# Online supplement

## Tables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table S1. Characteristics of the analytic sample for ELSA Wave 3 respondents and for observations in ELSA Waves 1–7** | | | | | |
| **Exposure measures** | | **Wave 3 respondents (n=3,459)1** | | **Observations, Waves 1–7 (n=22,146)2** | |
|  |  |
| **Variable** | **Categories** | **mean** | | **mean** | |
|  |  |  |  |  |  |
| Adverse events by life course stage | Total (0–49 years) | 1.65 | | 1.68 | |
| Early childhood (0–5 years) | 0.18 | | 0.18 | |
| Late childhood (6–15 years) | 0.55 | | 0.56 | |
| Early adulthood (16–30 years) | 0.47 | | 0.47 | |
| Late adulthood (31–49 years) | 0.44 | | 0.46 | |
|  |  |  |  |  |  |
| Adverse events by self- or other-orientation and life course stage | Self-oriented, total (0–49 years) | 0.65 | | 0.65 | |
| Other-oriented, total (0–49 years) | 0.99 | | 1.02 | |
| Self-oriented, childhood (0–15 years) | 0.33 | | 0.33 | |
| Self-oriented, adulthood (16–49 years) | 0.33 | | 0.32 | |
| Other-oriented, childhood (0–15 years) | 0.40 | | 0.41 | |
| Other-oriented, adulthood (16–49 years) | 0.59 | | 0.61 | |
|  |  |  |  |  |  |
| **Covariates** | |  |  |  |  |
| **Variable** | **Categories** | **mean** | | **mean** | |
|  |  |  |  |  |  |
| Frailty index | Frailty Index | 0.13 | | 0.11 | |
|  |  |  |  |  |  |
| Household income | Equivalized income (2011 £) | 18,880.08 | | 19,589.45 | |
|  |  |  |  |  |  |
| Age | Years | 67.35 | | 67.36 | |
|  |  |  |  |  |  |
|  |  | **n** | **%** | **n** | **%** |
|  |  |  |  |  |  |
| Gender | Male | 1,613 | 46.6 | 10,237 | 46.2 |
|  | Female | 1,846 | 53.4 | 11,909 | 53.8 |
|  |  |  |  |  |  |
| Current labour market status (self-reported) | Retired | 2,045 | 59.1 | 13,319 | 60.1 |
| In paid employment | 998 | 28.9 | 6,461 | 29.2 |
| Unemployed | 27 | 0.78 | 151 | 0.7 |
| Permanently sick or disabled | 113 | 3.3 | 674 | 3.0 |
| Looking after home / other | 276 | 8.0 | 1,541 | 7.0 |
|  |  |  |  |  |  |
| Participation in social activities | Never | 1,415 | 40.9 | 8,555 | 38.6 |
| Yes | 2,044 | 59.1 | 13,591 | 61.4 |
|  |  |  |  |  |
| Partnership status | Partnered | 2,464 | 71.2 | 16,059 | 72.5 |
|  | Non-partnered | 995 | 28.8 | 6,087 | 27.5 |
|  |  |  |  |  |  |
| Born abroad | No | 3,301 | 95.4 | 21,023 | 94.9 |
|  | Yes | 158 | 4.6 | 1,123 | 5.1 |
|  |  |  |  |  |  |
| Quintile of household net worth | 1 (poorest) | 432 | 12.5 | 2,654 | 12.0 |
| 2 | 556 | 16.1 | 3,492 | 15.8 |
| 3 | 725 | 21.0 | 4,618 | 20.9 |
| 4 | 798 | 23.1 | 5,193 | 23.5 |
| 5 | 948 | 27.4 | 6,189 | 28.0 |
|  |  |  |  |  |  |
| Housing tenure | Outright ownership | 2,376 | 68.7 | 15,636 | 70.6 |
| Ownsership with mortgage | 634 | 18.3 | 3,834 | 17.3 |
| Renting / other | 449 | 13.0 | 2,676 | 12.1 |
|  |  |  |  |  |  |
| NS-SEC (five-category) | I. Managerial / professional occupations | 1,239 | 35.8 | 8,256 | 37.3 |
| II. Intermediate occupations | 524 | 15.2 | 3,351 | 15.1 |
| III. Small employers/ own account workers | 384 | 11.1 | 2,556 | 11.5 |
| IV. Technical occupations | 333 | 9.6 | 2,112 | 9.5 |
| V. Semi routine / routine occupations | 944 | 27.3 | 5,738 | 26.1 |
| Never worked | 35 | 1.0 | 103 | 0.5 |

13,459 of 4,208 respondents in Wave 3 with complete information on adverse events and their age of occurrence also had complete covariate data in Wave 3. 2The 4,208 respondents with complete information on adverse events and their age of occurrence in Wave 3 gave 22,146 observations over Waves 1–7 in which they had complete covariate data.

