**Supplementary materials**

**Methodological challenges in harmonization of the variables used as indicators of social capital in epidemiological studies of ageing – results of the ATHLOS project**

**Assessment of construct validity**

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# **Known-group validity**

To determine known-group validity based on the literature review the following hypothesis were tested:

1. It was expected that people with higher level of education more frequently report trust in people than those with lower educational level (Nannestad 2008; Huang *et al.*  2011; Borgonovi 2012).

2. People with poorer self-rated health and the oldest old (85+) less frequently report participation in any political activity in comparison to those with good health and those aged 65-74 or 75-84 years old (Blakely *et al.*  2001; Lee *et al.*  2008; Ichida *et al.*  2013).

3. Women are more likely to participate in religious activities than men in Cristian-majority countries (Voas *et al.*  2013; Murphy 2016).

4. People with poorer self-rated health and the oldest old (85+) are less likely to report participation in sport activities in comparison to those with good health and those aged 65-74 or 75-84 years old (Scheerder *et al.*  2005).

5. People with poorer self-rated health and the oldest old (85+) are less likely to participate in volunteer/charity group activities in comparison to those with good health and those aged 65-74 or 75-84 years old as well as respondents with higher level of education are more likely to report participation in volunteer/charity group activities than those with lower educational level.

6. People with poorer self-rated health and the oldest old (85+) are less likely to report any form of participation in comparison to those with good health and those aged 65-74 or 75-84 years old.

To verified the aforementioned hypothesis the distribution of harmonized variables across demographic or health characteristics was compared within each cohort and wave of the study using chi-square test.

## **Generalized trust**

Table 1. Distribution of generalized trust across level of education group by study, cohort and wave.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Level of education | | | | Chi-square test | |
| Study | Cohort | Wave | Less than primary | Primary | Secondary | Tertiary | df | p-value |
| COURAGE | Finland | 1 | 46.7% | 59.8% | 70.6% | 85.3% | 3 | 0.000 |
| Poland | 1 | 18.2% | 14.4% | 17.3% | 23.3% | 3 | 0.000 |
| 2 | 26.7% | 23.0% | 29.3% | 38.3% | 3 | 0.000 |
| Spain | 1 | 18.2% | 24.1% | 29.2% | 35.0% | 3 | 0.000 |
| 2 | 25.3% | 26.2% | 31.6% | 47.3% | 3 | 0.000 |
| ELSA | United Kingdom | 1 | 72.6% |  | 72.9% | 74.7% | 2 | 0.299 |
| 3 | 74.0% |  | 75.1% | 78.1% | 2 | 0.016 |
| 7 | 67.6% |  | 72.1% | 80.5% | 2 | 0.000 |
| HAPPIE | Czech Republic | 1 | 50.0% | 68.5% | 77.0% | 85.0% | 3 | 0.000 |
| Lithuania | 1 | 73.3% | 76.3% | 78.9% | 84.2% | 3 | 0.000 |
| Poland | 1 | 72.4% | 80.3% | 80.5% | 87.6% | 3 | 0.000 |
| HRS | Finland | 1 | 47.8% | 57.4% | 79.2% | 88.4% | 3 | 0.000 |
| 2 | 61.9% | 67.9% | 86.9% | 91.8% | 3 | 0.000 |
| LASI | India | 1 | 89.2% | 89.6% | 92.3% | 90.6% | 3 | 0.418 |
| SAGE | China | 1 | 88.5% | 87.2% | 88.5% | 87.1% | 3 | 0.246 |
| Ghana | 1 | 65.7% | 57.1% | 52.6% | 54.7% | 3 | 0.000 |
| India | 1 | 55.7% | 56.9% | 54.0% | 57.3% | 3 | 0.205 |
| Mexico | 1 | 47.2% | 48.6% | 46.4% | 46.4% | 3 | 0.894 |
| Russia | 1 | 22.2% | 23.3% | 29.4% | 34.1% | 3 | 0.001 |
| South Africa | 1 | 16.7% | 19.3% | 21.5% | 24.6% | 3 | 0.028 |
| SHARE | Europe | 2 | 27.8% | 32.2% | 41.1% | 52.4% | 3 | 0.000 |
| 4 | 21.6% | 30.6% | 38.9% | 49.3% | 3 | 0.000 |
| 5 | 32.2% | 35.8% | 44.2% | 57.4% | 3 | 0.000 |

df- degree of freedom

The results showed that with exception of LASI and SAGE (for India, China and Mexico) the per cent of respondent reported trust toward people was higher in the groups with higher educational level and only in the first wave of the ELSA study the observed tendency was not statistically significant. In LASI and SAGE (for India, China and Mexico) the association between level of education and trust was not found statistically significant.

