Age, ageing and subjective wellbeing in later life

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Abstract

Objectives. This paper examines age-related changes in subjective wellbeing in later life using multiple measures that cover eudemonic, evaluative and affective dimensions of wellbeing.

Method. Using data from five waves of the English Longitudinal Study of Ageing (2002-2011), we fit multilevel linear growth curve models to examine the cross-sectional effects of age and the longitudinal effects of ageing on quality of life, depressive symptomatology and life satisfaction in later life.

Results. Older individuals are shown to have a better subjective wellbeing than those that are younger for each wellbeing measure, except at the oldest age for quality of life. Nonetheless, deterioration in wellbeing is greater at older ages, even when adjusting for age-related changes in later life, including widowhood, retirement and declining health.

Discussion. The results suggest that although older people enjoy higher levels of subjective wellbeing than their younger counterparts, they experience sharper declines, especially at the oldest ages. The findings also demonstrate the importance of taking into account the multidimensionality of subjective wellbeing to determine the point at which age deterioration begins to occur across different measures.

Keywords: subjective wellbeing, age, ageing, growth curve modelling.

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Introduction

The promotion of ageing well in later life is a key strategy of public health policy in many developed countries. In the UK and US, this is accompanied by a shift from measuring successful ageing as the absence of physical and mental health conditions towards assessing what is commonly referred to as subjective wellbeing (SWB) (HM Government, 2010; National Prevention Council, 2011). There are three broad approaches to the measurement of SWB in the academic literature: eudemonic, evaluative and affective.

The eudemonic approach can be defined as the self-assessed worth of an individual's life and how much control they feel they have over it (Ryff & Singer, 1998). The evaluative approach is based on a global appraisal of one's life and is measured in its crudest form by simply asking people how satisfied they are with their life. Diener (1994) suggests that although a single question tends to serve well as a measure of life satisfaction, it should be supplemented with multiple indicators. Affective wellbeing can be defined as the degree of positive or negative affect a person has experienced, including feelings of happiness, sadness, anxiety or excitement (Tinkler & Hicks, 2011). This could be in terms of frequency or intensity within a given time frame or at a certain point in time.

This paper provides a longitudinal analysis of the relationship between age and ageing, and how ageing effects vary with age, and the three approaches to the measurement of SWB (eudemonic, evaluative and affective wellbeing) in a sample of adults aged 50 and over in England. Such an approach is atypical since most of the existing literature employs specific measures and does not cover the differential effects of age on multidimensional constructs of SWB. Moreover, it is relevant to focus on change in SWB in older adults, as it is often assumed that greater deterioration at older ages is associated with a progressive decline in physical and mental capacity (Baird, Lucas, & Donnellan, 2010).

Wiggins, Higgs, Hyde & Blane (2004) and Netuveli, Wiggins, Hildon, Montgomery & Blane (2006) have both found a significant effect of age on a quality of life measure related to eudemonic SWB, when analysing the relationship using cross-sectional data. Wiggins et al. (2004) use a nationally representative sample of surviving members of the 1930s Boyd-Orr study of health and diet. They find that respondents aged 70 and over are predicted to have lower quality of life than those younger. Netuveli et al. (2006) use cross-sectional data from the first wave of the English Longitudinal Study of Ageing (ELSA) and find that quality of life increases from age 50 to a peak at 68 years, and from there it declines gradually.

Zaninotto, Falaschetti & Sacker (2009) have also used data from ELSA over three survey waves to predict age trajectories in quality of life, using the same eudemonic wellbeing measure. They use a structural equation growth model and find that once controlling for a range of time invariant and time varying determinants of SWB, including demographic, health, socioeconomic and psychological factors, there is no longer an association between initial age and quality of life. However, older age

predicts a faster within-individual decline over time. This means that age is not related to SWB, but that for those who are older ageing is related to a significant change over time. Zaninotto et al. (2009) show that when controlling for these effects quality of life is lower for men than women and for those with no qualifications than those with qualifications. Factors that had a negative impact on quality of life over time, in addition to ageing, were depression, functional limitations, poor wealth, not being in paid employment, not perceiving positive support from one's spouse, children and friends, and having a small social network of close friends and family.

Similar conclusions are drawn by Gerstorf, Lovden, Rocke, Smith & Lindenberger (2007), using data from the Berlin Aging Study and an old age-specific multidimensional SWB measure comprising non-agitation, ageing satisfaction and life satisfaction. They analyse change in the composite SWB measure across six waves of data collection, spanning 13 years, with respondents at an average age of 85 at baseline, and find no effect of age on initial SWB after adjusting for health constraints, openness to new experiences and social participation. However, they equally did find a negative effect on the change in SWB over time for adults who are older at baseline. This highlights the importance of not only considering the cross-sectional effect of age on SWB, but also the change within individuals over time and how this varies with age.

To date, few studies have considered the multiple approaches to the measurement of SWB (i.e. eudemonic, evaluative and affective) using the same sample, which makes it difficult to compare the effect of age, ageing and other determinants across measures. An exception is Steptoe, Demakakos & de Oliveira (2012) who use a variety of SWB measures from ELSA to compare the longitudinal relationship between eudemonic, evaluative and affective wellbeing and their known determinants, including age, over an eight year period. They find that there is a lower level of positive affect and a greater level of negative affect, for those aged 80 and over, and particularly for women. There is a similar relationship between age and change in eudemonic wellbeing. The change in evaluative wellbeing is more complex with those in the youngest age group at baseline (50-59) progressively increasing their average life satisfaction score compared with a decline for older age groups. Steptoe et al. (2012) do not control for other effects in their analysis of change in SWB.

