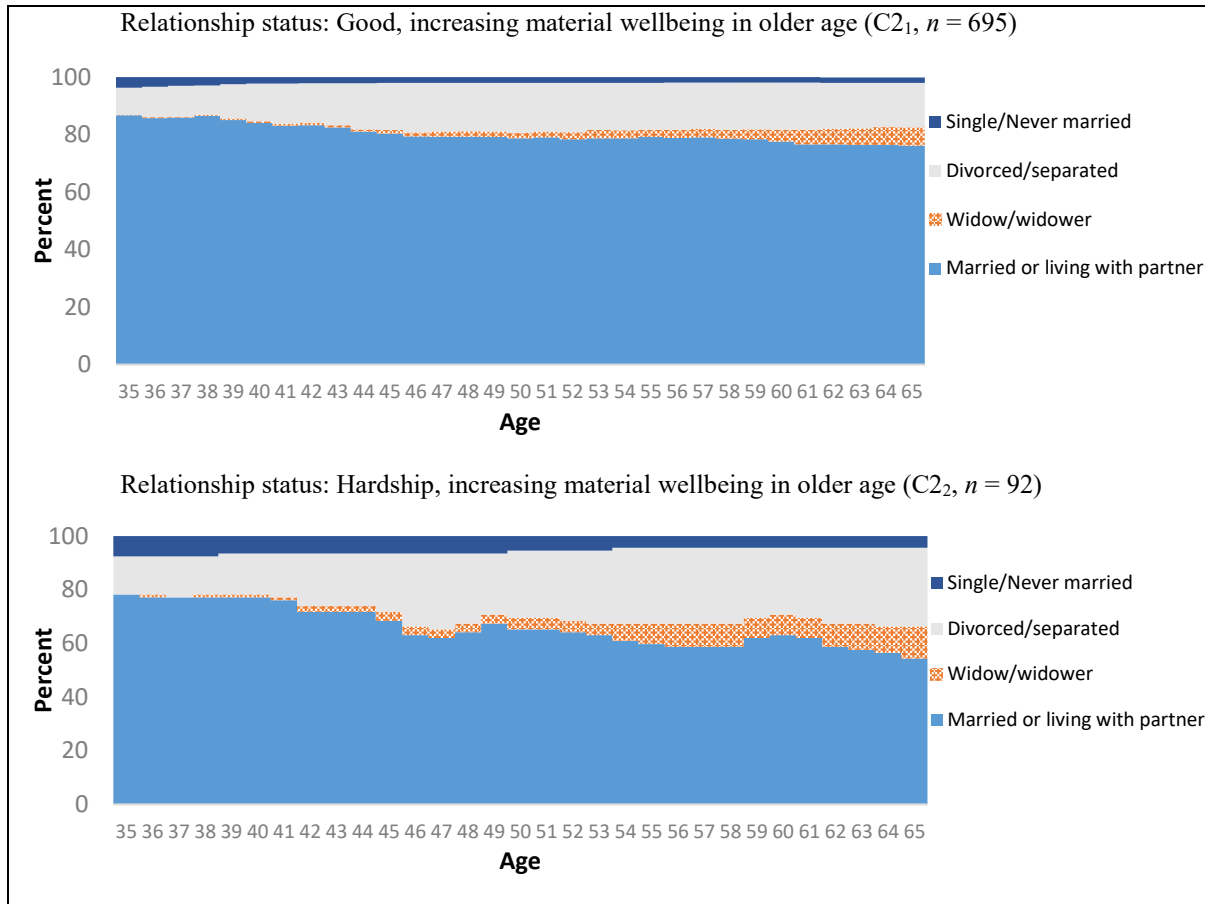


Figure 10 Chronograph illustrating prolonged illness by onset, duration and material wellbeing group, ages 35-64.

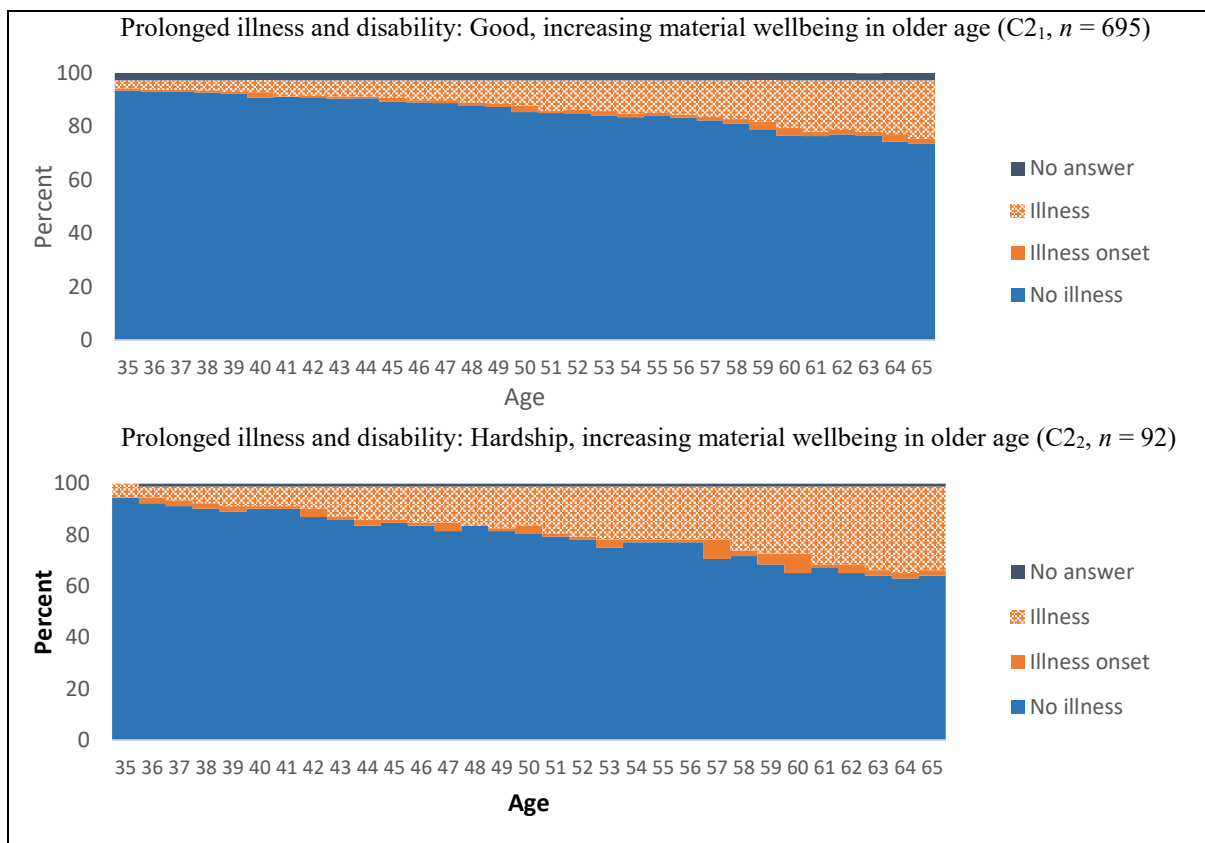




Table 10 describes material wellbeing profiles of participants included in the life course sub-analysis in terms of their demographic characteristics and experiences of risk factors for financial vulnerability by decade 45-54 and 55-64. Of participants recruited to the 2006 cohort who and who were included in the primary (growth mixture model) analysis of material wellbeing in later life, those who completed the life course history interview in 2017 were less likely to experience material hardship in older age (C2<sub>2</sub>) than those who did not complete the interview (11.7% vs 19.8%).