Additionally, the comparison of the level of trust in Poland between COURAGE and HAPPIE studies (COURAGE – trust to people in general; HAPPE – trust in neighborhood) across level of educational group showed that people with higher educational level more frequently reported that they trust people, despite the fact that measurement of trust to people in general in the first case, and trust to people in neighborhood in the second. Nonetheless, the level of trust in the HAPPIE study was higher than in the COURAGE. Also, in case of assessment of trust in India we observed that the present of people reported trust to people in general (“unknown”) based on SAGE study is lower than in case of LASI, where trust to people in neighborhood was verified. Which is consistent with the other research (e.g. Sturigs and Smith, 2010).

Concluding, in most cases the expected association reached statistical significance, which supported the overall validity of harmonized general trust variable.

## **Political participation**

Table 2a. Distribution of political involvement across age group by study, cohort and wave. Per cent of people participated in political activities.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Age | | | | Chi-square test | | |
| Study | Cohort | Wave | 65-74 | 75-84 | 85 yrs and older | df | | p-value |
| COURAGE | Finland | 1 | 24.1% | 17.3% | 13.2% | 2 | | 0.031 |
| Poland | 1 | 9.8% | 6.1% | 6.6% | 2 | | 0.057 |
| 2 | 12.5% | 8.5% | 12.1% | 2 | | 0.319 |
| Spain | 1 | 4.7% | 3.6% | 0.6% | 2 | | 0.032 |
| 2 | 7.5% | 3.4% | 2.7% | 2 | | 0.009 |
| ELSA | United Kingdom | 1 | 10.9% | 12.3% | 11.1% | 2 | | 0.399 |
| 2 | 11.2% | 12.0% | 14.5% | 2 | | 0.288 |
| 3 | 10.6% | 9.4% | 9.8% | 2 | | 0.592 |
| 4 | 9.6% | 8.9% | 8.9% | 2 | | 0.716 |
| 5 | 10.1% | 9.5% | 11.1% | 2 | | 0.683 |
| 6 | 10.4% | 9.8% | 10.8% | 2 | | 0.785 |
| 7 | 10.6% | 9.7% | 8.9% | 2 | | 0.484 |
| KLOSA | South Korea | 1 | 0.1% | 0.1% | 0.0% | 2 | | 0.850 |
| 2 | 0.3% | 0.1% | 0.0% | 2 | | 0.319 |
| 3 | 0.1% | 0.2% | 0.0% | 2 | | 0.589 |
| 4 | 0.1% | 0.1% | 0.3% | 2 | | 0.524 |
| SAGE | China | 1 | 3.6% | 4.1% | 3.6% | 2 | | 0.710 |
| Ghana | 1 | 51.1% | 43.7% | 32.2% | 2 | | 0.000 |
| India | 1 | 11.4% | 8.6% | 2.5% | 2 | | 0.003 |
| Mexico | 1 | 10.0% | 9.5% | 7.3% | 2 | | 0.668 |
| Russia | 1 | 5.2% | 2.9% | 0.9% | 2 | | 0.012 |
| South Africa | 1 | 28.6% | 25.6% | 24.5% | 2 | | 0.424 |
| SHARE | Europe | 1 | 1.7% | 1.2% | 0.9% | 2 | | 0.014 |
| 2 | 2.0% | 1.1% | 0.8% | 2 | | 0.003 |
| 4 | 3.5% | 2.3% | 1.3% | 2 | | 0.000 |
| 5 | 5.0% | 3.1% | 1.7% | 2 | | 0.000 |

Table 2b. Distribution of voting across age group by study, cohort and wave. Per cent of people who voted in the last national election.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Age | | | Chi-square test | |
| Study | Cohort | Wave | 65-74 | 75-84 | 85 yrs and older | df | p-value | |
| COURAGE | Finland | 1 | 88.9% | 89.1% | 75.9% | 2 | 0.004 | |
| Poland | 1 | 83.6% | 66.8% | 56.7% | 2 | 0.000 | |
| 2 | 76.9% | 60.7% | 42.0% | 2 | 0.000 | |
| Spain | 1 | 89.3% | 89.3% | 69.8% | 2 | 0.000 | |
| 2 | 89.7% | 87.3% | 78.9% | 2 | 0.007 | |
| ELSA | United Kingdom | 1 | 85.5% | 85.9% | 85.2% | 2 | 0.900 | |
| 3 | 88.2% | 89.8% | 91.7% | 2 | 0.109 | |
| LASI | India | 1 | 96.1% | 93.7% | 90.3% | 2 | 0.297 | |
| SAGE | China | 1 | 62.8% | 59.2% | 55.0% | 2 | 0.010 | |
| Ghana | 1 | 90.9% | 86.0% | 79.9% | 2 | 0.000 | |
| India | 1 | 94.5% | 95.6% | 84.4% | 2 | 0.000 | |
| Mexico | 1 | 77.8% | 72.7% | 66.1% | 2 | 0.012 | |
| Russia | 1 | 82.9% | 74.4% | 59.8% | 2 | 0.000 | |
| South Africa | 1 | 85.2% | 83.4% | 82.0% | 2 | 0.549 | |
| TILDA | Ireland | 1 | 94.5% | 92.3% |  | 1 | 0.024 | |