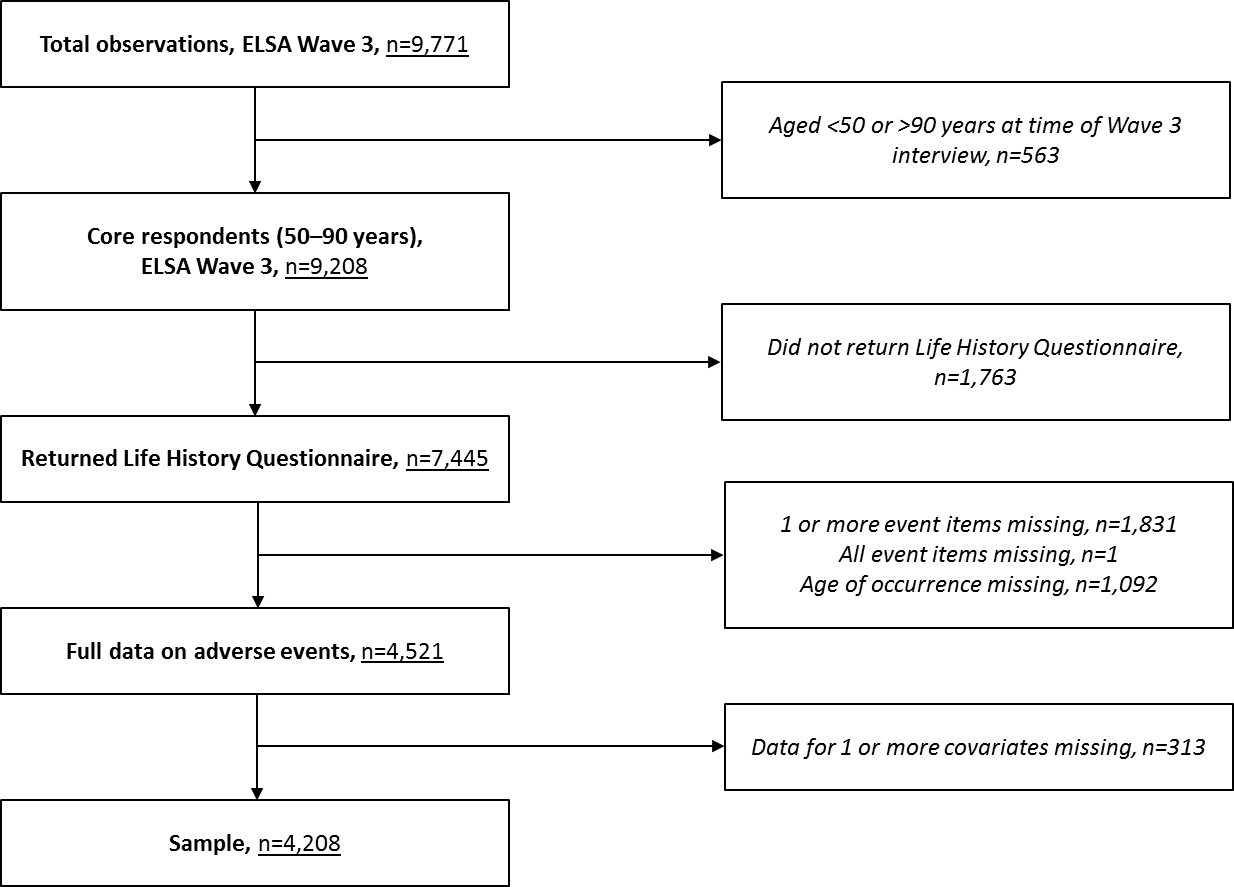
|  |  |  |  |
| --- | --- | --- | --- |
| **Table S2. Complete results of fully-adjusted model for the association between total adverse events (0–49 years) subjective life satisfaction scores (n=17,948 observations/4,152 unique individuals)** | | | |
|  |  | **Subjective life satisfaction** | |
|  |  |  |  |
| **Variable** | **Categories** | **Coefficient (95% CI)** | **p** |
|  |  |  |  |
|  |  |  |  |
| Adverse events | Total (0–49 years) | -0.11 (-0.13, -0.09) | <0.001 |
|  |  |  |  |
| Age |  | 0.00 (0.00, 0.00) | 0.918 |
|  |  |  |  |
| Gender | Male | ref |  |
| Female | -0.03 (-0.10, 0.03) | 0.302 |
|  |  |  |  |
| Physical frailty index | Frailty Index | -1.76 (-1.94, -1.57) | <0.001 |
|  |  |  |  |
| Current labour market status (self-reported) | Retired | ref |  |
| In paid employment | -0.08 (-0.14, -0.03) | 0.002 |
| Unemployed | -0.48 (-0.66, -0.29) | <0.001 |
| Permanently sick or disabled | -0.50 (-0.61, -0.39) | <0.001 |
| Looking after home / other | -0.07 (-0.14, 0.00) | 0.038 |
|  |  |  |
| Participation in social activities | Never | ref |  |
| Yes | 0.12 (0.08, 0.16) | <0.001 |
|  |  |  |  |
| Partnership status | Partnered | ref |  |
| Non-partnered | -0.41 (-0.47, -0.34) | <0.001 |
|  |  |  |  |
| Born abroad | No | ref |  |
| Yes | 0.11 (-0.03, 0.24) | 0.113 |
|  |  |  |  |
| Quintile of household net worth | 1 (poorest) | ref |  |
| 2 | 0.07 (0.00, 0.13) | 0.047 |
| 3 | 0.10 (0.03, 0.17) | 0.004 |
| 4 | 0.14 (0.07, 0.22) | <0.001 |
| 5 | 0.18 (0.10, 0.25) | <0.001 |
|  |  |  |  |
| Household income | Logged equivalized income | 0.02 (-0.01, 0.05) | 0.170 |
|  |  |  |  |
| Housing tenure | Outright ownership | ref |  |
| Ownership with mortgage | -0.06 (-0.12, 0.00) | 0.036 |
| Renting / other | -0.09 (-0.17, 0.00) | 0.041 |
|  |  |  |  |
| NS-SEC (five-category) | I. Managerial / professional occupations | 0.06 (-0.02, 0.13) | 0.121 |
| II. Intermediate occupations | 0.01 (-0.08, 0.10) | 0.820 |
| III. Small employers/ own account workers | 0.03 (-0.06, 0.13) | 0.456 |
| IV. Technical occupations | 0.03 (-0.07, 0.13) | 0.572 |
| V. Semi routine / routine occupations | ref |  |
| Never worked | 0.02 (-0.33, 0.38) | 0.891 |
|  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S3. Results of fully-adjusted models for associations between total adverse events disaggregated by age of occurrence and self- or other-orientation (Models A–E), and life satisfaction scores (n=17,948 observations/4,152 unique individuals)** | | | | | | | | | | |
|  | **Model A\*** |  | **Model B** |  | **Model C** |  | **Model D** |  | **Model E** |  |
|  | **Coefficient (95% CI)** |  | **Coefficient (95% CI)** |  | **Coefficient (95% CI)** |  | **Coefficient (95% CI)** |  | **Coefficient (95% CI)** |  |
| **Categories** | **p** | **p** | **p** | **p** | **p** |
|  |  |  |  |  |  |  |  |  |  |  |
| Total (0–49 years) | -0.11 (-0.13, -0.09) | <0.001 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Early childhood (0–5 years) |  |  | -0.07 (-0.13, -0.01) | 0.026 |  |  |  |  |  |  |
| Late childhood (6–15 years) |  |  | -0.11 (-0.14, -0.07) | <0.001 |  |  |  |  |  |  |
| Early adulthood (16–30 years) |  |  | -0.11 (-0.15, -0.07) | <0.001 |  |  |  |  |  |  |
| Late adulthood (31–49 years) |  |  | -0.12 (-0.17, -0.08) | <0.001 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, total (0–49 years) |  |  |  |  | -0.08 (-0.12, -0.05) | <0.001 |  |  |  |  |
| Other-oriented, total (0–49 years) |  |  |  |  | -0.13 (-0.16, -0.09) | <0.001 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, childhood (0–15 years) |  |  |  |  |  |  | -0.04 (-0.09, 0.01) | 0.118 |  |  |
| Self-oriented, adulthood (16–49 years) |  |  |  |  |  |  | -0.13 (-0.18, -0.08) | <0.001 |  |  |
| Other-oriented, childhood (0–15 years) |  |  |  |  |  |  | -0.14 (-0.19, -0.10) | <0.001 |  |  |
| Other-oriented, adulthood (16–49 years) |  |  |  |  |  |  | -0.11 (-0.15, -0.07) | <0.001 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, early childhood (0–5 years) |  |  |  |  |  |  |  |  | -0.02 (-0.12, 0.08) | 0.716 |
| Self-oriented, late childhood (6–15 years) |  |  |  |  |  |  |  |  | -0.05 (-0.11, 0.01) | 0.097 |
| Self-oriented, early adulthood (16–30 years) |  |  |  |  |  |  |  |  | -0.10 (-0.16, -0.03) | 0.004 |
| Self-oriented, late adulthood (31–49 years) |  |  |  |  |  |  |  |  | -0.18 (-0.26, -0.09) | <0.001 |
| Other-oriented, early childhood (0–5 years) |  |  |  |  |  |  |  |  | -0.12 (-0.22, -0.03) | 0.009 |
| Other-oriented, late childhood (6–15 years) |  |  |  |  |  |  |  |  | -0.15 (-0.20, -0.10) | <0.001 |
| Other-oriented, early adulthood (16–30 years) |  |  |  |  |  |  |  |  | -0.12 (-0.18, -0.06) | <0.001 |
| Other-oriented, late adulthood (31–49 years) |  |  |  |  |  |  |  |  | -0.10 (-0.15, -0.04) | <0.001 |
|  |  |  |  |  |  |  |  |  |  |  |