Table 10 Mid-life risk profile by material wellbeing group.

	Overall	(C2 <sub>1</sub> ) Good, ↑MW	(C2 <sub>2</sub> ) Hardship, ↑MW
N	787	695	92
Average age at observation	66.8 (3.7)	66.8 (3.7)	66.8 (3.7)
#observations of ELSI-SF scores (mean, SD)	6.1 (1.2)	6.2 (1.2)	6.1 (1.1)
%Female	52.0	51.5	55.4
%Māori	37.4	36.1	46.7
%No tertiary education	76.2	74.2	91.3
<b>Relationship loss<sup>†</sup></b>			
%Loss 45-54	12.3	11.1	21.7
%Loss 55-64	8.1	8.1	8.7
Missing n	0	0	0
<b>Illness or disability<sup>††</sup></b>			
%45-54	13.4	13.2	14.3
%55-64	18.9	17.4	29.7
Missing n	3	3	0
<b>Not homeowner<sup>†††</sup></b>			
%45-54	17.3	15.2	34.8
%55-64	18.3	15.5	39.1
Missing n	5	5	0
<b>Not in paid work 3+ years</b>			
%45-54	33.3	31.2	48.9
%55-64	52.9	50.4	71.7
Missing n	0	0	0

Note: <sup>†</sup> divorced, separated or widowed during this decade; <sup>††</sup> onset of period(s) of ill health or disability; <sup>†††</sup> did not own a primary residence in this decade; MW = material wellbeing; ↑ = increase in material wellbeing with age.

Table 11 presents the odds ratios for mid- (aged 45-54) and later-life (aged 55-64) events and conditions predicting membership of the C2<sub>2</sub> (material hardship), compared to C2<sub>1</sub> (good material wellbeing) group. Adjusted odds ratio and associated estimates for each factor when modelling for the effects of other events and conditions are also presented. Due to the high stability in housing tenure across ages 45-64, only homeownership 55-64 was considered in the adjusted model.

While the unadjusted models indicate that women and Māori were more likely to experience material hardship in later life than men and non-Māori respectively, the adjusted odds were consistent with there being no difference between these groups when modelling the impacts of mid- and later- life events and conditions. The adjusted odds of material hardship in later life were greater for those who did not have a tertiary education. The adjusted odds of material hardship in later life were also greater for those who experienced a relationship loss aged 45-54. However estimates were consistent with there being no difference in odds of material hardship between those who did and did not experience a relationship loss aged 55-64. The observed difference in the odds of material hardship for those who experienced a prolonged illness onset ages 45-54 were consistent with there being no difference from those without an illness onset 45-54. When adjusting other events and unemployment ages 55-65, the difference in the odds of material hardship for those reported three or more year's unemployment ages 45-54 were consistent with there being no difference from those who did not experience three or more year's unemployment. Overall, this model indicates that the odds of material hardship are increased with relationship loss 45-54, onset of prolonged illness or disability 55-65, not being a homeowner 55-64 and prolonged unemployment aged 55-64.

Table 11 Odds ratios for association of mid- and later- life risk factors predicting material hardship in later life and adjusted odds ratios for full model (n = 776).

	Hardship, increasing MW			
	OR (95% CI)	AOR (95% CI)	SE	(Est – 1)/SE
Female	<b>1.48 (1.26, 1.72)</b>	0.98 (0.59, 1.61)	0.31	-0.08
Māori	<b>2.69 (2.31, 3.15)</b>	1.60 (0.98, 2.62)	0.30	1.58
No tertiary education	<b>2.85 (2.19, 3.71)</b>	<b>4.72 (2.06, 10.81)</b>	0.50	3.07
<b>Relationship loss</b>				
45-54	<b>2.52 (1.49, 4.27)</b>	<b>2.68 (1.46, 4.90)</b>	0.37	2.68
55-64	1.10 (0.51, 2.37)	0.86 (0.37, 2.00)	0.51	-0.29
<b>Illness or disability</b>				
45-54	1.11 (0.60, 2.06)	0.99 (0.49, 1.97)	0.42	-0.04
55-64	<b>2.24 (1.39, 3.60)</b>	<b>2.56 (1.46, 4.48)</b>	0.34	2.76
<b>Not homeowner</b>				
45-54	<b>3.53 (2.22, 5.61)</b>	-	-	-
55-64	<b>4.28 (2.71, 6.76)</b>	<b>4.34 (2.55, 7.37)</b>	0.32	4.54
<b>Not in paid work 3+ years</b>				
45-54	<b>2.42 (1.56, 3.75)</b>	1.14 (0.60, 2.14)	0.39	0.33
55-64	<b>3.06 (1.83, 5.12)</b>	<b>2.56 (1.38, 4.74)</b>	0.37	2.52

Note: OR = odds ratio for univariate models; AOR = adjusted odds ratio; 95% CI = 95% confidence interval; SE = standard error of the estimate; REF = reference category for categorical indicator comparison; bolded estimates indicate greater odds of material hardship; MW = material wellbeing.

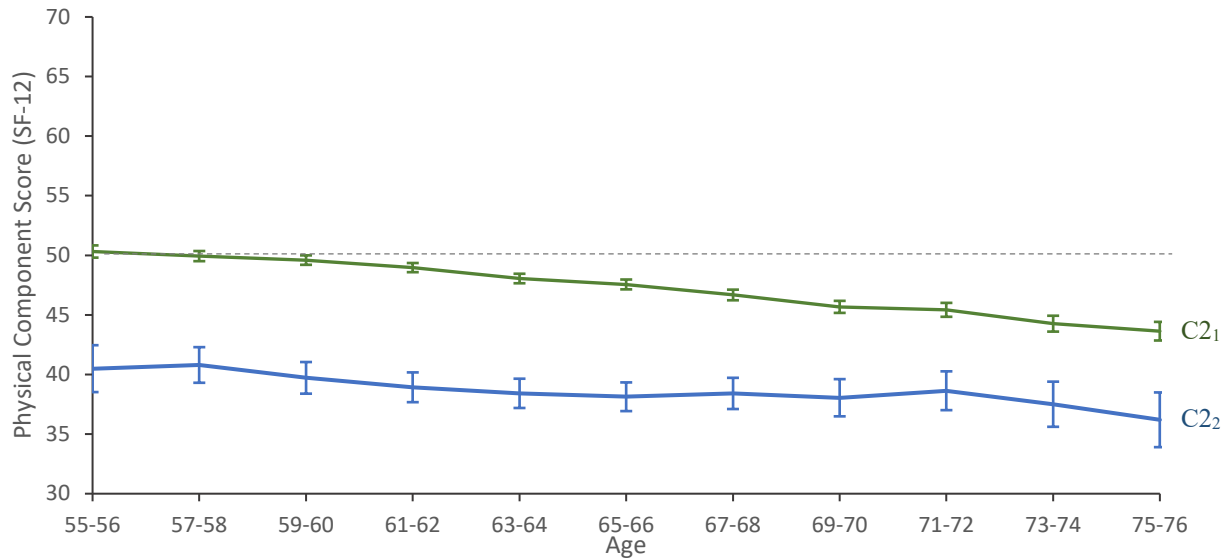
## Section D: Non-material wellbeing outcomes associated with profiles of material wellbeing 55-76

To assess how profiles of material wellbeing and hardship ages 55-76 relate to experiences of non-material wellbeing, multi-group linear growth curve models were estimated to assess group trends on physical, mental and social wellbeing with age. Full estimates from latent growth curve models are reported in Appendix 3.

