Table S1. Process of sample selection

|  |  |  |
| --- | --- | --- |
|  | **Life satisfaction analysis** | **Self-rated health analysis** |
|  | UK1 | Germany2 | UK | Germany |
| N |  | N |  |
| **Yes/no care within the age range (17-29)** |  |  |  |  |
| No | 21,671 | 14452 | 21,671 | 14,452 |
| Yes | 4,185 (16.2%) | 741(4.9%) | 4,185(16.2%) | 741(4.9%) |
| **Only select carers with at least once before and once at/ after care onset year3** | 1,941 | 429 | 1,941 | 429 |
| **Carers after excluding missing data** (mainly because of missing data on the health outcome) | 1,435 | 428 | 1,817 | 429 |
| **After propensity score matching** |  |  |  |  |
| Treated (carers) | 1,435 | 278 | 1,817 | 279 |
| Untreated (matched non-carers) | 1,435 | 278 | 1,817 | 279 |
| **Only select non-carers with once before and once after**  |  |  |  |  |
| Treated (carers) | 1,435 | 279 | 1,817 | 279 |
| Untreated (matched non-carers) | 828 | 170 | 1,034 | 175 |

Note 1 The UK data is UKHLS. UKHLS is primarily funded by the UK Economic and Social Research Council (ESRC) and is managed by the Institute for Social and Economic Research at the University of Essex. 2 The German data is GSOEP. GSOEP is funded by the Federal Ministry of Education and Research (BMBF) and from Germany’s state governments and managed by the German Institute for Economic Research. 3 The main reason for exclusion is missing information in the wave before or after the onset of care. Only 10 YAC are providing care for the entire duration in the UK and the number is even smaller in Germany.

Table S2. Care-related questionnaires in both datasets and the process of harmonisation.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **UK** |  | **Germany** |
| **Variables** | **Questionnaire**  | **Measures** |  | **Questionnaire**  | **Measures** |
| **Yes/no care** | “Is there anyone living with you who is sick, disabled or elderly whom you look after or give special help to?”“Do you provide some regular service or help for any sick, disabled or elderly person not living with you?”Response: Yes/No | Carers: answered yes to either of these questions in one or more waves between age 17-29Non-carers: No care in any wave between age 17-29 |  | “What is a typical day like for you? How many hours do you spend on the following activities on a typical weekday, Saturday, and Sunday - Care and support of persons in need of care?” Metric response: 0-24 hours per weekday1 | Carers: caring for one or more hours in one or more waves between age 17-29Non-carers: zero hour care in any wave between age 17-29 |
| **Duration of care** | Same as above | No care; care in one wave; care in two waves or more  |  | Same as above | No care; care in one wave; care in two waves or more |
| **Intensity of care3** | “both those living with you and not living with you - in total, how many hours do you spend each week looking after or helping them”Nine-category response: 0 - 4 hours/5 - 9 hours/10 - 19 hours/20 - 34 hours/35 - 49 hours/50 - 99 hours/100 or more hours or continuous care/Varies under 20 hours/Varies 20 hours or more2 | No Care; Regular Care (<10hours); Intensive Care (10+ hours) |  | Same as above | No Care; Regular Care (<10hours); Intensive Care (10+ hours) |

Note  1 The German analysis specifically only focused on informal caring on weekdays due to the Saturday and Sunday parts of this question not being ask in the waves 2010, 2014, 2016 and 2018. 2 Varies under 20 hours was coded as 10 hours. 3 The median caring hour in German data is 10 hours per week among YAC. There are 64% of YAC care less than 10 h/w, and that is why 10h/w will be roughly the median level of caring in the UKHLS as well.

Table S3. Descriptive characteristics of young adult carers (YAC) and their matched non-carers in the UK and Germany.