In this study, we use three measures covering the eudemonic, evaluative and affective approaches to examine the relationship with age and ageing. We adjust for age related changes in later life as well as other factors associated with wellbeing in the older population, to determine whether these explain lower levels of subjective wellbeing at the oldest age and an accelerated decline at the oldest age. Our first hypothesis is that cross-sectional differences in SWB will not vary by age once controlling for mediating effects that are known to be associated with SWB and age. Our second hypothesis is that older people will experience a faster longitudinal deterioration in each of measure of SWB, even after adjusting for the mediating time-varying effects of retirement, marital and health status, as well as other known associates of SWB in the older age population.

Methods

Data

This study uses data from the English Longitudinal Study of Ageing (ELSA) collected over five waves during an 8-year period. ELSA is a panel study of people aged 50 and over, which began data collection in 2002 and has continued to track the same individuals every two years (Steptoe, Breeze, Banks, & Nazroo, 2012). The ELSA sample was refreshed at waves 3 and 4 to ensure a representative cross-sectional sample of the population aged 50 and over. Only sample members who were present at wave 1 are included in the analysis in this study. The original ELSA sample was drawn from 18,651 respondents to the Health Survey for England in 1998, 1999 or 2001 and are interviewed face to face as well as asked to complete a self-completion questionnaire. There were 10,331 sample members that completed both a computer-assisted personal interview and a self-completion questionnaire in 2002-03 at wave 1; 8,256 respondents at wave 2; 7,103 respondents at wave 3; 6,261 respondents at wave 4; and 5,913 respondent at wave 5. Attrition means that the number of waves completed by sample members ranges from 1 to 5, with a mean of 3.1. The details of the ELSA sample are described in more depth by Cheshire, Hussey, Phelps & Wood (2012).

Outcome measures

Eudemonic subjective wellbeing is measured using a revised 15-item version of the CASP-19 scale developed by Wiggins, Netuveli, Hyde, Higgs & Blane (2007). CASP-19 was specifically designed to measure quality of life in later age covering four domains of individual needs: control, autonomy, self-realisation and pleasure. In the original CASP-19 scale, tested using data from wave 1 of ELSA, three domains had five items with the control domain having four (Hyde, Wiggins, Higgs, & Blane, 2003). A quality of life index is constructed by summing the scores to four-point Likert scale responses (often, sometimes, not often, never) for each item. In a revised 15-item scale suggested by Vanhoutte (2012), four items are removed that either have low factor loadings to the substantive domain (i.e. shortage of money and family responsibility), or have moderate loadings across multiple substantive domains (i.e. my age prevents me from doing things and my health stops me from doing things). The resultant 15-item CASP scale reflects a three-factor solution where the control and autonomy domains form one factor and each domain includes five items. The summed scores for the revised 15-item scale range from 0 to 45 where a higher score indicates better quality of life. The items that form the revised CASP-15 scale are asked in the self-completion questionnaire in ELSA.

Evaluative subjective wellbeing is measured using the Satisfaction With Life Scale (SWLS) developed by Diener, Emmons, Larsen & Griffin (1985). This scale, which consists of five items about overall life satisfaction, is a widely used measure of subjective wellbeing in academic research (Pavot & Diener, 2008). Similarly to CASP, SWLS has Likert scale responses which are summed to provide an overall score. The responses range from strongly agree to strongly disagree on a seven-point scale which result in summary scores from 5 to 35, with higher scores indicating greater life

satisfaction. The SWLS items were asked in the self-completion questionnaire in ELSA from wave 2 onwards.

Affective subjective wellbeing is measured using a shortened 8-item version of the Center for Epidemiologic Studies-Depression (CES-D) scale (Radloff, 1977). CES-D provides an indication of negative affect during the last week through questions which ask about depressive symptoms experienced. The items are answered using binary yes/no responses which can be summed to give summary scores ranging from 0 to 8. Those with higher scores are considered to show more depressive symptoms. Steffick (2000) suggests dichotomising the CES-D scores at the point of four or more symptoms to indicate those most at risk of depression. A continuous measure is used in the analysis in this paper to make it easier to compare the results from the other subjective wellbeing measures. Modelling CES-D with a binomial distribution did not alter the substantive findings (not shown here). The items that form the CES-D are asked during the face-to-face interview in ELSA.

Marital status

Marital status is measured at each survey wave using a four-group categorisation based on individuals' current and previous relationships: single and never been married nor in a civil partnership; married, in a civil partnership or cohabiting; separated or divorced; and widowed.

Economic activity

Economic activity is grouped into three categories: employed; retired; and other inactive (i.e. unemployed, permanently sick or disabled, or looking after family) and measured at each survey wave.

Health status

Limiting long-standing illness is recorded if the respondent reports a long-standing illness that is likely to affect them over a period of time in a way that limits their activities. The number of limitations in Activities of Daily Living (ADL) and Instrumental Activities in Daily Living (IADL) reported by the respondent provide an indication of disability. ADLs comprise dressing, walking, bathing, eating, getting out of bed and using the toilet. IADLs comprise preparing a hot meal, shopping for groceries, making telephone calls, taking medication, doing work around the house and managing money. Chronic conditions are measured by the number of the following health problems a respondent reports having ever been diagnosed with: heart disease, a stroke, diabetes, cancer, lung disease, or arthritis. The health status characteristics are measured at each survey wave.