## Physical health

A linear model of physical health (SF-12 PCS) with age provided a good fit to the data [CFI = 0.98, SRMR = 0.08, RMSEA = 0.03 (0.02-0.03)]. Observed mean scores for physical health with age for the material wellbeing profiles are presented in Figure 11.

Figure 11 Observed mean and 95% CI for physical health total scores by age and material wellbeing group. Dotted line indicates population mean.



Estimated coefficients for the linear model of physical health with age for the good (C2<sub>1</sub>) and hardship (C2<sub>2</sub>) material wellbeing profiles are displayed in Table 12. While individuals in the good and increasing material wellbeing group displayed significant variation in both their physical health at age 63-64 and their rate of decline with age, on average this group displayed a level physical wellbeing comparable to that of New Zealand population. While physical wellbeing declined with age in this group, average scores remained within 1 SD of the population mean score during the follow up period. A positive covariation of the intercept and slope indicated that those with better health at age 63-64 displayed a more rapid decline in physical wellbeing with age.

Those in the group experiencing hardship but increasing material wellbeing with age (C2<sub>2</sub>) also displayed significant variation in both the level and rate of change in physical health with age. However by age 63-64, on average this group displayed a level of physical health around 1 SD below the New Zealand population mean. This group also displayed decline in physical health over time, however there was no significant relationship between physical wellbeing at age 63-64 and rate of change in physical health with age.

Table 12 Mean (95% CI) coefficient estimates for linear model of physical health with age by group

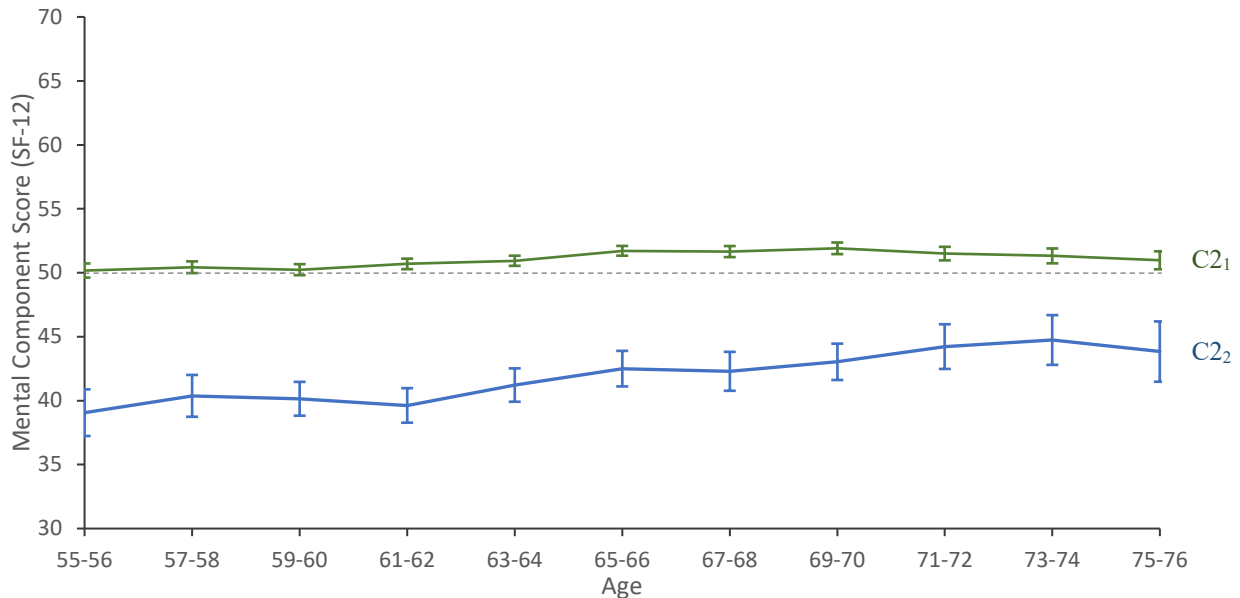
Group	N	Intercept (I)		Linear slope (S)		Covariance (I-S)
		Mean	Variance	Mean	Variance	Mean
Good, ↑MW (C2 <sub>1</sub> )	4806	47.94 (47.74, 48.14)	48.89 (46.63, 51.16)	-0.67 (-0.72, -0.62)	0.76 (0.65, 0.87)	1.69 (1.32, 2.05)
Hardship, ↑MW (C2 <sub>2</sub> )	733	38.78 (38.16, 39.40)	85.22 (76.14, 94.29)	-0.49 (-0.63, -0.34)	1.13 (0.71, 1.55)	-0.56 (-1.98, 0.87)

Note: MW = material wellbeing; ↑ = increase in material wellbeing with age.

## Mental health

A linear model of mental health (SF-12 MCS) with age provided a good fit to data [CFI = 0.98, SRMR = 0.08, RMSEA = 0.02 (0.02-0.02)]. Observed mean scores for mental health with age for the material wellbeing profiles are presented in Figure 12.

Figure 12 Observed mean and 95% CI for mental health total scores by age and material wellbeing group. Dotted line indicates population mean.



Estimated coefficients for the linear model of mental health with age for the good (C2<sub>1</sub>) and hardship (C2<sub>2</sub>) material wellbeing profiles are displayed in Table 13. While individuals in the good and increasing material wellbeing profile (C2<sub>1</sub>) displayed significant variation in mental health at age 63-64 and in the rate of change in mental health with age, this group displayed an average mental health score comparable to that of broader New Zealand population, which increased slowly with age. There was no significant relationship between mental health at age 63-64 and rate of change in mental health scores with age.

Those in the hardship but increasing material wellbeing group (C2<sub>2</sub>) also displayed significant variation in both the level of mental health at age 63-64 but displayed no significant variation in the rate of change with age. Prior to age 65, on average this group displayed a level of mental health around 1 SD below the New Zealand population mean, however mental health scores increased with age. There was no significant relationship between mental health at age 63-64 and rate of change in mental health with age.