|  |  |  |
| --- | --- | --- |
|  | **UK** | **Germany** |
|  | **Life Satisfaction** | **Self-rated Health** | **Life Satisfaction** | **Self-rated Health** |
|  | YACN= 1,435 | Matched non-carersN=828 | Standardizeddifference | YACN= 1,817 | Matched non-carersN=1,034 | Standardized difference | YACN= 279 | Matched non-carersN=170 | Standardized difference | YACN= 279 | Matched non-carersN=175 | Standardized difference |
| **Biological sex (%)** |  |  | 0.013 |  |  | 0.033 |  |  | 0.116 |  |  | 0.064 |
|  Male | 40.6 | 41.6 | *p*=0.732 | 41.9 | 45.3 | *p*=0.315 | 44.8 | 50.6 | *p*=0.234 | 44.8 | 48.0 | *p*=0.506 |
|  Female | 59.4 | 58.4 |  | 58.1 | 54.7 |  | 55.2 | 49.4 |  | 55.2 | 52.0 |  |
| **Age (Mean, SD)** | 20.35(3.44) | 19.60(3.13) | -0.036*p*=0.331 | 20.40(3.44) | 19.68(3.20) | -0.008*p*=0.803 | 19.34 (3.03) | 18.64 (2.69) | -0.243*p*=0.014 | 19.34 (3.03) | 18.63(2.57) | -0.252*p=*0.011 |
| **Migration background (%)** |  |  |  |  |  |  |  |  | 0.080 |  |  | 0.108 |
|  No | x | x | x | x | x | x | 81.7 | 84.7 | *p*=0.416 | 81.7 | 85.7 | *p*=0.267 |
|  Yes | x | x | x | x | x | x | 18.3 | 15.3 |  | 18.3 | 14.3 |  |
| **Ethnicity (%)** |  |  | 0.055 |  |  | 0.026 |  |  |  |  |  |  |
|  White | 75.1 | 78.2 | *p*=0.822 | 71.2 | 77.4 | *p*=0.987 | x | x |  | x | x | *p*= |
|  Black | 6.0 | 6.2 |  | 6.9 | 6.0 |  | x | x |  | x | x |  |
|  Indian | 4.2 | 2.9 |  | 4.7 | 3.0 |  | x | x |  | x | x |  |
|  Pakistani | 6.9 | 6.7 |  | 7.7 | 6.2 |  | x | x |  | x | x |  |
|  Bangladeshi | 4.9 | 3.2 |  | 6.3 | 4.9 |  | x | x |  | x | x |  |
|  Asian/Other | 3.1 | 2.9 |  | 3.2 | 2.6 |  | x | x |  | x | x |  |
| **Partnership status (%)** |  |  | 0.003 |  |  | 0.013 |  |  | 0.189 |  |  | 0.192 |
|  Single | 77.9 | 82.7 | *p*=0.928 | 78.3 | 82.7 | *p*=0.689 | 54.8 | 64.1 | *p*=0.053 | 55.2 | 64.6 | *p*=0.048 |
|  Serious relationship/ married | 22.1 | 17.3 |  | 21.7 | 17.3 |  | 45.2 | 35.9 |  | 44.8 | 35.4 |  |
| **Number of children <16y in household (%)** |  |  | 0.067 |  |  | 0.019 |  |  | 0.120 |  |  | 0.128 |
|  0  | 82.5 | 89.5 | *p*=0.363 | 83.3 | 88.9 | *p*=0.953 | 51.6 | 55.3 | *p*=0.691 | 51.9 | 46.9 | *p*=0.622 |
|  1  | 10.7 | 6.8 |  | 10.1 | 8.0 |  | 30.8 | 30.6 |  | 30.5 | 36.0 |  |
|  2  | 5.6 | 3.3 |  | 5.4 | 2.8 |  | 11.8 | 10.6 |  | 11.5 | 12.0 |  |
|  3+  | 1.3 | 0.4 |  | 1.3 | 0.4 |  | 5.7 | 3.5 |  | 6.1 | 5.1 |  |
| **Highest educational attainment (%)** |  |  | 0.003 |  |  | 0.015 |  |  | 0.052 |  |  | 0.035 |
|  No higher education | 74.4 | 71.3 | *p*=0.932 | 74.8 | 74.4 | *p*=0.646 | 92.8 | 94.1 | *p*=0.597 | 92.8 | 93.7 | *p*=0.717 |
|  Higher education | 25.6 | 28.7 |  | 25.2 | 25.6 |  | 7.2 | 5.9 |  | 7.2 | 6.3 |  |
| **Employment status (%)** |  |  | 0.102 |  |  | 0.043 |  |  | 0.283 |  |  | 0.266 |
|  Unemployed | 14.0 | 11.7 | *p*=0.188 | 14.3 | 12.3 | *p*=0.891 | 7.9 | 2.9 | *p*=0.175 | 8.2 | 5.1 | *p*=0.240 |
|  Part time | 12.6 | 8.8 |  | 12.4 | 11.6 |  | 2.5 | 1.2 |  | 2.9 | 2.3 |  |
|  Full time | 18.7 | 16.8 |  | 18.2 | 16.6 |  | 4.3 | 2.4 |  | 3.6 | 0.6 |  |
|  Full time, long working hours | 2.7 | 1.5 |  | 2.7 | 1.7 |  | 3.2 | 2.4 |  | 3.2 | 2.9 |  |
|  In education | 42.8 | 55.7 |  | 42.5 | 50.6 |  | 70.3 | 77.6 |  | 69.9 | 73.7 |  |
|  Not working/other | 9.2 | 5.6 |  | 9.9 | 7.2 |  | 11.8 | 13.5 |  | 12.2 | 15.4 |  |
| **Occupational class (%)** |  |  | 0.060 |  |  | 0.057 |  |  | 0.218 |  |  | 0.192 |