Additional variables

We include a number of additional variables that have been shown to be associated with subjective wellbeing, but are not highly correlated with age, and are measured at each survey wave unless stated otherwise.

Demographic - Gender and ethnicity are measured at baseline (wave 1). Ethnicity is dichotomised into white and non-white.

Social support - The receipt of social support is measured by the number of close contacts an individual has and the level of support they receive from these contacts. Close contacts are defined as children, other immediate family and friends that an individual has a close relationship with. The level of support from these contacts is measured by a positive support score calculated from three items that ask how much they understand the way the respondent feels about things, how much they can be relied on if the respondent has a serious problem and how much the respondent can open up to them to talk about worries. Responses are summed for support from children, other immediate family and friends and range from 0 to 27, with a high score indicating greater social support.

Volunteering - Volunteering is measured by whether a respondent has volunteered in the last month.

Socioeconomic - Socioeconomic status is measured using wealth, occupational class categorized using the National Statistics Socio-economic Classification (NS-SeC), and time spent in education. Wealth is measured at each survey wave by grouping individuals into quintiles based on non-pension family wealth. NS-SeC is used as a six-group categorisation, which classifies occupations according to the structure of employment in modern society (Rose & Pevalin, 2005). Respondents are classified by their current or most recent job at baseline into the following categories: managerial and professional occupations; intermediate occupations; small employers and own account workers; lower supervisory and technical occupations; semi-routine and routine occupations; and other.

Education is measured at baseline using the age an individual first left full-time education. Individuals are grouped into three categories: those that left at or before the compulsory school-leaving age that applied in the UK to their cohort (referred to as 'low' education), those leaving school after compulsory school-leaving but before age 19 (referred to as 'mid' education) and those leaving at or after age 19 (referred to as 'high' education).

Statistical analysis

We use a multilevel linear growth curve model to predict subjective wellbeing scores in ELSA at baseline and change in wellbeing over time, conditional on age and survey wave. The measurement of subjective wellbeing at waves 1-5 provides clustered data where repeated measures of the outcomes at level 1 are clustered within individuals at level 2. Longitudinal data in this form lends itself to analysis using multilevel modelling to take account of its hierarchy (Goldstein, Healy, & Rasbash, 1994; Steele, 2008). The multilevel modelling procedure can estimate the amount of variability

within individual trajectories over time and the amount of variability between individuals.

The first model fitted is a simple variance components model, with no predictor variables, to examine how the total variance is partitioned between individuals and within individuals. A subsequent base model is estimated that includes age at baseline at level 2, survey wave at level 1, and a cross-level interaction between these effects. This model shows the cross-sectional age effect, the longitudinal ageing effect and how ageing effects depend on starting age.

It might be expected that the linear growth rate measured by the survey wave will vary from individual to individual, rather than be fixed, and therefore a random effect for survey wave could be added. However, in the interest of parsimony and due to the fact that the inclusion of random effects on survey wave and baseline age did not alter the substantive findings, only a linear growth model is reported. Survey wave is fitted as a linear effect rather than using dummy variables to save on degrees of freedom. The inclusion of a linear effect does not alter the substantive findings. The model is specified as follows:

$$Y_{tj} = B_{0tj} + B_1(wave_{tj}) + B_2(age_j) + B_3(age_j)^2 + B_4(wave*age_{tj})$$
$$B_{0tj} = B_0 + u_{0j} + e_{0tj}$$

where t (t=1,…,T_j) indicates the level 1 units (survey wave) within j (j= 1,…,n) level 2 units (individuals); Y_{tj} is the SWB score at time t of an individual j; B_1 is a coefficient for the survey wave; B_2 is a coefficient for an individuals' age at baseline centred to a mean of 65; B_3 is a quadratic term for age at baseline to take account of the non-linear relationship expected between age and SWB; B_4 is a cross level interaction between survey wave and baseline age which indicates the change in SWB by age over survey waves. The fixed effect of the intercept B_0 indicates the mean SWB score at wave 1 for an individual aged 65 at baseline. The individual level residuals, or random intercept effect, (u_{0j}) and the survey wave level residuals (e_{0tj}) are assumed to be normally distributed, i.e. $e_{0tj} \sim N(0, \sigma^2_{e0})$ and $u_{0j} \sim N(0, \sigma^2_{u0})$.

Additional variables are added in steps to the base model at both level 1 and level 2, including interactions with the survey wave to determine the effect over time of each additional variable. Demographic, social support, volunteering, socioeconomic and education variables are added first followed by separate steps for marital status, economic activity, and health status. The fit of the final model, including all variables, is assessed by the reduction in the -2 log likelihood compared with the base model specified above. The results of the base model and the final model are presented graphically using age vector plots for each one-year cohort which show the baseline score for each SWB outcome, at the origin of each line, and the change over each survey wave represented by the slope of each line (see Figure 1).

An advantage of using a multilevel model to analyse change over time is that the number of level 1 units clustered at level 2 does not need to be even. This uneveness often occurs with repeated measures, where attrition means that data are missing for some individuals at a later survey wave. Providing the attrition is missing at random, no further adjustment is required and the data can be combined from individuals with

different measurement patterns (Steele, 2008). Therefore, no imputation procedure is applied to the final model of interest in this study. A multiple imputation procedure was applied to a more parsimonious version of the final model for quality of life (CASP), which shows that imputation does not alter substantive conclusions drawn from non-imputed data (results available from authors).