Table 3a. Distribution of political involvement across self-rated health group by study, cohort and wave. Per cent of people participated in political activities.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Self-rated health | | | |  |  |
| good | moderate | poor | df | | p-value |
| COURAGE | Finland | 1 | 22.6% | 21.3% | 11.3% | 2 | | 0.109 |
| Poland | 1 | 11.9% | 8.7% | 4.4% | 2 | | 0.002 |
| 2 | 16.8% | 12.3% | 3.4% | 2 | | 0.000 |
| Spain | 1 | 5.4% | 3.7% | 1.8% | 2 | | 0.010 |
| 2 | 6.9% | 4.3% | 2.4% | 2 | | 0.066 |
| ELSA | United Kingdom | 1 | 13.0% | 9.3% | 6.4% | 2 | | 0.000 |
| 2 | 12.7% | 9.7% | 8.3% | 2 | | 0.013 |
| 3 | 11.2% | 8.0% | 8.6% | 2 | | 0.013 |
| 4 | 10.7% | 6.4% | 5.0% | 2 | | 0.000 |
| 5 | 10.7% | 7.6% | 9.1% | 2 | | 0.019 |
| 6 | 11.4% | 7.5% | 6.4% | 2 | | 0.000 |
| 7 | 11.1% | 7.6% | 7.8% | 2 | | 0.004 |
| KLOSA | South Korea | 1 | 0.0% | 0.2% | 0.1% | 2 | | 0.259f |
| 2 | 0.6% | 0.1% | 0.2% | 2 | | 0.055f |
| 3 | 0.4% | 0.1% | 0.1% | 2 | | 0.153f |
| 4 | 0.1% | 0.2% | 0.1% | 2 | | 0.490f |
| SAGE | China | 1 | 5.4% | 3.5% | 2.7% | 2 | | 0.001 |
| Ghana | 1 | 52.2% | 51.7% | 31.4% | 2 | | 0.000 |
| India | 1 | 15.5% | 9.6% | 7.8% | 2 | | 0.000 |
| Mexico | 1 | 11.2% | 9.7% | 4.8% | 2 | | 0.057 |
| Russia | 1 | 13.2% | 4.8% | 2.0% | 2 | | 0.000 |
| South Africa | 1 | 25.4% | 30.3% | 22.2% | 2 | | 0.026 |
| SHARE | Europe | 1 | 2.0% | 1.1% | 0.4% | 2 | | 0.000 |
| 2 | 2.3% | 0.9% | 0.2% | 2 | | 0.000 |
| 4 | 4.1% | 2.2% | 1.0% | 2 | | 0.000 |
| 5 | 5.4% | 2.7% | 1.9% | 2 | | 0.000 |

Table 3b. Distribution of voting across self-rated health group by study, cohort and wave. Per cent of people who voted in the last national election.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Self-rated health | | |  |  |
|  |  |  | good | moderate | poor | df | p-value |
| COURAGE | Finland | 1 | 90.1% | 88.6% | 74.3% | 2 | 0,001 |
| Poland | 1 | 83.2% | 76.4% | 62.8% | 2 | 0,000 |
| 2 | 81.7% | 68.9% | 48.9% | 2 | 0,000 |
| Spain | 1 | 91.9% | 85.8% | 83.2% | 2 | 0,000 |
| 2 | 91.9% | 85.5% | 75.2% | 2 | 0,000 |
| ELSA | United Kingdom | 1 | 87.9% | 83.0% | 77.5% | 2 | 0,000 |
| 3 | 90.2% | 88.3% | 82.0% | 2 | 0,000 |
| LASI | India | 1 | 99.3% | 95.4% | 88.1% | 2 | 0,001 |
| SAGE | China | 1 | 68.4% | 62.0% | 53.5% | 2 | 0,000 |
| Ghana | 1 | 92.4% | 89.4% | 81.5% | 2 | 0,000 |
| India | 1 | 96.1% | 95.3% | 91.0% | 2 | 0,000 |
| Mexico | 1 | 77.7% | 75.0% | 67.7% | 2 | 0,041 |
| Russia | 1 | 83.9% | 82.5% | 72.6% | 2 | 0,000 |
| South Africa | 1 | 84.7% | 86.9% | 77.3% | 2 | 0,002 |
| TILDA | Ireland | 1 | 94.5% | 91.8% | 89.9% | 2 | 0,009 |

f-Fisher exact test

To test known-group validity for political participation it was assumed that the percent of people involved in political activities and those voted were lower among groups with poorer health and the oldest old.

For age group differences in voting variable the expected relationship was found as significant for COUREGE, SAGE (with exception of South Africa cohort) and TILDA study. In LASI and ELSA the results were not statistically significant. In case of other political involvement the expected results were found for COURAGE (Finland and Spain), SAGE (Ghana, India , Russia) and SHARE study. In other cases (KLOSA, SAGE (China, Mexico, South Africa), COURAGE(Poland), ELSA) the results were not statistically significant.