Table 13 Mean (95% CI) coefficient estimates for linear model of mental health with age by group

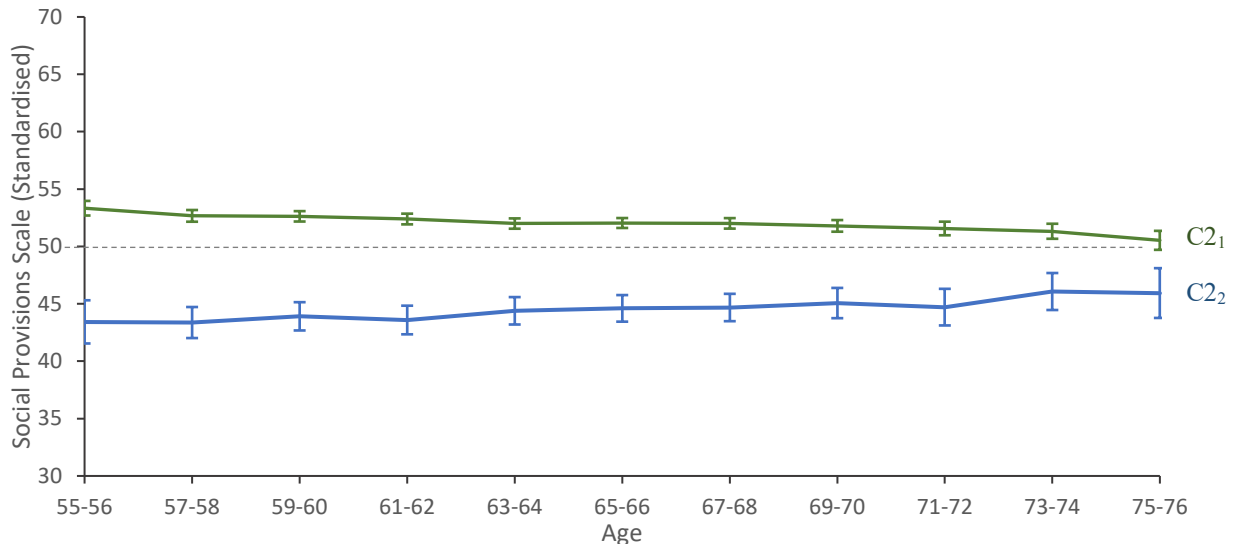
Group	N	Intercept (I)		Linear slope (S)		Covariance (I-S)
		Mean	Variance	Mean	Variance	Mean
Good, ↑MW (C2 <sub>1</sub> )	4806	50.88	38.25	0.12	0.52	-0.18
		(50.69, 51.07)	(36.28, 40.22)	(0.07, 0.16)	(0.40, 0.63)	(-0.51, 0.14)
Hardship, ↑MW (C2 <sub>2</sub> )	733	41.09	81.63	0.32	0.44	0.10
		(40.46, 41.71)	(72.35, 90.91)	(0.17, 0.47)	(0.02, 0.87)	(-1.32, 1.53)

Note: MW = material wellbeing; ↑ = increase in material wellbeing with age.

## Social wellbeing

A linear model of social wellbeing (standardized SPS total score) with age provided a good fit to data [CFI = 0.99, SRMR = 0.07, RMSEA = 0.01 (0.01-0.02)]. Observed mean scores on the social provisions scale with age for the material wellbeing profiles are presented in Figure 13.

Figure 13 Observed mean and 95% CI for social provisions scale standardized total scores by age and material wellbeing group. Dotted line indicates mean for older adults.



Estimated coefficients for the linear model of social wellbeing with age for the good (C2<sub>1</sub>) and hardship (C2<sub>2</sub>) material wellbeing profiles are displayed in Table 14. While individuals in the good and increasing material wellbeing profile (C2<sub>1</sub>) displayed significant variation in their social wellbeing at age 63-64 and in their rate of change in social wellbeing with age, on average this group displayed a level of social wellbeing around the average reported by older adults responding to Health, Work and Retirement surveys 2006-2018 and retirement planning survey. Social wellbeing declined slowly with age. This rate of change was not associated with social wellbeing at age 63-64.

Those in the material hardship profile (C2<sub>2</sub>) also displayed significant variation in both the level of social wellbeing at age 63-64 and rate of change in social wellbeing with age. On average, by age 63-64 this group displayed a level of social wellbeing around half a SD below the average reported by the older adults, and social wellbeing in this group did not change with age.

Table 14 Mean (95% CI) coefficient estimates for linear model of social wellbeing with age by group

Group	N	Intercept (I)		Linear slope (S)		Covariance (I-S)
		Mean	Variance	Mean	Variance	Mean
Good, ↑MW (C2 <sub>1</sub> )	4065	52.05	55.23	-0.19	0.38	-0.12
		(51.84, 52.26)	(52.77, 57.69)	(-0.23, -0.14)	(0.29, 0.47)	(-0.47, 0.23)
Hardship, ↑MW (C2 <sub>2</sub> )	732	43.91	66.14	-0.13	0.59	-2.18
		(43.36, 44.46)	(59.01, 73.28)	(-0.26, 0.00)	(0.27, 0.92)	(-3.35, -1.01)

Note: MW = material wellbeing; ↑ = increase in material wellbeing with age.

## Section E: Summary

Data indicate two major trajectories of material wellbeing as adults approach and pass retirement age. On average, a majority report a good level of material wellbeing prior to retirement, while around 15% of the sample indicated experiences of material hardship prior to retirement. Material wellbeing increased with age for both groups, but increased more rapidly with age for the group characterised by material hardship prior to retirement. Despite the increase with age, mean ELSI-SF scores for those in the material hardship profile remained indicative of material hardship as this group entered their 70s.

These material wellbeing trajectory profiles mapped closely to known risk factors for financial vulnerability in New Zealand. In models adjusted for other risk factors, excluding health, the likelihood of material hardship in older age was greater for Māori, those with no tertiary qualification, those who were not in a married or *de facto* relationship, those who held non-professional roles and those who not in paid work long term (*vs.* those who held professional positions), and those who have a mortgage or do not own their home (*vs.* those who owned their home without a mortgage). While women were over represented among those entering later life in material hardship, the risk of material hardship was not greater for women when other risk factors were also modelled. While indicators of health were not included as predictors of material hardship in these initial models, comparisons of the unadjusted odds of mortality among the material wellbeing groups indicated that likelihood of mortality was greater among those in the material hardship profile, confirming poor health a factor associated with poor material wellbeing in later life.

In models of the impact of mid- and later- life events on material wellbeing, odds for material hardship were greater for women and Māori, however these effects were attenuated when adjusting for adverse events in mid- and late- life, including onset of serious illness. In adjusted models, the odds of material hardship in later life were greater for those who did not have a tertiary qualification, those who experienced a relationship loss (divorce, separation or widowhood) aged 45-54, those experienced onset of serious illness aged 55-64, those not in paid employment for 3 or more years aged 55-64, and lower for those who owned their own home aged 55-64. Relationship loss for those 55-64 was observed relatively infrequently in both groups and was not associated with increased odds of material hardship. The increased risk of material hardship with relationship loss in mid-life may reflect losses of assets, income, difficulties entering or re-entering the workforce, and difficulties meeting living expenses with reduced income may all play a part in the association of relationship loss and later life material hardship. A reciprocal impact of financial hardship on relationship loss in mid-life should also be considered. Partner loss in later life may have a lesser impact on material wellbeing than partner loss in mid-life as reliance on income associated with workforce participation declines overall.