|  Routine/manual | 18.9 | 14.4 | *p*=0.459 | 18.7 | 17.7 | *p*=0.400 | 14.7 | 10.6 | *p*=0.192 | 15.1 | 9.1 | *p*=0.290 |
|  Intermediate | 7.2 | 5.6 |  | 7.1 | 4.9 |  | 13.6 | 12.4 |  | 13.3 | 14.9 |  |
|  Managerial/ professional | 7.9 | 7.1 |  | 7.5 | 7.4 |  | 6.1 | 2.9 |  | 6.1 | 5.1 |  |
|  Not working | 66.0 | 73.0 |  | 66.7 | 70.1 |  | 65.6 | 74.1 |  | 65.6 | 70.9 |  |
| **Household income (%)** |  |  | 0.035 |  |  | 0.061 |  |  | 0.147 |  |  | 0.201 |
|  1st quintile | 24.2 | 23.1 | *p*=0.927 | 25.8 | 25.0 | *p*=0.496 | 7.2 | 6.5 | *p*=0.692 | 7.2 | 2.9 | *p*=0.412 |
|  2nd quintile | 24.9 | 23.1 |  | 24.6 | 24.6 |  | 20.4 | 15.3 |  | 20.4 | 21.7 |  |
|  3rd quintile | 21.1 | 22.1 |  | 20.6 | 19.6 |  | 28.7 | 32.4 |  | 28.7 | 28.6 |  |
|  4th quintile | 17.7 | 19.4 |  | 17.5 | 18.8 |  | 24.4 | 24.7 |  | 24.4 | 26.3 |  |
|  5th quintile | 12.2 | 12.4 |  | 11.5 | 12.0 |  | 19.4 | 21.2 |  | 19.4 | 20.6 |  |
| **Occupational class of parents (%)** |  |  | 0.029 |  |  | 0.044 |  |  | 0.197 |  |  | 0.128 |
|  Routine/manual | 38.2 | 38.0 | *p*=0.898 | 37.3 | 38.7 | *p*=0.624 | 20.1 | 14.7 | *p*=0.264 | 20.1 | 16.0 | *p*=0.633 |
|  Intermediate | 11.7 | 12.5 |  | 11.7 | 11.6 |  | 33.3 | 32.4 |  | 33.3 | 34.9 |  |
|  Managerial/ professional | 29.1 | 31.4 |  | 28.4 | 30.3 |  | 42.7 | 50.6 |  | 42.7 | 46.3 |  |
|  Not working | 21.0 | 18.1 |  | 22.7 | 19.4 |  | 3.9 | 2.4 |  | 3.9 | 2.9 |  |
| **Regional type (%)** |  |  | 0.021 |  |  | 0.005 |  |  | 0.096 |  |  | 0.018 |
|  Urban | 83.3 | 82.6 | *p*=0.579 | 84.8 | 83.6 | *p*=0.890 | 64.9 | 69.4 | *p*=0.323 | 64.9 | 65.7 | *p*=0.855 |
|  Rural | 16.7 | 17.4 |  | 15.2 | 16.4 |  | 35.1 | 30.6 |  | 35.1 | 34.3 |  |
| **Amount of waves participated** **(Mean, SD)** | 5.49(2.33) | 6.14(2.33) | 0.039*p*=0.998 | 5.49(2.30) | 5.99(2.26) | 0.050*p*=0.971 | 5.57 (2.24) | 5.75 (2.33) | 0.079*p*=0.418 | 5.57 (2.24) | 5.91(2.20) | 0.151*p*=0.119 |
| **Weekly hours of caring (%)** |  |  |  |  |  |  |  |  |  |  |  |  |
|  <10 h/w | 69.5 | x | x | 69.1 | x | x | 57.7 | x | x | 57.7 | x | x |
|  10 h/w+ | 30.5 | x | x | 30.9 | x | x | 42.3 | x | x | 42.3 | x | x |
| **Duration of caring (%)** |  |  |  |  |  |  |  |  |  |  |  |  |
|  1 wave  | 61.7 | x | x | 61.6 | x | x | 79.9 | x | x | 79.9 | x | x |
|  2+ waves  | 38.3 | x | x | 38.4 | x | x | 20.1 | x | x | 20.1 | x | x |

Note *p* values show the statistical differences between YAC and matched non-carers*.*

**Sensitivity analysis**

The E-value is defined as the minimum strength of association, on the risk ratio scale, that an unmeasured confounder would need to have with both the exposure and the outcome to fully explain away a specific association, conditional on the measured covariates. For life satisfaction, the difference between intensive carers and non-carers was more than 0.2 point z score. The E-value for continuous outcomes is calculated as exp(0.91 × d), where d is the standardized effect size. As we are using standardized effect size (z score) already, the E value= exp(0.91 × 0.2), which equals 2.5. That means the difference between intensive carers and non-carers could be explained away by an unmeasured confounder that was associated with both the treatment and the outcome by a risk ratio of 2.5-fold each, above and beyond the measured confounders, but weaker confounding could not do so.