Moreover, most of the missing data are due to missing values in the outcome SWB scores during waves 2-5, which means imputing across waves for individuals with only one observed value at wave 1 would produce estimated values that are likely to have a large degree of uncertainty by wave 5. Spratt et al. (2010) suggest that when only the outcome variable is missing, complete case analysis is likely to be unbiased providing the data missingness is unrelated to the outcome. A logistic regression model with missing at waves 2-5 as the outcome shows that CES-D and SWLS are not related to attrition when controlling for the other variables (measured at baseline) in the final model. However, lower CASP scores are associated with a higher likelihood of attrition (results available from authors).

To adjust for non-response at wave 1, the survey weights produced for ELSA respondents at wave 1 are used at level 2 in the model. These weights bring the sample in line with the 2002-03 population aged 50 and over in England (see Cheshire et al., 2012). All statistical analysis is carried out using the runmlwin command in Stata v12 (Leckie & Charlton, 2011), to fit multilevel models in MLwiN v2.25 (Rasbash, Charlton, Browne, Healy, & Cameron, 2009).

Results

Table 1 shows the weighted baseline characteristics in 2002-03 (wave 1). The mean SWB scores are 34.9 for CASP, 1.6 for CES-D and 26.1 for SWLS. The average age of a respondent at baseline is 65 and almost half are male. The vast majority of respondents in the sample are white and more than two-thirds are living with a partner. The sample is evenly distributed across wealth quintiles. Almost half are classified as working or previously working in a routine or manual occupation level and more than half had a low level of education when leaving school. Half of respondents are retired, a third are employed, and the remaining sixth are economically inactive (i.e. unemployed, permanently sick or disabled or looking after family). More than a third has a limiting long-standing illness and, on average, a respondent has 0.6 limitations in ADLs and IADLs, and 1.2 chronic conditions. The average respondent has almost 7 close contacts and a mean support score of 15.7. Around one-in-ten volunteered in the last month.

Table 2 presents the model results for each SWB outcome from the variance components models, without any predictor variables. It shows that there is a significant variation in each SWB measure within individuals over time (level 1) and between individuals (level 2), which provides a strong justification for the multilevel modelling approach. The variance partition coefficient is 0.69 for CASP, 0.53 for CES-D and 0.68 for SWLS, which means 31%, 47% and 32% of the variance in SWB scores is due to differences within individuals over time. This suggests considerable change in the SWB scores of individuals during ELSA waves 1-5.

Table 3 displays the results from each step of the linear growth curve models for CASP, CES-D, and SWLS. The fixed effect of baseline age in the base model is inconsistent across SWB measures. Individuals who are older at wave 1 are likely to indicate that they have a poorer quality of life and more depressive symptoms than those at are younger. However, older individuals at wave 1 are likely to have higher life satisfaction than those that are younger at baseline. The effect of the quadratic term for age is consistent across SWB measures, and suggests that at baseline the oldest in the sample are likely to have progressively lower CASP and SWLS scores and higher CES-D scores.

The fixed estimates of survey wave in the base model show that there is a drop in quality of life and life satisfaction over time. CASP and SWLS scores are predicted to decline for an individual aged 65 by 3.4 points and 1.2 points, respectively, over 8 years. There is not a significant effect over time on an individual of average age for the number of depressive symptoms.

The interaction term of survey wave by age shows that in the base model for all three outcome measures, SWB deteriorates faster for individuals that are older at baseline. For example, a 60-year old in 2002-03 is predicted to see their CASP score fall by almost two points between waves 1 and 5, whereas an 80-year old is predicted to see their CASP scores fall by just over five points.

Figure 1 shows this accelerated decline at older age graphically in the base model using age-vectors of change in SWB scores from wave 1 to wave 5 for each single year of age. A decline, shown by the negative slope for each single year of age, in CASP scores is consistent across all ages, although this is small up to age 55 and at an ever increasing rate thereafter. For those aged 50 to 63 SWLS scores increase over time, indicating improved life satisfaction, while for those at older ages SWLS scores decline at an increasing rate. CES-D scores decline up to age 62, indicating fewer depressive symptoms by wave 5. There is an increase in depressive symptoms over time for those aged older than 65, which increases dramatically after age 70. For example, an individual aged 78 at baseline is predicted to have a CES-D score that is 20% higher by wave 5.

The estimates from the final model in Table 3 show that the fixed effect of age at baseline is reversed when including all of the time and non-time varying effects for CASP and CES-D. This means that older individuals at baseline will have higher quality of life and fewer depressive symptoms when all other effects are held constant. The inclusion of marital status and health status variables has the greatest effect on the age coefficient for both of these outcomes. The effect of age at baseline on SWLS scores is twice as strong in the final model compared with the base model and suggests that older individuals at baseline will have even higher life satisfaction when other influences, related to age, are held constant. The effect becomes stronger with each additional step in the model, particularly when marital status and health status variables are added. The age-squared term in the final model suggests at the oldest age quality of life will be lower and more depressive symptoms will be experienced. The effect on life satisfaction becomes insignificant when adding the health status variables.