Homeownership in the current subsample of adults participating in the life course history interviews was highly stable from mid-later life. The importance of homeownership for material wellbeing in later life and the observed stability of homeownership over ages 45-64 indicate that declining homeownership in mid- and later-life may pose a challenge to the accumulation and maintenance of assets supporting material wellbeing in retirement. Similarly, the association of professional and paid employment in later life with material wellbeing suggests that barriers to continued workforce participation in mid- and later- life may present meaningful points of intervention for supporting material wellbeing in later life. Policies influencing the 'fit' of personal (e.g., health, skills) and environmental (e.g., availability and demands of suitable jobs, reduced conflict with non-work responsibilities) factors enabling continued workforce engagement in later life may include support for mid-life retraining and the availability of jobs suitable for workers who may experience barriers to continued employment in later life.

Although the cohort of adults included in the current analyses became eligible for NZ Super at age 65 (born 1936-1961), potential benefits of more recent retirement income policy reforms, such as Kiwi Saver, may not be fully realised in outcomes experienced by older adults today. Future collections of data from longitudinal participants will enable more detailed examination of wellbeing in later life under different policy settings. While detail not considered in the current work, particular focus of future analyses may include the impacts of full and part time employment, impacts of non-professional employment on health and workforce participation

and health, the nature of relationship loss, factors predicting homeownership in early adulthood and mid life, and the impact of illness duration on later life material wellbeing.

Section D of this report describes the non-material wellbeing associated with trajectories of material wellbeing as adults approach and pass retirement age. On all indices (physical health, mental health and social wellbeing), the material hardship profile displayed lower levels of non-material wellbeing than the good material wellbeing profile. Indeed, on average, adults characterized as having good material wellbeing reported levels of non-material wellbeing on par with those of the broader population. While physical health in this group declined with age, indices of mental health and social wellbeing displayed only small changes over time. In contrast, those in the material hardship profile arrived at ages 63-64 with low levels of physical and mental health relative to the general population and with social wellbeing scores around half a standard deviation below those of a broader sample of older New Zealand adults. On average physical health declined slowly with age among this group, however mental health improved with age, and social wellbeing remained stable.

Such disparities in material wellbeing outcomes may be particularly stark in early older age, as lifetime experiences of advantage and disadvantage culminate to shape the material resources with which adults arrive in older age. However, the divergence in trajectories of non-material wellbeing in older age and their impacts on material wellbeing in older age have been less extensively discussed. The relatively steep decline in physical health for those with good material wellbeing likely represents a combination of the high level of physical health with which this group reach older age, normal ageing, and transitions into retirement behaviours. Increases in mental health among older adults experiencing hardship prior to reaching age 65 may partly reflect decreased financial stress and increased ontological security with receipt of pension benefits for those who have experienced chronic financial stress, as expressed in qualitative research with retired New Zealand adults (Mansvelt, Breheny et al. 2013). Further analyses assessing potential for non-linear or piecewise models of material well-being and mental health as adults approach and pass ages of eligibility for receipt of retirement income benefits may help quantify the extent to which gains in mental health with age represent alleviation of chronic financial stress for those in material hardship.

Current data contribute to understanding the diversity and nature of material wellbeing experienced by older adults as they reach and pass the age of retirement, as well as insight into the corresponding experiences of non-material wellbeing for individuals. Strengths of the current study include its random selection of participants from a representative sampling frame, good representation of older Māori, and substantial longitudinal follow-up of adults on established indicators of material and non-material wellbeing. Older adults included in the analyses display ELSI-SF distributions consistent with those of large cross-sectional studies of the New Zealand population, indicating that data represent adults experiencing a spectrum of severe to very good material wellbeing outcomes in the wider community. The analysis approach adopted acknowledges the potential for significant differences in both the level of material wellbeing in later life and its trajectory as adults become eligible for retirement income benefits, and assesses the association of these distinct profiles with risk factors for financial vulnerability as shaped by conditions across the life course. Such methods, informed by a capabilities framework for ageing research, enable an account of ageing which acknowledges the diversity of conditions and experiences among this group and the role of these factors in shaping outcomes for individuals.

This work additionally considers a multi-dimensional view of individual-level wellbeing with age with reference to definitions of health and healthy ageing as adopted by the World Health Organization's Constitution<sup>2</sup> and Global Report on Ageing and Health (World Health Organization 2015). These positions regard health as state of a physical, mental and social wellbeing and 'healthy ageing' as the health-related functional abilities that enable people to act in ways that they themselves value. Work is continuing in the development of individual-level indicators of wellbeing for New Zealand (i.e., McLeod 2018, Te Puni Kōkiri 2019). While the current work utilizes indices of material and non-material wellbeing that consider subjective capacities, needs and desires of individuals, the suitability of wellbeing indicators for older populations, and indicators of cultural wellbeing for older adults deserve further consideration. Over the past 12 years the Health, Work and

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<sup>2</sup> Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946

Retirement survey has administered indices of cultural wellbeing for Māori as represented in the Best Outcomes For Māori Te Hoe Nuku Roa project (Cunningham, Durie et al. 2002, Cunningham, Stevenson et al. 2005) and researchers acknowledge that capacities reflected in these indicators may diverge significantly from those considered in the current report. Future work assessing correlates and trajectories of cultural wellbeing for older adults over time and assessment of wellbeing of family/whānau and communities will meaningfully deepen our understanding of wellbeing in New Zealand.

In the current work we have adopted a two-group model of material wellbeing with age. However evidence of a third group who displayed declining material wellbeing with age (6.5% of the sample) was observed. Decisions not to further explore this group in the current report were driven by its focus on material wellbeing prior to reaching the age of eligibility for NZ Super, and the limited capacity to estimate outcomes among this relatively small sub-population. However where investigations of outcomes associated with financial decline in older age are of interest, models restricting variability in growth mixture model slope parameters within groups may help to further refine this profile. Future data collections from the Health, Work and Retirement and other longitudinal studies representing older adults will increase viability of examining the wellbeing trajectories and corresponding antecedents among adults experiencing sustained decline in material living standards with age.

As populations live longer lives, expanding our knowledge about the material and non-material conditions associated with older age today will be important to understanding the diversity of needs, capacities and contributions of this large, increasing and heterogeneous population. This will require extended descriptions of conditions of health and wellbeing into older ages, as categorizations of persons as aged '65+' become increasingly untenable representations of this diverse population. While a majority of older adults experience a good standard of material wellbeing which is maintained in retirement, current findings highlight material and non-material inequalities among adults as they approach 'retirement age'. While those experiencing material hardship enter older age with poorer outcomes across all non-material indices, changes in material wellbeing and mental health with age indicate that current retirement income policies supporting material wellbeing of older adults may modestly improve outcomes among vulnerable older adults. Policies formed with the intent to reduce inequalities with which financially vulnerable adults reach older age may meaningfully focus on reducing risks associated with not owning one's home, poor health, and supporting employment and training across the life course.