\*All models were fully adjusted for covariates including age, gender, physical frailty index, current labour market status, participation in social activities, partnership status, quintile of household net worth, household income, housing tenure at the time of interview, birth abroad and last-known occupational position (five-category NS-SEC).

## Figures

**Figure S1. Flow diagram describing the definition of the ELSA Wave 3 sample for investigation of adverse events**



**Figure S2. Cumulative proportions of respondents in the ELSA Wave 3 Life History module experiencing specific adverse events in childhood by age (weighted, n=4,521)**



## Appendices

**Appendix A1:** The CASP-12 scale encompasses twelve items across four domains: Control (“How often do you think your age prevents you from doing the things you would like to do?” “How often do you feel that what happens to you is out of your control?\*” “How often do you feel left out of things?\*”), Autonomy (“How often do you think that you can do the things that you want to do?” “How often do you think that family responsibilities prevent you from doing what you want to do?\*” “How often do you think that shortage of money stops you from doing the things you want to do?\*”), Self-realisation (“How often do you look forward to each day?” “How often do you feel that your life has meaning?” “How often, on balance, do you look back on your life with a sense of happiness?”), and Pleasure (“How often do you feel full of energy these days?” “How often do you feel that life is full of opportunities?” “How often do you feel that the future looks good for you?”). Responses were rated on a four-point Likert scale and scored from one to four. Asterisked items were reverse-coded. CASP-12 summary scores were obtained by summing scores across all individual items. Possible scores ranged from 12 to 48 with higher scores representing a higher degree of wellbeing. The CASP scale (including its CASP-12 and CASP-19 variants) has been validated using exploratory (Hyde, Wiggins, Higgs and Blane, 2003; Vanhoutte, 2014; Higgs, Hyde, Wiggins and Blane, 2003) and confirmatory (Vanhoutte, 2014; Sexton, King-Kallimanis, Conroy and Hickey, 2013; Wiggins, Netuveli, Hyde, Higgs and Blane, 2008) factor analyses.