The effect of linear time on CASP scores, represented by the survey wave, becomes weaker after each model step, although the effects remains significant and negative suggesting individuals will, on average, experience deterioration in the quality of life over time. The effect of survey wave remains insignificant for depressive symptoms and becomes insignificant for life satisfaction in the final model, largely as a result of the additional variables added in the second step of the model.

The accelerated deterioration in each SWB outcome for individuals who are older at baseline, represented by the negative effect of the age by wave interaction, remains stable in each step of the models for each SWB outcome. This is despite controlling for time varying and non-time varying individual characteristics related to age and SWB in older age.

The addition of the time and non-time varying effects in the final model compared with the base model for each SWB outcome reduces the random variance in the intercept at level 2 (i.e. variation between individuals) by 38% for CASP, 39% for CES-D and 29% for SWLS. This shows that the full model explains a considerable proportion of the variance in SWB between individuals at baseline. The same cannot be said for the difference in the explained variance at level 1 between the base model and the full model. The addition of the same control variables has very little effect on the proportion of variance explained for the intercept at the survey wave level. The proportion of the within-individual variance explained at level 1 is 2% for CASP, 2% for CES-D and 1% for SWLS. The significant reduction (p-value < 0.001) in the -2 log likelihood suggests better model fit for the final model compared with the base model for each SWB outcome when taking into account the added degrees of freedom.

Figure 2 shows the predicted baseline score and trajectory over time for each single year of age from the final model. The predicted baseline value of CASP scores, represented by the starting position of each age vector is flat across each single year of age. However, the steeper downward slopes for age vectors at older ages represent an accelerated decline in quality of life compared with those at younger ages. Depressive symptoms are predicted to be lower for individuals at the older ages in the full model, however, the oldest old are predicted to experience a faster increase in the number of depressive symptoms over time. This is represented by the upward slopes in each age vector after 72. Life satisfaction is shown to be higher for each single year of age at baseline. However, there is an accelerated decline in SWLS scores after age 65.

Conclusions

This paper has explored the longitudinal relationship between multiple approaches to the measurement of subjective wellbeing, age and ageing in a sample of older adults in England. We find that there is a positive relationship between SWB and age when taking into account the factors associated with increased age and SWB which is largely explained by health and marital status. The effect of age is not significant for eudemonic wellbeing, measured by quality of life, except at the very oldest age when SWB declines marginally. Individuals have better affective wellbeing, measured by a lower number of depressive symptoms, up to age 67 and remain constant thereafter. Individuals have higher evaluative wellbeing, measured by a life satisfaction index,

up to the age of 75 and remain constant thereafter. These findings provide mixed support for our first hypothesis that SWB does not vary by age when controlling for age-related drivers and other known associates of SWB in the older age population.

In comparison with the earlier studies that find a negative or no association between age and indicators of SWB when adjusting for other effects, this study illustrates that for different indicators of SWB different relationships with age exist. Controlling for possible correlates, eudemonic wellbeing is still curvilinear in shape, illustrating that autonomy and self-actualisation initially increase and then decline among the oldest old. Depressive symptoms on the other hand do not necessarily increase when someone is older, but can actually decrease, as long as partnership support and health remain stable. Satisfaction with life on the other hand seems to increase with age. This is probably due to the adaptive nature of evaluative measures of SWB, and shows that as people age, and their health declines and they have less partnership support, they nevertheless become more satisfied with their circumstances, and are happier in their situation than they would have been if they had been ten years younger. Therefore, it is important to consider the multidimensionality of SWB when analysing its relationship with age and to consider appropriate SWB measures related to theory.

Our growth curve model shows there is considerable variation in measures of eudemonic, evaluated and affective SWB within individuals over time (as well as between individuals). This suggests that certain circumstances, perhaps age-related, are responsible for the same individuals reporting increased or decreased SWB scores over time. We find that ageing at older ages is consistently associated with an accelerated deterioration in SWB across each outcome. This effect cannot be explained by changes in retirement, marital and health status as well as other factors associated with SWB. This supports our second hypothesis and findings from previous studies using ELSA (Zaninotto et al., 2009) and the Berlin Aging Study (Gerstorf et al., 2007). The accelerated decline at the oldest age may reflect entry into the final years of life when, despite the presence of partners and the absence of health conditions, it is argued that individuals experience deteriorating subjective wellbeing that is related to a closeness to death (Gerstorf et al., 2008).

The findings of this paper should be set against a number of potential limitations that we have tried to address. First, the attrition of the ELSA sample over time means it is difficult to know whether if respondents who have dropped out were included, the findings would remain the same. This is heavily dependent on the selectivity of the attrition and the reason for drop out. Our methodology allows for an uneven sample across time points and is known to provide unbiased estimates providing attrition is not related to the outcome. This is the case for the depressive symptoms and life satisfaction outcome variables, but not the quality of life measure. Attempts to impute missing data for quality of life scores did not produce substantively different findings. The data have also been adjusted using sample weights created to ensure the sample is representative at baseline.

Second, it is unclear to what extent the results are affected by repeatedly asking people the same questions time after time. Baird et al. (2010) suggest that answering the same questions on multiple occasions might lead people to change their response over time. It is unclear, however, why the oldest old would be susceptible to instrument effects. More data is required over a longer period of time, including

refreshment sample members who have participated for more than two occasions to test this effect.