## References

- Allan, J. (2001). *Classification and Issues: Review of the Measurement of Ethnicity*. Wellington, Statistics New Zealand.
- Allen, J., F. M. Alpass and C. V. Stephens (2019). *New Zealand Health, Work and Retirement Longitudinal Study*. *Encyclopedia of Gerontology and Population Aging*. D. Gu and M. E. Dupre. Cham, Springer International Publishing: 1-7.
- Clark, S. and B. Muthén (2009). *Relating Latent Class Analysis Results to Variables not Included in the Analysis*.
- Cunningham, C., M. Durie, D. Fergusson, E. Fitzgerald, B. Hong, J. Horwood, J. Jensen, M. Rochford and B. Stevenson (2002). *Living Standards of Older Māori*. Wellington The Ministry of Social Development.
- Cunningham, C., M. Durie, D. Fergusson, E. Fitzgerald, B. Hong, J. Horwood, J. Jensen, M. Rochford and B. Stevenson (2002). *Nga Ahuatanga Noho o te Hunga Pakeke Maori Living Standards of Older Maori*. Wellington, Ministry of Social Development.
- Cunningham, C., B. Stevenson and N. Tassell (2005). *Analysis of the characteristics of whānau in Aotearoa*. A report prepared for the ministry of education. Retrieved from [https://www.educationcounts.govt.nz/\\_data/assets/pdf\\_file/0005/33494/characteristics-of-whanau-31-may-2005-final.pdf](https://www.educationcounts.govt.nz/_data/assets/pdf_file/0005/33494/characteristics-of-whanau-31-may-2005-final.pdf).
- Cutrona, C. and D. Russell (1987). The provisions of social relationships and adaptation to stress. *Advances in personal relationships* (Vol. 1, pp. 37-67). Greenwich, CT: JAI Press. W. H. Jones and D. Perlman. Greenwich, CT, JAI Press. **Vol. 1:** pp. 37-67.
- Frieling, M. A., W. R. Davis and G. Chiang (2013). "The SF-36v2 and SF-12v2 health surveys in New Zealand: norms, scoring coefficients and cross-country comparisons." *Australian and New Zealand Journal of Public Health* **37**(1): 24-31.
- Hu, L. t. and P. M. Bentler (1999). "Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives." *Structural Equation Modeling: A Multidisciplinary Journal* **6**(1): 1-55.
- Hurnard, R. (2005). *The effect of New Zealand Superannuation eligibility age on the labour force participation of older people*. *New Zealand Treasury Working Paper 05/09*. Wellington: New Zealand, The Treasury.
- Jensen, J., M. Spittal and V. Krishnan (2005). *ELSI short form: User manual for a direct measure of living standards*. Wellington: Ministry of Social Development.
- Krishnan, Jensen and Ballantyne (2002). *New Zealand Living Standards 2000: Chapter 3: An overview of the living standards of the total population*, . Wellington, Centre for Social Research and Evaluation, Ministry of Social Development.
- Mansvelt, J., M. Breheny and C. Stephens (2013). "Pursuing security: economic resources and the ontological security of older New Zealanders." *Ageing and Society* **34**(10): 1666-1687.
- McLeod, K. (2018). *Our people – Multidimensional wellbeing in New Zealand (Analytical Paper 18/04)*. *Analytical Papers*. Wellington, New Zealand Treasury.
- Muthén, B. (2004). *Latent Variable Analysis: Growth Mixture Modeling and Related Techniques for Longitudinal Data*. *The SAGE Handbook of Quantitative Methodology for the Social Sciences*. D. Kaplan, SAGE Publications, Inc.
- Muthén, L. K. and B. O. Muthén (1998-2017). *Mplus User's Guide*. Los Angeles, CA, Muthén & Muthén.
- Nylund, K. L., T. Asparouhov and B. O. Muthén (2007). "Deciding on the Number of Classes in Latent Class Analysis and Growth Mixture Modeling: A Monte Carlo Simulation Study." *Structural Equation Modeling: A Multidisciplinary Journal* **14**(4): 535-569.
- OECD (2017). *Pensions at a Glance 2017. OECD and G20 Indicators*. Paris, OECD Publishing.
- Perry, B. (2013). *The material wellbeing of older New Zealanders: background paper for the Retirement Commissioner's 2013 review*, Ministry for Social Development.
- Perry, B. (2017). *Household Incomes in New Zealand: Trends in indicators n inequality and hardship 1982 to 2016*. Wellington, Ministry of Social Development.

- Perry, B. (2018). The material wellbeing of New Zealand households: trends and relativities using non-income measures, with international comparisons. Wellington, Ministry of Social Development.
- Sen, A. (1993). Capability and well-being. Oxford, Clarendon Press.
- Sen, A. (2004). "Capabilities, Lists, and Public Reason: Continuing the Conversation." Feminist Economics **10**(3): 77-80.
- Statistics New Zealand (2015). Income. 2013 Census QuickStats about people aged 65 and over. Wellington: New Zealand.
- Stephens, C. (2017). "From success to capability for healthy ageing: shifting the lens to include all older people." Critical Public Health **27**(4): 490-498.
- Te Puni Kōkiri (2019). An Indigenous Approach to the Living Standards Framework. The Treasury Discussion Paper 19/01. Wellington, Te Puni Kōkiri and the Treasury.
- Vermunt, J. K. (2010). "Latent Class Modeling with Covariates: Two Improved Three-Step Approaches." Political Analysis **18**(4): 450-469.
- Ware, J., M. Kosinski, D. Turner-Bowker and B. Gandek (2002). How to Score Version 2 of the SF-12® Health Survey (With a Supplement Documenting Version 1). Lincoln, RI, Quality Metric Incorporated.
- World Health Organization (2015). World Report on Ageing and Health. ISBN 978 92 4 156504. Luxembourg.

## Appendix 1: Key measures of material and non-material wellbeing

Table A1.1: Domains and items of the ELSI-SF

<b>Ownership</b> (have, don't have but don't want, don't have but want and can't afford)	Phone Washing machine Two pairs of shoes in a good condition and suitable for you daily activities Ability to keep main rooms adequately warm Suitable clothes for important or special occasions Home computer Contents insurance
<b>Social participation</b> (do, don't do but don't want to, don't do but want to and can't afford)	Presents for family/whānau/friends on special occasions Space for family/whānau to stay the night Family/friends over for a meal at least once each few months Visit hairdresser at least once every three months Holiday away from home at least once every year Night out for entertainment or socialising at least once a fortnight Overseas holiday at least once every three years
<b>Economising</b> (not at all, a little, a lot) – to keep down costs to help in paying for (other) basic items	Not picked up a prescription Stayed in bed to keep warm Postponed a visit to the doctor Gone without or cut back on fresh fruit and vegetables Continued wearing worn out clothes Spent less on hobbies or other special interests than you would like Do without or cut back on trips to the shops or other local places Put off buying new clothes as long as possible
<b>Global self-ratings</b>	Adequacy of income to cover basics of accommodation, food, clothing, etc. Material standard of living Satisfaction with material standard of living