References

**Higgs, P., Hyde, M., Wiggins, R. and Blane, D. B.** (2003). Researching quality of life in early old age: the importance of the sociological dimension. *Social Policy and Administration*, 37, 239–252. doi: 10.1111/1467-9515.00336.

**Hyde, M., Wiggins, R. D., Higgs, P. and Blane, D. B.** (2003) .A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19). *Aging & Mental Health*, 7, 186–194. doi: 10.1080/1360786031000101157.

**Sexton, E., King-Kallimanis, B. L., Conroy, R. M. and Hickey, A.** (2013). Psychometric evaluation of the CASP-19 quality of life scale in an older Irish cohort. *Quality of Life Research*, 22, 2549–2559. doi: 10.1007/s11136-013-0388-7.

**Vanhoutte, B.** (2014). The multidimensional structure of subjective wellbeing in later life. *Journal of Population Ageing*, 7, 1–20. doi: 10.1007/s12062-014-9092-9.

**Wiggins, R., Netuveli, G., Hyde, M., Higgs, P. and Blane, D. B.** (2008). The evaluation of a self-enumerated scale of quality of life (CASP 19) in the context of research on ageing: a combination of explanatory and confirmatory approaches. *Social Indicators Research*, 89, 61–77. doi: 10.1007/s11205-007-9220-5.

**Appendix A2:** Depression outcomes were measured using the eight-item Centre of Epidemiological Studies Depression Scale (CES-D). Items comprised eight self-reported depressive symptoms including “depressed”, “felt that activities were an effort”, “restless during sleep”, “lonely”, “sad”, “could not get going” or did not “enjoy life” in the past week. Scores from zero to eight were derived based on the self-reported number of symptoms. A score of 3 or more was used to define probable depressive caseness.

In addition to high reliability and validity, measures of CES-D collected using the self-completion version of the questionnaire (as in the present study) have been shown to have a high sensitivity and specificity both in an English sample (89% and 86% respectively) and in populations in other countries (Head et al., 2013).

References

**Head. J. *et al*.** (2013). Use of self-administered instruments to assess psychiatric disorders in older people: validity of the General Health Questionnaire, the Center for Epidemiologic Studies Depression Scale and the self-completion version of the revised Clinical Interview Schedule. *Psychological Medicine*, 43, 2649–2656. doi: 10.1017/S0033291713000342.

**Appendix A3:** Self-reported subjective life satisfaction was measured in ELSA participants using the question “Please say how much you agree or disagree with the following statement: I am satisfied with my life.” Responses were given on a Likert scale (“strongly agree”, “agree”, “slightly agree”, “neither agree nor disagree”, “slightly disagree”, “disagree” or “strongly disagree”) and scored from zero to seven with a score of seven representing the highest level life satisfaction and corresponding to a response of “strongly agree”. Although data on subjective life satisfaction was available in Wave 1 of ELSA, observations could not be harmonized with other waves as it employed a different response scale.

**Appendix A4:** The physical frailty index comprised the following 36 items: medically diagnosed conditions including myocardial infarction, hypertension, stroke, diabetes or elevated blood sugar, chronic obstructive pulmonary disease, arthritis, osteoporosis, cancer, Parkinson’s disease and cataracts; medical symptoms including problem sleeping or restlessness, difficulty seeing objects at distance and difficulty seeing objects at arm's length; difficulties with functional activities including walking short distances (100 yards), sitting for long periods (≥2 hours), standing up from sitting down, climbing several flights of stairs, climbing one flight of stairs without resting, kneeling or crouching, extending arms above shoulders, pulling or pushing large objects, carrying or lifting heavy objects (≥10lbs) and picking up a small coin from a table; and difficulties with activities of daily living including dressing (including shoes and socks), walking across a room, bathing or showering, eating independently, getting in or out of bed, using the toilet (including getting up or down), using a map to navigate in a strange place, preparing a hot meal, shopping for groceries, making telephone calls, taking medication, work in the home or garden and managing money. Each item was assigned one point and these were summed to generate an index score from 1 to 36. Scores were rescaled to give a continuous variable with a range of 0 to 1. For more information, see Richardson et al. (2018).

References

**Richardson, S., Carr, E., Netuveli, G. and Sacker, A.** (2018). Country-level welfare-state measures and change in wellbeing following work exit in early old age: evidence from 16 European countries. *International Journal of Epidemiology*, 48, 389–401. doi: 10.1093/ije/dyy205.

**Appendix A5:** Activities included participating in a political party, trade union or environmental group, tenant group, resident group or neighbourhood watch, charitable association, education, arts or music group, a social club, or sports club, gym or exercise class.

**Appendix A6:** A manual likelihood-ratio-test-based forward stepwise selection procedure was used to determine which independent variables would be included in the final model in addition to measures of exposure to adverse events according to their age of occurrence, or self or other orientation, over the life course. The significance level for inclusion in the model was p=0.05.