Third, there could be an effect of the distribution of the SWB scale on the findings in the paper which explain why older people who have higher SWB at baseline experience a faster decline over time. This is because those that start with higher SWB have much further to fall than those that start with low SWB. For example, for depressive symptoms, a CES-D score of zero indicates no depressive symptoms, and therefore people in this situation cannot become any less likely to be depressed. Clouston (2011) have explored this effect for grip strength in older age and suggest using an outcome of proportional decline. However, using this approach to predict CES-D scores did not alter the substantive finding of within-individual decline at later ages.

In summary, this paper suggests that age is not a definitive cause of low levels of SWB. In fact, people who are aged older than 50 can expect to have higher SWB of different forms than those that are younger. However, older people are more likely to experience a faster decline in their SWB over time. This might be related to feelings unobserved in this study that older people experience in the final years of life that are not related to economic activity, partnership status or health status. These feelings might be brought on by a realisation that one cannot live forever which themselves are brought home by the onset of one's own frailty and the frailty and bereavement of close partners, siblings and friends.

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Tables and figures

Table 1. Baseline characteristics of ELSA respondents at wave 1, 2002-03

Variable	Mean
Subjective wellbeing scores	
CASP	34.9
CES-D	1.6
SWLS*	26.1
Demographic	
Age	65.1
Male	46.5%
Non-white	2.6%
Marital status	
Single	5.1%
Partnered	69.6%
Separated	8.0%
Widowed	17.3%
Wealth	
Quintile5	20.1%
Quintile4	20.2%
Quintile3	20.1%
Quintile2	20.0%
Quintile1	19.5%
Occupational level	
Managerial & professional	28.8%
Intermediate	23.9%
Routine	47.3%
Education	
High	12.1%
Mid	31.8%
Low	56.1%
Economic activity	
Retired	49.7%
Employed	33.0%
Other inactive	17.3%
Health	
LLTI	34.2%
Limitations in ADL or IADL	0.6
Chronic conditions	1.2
Social support	
Close contacts	6.8
Support score	15.7
Carer	9.5%
volunteer	11.4%
Total sample size	**10,331**

*SWLS baseline score were first measured at wave 2 (2004-05)

Table 2. Variance components multilevel models for Quality of life, depressive symptom, and life satisfaction scores

	Variance		VPC[a]
	Level 2	Level 1	
CASP	36.75	16.18	0.69
CES-D	1.98	1.73	0.53
SWLS	27.00	12.48	0.68

[a] variance partition coefficient

Table 3. Base SWB multilevel linear growth curve models

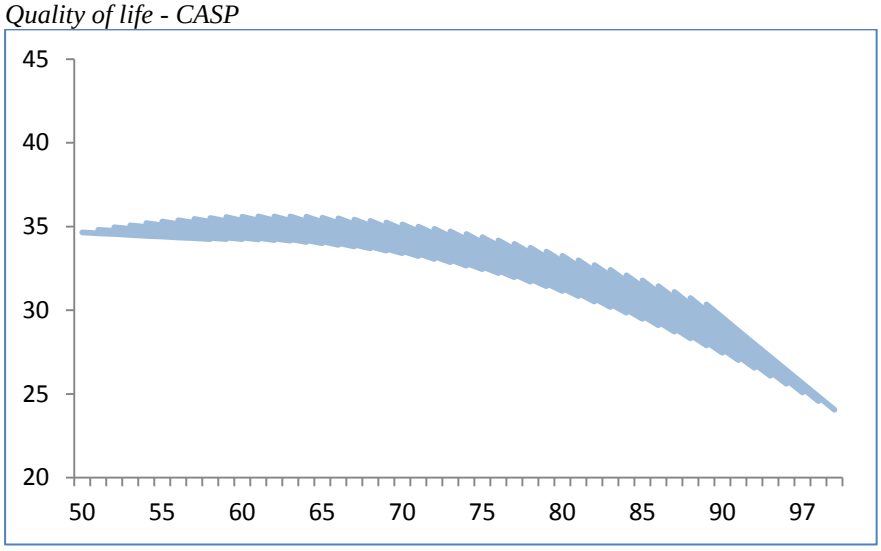
		Base Model		+ Control variables		+ Economic activity		+Marital status		+Health status (Final model)	
		Est.	S.E.	Est.	S.E.	Est.	S.E.	Est.	S.E.	Est.	S.E.
CASP	Fixed part										
	Constant	35.537***	0.101	39.000***	0.220	39.093***	0.220	39.418***	0.223	40.338***	0.223
	Wave	-0.666***	0.022	-0.562***	0.065	-0.557***	0.066	-0.620***	0.068	-0.483***	0.072
	Age	-0.047***	0.008	-0.025***	0.008	-0.018*	0.009	-0.010	0.009	0.018	0.009
	Age2	-0.007***	0.001	-0.007**	0.001	-0.007***	0.001	-0.006***	0.001	-0.005***	0.001
	Wave x age	-0.038***	0.002	-0.035***	0.002	-0.040***	0.003	-0.043***	0.003	-0.034***	0.003
	Random part										
	Level 1 variance	36.516***	0.762	29.282***	0.626	28.431***	0.605	28.115***	0.599	22.516***	0.499
	Level 2 variance	15.024***	0.303	14.949***	0.296	14.942***	0.294	14.920***	0.293	14.725***	0.286
	Log likelihood	-94904		-93956		-93833		-93772			
	N	9629									
CESD	Fixed part										
	Constant	1.416***	0.025	0.796***	0.057	0.797***	0.058	0.633***	0.058	0.395***	0.058
	Wave	0.010	0.006	0.011	0.020	0.005	0.020	0.011	0.020	-0.021	0.021
	Age	0.009***	0.002	0.002	0.002	-0.004	0.003	-0.014***	0.003	-0.020***	0.002
	Age2	0.001***	0.000	0.001***	0.000	0.001***	0.000	0.001***	0.000	0.001***	0.000
	Wave x age	0.006***	0.001	0.005***	0.001	0.006***	0.001	0.006***	0.001	0.003***	0.001
	Random part										
	Level 1 variance	1.936***	0.050	1.617***	0.043	1.552***	0.041	1.516***	0.040	1.182***	0.034
	Level 2 variance	1.717***	0.030	1.726***	0.030	1.731***	0.030	1.710***	0.029	1.684***	0.029
	Log likelihood	-62591		-62009		-61901		-61663		-60624	
	N	9917									
SWLS	Fixed part										
	Constant	26.202***	0.099	27.496***	0.225	27.472***	0.227	28.175***	0.225	28.923***	0.232
	Wave	-0.227***	0.027	-0.077	0.082	-0.035	0.083	-0.073	0.084	-0.016	0.088
	Age	0.047***	0.008	0.061***	0.008	0.071***	0.009	0.093***	0.010	0.111***	0.009
	Age2	-0.003***	0.001	-0.002**	0.001	-0.003**	0.001	-0.002*	0.001	-0.001	0.001
	Wave x age	-0.023***	0.003	-0.021***	0.003	-0.029***	0.004	-0.029***	0.004	-0.021***	0.004
	Random part										
	Level 1 variance	26.962***	0.606	23.051***	0.523	22.797***	0.517	21.407***	0.495	19.261***	0.462
	Level 2 variance	12.366***	0.256	12.418***	0.250	12.413***	0.250	12.340***	0.247	12.224***	0.241
	Log likelihood	-65616		-65164		-65127		-64890		-64501	
	N	7430									