Table A1.2 Domains and items of the SF-12v2

Subscale	Item
General health	In general, would you say your health is
Physical Functioning	How much does your health now limit you in: <u>moderate activities</u> How much does your health now limit you in: climbing <u>several</u> flights of stairs
Role physical	Due to physical health: <u>Accomplished less</u> than you would like Due to physical health: Limited in <u>kind</u> of work or other activities
Role emotional	Due to emotional problems: <u>Accomplished less</u> than you would like Due to emotional problems: Did work less carefully than usual
Vitality	In past 4 weeks: Did you have a lot of energy?
Mental health	In past 4 weeks: Have you felt calm and peaceful? In past 4 weeks: Have you felt downhearted and depressed?
Bodily pain	During the past 4 weeks: How much did pain interfere with your normal work
Social functioning	During the past 4 weeks: how much has your physical health or emotional problems interfered social activities

Table A1.3 Domains and items of the Social Provisions Scale

<b>Reliable Alliance</b>	<p>There are people I can depend on to help me if I really need it.</p> <p>If something went wrong, no one would come to my assistance.</p> <p>There is no one I can depend on for aid if I really need it.</p> <p>There are people I can count on in an emergency.</p>
<b>Attachment</b>	<p>I feel that I do not have close personal relationships with other people.</p> <p>I have close relationships that provide me with a sense of emotional security and well-being</p> <p>I feel a strong emotional bond with at least one other person.</p> <p>I lack a feeling of intimacy with another person.</p>
<b>Guidance</b>	<p>There is no one I can turn to for guidance in times of stress.</p> <p>There is someone I could talk to about important decisions in my life.</p> <p>There is a trustworthy person I could turn to for advice if I were having problems.</p> <p>There is no one I feel comfortable talking about problems with.</p>
<b>Opportunity for Nurturance</b>	<p>There are people who depend on me for help.</p> <p>I feel personally responsible for the well-being of another person.</p> <p>There is no one who really relies on me for their well-being.</p> <p>No one needs me to care for them.</p>
<b>Social Integration</b>	<p>There are people who enjoy the same social activities I do.</p> <p>I feel part of a group of people who share my attitudes and beliefs.</p> <p>There is no one who shares my interests and concerns.</p> <p>There is no one who likes to do the things I do.</p>
<b>Reassurance of worth</b>	<p>Other people do not view me as competent.</p> <p>I do not think other people respect my skills and abilities.</p> <p>I have relationships where my competence and skills are recognised.</p> <p>There are people who admire my talents and abilities.</p>

## Appendix 2: Risk profiles by class in the three-class GMM

Factor	C3 <sub>1</sub>	C3 <sub>2</sub>	C3 <sub>3</sub>
	Good, ↑ MW	Hardship, ↑ MW	Hardship, ↓ MW
N	4001	496	314
<b>Female %</b>	53.6%	61.5%	61.5%
<b>Māori %</b>	33.9%	53.8%	54.5%
<b>Tertiary education %</b>	22.6%	10.1%	12.7%
<b>Marital status<sup>^</sup></b>			
Married or de facto	80.2%	47.2%	49.7%
Not married or de facto	19.8%	52.6%	50.3%
<i>Missing (n)</i>	1	1	0
<b>Occupation %</b>			
Professional	28.4%	10.5%	13.7%
Non-professional	67.1%	77.5%	73.8%
Not in workforce	4.5%	12.0%	12.5%
<i>Missing (n)</i>	9	3	1
<b>Homeownership %</b>			
Owned w/o mortgage	77.2%	48.4%	47.1%
Owned w/ mortgage	15.4%	19.4%	19.1%
Rental or other tenure	6.2%	29.2%	32.5%
<i>Missing (n)</i>	49	15	4
<b>Mortality (n, %)</b>	266 (6.6%)	71 (14.0%)	36 (11.5%)

MW: Material wellbeing as indicated by mean ELSI-SF score at age 63-64; ↑ = slope indicates significant increase with age; ↓ = slope indicates significant decrease with age.

### Appendix 3: Multi-group linear growth curve model fit and estimates for physical, mental, and social wellbeing with age (C2<sub>1</sub> vs C2<sub>2</sub>)

#### Physical health (SF-12 MCS) Model intercept at ages 63-64.

<b>Model fit information</b>						
SSABIC	129510.051					
Chi-square Test of Model Fit	322.358 (117), p < .001					
RMSEA	0.03 (0.02-0.03), p = 1.00					
CFI	0.98					
SRMR	0.08					

<b>Model C2<sub>1</sub> (n = 4806)</b>	<b>95% CI</b>			SE	Est./SE	p
	Lo	Estimate	Hi			
S-I	1.32	1.69	2.05	0.22	7.65	< 0.001
<b>Means</b>						
I	47.74	47.94	48.14	0.12	390.36	< 0.001
S	-0.72	-0.67	-0.62	0.03	-22.82	< 0.001
<b>Variances</b>						
I	46.63	48.89	51.16	1.38	35.45	< 0.001
S	0.65	0.76	0.87	0.07	11.08	< 0.001
<b>Residual Variances</b>						
PCS 55-56	21.82	24.73	27.63	1.77	14.00	< 0.001
PCS 57-59	22.56	24.81	27.05	1.37	18.18	< 0.001
PCS 59-60	26.85	29.00	31.14	1.31	22.22	< 0.001
PCS 61-63	29.76	31.97	34.18	1.34	23.81	< 0.001
PCS 63-64	31.17	33.38	35.60	1.35	24.77	< 0.001
PCS 65-66	29.46	31.64	33.81	1.32	23.96	< 0.001
PCS 67-68	32.19	34.64	37.10	1.49	23.20	< 0.001
PCS 69-70	31.72	34.44	37.15	1.65	20.87	< 0.001
PCS 71-72	27.80	30.67	33.54	1.75	17.57	< 0.001
PCS 73-74	31.75	35.46	39.16	2.25	15.74	< 0.001
PCS 75-76	31.54	36.20	40.85	2.83	12.80	< 0.001

<b>Model C2<sub>2</sub> (n = 733)</b>	<b>95% CI</b>			SE	Est./SE	p
	Lo	Estimate	Hi			
S-I	-1.98	-0.56	0.87	0.87	-0.64	0.520
<b>Means</b>						
I	38.16	38.78	39.40	0.38	102.60	< 0.001
S	-0.63	-0.49	-0.34	0.09	-5.54	< 0.001
<b>Variances</b>						
I	76.14	85.22	94.29	5.52	15.45	< 0.001
S	0.71	1.13	1.55	0.25	4.47	< 0.001
<b>Residual Variances</b>						
PCS 55-56	43.30	58.58	73.86	9.29	6.31	< 0.001
PCS 57-59	30.90	40.54	50.18	5.86	6.91	< 0.001
PCS 59-60	34.87	43.27	51.68	5.11	8.47	< 0.001
PCS 61-63	29.69	36.62	43.55	4.21	8.69	< 0.001
PCS 63-64	41.20	49.36	57.51	4.96	9.95	< 0.001
PCS 65-66	32.90	40.18	47.45	4.42	9.08	< 0.001
PCS 67-68	39.11	47.47	55.83	5.08	9.34	< 0.001
PCS 69-70	38.75	47.77	56.78	5.48	8.71	< 0.001
PCS 71-72	23.88	31.42	38.95	4.58	6.86	< 0.001
PCS 73-74	30.75	41.67	52.60	6.64	6.27	< 0.001
PCS 75-76	14.65	25.50	36.35	6.60	3.87	< 0.001