We attempted to identify the widest-possible range of covariates available over Waves 1–7 of ELSA covering health, socioeconomic position, and other factors, to adjust for potential confounding of the association between experiences of adverse events and later-life wellbeing and depression outcomes. The list of potential covariates was defined a priori, based on the full list of covariates considered for inclusion in a previous analysis conducted by Richardson et al. (2018) on the association between route and timing of work exit and change in wellbeing following labour market transitions, excluding variables related to work and labour market exit (route of exit from work, age at exit from work, number of hours worked per week, effort-reward ratio in employment), but including current labour market status and last-known occupational position measured using the five-category National Statistics Socio-economic Classification (NS-SEC) groupings. The final list of potential covariates included age, gender, physical frailty index, current labour market status, participation in social activities, partnership status, quintile of household net worth, equivalized household income, housing tenure at the time of interview, birth abroad and last-known occupational position. This model selection procedure was applied to CASP-12 outcomes, and it was found that the best-fit model was the maximally-adjusted model with all covariates included. The same covariates were employed in analyses of CES-D and subjective life satisfaction outcomes.

The table below shows models for all three outcomes adjusted for different groups of covariates to determine whether their inclusion in the model influenced the association between exposure to adverse events and wellbeing outcomes. After fitting unadjusted multilevel models for the associations between total adverse events (0–49 years) and CASP-12, CES-D depression caseness and and subjective life satisfaction scores, five further models were fitted for each of these outcomes. Model 1 adjusted for frailty index and age. Model 2 further adjusted for gender, current labour market status, participation in activities, partnership status and birth abroad. While both Models 3 and 4 included all covariates fitted in Model 2, Model 3 further adjusted for NS-SE) and Model 4 adjusted for household net worth, household income and housing tenure. A fully-adjusted model was then fitted with inclusion of all variables mentioned above.

We considered whether the model covariates may act as mediators rather than confounders for the associations tested (VanderWeele, 2016). The results of six models show that counts of adverse events were significantly and independently associated with all three outcomes, and that effect sizes were similar and unattenuated regardless of covariates included. This finding suggests that the covariates included in the fully-adjusted model were unlikely to act as mediators for the relationship between experiences of adverse events and later-life wellbeing and depression outcomes.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Results of linear and logistic random-effects regression models for the associations between total counts of adverse life events (0–49 years) and CASP-12 scores, CES-D depressive caseness (logistic model) and subjective life satisfaction scores with adjustment for different groups of covariates** | | | | | | |
|  | **Total adverse life events (0–49 years)** | | | | | |
|  | **CASP-12**  **(n=20,701 observations /4,176 unique individuals)** | | **CES-D (n=22,039 observations /4,208 unique individuals)** | | **Subjective life satisfaction (n=17,948 observations /4,152 unique individuals)** | |
|  |
| **Model** | **Coefficient (95% CI)** | **p** | **Odds ratio (95% CI)** | **p** | **Coefficient (95% CI)** | **p** |
|  |  |  |  |  |  |  |
| No adjustment | -0.53 (-0.63, -0.44) | <0.001 | 1.29 (1.22, 1.36) | <0.001 | -0.14(-0.15, -0.11) | <0.001 |
|
|  |  |  |  |  |  |  |
| Model 1 | -0.52 (-0.61, -0.44) | <0.001 | 1.19 (1.14, 1.25) | <0.001 | -0.11 (-0.13, -0.09) | <0.001 |
|
|  |  |  |  |  |  |  |
| Model 2 | -0.52 (-0.60, -0.43) | <0.001 | 1.21 (1.16, 1.27) | <0.001 | -0.11 (-0.13, -0.09) | <0.001 |
|
|  |  |  |  |  |  |  |
| Model 3 | -0.53 (-0.62, -0.44) | <0.001 | 1.22 (1.16, 1.28) | <0.001 | -0.12 (-0.14, -0.10) | <0.001 |
|
|  |  |  |  |  |  |  |
| Model 4 | -0.49 (-0.58, 0.41) | <0.001 | 1.19 (1.14, 1.26) | <0.001 | -0.11 (-0.13, -0.09) | <0.001 |
|
|  |  |  |  |  |  |  |
| Full model | -0.49 (-0.58, 0.41) | <0.001 | 1.19 (1.14, 1.25) | <0.001 | -0.11 (-0.13, -0.09) | <0.001 |
|
|  |  |  |  |  |  |  |
| **Model 1:** frailty index and age  **Model 2:** Model 1 + gender, current labour market status, participation in activities, partnership status and born abroad  **Model 3:** Model 2 + NS-SEC  **Model 4:** Model 2 + household net worth, household income and housing tenure  **Full Model:** Model 2 + NS-SEC, household net worth, household income and housing tenure (all covariates) | | | | | | |

References

**Richardson, S., Carr, E., Netuveli, G. and Sacker, A.** (2018). Country-level welfare-state measures and change in wellbeing following work exit in early old age: evidence from 16 European countries. *International Journal of Epidemiology*, 48, 389–401. doi: 10.1093/ije/dyy205.

**VanderWeele, T. J.** (2016). Mediation analysis: a practitioner's guide. Annual Review of Public Health, 37, 17–32. doi: 10.1146/annurev-publhealth-032315-021402.

**Appendix A7:** We fitted fully-adjusted fixed-effects linear and logistic regression models for models for the association between total adverse events (0–49 years), and CASP-12 scores, CES-D depressive caseness (logistic model) and subjective life satisfaction scores (Model A) for the purposes of calculating variance inflation factors (VIFs) to measure the degree of multicollinearity for each model covariate. Random-effects models were not fitted as calculation of VIFs was not supported in Stata 14.