The analysis showed that as expected, in most cases, in groups of respondents with poorer health we observed significantly lower percent of those who were politically involved. In three cohorts (COURAGE-Finland, COURAGE-Spain-wave2, SAGE-Mexico) the observed tendency was not found as significant. In KLOSA study the results were not statistically significant. In case of voting the expected association was observed for all available groups. Thus the results support known-group validity of the harmonized variables.

In summary, in most cases the expected association with self-rated health reached statistical significance, which supported the overall validity of harmonized political participation variables. In case of age differences, also all significant results confirmed the expected relationship.

## **Religious participation**

Table 4. Distribution of religious participation in women and men by study, cohort and wave.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Gender | | Chi-square test | |
| Study | Cohort | Wave | Women | Men | df | p-value |
| 10/66 | Cuba | 1 | 15.4% | 6.9% | 1 | 0.000 |
| Dominican Republic | 1 | 47.7% | 26.7% | 1 | 0.000 |
| India | 1 | 14.2% | 22.0% | 1 | 0.000 |
| Puerto Rico | 1 | 55.7% | 44.3% | 1 | 0.000 |
| Rural China | 1 | 7.2% | 6.3% | 1 | 0.573 |
| Rural Mexico | 1 | 57.3% | 44.0% | 1 | 0.000 |
| Rural Peru | 1 | 42.5% | 37.4% | 1 | 0.217 |
| Urban China | 1 | 1.5% | 0.8% | 1 | 0.272 |
| Urban Mexico | 1 | 62.6% | 54.3% | 1 | 0.012 |
| Urban Peru | 1 | 62.8% | 47.1% | 1 | 0.000 |
| Venezuela | 1 | 42.4% | 28.8% | 1 | 0.000 |
| ALSA | South Australia | 1 | 40.0% | 28.9% | 1 | 0.000 |
| 3 | 38.4% | 28.7% | 1 | 0.000 |
| 6 | 41.4% | 32.5% | 1 | 0.021 |
| 7 | 80.6% | 82.6% | 1 | 0.775 |
| 9 | 33.9% | 34.4% | 1 | 0.947 |
| 11 | 38.2% | 27.3% | 1 | 0.212 |
| 12 | 40.0% | 40.9% | 1 | 0.941 |
| COURAGE | Finland | 1 | 17.2% | 7.9% | 1 | 0.000 |
| Poland | 1 | 68.6% | 55.0% | 1 | 0.000 |
| 2 | 73.6% | 58.9% | 1 | 0.000 |
| Spain | 1 | 36.2% | 21.6% | 1 | 0.000 |
| 2 | 36.1% | 22.2% | 1 | 0.000 |
| ELSA | United Kingdom | 1 | 24.6% | 16.1% | 1 | 0.000 |
| 2 | 26.5% | 17.2% | 1 | 0.000 |
| 3 | 24.2% | 15.8% | 1 | 0.000 |
| 4 | 23.9% | 15.4% | 1 | 0.000 |
| 5 | 23.6% | 15.2% | 1 | 0.000 |
| 6 | 22.6% | 15.4% | 1 | 0.000 |
| 7 | 23.1% | 15.2% | 1 | 0.000 |
| HRS | Finland | 1 | 16.5% | 8.2% | 1 | 0.000 |
| 2 | 13.8% | 8.0% | 1 | 0.000 |
| KLOSA | South Korea | 1 | 27.8% | 15.3% | 1 | 0.000 |
| 2 | 25.9% | 14.5% | 1 | 0.000 |
| 3 | 23.9% | 12.8% | 1 | 0.000 |
| 4 | 24.4% | 14.5% | 1 | 0.000 |
| LASI | India | 1 | 44.3% | 46.9% | 1 | 0.302 |
| MHAS | Mexico | 2 | 43.9% | 29.5% | 1 | 0.000 |
| 3 | 41.3% | 30.0% | 1 | 0.000 |
| SAGE | China | 1 | 4.4% | 1.7% | 1 | 0.000 |
| Ghana | 1 | 84.1% | 79.1% | 1 | 0.000 |
| India | 1 | 22.9% | 29.4% | 1 | 0.000 |
| Mexico | 1 | 51.0% | 38.3% | 1 | 0.000 |
| Russia | 1 | 10.9% | 7.9% | 1 | 0.002 |
| South Africa | 1 | 80.7% | 74.8% | 1 | 0.000 |
| SHARE | Europe | 1 | 8.7% | 6.9% | 1 | 0.000 |
| 2 | 6.4% | 4.6% | 1 | 0.000 |
| 4 | 12.6% | 8.5% | 1 | 0.000 |
| TILDA | Ireland | 1 | 79.9% | 74.8% | 1 | 0.000 |

The results showed that in most cases women significantly more frequently reported participation in religious activities. The expected relationship was not found as significant for China and Rural Peru cohort in 10/66 study as well as in ALSA study (in waves 7,9,11 and 12). Only in India reverse relationship was observed (for study 10/66 and SAGE statistically significant, for LASI the result was not found as significant). In summary, in most cases the expected association reached statistical significance, which supported the overall validity of harmonized variable related to religious participation.