*p < .05. **p < .01. ***p < .001.

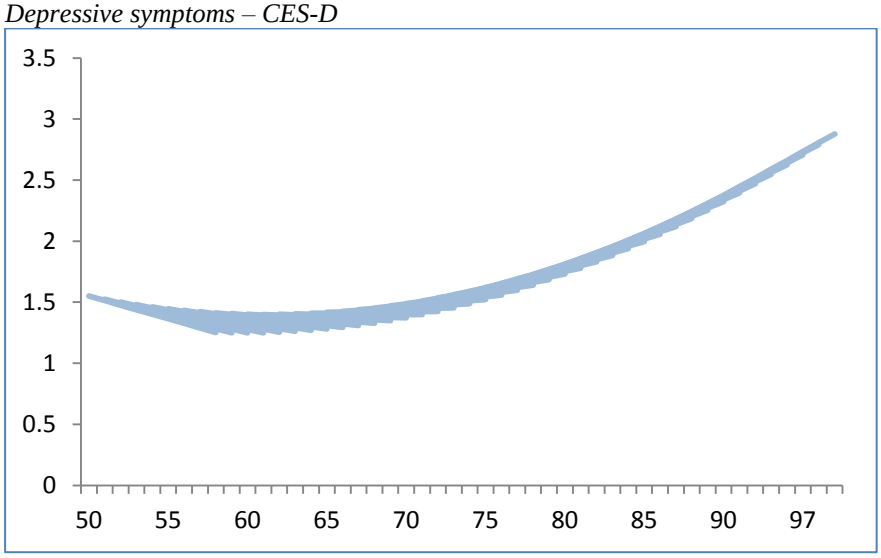
See methods section for discussion of the variable included in each step.

Figure 1. Age adjusted vector graphs for predicted SWB scores by single year of age from waves 1 to 5, 2002-2011