VIF provides an index of how much the variance of a given estimated regression coefficient in a multivariate model is increased due to collinearity with other covariates, compared with that of a model with one term alone. A VIF of 10 is typically considered to signify a problematic degree of multicollinearity for a model variable (Neter et al., 1989).

VIFs for linear regression models were calculated using the estat vif command. The package and command collin was used for calculating results for CES-D depressive caseness outcomes as a logistic model was used.

The table below shows the VIFs for each model covariate from the three models fitted. In no instance did the VIF for any model covariate exceed 3.5; this suggests that multicollinearity was unlikely to have posed a significant issue for model estimation.

References

**Neter, J., Wasserman, W. and Kutner, M. H.** (1989). Applied Linear Regression Models. Homewood, IL: Irwin.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table of variance inflation factors (VIFs) for covariates of fully-adjusted fixed-effects models for the association between total adverse events (0–49 years), and CASP-12 scores (n=20,176), CES-D depressive caseness (n=22,039) and subjective life satisfaction scores (n=17,948) (Model A)** | | | | |
|  |  | **CASP-12** | **CES-D depressive caseness** | **Subjective life satisfaction** |
|  |  |  |  |  |
| **Variable** | **Categories** | **VIF** | **VIF** | **VIF** |
|  |  |  |  |  |
|  |  |  |  |  |
| Adverse events | Total (0–49 years) | 1.05 | 1.05 | 1.05 |
|  |  |  |  |  |
| Age |  | 1.86 | 1.88 | 1.81 |
|  |  |  |  |  |
| Gender | Male |  |  |  |
| Female | 1.26 | 1.26 | 1.25 |
|  |  |  |  |  |
| Physical frailty index | Frailty Index | 1.31 | 1.32 | 1.32 |
|  |  |  |  |  |
| Current labour market status (self-reported) | Retired |  |  |  |
| In paid employment | 1.86 | 1.87 | 1.78 |
| Unemployed | 1.04 | 1.04 | 1.04 |
| Permanently sick or disabled | 1.27 | 1.27 | 1.25 |
| Looking after home / other | 1.13 | 1.13 | 1.12 |
|  |  |  |  |
| Participation in social activities | Never |  |  |  |
| Yes | 1.08 | 1.08 | 1.08 |
|  |  |  |  |  |
| Partnership status | Partnered |  |  |  |
| Non-partnered | 1.23 | 1.24 | 1.24 |
|  |  |  |  |  |
| Born abroad | No |  |  |  |
| Yes | 1.01 | 1.01 | 1.01 |
|  |  |  |  |  |
| Quintile of household net worth | 1 (poorest) |  |  |  |
| 2 | 2.07 | 2.06 | 2.12 |
| 3 | 2.53 | 2.49 | 2.59 |
| 4 | 2.83 | 2.77 | 2.86 |
| 5 | 3.45 | 3.37 | 3.49 |
|  |  |  |  |  |
| Household income | Logged equivalized income | 1.39 | 1.40 | 1.05 |
|  |  |  |  |  |
| Housing tenure | Outright ownership |  |  |  |
| Ownership with mortgage | 1.33 | 1.33 | 1.31 |
| Renting / other | 1.30 | 1.30 | 1.29 |
|  |  |  |  |  |
| NS-SEC (five-category) | I. Managerial / professional occupations | 1.91 | 1.88 | 1.90 |
| II. Intermediate occupations | 1.44 | 1.42 | 1.43 |
| III. Small employers/ own account workers | 1.35 | 1.34 | 1.35 |
| IV. Technical occupations | 1.30 | 1.29 | 1.30 |
| V. Semi routine / routine occupations |  |  |  |
| Never worked | 1.02 | 1.02 | 1.03 |

**Appendix A8:** The table below shows results of a random-effects Poisson model for the association between total adverse events (0–49 years) and count of CES-D symptoms. There was a significant association between events experienced and number of CES symptoms identified (p<0.001).

|  |  |  |  |
| --- | --- | --- | --- |
| **Results of a fully-adjusted random-effects Poisson model for the association between adverse events (0–49 years) and CES-D depressive caseness (n=22,039 observations/4,208 unique individuals)** | | | |
|  |  | **CES-D depressive caseness** | |
|  |  |  |  |
| **Variable** | **Categories** | **Coefficient (95% CI)** | **p** |
|  |  |  |  |
|  |  |  |  |
| Adverse events | Total (0–49 years) | 0.09 (0.13, 0.09) | <0.001 |
|  |  |  |  |
| Age |  | 0.00 (0.01, 0.00) | 0.168 |
|  |  |  |  |
| Gender | Male | ref |  |
| Female | 0.29 (0.23, 0.36) | <0.001 |
|  |  |  |  |
| Physical frailty index | Frailty Index | -.64 (2.49, 2.79) | <0.001 |
|  |  |  |  |
| Current labour market status (self-reported) | Retired | ref |  |
| In paid employment | 0.02 (-0.04, 0.07) | 0.529 |
| Unemployed | 0.18 (0.03, 0.33) | 0.018 |
| Permanently sick or disabled | 0.07 (0.00, 0.14) | 0.056 |
| Looking after home / other | 0.08 (0.02, 0.14) | 0.007 |
|  |  |  |
| Participation in social activities | Never | ref |  |
| Yes | -0.12 (-0.16, -0.09) | <0.001 |
|  |  |  |  |
| Partnership status | Partnered | ref |  |
| Non-partnered | 0.39 (0.33, 0.44) | <0.001 |
|  |  |  |  |
| Born abroad | No | ref |  |
| Yes | 0.04 (-0.09, -0.18) | 0.514 |
|  |  |  |  |
| Quintile of household net worth | 1 (poorest) | ref |  |
| 2 | -0.05 (-0.10, 0.01) | 0.085 |
| 3 | -0.14 (-0.20, -0.08) | <0.001 |
| 4 | -0.18 (-0.24, -0.12) | <0.001 |
| 5 | -0.21 (-0.27, -0.14) | <0.001 |
|  |  |  |  |
| Household income | Logged equivalized income | -0.03 (-0.06, -0.01) | 0.014 |
|  |  |  |  |
| Housing tenure | Outright ownership | ref |  |
| Ownership with mortgage | 0.04 (-0.02, 0.09) | 0.161 |
| Renting / other | 0.08 (0.01, 0.16) | 0.027 |
|  |  |  |  |
| NS-SEC (five-category) | I. Managerial / professional occupations | -0.11 (-0.18, -0.04) | 0.002 |
| II. Intermediate occupations | -0.13 (-0.21, -0.04) | 0.004 |
| III. Small employers/ own account workers | -0.15 (-0.24, -0.06) | 0.001 |
| IV. Technical occupations | -0.03 (-0.13, 0.06) | 0.501 |
| V. Semi routine / routine occupations | ref |  |
| Never worked | -0.04 (-0.38, 0.29) | 0.806 |