**Mental health (SF-12 MCS, 55-56... 75-76) Model intercept at ages 63-64.**

<b>Model fit information</b>						
SSABIC	132531.164					
Chi-square Test of Model Fit	216.75 (117), p < .001					
RMSEA	0.02 (0.02-0.02), p = 1.00					
CFI	0.98					
SRMR	0.08					

<b>Model C<sub>2</sub><sub>1</sub> (n = 4806)</b>	<b>95% CI</b>			SE	Est./SE	p
	Lo	Estimate	Hi			
S-I	-0.51	-0.18	0.14	0.20	-0.92	0.358
<b>Means</b>						
I	50.69	50.88	51.07	0.11	445.03	< 0.001
S	0.07	0.12	0.16	0.03	3.96	< 0.001
<b>Variances</b>						
I	36.28	38.25	40.22	1.20	32.00	< 0.001
S	0.40	0.52	0.63	0.07	7.54	< 0.001
<b>Residual Variances</b>						
MCS 55-56	33.01	37.09	41.16	2.48	14.98	< 0.001
MCS 57-59	34.94	38.20	41.46	1.98	19.27	< 0.001
MCS 59-60	43.25	46.52	49.78	1.98	23.44	< 0.001
MCS 61-63	41.34	44.29	47.24	1.79	24.71	< 0.001
MCS 63-64	39.95	42.71	45.47	1.68	25.46	< 0.001
MCS 65-66	36.88	39.48	42.07	1.58	25.03	< 0.001
MCS 67-68	38.55	41.43	44.31	1.75	23.64	< 0.001
MCS 69-70	34.81	37.75	40.68	1.78	21.16	< 0.001
MCS 71-72	36.50	40.01	43.52	2.14	18.74	< 0.001
MCS 73-74	32.01	35.68	39.36	2.23	15.98	< 0.001
MCS 75-76	40.33	45.77	51.20	3.31	13.85	< 0.001

<b>Model C<sub>2</sub><sub>2</sub> (n = 733)</b>	<b>95% CI</b>			SE	Est./SE	p
	Lo	Estimate	Hi			
S-I	-1.32	0.10	1.53	0.87	0.12	0.904
<b>Means</b>						
I	40.46	41.09	41.71	0.38	107.83	< 0.001
S	0.17	0.32	0.47	0.09	3.53	< 0.001
<b>Variances</b>						
I	72.35	81.63	90.91	5.64	14.47	< 0.001
S	0.02	0.44	0.87	0.26	1.70	0.089
<b>Residual Variances</b>						
MCS 55-56	51.67	69.94	88.21	11.11	6.30	< 0.001
MCS 57-59	50.06	63.73	77.40	8.31	7.67	< 0.001
MCS 59-60	49.97	61.43	72.90	6.97	8.82	< 0.001
MCS 61-63	58.14	70.01	81.87	7.21	9.71	< 0.001
MCS 63-64	57.18	68.38	79.58	6.81	10.04	< 0.001
MCS 65-66	55.28	66.53	77.79	6.84	9.72	< 0.001
MCS 67-68	67.53	80.94	94.34	8.15	9.93	< 0.001
MCS 69-70	41.17	51.42	61.68	6.24	8.25	< 0.001
MCS 71-72	53.40	67.47	81.54	8.55	7.89	< 0.001
MCS 73-74	31.82	44.35	56.88	7.62	5.82	< 0.001
MCS 75-76	41.93	61.35	80.77	11.81	5.20	< 0.001

**Social Provisions Scale total score, standardized (zSPS, 55-56... 75-76) Model intercept at ages 63-64.**

<b>Model fit information</b>	
SSABIC	110259.94
Chi-square Test of Model Fit	7687.331 (103), p < .001
RMSEA	0.01 (0.01, 0.02), p = 1.00
CFI	0.99
SRMR	0.07

<b>Model C2<sub>1</sub> (n = 4065)</b>	<b>95% CI</b>			SE	Est./SE	p
	Lo	Estimate	Hi			
S-I	-0.47	-0.12	0.23	0.21	-0.57	0.572
<b>Means</b>						
I	51.84	52.05	52.26	0.13	404.71	< 0.001
S	-0.23	-0.19	-0.14	0.03	-6.91	< 0.001
<b>Variances</b>						
I	52.77	55.23	57.69	1.50	36.93	< 0.001
S	0.29	0.38	0.47	0.05	6.98	< 0.001
<b>Residual Variances</b>						
zSPS 55-56	27.28	31.09	34.89	2.31	13.43	< 0.001
zSPS 57-59	27.43	30.34	33.26	1.77	17.11	< 0.001
zSPS 59-60	28.99	31.53	34.06	1.54	20.45	< 0.001
zSPS 61-63	32.53	35.25	37.97	1.66	21.30	< 0.001
zSPS 63-64	29.06	31.37	33.69	1.41	22.29	< 0.001
zSPS 65-66	25.15	27.24	29.33	1.27	21.46	< 0.001
zSPS 67-68	24.46	26.65	28.84	1.33	20.00	< 0.001
zSPS 69-70	22.63	24.94	27.26	1.41	17.73	< 0.001
zSPS 71-72	24.58	27.50	30.42	1.77	15.51	< 0.001
zSPS 73-74	22.48	25.73	28.97	1.97	13.05	< 0.001
zSPS 75-76	21.51	25.63	29.75	2.51	10.22	< 0.001
<b>Model C2<sub>2</sub> (n = 732)</b>	<b>95% CI</b>			SE	Est./SE	p
Lo	Estimate	Hi				
S-I	-3.35	-2.18	-1.01	0.71	-3.07	0.002
<b>Means</b>						
I	43.36	43.91	44.46	0.34	130.92	< 0.001
S	-0.26	-0.13	0.00	0.08	-1.65	0.100
<b>Variances</b>						
I	59.01	66.14	73.28	4.34	15.25	< 0.001
S	0.27	0.59	0.92	0.20	2.99	0.003
<b>Residual Variances</b>						
zSPS 55-56	34.39	48.91	63.44	8.83	5.54	< 0.001
zSPS 57-59	35.33	46.07	56.80	6.53	7.06	< 0.001
zSPS 59-60	26.73	33.86	40.99	4.33	7.81	< 0.001
zSPS 61-63	26.08	32.98	39.88	4.20	7.86	< 0.001
zSPS 63-64	23.27	29.25	35.22	3.63	8.05	< 0.001
zSPS 65-66	27.88	34.61	41.35	4.09	8.46	< 0.001
zSPS 67-68	26.13	33.16	40.19	4.27	7.76	< 0.001
zSPS 69-70	28.58	36.91	45.24	5.07	7.29	< 0.001
zSPS 71-72	24.82	34.34	43.85	5.79	5.93	< 0.001
zSPS 73-74	17.05	26.51	35.97	5.75	4.61	< 0.001
zSPS 75-76	18.22	32.79	47.35	8.85	3.70	< 0.001