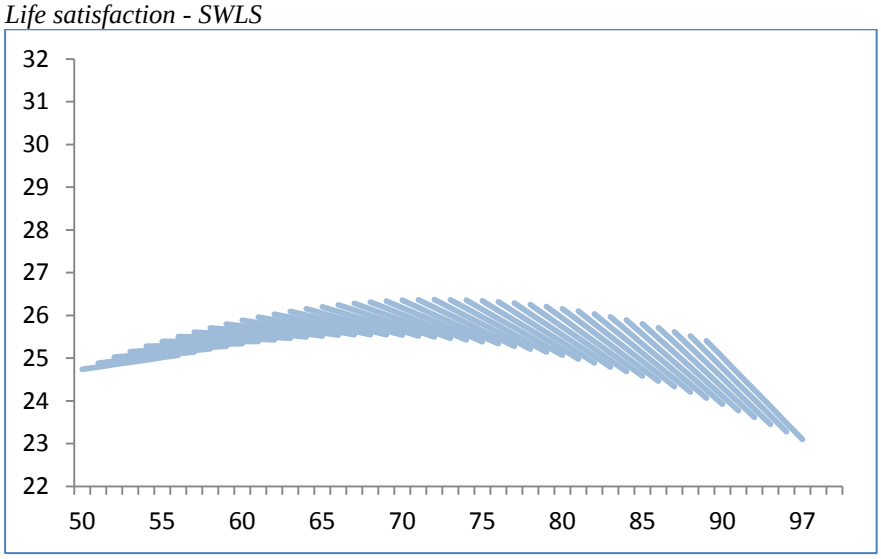
a) Quality of life - CASP



b) Depressive symptoms – CES-D



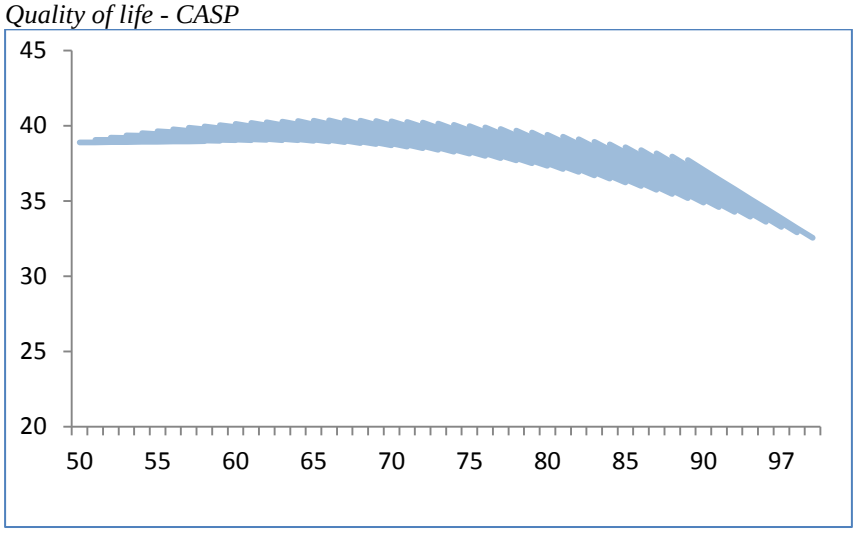
c) Life satisfaction - SWLS



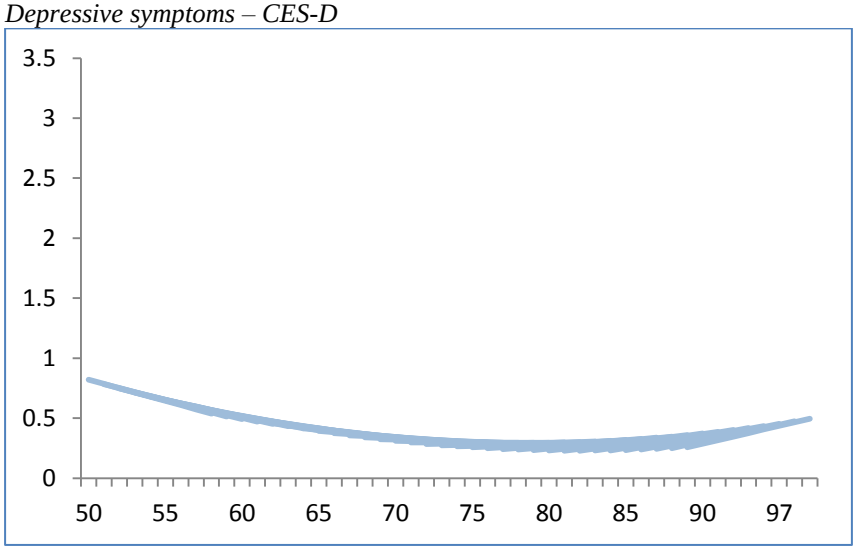
Notes: See Table 3 for base model coefficients.

Figure 2. Fully adjusted vector graphs for predicted SWB scores by single year of age from waves 1 to 5, 2002-2011

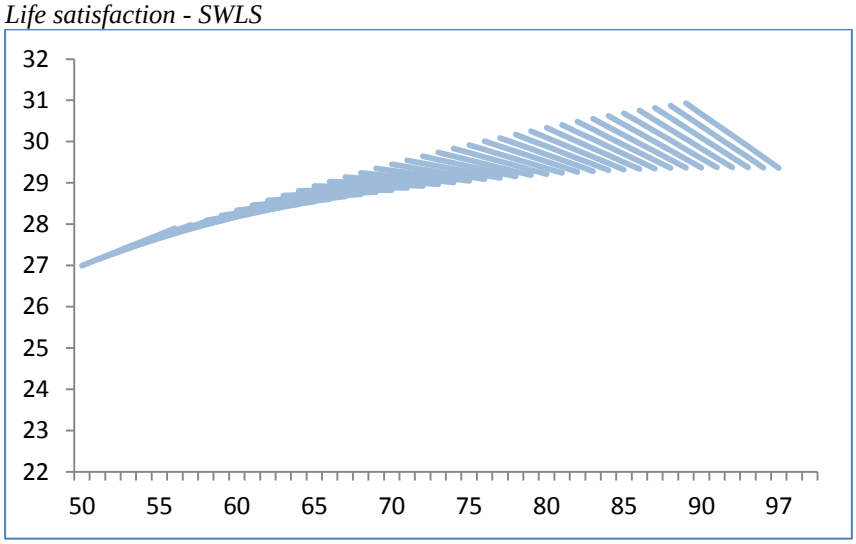
a) Quality of life - CASP



b) Depressive symptoms – CES-D



c) Life satisfaction - SWLS



Notes: Predicted values refer to an an individual who is female, white, in the richest wealth quintile, in a managerial and professional socioeconomic class, has a high education level, is volunteering, has a mean number of close contacts, support score from social contacts, ADLs, chronic conditions, has no LLSI, is retired and has a partner. See Table 4 for base model coefficients.