**Appendix A9:** We conducted a sensitivity analysis to provide evidence against the hypothesis that there exists reverse causation between reporting of adverse life events in the Wave 3 ELSA Life History Questionnaire and depressive caseness among respondents in the same survey wave (i.e. due to overreporting of adverse events among those with depressive symptoms). This was accomplished by fitting fully-adjusted random-effects logistic regression models for associations between total adverse events disaggregated by age of occurrence and self- or other-orientation (Models A–E), and CES-D depressive caseness in Waves 1, 2, 4, 5, 6 and 7 among respondents who were not identified as having depressive caseness in Wave 3 (n=3,147).

The model results are shown in the table below. The results show that there was a positive association between between total adverse events experienced (0–49 years) and odds of depressive caseness, with an effect of approximately 15% greater odds of depressive caseness per additional adverse event experienced (OR: 1.15, 95% CI: 1.09, 1.21, p<0.001). While the strength of the associations were slightly attenuated compared to those of models when data from respondents identified as having depressive caseness in Wave 3 were included (see Table 4), the results suggest that the findings of this study are not wholly as a result of reverse causation due to recall bias.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Results of fully-adjusted random-effects logistic regression models for associations between total adverse events disaggregated by age of occurrence and self- or other-orientation (Models A–E), and CES-D depressive caseness (n=15,482 observations/3,147 unique individuals) in Waves 1, 2, 4, 5, 6 and 7** | | | | | | | | | | |
|  | **Model A\*** |  | **Model B** |  | **Model C** |  | **Model D** |  | **Model E** |  |
|  | **Odds ratio (95% CI)** |  | **Odds ratio (95% CI)** |  | **Odds ratio (95% CI)** |  | **Odds ratio (95% CI)** |  | **Odds ratio (95% CI)** |  |
| **Categories** | **p** | **p** | **p** | **p** | **p** |
|  |  |  |  |  |  |  |  |  |  |  |
| Total (0–49 years) | 1.15 (1.09, 1.21) | <0.001 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Early childhood (0–5 years) |  |  | 1.16 (0.99, 1.36) | 0.060 |  |  |  |  |  |  |
| Late childhood (6–15 years) |  |  | 1.17 (1.07, 1.28) | <0.001 |  |  |  |  |  |  |
| Early adulthood (16–30 years) |  |  | 1.12 (1.01, 1.25) | 0.039 |  |  |  |  |  |  |
| Late adulthood (31–49 years) |  |  | 1.14 (1.02, 1.28) | 0.023 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, total (0–49 years) |  |  |  |  | 1.08 (1.10, 1.28) | 0.082 |  |  |  |  |
| Other-oriented, total (0–49 years) |  |  |  |  | 1.21 (1.10, 1.30) | <0.001 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, childhood (0–15 years) |  |  |  |  |  |  | 0.96 (0.84, 1.10) | 0.587 |  |  |
| Self-oriented, adulthood (16–49 years) |  |  |  |  |  |  | 1.21 (1.06, 1.39) | 0.005 |  |  |
| Other-oriented, childhood (0–15 years) |  |  |  |  |  |  | 1.35 (1.20, 1.51) | <0.001 |  |  |
| Other-oriented, adulthood (16–49 years) |  |  |  |  |  |  | 1.06 (0.97, 1.22) | 0.168 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, early childhood (0–5 years) |  |  |  |  |  |  |  |  | 1.01 (0.81, 1.29) | 0.943 |
| Self-oriented, late childhood (6–15 years) |  |  |  |  |  |  |  |  | 0.94 (0.81, 1.11) | 0.496 |
| Self-oriented, early adulthood (16–30 years) |  |  |  |  |  |  |  |  | 1.23 (1.04, 1.46) | 0.015 |
| Self-oriented, late adulthood (31–49 years) |  |  |  |  |  |  |  |  | 1.17 (0.94, 1.47) | 0.148 |
| Other-oriented, early childhood (0–5 years) |  |  |  |  |  |  |  |  | 1.33 (1.06, 1.69) | 0.015 |
| Other-oriented, late childhood (6–15 years) |  |  |  |  |  |  |  |  | 1.34 (1.19, 1.53) | <0.001 |
| Other-oriented, early adulthood (16–30 years) |  |  |  |  |  |  |  |  | 1.04 (0.89, 1.23) | 0.574 |
| Other-oriented, late adulthood (31–49 years) |  |  |  |  |  |  |  |  | 1.12 (0.96, 1.30) | 0.141 |
|  |  |  |  |  |  |  |  |  |  |  |

\*All models were fully adjusted for covariates including age, gender, physical frailty index, current labour market status, participation in social activities, partnership status, quintile of household net worth, household income, housing tenure at the time of interview, birth abroad and last-known occupational position (five-category NS-SEC).