## **Participation in sport groups**

Table 5. Distribution of participation in sport group across self-rated health group by study, cohort and wave.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | Self-rated health | | | | Chi-square test | | |
| Study | Cohort | Wave | Good | | Moderate | Poor | df | | p-value |
| ALSA | South Australia | 3 | 7.7% | | 3.5% | 3.9% | 2 | | 0.009 |
| COURAGE | Finland | 1 | 59.5% | | 34.2% | 20.5% | 2 | | 0.000 |
| Poland | 1 | 12.3% | | 5.0% | 2.2% | 2 | | 0.000 |
| 2 | 10.1% | | 8.3% | 1.6% | 2 | | 0.000 |
| Spain | 1 | 24.0% | | 13.4% | 5.3% | 2 | | 0.000 |
| ELSA | United Kingdom | 1 | 23.2% | | 10.8% | 6.0% | 2 | | 0.000 |
| 2 | 23.8% | | 11.8% | 7.8% | 2 | | 0.000 |
| 3 | 26.6% | | 11.1% | 6.6% | 2 | | 0.000 |
| 4 | 27.3% | | 11.6% | 6.5% | 2 | | 0.000 |
| 5 | 27.6% | | 12.5% | 6.2% | 2 | | 0.000 |
| 6 | 28.7% | | 13.2% | 8.0% | 2 | | 0.000 |
| 7 | 30.4% | | 15.4% | 8.4% | 2 | | 0.000 |

Table 6. Distribution of participation in sport group across age group by study, cohort and wave.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Age | | | | Chi-square test | | |
| Study | Cohort | Wave | 65-74 | 75-84 | 85 yrs and older | df | | p-value |
| ALSA | South Australia | 3 | 6.6% | 7.5% | 2.5% | 2 | | 0.003 |
| COURAGE | Finland | 1 | 42.9% | 27.4% | 13.0% | 2 | | 0.000 |
| Poland | 1 | 4.6% | 3.1% | 3.0% | 2 | | 0.357 |
| 2 | 6.3% | 5.2% | 8.1% | 2 | | 0.620 |
| Spain | 1 | 13.5% | 5.8% | 2.3% | 2 | | 0.000 |
| ELSA | United Kingdom | 1 | 18.4% | 9.9% | 5.2% | 2 | | 0.000 |
| 2 | 21.4% | 12.6% | 10.5% | 2 | | 0.000 |
| 3 | 20.4% | 11.6% | 5.2% | 2 | | 0.000 |
| 4 | 23.9% | 14.4% | 7.6% | 2 | | 0.000 |
| 5 | 24.5% | 16.4% | 7.4% | 2 | | 0.000 |
| 6 | 25.5% | 19.0% | 7.8% | 2 | | 0.000 |
| 7 | 28.3% | 21.0% | 10.9% | 2 | | 0.000 |

The expected relationship between self-rated health and participation in sport groups was statistically significant for all analyzed cohorts and waves. The expected relationship between age and participation in sport groups was also significant in most case. Only in Poland the results was found as not significant. Thus, the results support known-group validity of the harmonized variable.

**Participation in volunteer/charity group activities**

Table 7. Distribution of participation in volunteer/charity group activities across level of education by study, cohort and wave.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Level of education | | | | Chi-square test | |
| Less than primary | Primary | Secondary | Tertiary | df | p-value |
| Study | Cohort | Wave |  |  |  |  |  |  |
| CHARLS | China | 1 | 5.5% | 6.2% | 8.6% | 15.4% | 3 | 0.000 |
| 2 | 12.0% | 15.3% | 20.0% | 30.0% | 3 | 0.000 |
| COURAGE | Finland | 1 | 12.5% | 4.4% | 11.9% | 12.2% | 3 | 0.008 |
| Poland | 1 | 5.5% | 6.0% | 7.6% | 7.9% | 3 | 0.370 |
| 2 | 3.3% | 10.3% | 11.4% | 12.0% | 3 | 0.490 |
| Spain | 1 | 2.6% | 3.6% | 5.7% | 8.3% | 3 | 0.000 |
| 2 | 4.7% | 6.4% | 7.0% | 11.0% | 3 | 0.002 |
| ELSA | United Kingdom | 1 | 19.0% |  | 35.0% | 54.6% | 2 | 0.000 |
| 2 | 22.5% |  | 37.3% | 54.8% | 2 | 0.000 |
| 3 | 20.0% |  | 35.5% | 55.8% | 2 | 0.000 |
| 4 | 19.9% |  | 35.2% | 55.2% | 2 | 0.000 |
| 5 | 19.0% |  | 35.1% | 55.0% | 2 | 0.000 |
| 6 | 20.1% |  | 35.2% | 51.8% | 2 | 0.000 |
| 7 | 20.0% |  | 34.2% | 53.1% | 2 | 0.000 |
| KLOSA | South Korea | 1 | 0.2% | 1.4% | 3.3% | 5.9% | 3 | 0.000 |
| 2 | 0.1% | 0.5% | 1.7% | 3.6% | 3 | 0.000 |
| 3 | 0.1% | 0.6% | 1.1% | 3.0% | 3 | 0.000 |
| 4 | 0.2% | 0.7% | 1.0% | 1.7% | 3 | 0.001 |
| MHAS | Mexico | 1 | 10.4% | 13.8% | 18.0% | 20.0% | 3 | 0.000 |
| 2 | 15.8% | 14.7% | 9.7% | 12.5% | 3 | 0.890 |
| 3 | 21.4% | 21.8% | 20.8% | 24.6% | 3 | 0.191 |
| SAGE | China | 1 | 15.1% | 13.3% | 15.5% | 10.1% | 3 | 0.000 |
| Ghana | 1 | 41.8% | 37.6% | 40.4% | 38.5% | 3 | 0.496 |
| India | 1 | 19.8% | 16.3% | 21.1% | 24.3% | 3 | 0.000 |
| Mexico | 1 | 7.9% | 8.6% | 5.8% | 9.2% | 3 | 0.351 |
| Russia | 1 | 4.2% | 4.5% | 8.4% | 9.8% | 3 | 0.018 |
| South Africa | 1 | 24.8% | 23.7% | 24.0% | 30.8% | 3 | 0.225 |
| SHARE | Europe | 1 | 12.2% | 20.5% | 32.8% | 43.7% | 3 | 0.000 |
| 2 | 6.0% | 14.5% | 26.6% | 40.2% | 3 | 0.000 |
| 4 | 5.0% | 8.4% | 15.1% | 26.6% | 3 | 0.000 |
| 5 | 5.7% | 9.7% | 17.3% | 28.1% | 3 | 0.000 |
| TILDA | Ireland | 1 | 23.9% | 26.5% | 34.2% | 48.6% | 3 | 0.000 |

Table 8. Distribution of participation in volunteer/charity group activities across self-rated health by study, cohort and wave.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Self-rated health | | | Chi-square test | |
| Study | Cohort | Wave | Good | Moderate | Poor | df | p-value |
| ALSA | South Australia | 3 | 4.2% | 2.5% | 1.9% | 2 | 0.179 |
| CHARLS | China | 1 | 7.7% | 7.8% | 4.8% | 2 | 0.000 |
| 2 | 16.7% | 14.9% | 9.6% | 2 | 0.000 |
| COURAGE | Finland | 1 | 11.6% | 11.2% | 5.9% | 2 | 0.176 |
| Poland | 1 | 7.9% | 7.5% | 5.2% | 2 | 0.057 |
| 2 | 12.5% | 13.0% | 2.7% | 2 | 0.000 |
| Spain | 1 | 5.4% | 4.4% | 1.8% | 2 | 0.000 |
| 2 | 6.9% | 7.4% | 3.6% | 2 | 0.159 |
| ELSA | United Kingdom | 1 | 34.3% | 24.9% | 16.8% | 2 | 0.000 |
| 2 | 37.6% | 25.8% | 19.1% | 2 | 0.000 |
| 3 | 38.0% | 29.2% | 18.4% | 2 | 0.000 |
| 4 | 38.6% | 26.2% | 18.0% | 2 | 0.000 |
| 5 | 38.7% | 26.2% | 21.2% | 2 | 0.000 |
| 6 | 39.5% | 26.5% | 21.9% | 2 | 0.000 |
| 7 | 38.5% | 29.6% | 21.0% | 2 | 0.000 |
| KLOSA | South Korea | 1 | 3.4% | 2.7% | 1.3% | 2 | 0.000 |
| 2 | 1.8% | 1.5% | 0.5% | 2 | 0.000 |
| 3 | 1.4% | 1.0% | 0.5% | 2 | 0.002 |
| 4 | 1.6% | 0.8% | 0.2% | 2 | 0.000 |
| MHAS | Mexico | 1 | 14.6% | 14.1% | 12.9% | 2 | 0.160 |
| 2 | 94.0% | 94.0% | 91.1% | 2 | 0.000 |
| 3 | 19.9% | 17.8% | 14.2% | 2 | 0.000 |
| SAGE | China | 1 | 14.9% | 13.4% | 11.9% | 2 | 0.001 |
| Ghana | 1 | 41.4% | 30.5% | 19.0% | 2 | 0.000 |
| India | 1 | 21.2% | 18.3% | 13.1% | 2 | 0.000 |
| Mexico | 1 | 9.3% | 8.0% | 3.3% | 2 | 0.004 |
| Russia | 1 | 10.9% | 9.7% | 3.4% | 2 | 0.000 |
| South Africa | 1 | 28.3% | 23.9% | 15.4% | 2 | 0.000 |
| SHARE | Europe | 1 | 35.5% | 24.4% | 13.8% | 2 | 0.000 |
| 2 | 30.7% | 19.6% | 10.6% | 2 | 0.000 |
| 4 | 20.3% | 11.5% | 5.5% | 2 | 0.000 |
| 5 | 22.3% | 12.7% | 6.2% | 2 | 0.000 |
| TILDA | Ireland | 1 | 39.1% | 29.8% | 21.5% | 2 | 0.000 |
| 2 | 43.7% | 31.3% | 20.7% | 2 | 0.000 |