**Appendix A10:** We fitted fully-adjusted fixed-effects Poisson models for associations between total adverse events disaggregated by age of occurrence and self- or other-orientation (Models A–E), and number of waves (Waves 1–7) in which respondents were identified with CES-D depressive caseness. The outcome variable was expressed as a count for number of waves (range: in which a given individual respondent with available Wave 3 Life History Questionnaire data (n=2,069) was identified as having depressive caseness (three or more CES-D depressive symptoms). There was no significant evidence of model over-dispersion.

Findings are displayed in the table below. The results of Model A for the association between total adverse events experienced (0–49 years) and number of waves in which an individual was identified as having depressive caseness show that each additional event experienced by a given individual was significantly associated with depressive caseness in an additional 0.10 (95% CI: 0.07, 0.12, p<0.001) ELSA survey waves. The results of Models B–D show that events at all stages of the lifecourse, and both self and other oriented events, were positively associated with the number of waves in which an individual was found to have depressive caseness (three or more CES-D depressive symptoms).

These findings strengthen the overall inferences that can be drawn from this study; not only was the number of adverse experiences positively and significantly associated with depressive caseness at a given point in time (see Table 4), they were also associated with the frequency with which an individual is identified as having depressive caseness over time (over the period 2002 to 2015)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Results of fully-adjusted fixed-effects Poisson models for associations between total adverse events disaggregated by age of occurrence and self- or other-orientation (Models A–E), and number of waves (Waves 1–7) in which respondents were identified with CES-D depressive caseness (n=2,069)** | | | | | | | | | | |
|  | **Model A\*** |  | **Model B** |  | **Model C** |  | **Model D** |  | **Model E** |  |
|  | **Coefficient (95% CI)** |  | **Coefficient (95% CI)** |  | **Coefficient (95% CI)** |  | **Coefficient (95% CI)** |  | **Coefficient (95% CI)** |  |
| **Categories** | **p** | **p** | **p** | **p** | **p** |
|  |  |  |  |  |  |  |  |  |  |  |
| Total (0–49 years) | 0.10 (0.07, 0.12) | <0.001 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Early childhood (0–5 years) |  |  | 0.17 (0.10, 0.26) | <0.001 |  |  |  |  |  |  |
| Late childhood (6–15 years) |  |  | 0.07 (0.03, 0.11) | 0.002 |  |  |  |  |  |  |
| Early adulthood (16–30 years) |  |  | 0.08 (0.02, 0.13) | 0.008 |  |  |  |  |  |  |
| Late adulthood (31–49 years) |  |  | 0.12 (0.06, 0.18) | <0.001 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, total (0–49 years) |  |  |  |  | 0.11 (0.06, 0.15) | <0.001 |  |  |  |  |
| Other-oriented, total (0–49 years) |  |  |  |  | 0.09 (0.05, 0.13) | <0.001 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, childhood (0–15 years) |  |  |  |  |  |  | 0.08 (0.01, 0.14) | 0.018 |  |  |
| Self-oriented, adulthood (16–49 years) |  |  |  |  |  |  | 0.13 (0.07, 0.20) | <0.001 |  |  |
| Other-oriented, childhood (0–15 years) |  |  |  |  |  |  | 0.10 (0.05, 0.16) | 0.001 |  |  |
| Other-oriented, adulthood (16–49 years) |  |  |  |  |  |  | 0.07 (0.02, 0.13) | 0.012 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Self-oriented, early childhood (0–5 years) |  |  |  |  |  |  |  |  | 0.08 (-0.04, 0.21) | 0.185 |
| Self-oriented, late childhood (6–15 years) |  |  |  |  |  |  |  |  | 0.06 (-0.01, 0.14) | 0.078 |
| Self-oriented, early adulthood (16–30 years) |  |  |  |  |  |  |  |  | 0.13 (0.04, 0.21) | 0.004 |
| Self-oriented, late adulthood (31–49 years) |  |  |  |  |  |  |  |  | 0.15 (0.04, 0.25) | 0.005 |
| Other-oriented, early childhood (0–5 years) |  |  |  |  |  |  |  |  | 0.26 (0.14, 0.38) | <0.001 |
| Other-oriented, late childhood (6–15 years) |  |  |  |  |  |  |  |  | 0.06 (-0.00, 0.13) | 0.053 |
| Other-oriented, early adulthood (16–30 years) |  |  |  |  |  |  |  |  | 0.03 (-0.06, 0.10) | 0.532 |
| Other-oriented, late adulthood (31–49 years) |  |  |  |  |  |  |  |  | 0.10 (0.03, 0.17) | 0.006 |
|  |  |  |  |  |  |  |  |  |  |  |

\*All models were fully adjusted for covariates including age, gender, physical frailty index, current labour market status, participation in social activities, partnership status, quintile of household net worth, household income, housing tenure at the time of interview, birth abroad and last-known occupational position (five-category NS-SEC).