Table 9. Distribution of participation in volunteer/charity group activities across age group by study, cohort and wave.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | Age | | | | Chi-square test | |
| Study | Cohort | Wave | 65-74 | | 75-84 | 85 yrs and older | df | | p-value |
| ALSA | South Australia | 3 | 5.4% | | 3.0% | 3.0% | 2 | | 0.073 |
| CHARLS | China | 1 | 4.1% | | 2.1% | 1.1% | 2 | | 0.001 |
| 2 | 10.2% | | 4.2% | 2.0% | 2 | | 0.000 |
| COURAGE | Finland | 1 | 11.5% | | 9.8% | 1.3% | 2 | | 0.025 |
| Poland | 1 | 8.1% | | 6.5% | 4.2% | 2 | | 0.188 |
| 2 | 11.5% | | 8.1% | 10.1% | 2 | | 0.405 |
| Spain | 1 | 5.8% | | 2.2% | 2.3% | 2 | | 0.001 |
| 2 | 7.8% | | 3.4% | 5.4% | 2 | | 0.017 |
| ELSA | United Kingdom | 1 | 32.2% | | 30.0% | 28.1% | 2 | | 0.152 |
| 2 | 38.2% | | 35.0% | 26.1% | 2 | | 0.000 |
| 3 | 38.8% | | 32.6% | 28.4% | 2 | | 0.000 |
| 4 | 38.8% | | 33.6% | 28.8% | 2 | | 0.000 |
| 5 | 39.1% | | 34.4% | 24.5% | 2 | | 0.000 |
| 6 | 40.4% | | 35.6% | 23.0% | 2 | | 0.000 |
| 7 | 40.9% | | 35.8% | 29.6% | 2 | | 0.000 |
| KLOSA | South Korea | 1 | 1.5% | | 0.6% | 0.4% | 2 | | 0.032 |
| 2 | 1.0% | | 0.2% |  | 2 | | 0.014 |
| 3 | 0.9% | | 0.4% | 0.3% | 2 | | 0.107 |
| 4 | 0.6% | | 0.3% | 0.9% | 2 | | 0.207 |
| MHAS | Mexico | 1 | 12.6% | | 8.4% | 4.3% | 2 | | 0.000 |
| 2 | 93.8% | | 90.4% | 87.7% | 2 | | 0.000 |
| 3 | 15.6% | | 10.9% | 5.0% | 2 | | 0.000 |
| SAGE | China | 1 | 11.8% | | 9.5% | 6.2% | 2 | | 0.004 |
| Ghana | 1 | 28.3% | | 19.5% | 13.6% | 2 | | 0.000 |
| India | 1 | 18.3% | | 14.4% | 6.6% | 2 | | 0.001 |
| Mexico | 1 | 8.2% | | 7.7% | 4.5% | 2 | | 0.409 |
| Russia | 1 | 7.9% | | 4.6% | 1.8% | 2 | | 0.003 |
| South Africa | 1 | 22.8% | | 16.7% | 11.8% | 2 | | 0.004 |
| SHARE | Europe | 1 | 27.8% | | 16.7% | 7.5% | 2 | | 0.000 |
| 2 | 25.6% | | 15.6% | 7.0% | 2 | | 0.000 |
| 4 | 17.7% | | 10.7% | 5.5% | 2 | | 0.000 |
| 5 | 20.4% | | 12.3% | 6.0% | 2 | | 0.000 |
| TILDA | Ireland | 1 | 41.2% | | 27.9% |  | 1 | | 0.000 |
| 2 | 44.4% | | 33.2% |  | 1 | | 0.000 |

The expected relationship between level of education and participation in volunteer group activities as well as between self-rated health and participation in volunteer group activities was observed as statistically significant in 26 analyzed datasets out of 32 in the first case and 28 out of 32 in the second. Similarly, the expected results across age groups was observed statistically significant in 26 out of 32 analyzed cohorts and waves of the studies.

## **Any participation**

Table 10. Distribution of any participation across age group by study, cohort and wave.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Age | | | | Chi-square test | |
| Study | Cohort | Wave | 50-64 | 65-74 | 75-84 | 85 yrs and older | df | p-value |
| 10/66 | Cuba | 1 |  | 46.1% | 35.2% | 15.0% | 2 | 0.000 |
| 2 |  | 59.7% | 47.3% | 24.0% | 2 | 0.000 |
| Dominican Republic | 1 |  | 41.2% | 32.3% | 21.3% | 2 | 0.000 |
| 2 |  | 73.1% | 60.0% | 38.3% | 2 | 0.000 |
| India | 1 |  | 23.3% | 21.5% | 16.7% | 2 | 0.239 |
| Puerto Rico | 1 |  | 29.8% | 25.5% | 13.5% | 2 | 0.000 |
| 2 |  | 60.4% | 58.4% | 40.8% | 2 | 0.000 |
| Rural China | 1 |  | 10.5% | 12.4% | 6.3% | 2 | 0.398 |
| 2 |  | 23.0% | 18.9% | 11.9% | 2 | 0.161 |
| Rural Mexico | 1 |  | 28.3% | 19.7% | 14.5% | 2 | 0.001 |
| 2 |  | 46.8% | 38.0% | 36.7% | 2 | 0.048 |
| Rural Peru | 1 |  | 82.4% | 82.2% | 77.6% | 2 | 0.671 |
| 2 |  | 74.1% | 63.7% | 48.3% | 2 | 0.001 |
| Urban China | 1 |  | 5.3% | 2.0% | 2.4% | 2 | 0.021 |
| 2 |  | 25.7% | 19.5% | 14.3% | 2 | 0.041 |
| Urban Mexico | 1 |  | 26.7% | 29.0% | 18.3% | 2 | 0.120 |
| 2 |  | 46.1% | 34.1% | 26.4% | 2 | 0.000 |
| Urban Peru | 1 |  | 80.4% | 72.6% | 54.3% | 2 | 0.000 |
| 2 |  | 81.6% | 70.7% | 45.2% | 2 | 0.000 |
| Venezuela | 1 |  | 62.9% | 53.0% | 40.2% | 2 | 0.000 |
| 2 |  | 64.0% | 52.0% | 25.9% | 2 | 0.000 |
| ALSA | South Australia | 1 | 50.0% | 58.6% | 53.2% | 44.4% | 3 | 0.000 |
| 3 |  | 59.3% | 54.2% | 45.8% | 2 | 0.000 |
| 6 |  | 61.1% | 74.2% | 57.4% | 2 | 0.001 |
| 7 |  |  | 78.5% | 81.1% | 1 | 0.645 |
| 9 |  |  | 53.1% | 64.7% | 1 | 0.221 |
| 11 |  |  | 36.4% | 46.4% | 1 | 0.519 |
| 12 |  |  |  | 58.8% |  |  |
| CHARLS | China | 1 | 6.9% | 7.9% | 6.3% | 1.7% | 3 | 0.004 |
| 2 | 9.8% | 9.7% | 7.3% | 2.8% | 3 | 0.000 |
| COURAGE | Finland | 1 | 80.8% | 79.3% | 75.3% | 55.7% | 3 | 0.000 |
| Poland | 1 | 47.8% | 44.8% | 33.5% | 24.1% | 3 | 0.000 |
| 2 | 51.5% | 50.9% | 42.7% | 27.3% | 3 | 0.000 |
| Spain | 1 | 47.1% | 41.2% | 30.9% | 21.0% | 3 | 0.000 |
| 2 | 48.4% | 42.4% | 30.2% | 18.8% | 3 | 0.000 |
| ELSA | United Kingdom | 1 | 70.5% | 70.1% | 66.1% | 60.3% | 3 | 0.000 |
| 2 | 74.0% | 75.8% | 72.9% | 69.9% | 3 | 0.083 |
| 3 | 72.0% | 74.2% | 69.2% | 69.2% | 3 | 0.015 |
| 4 | 70.4% | 73.1% | 70.4% | 72.5% | 3 | 0.081 |
| 5 | 70.1% | 73.2% | 71.6% | 69.2% | 3 | 0.041 |
| 6 | 69.2% | 73.1% | 73.4% | 69.2% | 3 | 0.001 |
| 7 | 67.2% | 73.9% | 73.2% | 71.0% | 3 | 0.000 |
| HAPIEE | Czech Republic | 1 | 25.9% | 33.6% |  |  | 1 | 0.000 |
| Lithuania | 1 | 14.0% | 14.4% |  |  | 2 | 0.821 |
| Poland | 1 | 12.0% | 13.3% |  |  | 1 | 0.105 |
| HRS | Finland | 1 | 26.1% | 31.2% | 29.0% | 16.7% | 3 | 0.000 |
| 2 | 24.7% | 35.2% | 41.3% | 25.3% | 3 | 0.000 |
| KLOSA | South Korea | 1 | 73.2% | 61.4% | 52.5% | 33.2% | 3 | 0.000 |
| 2 | 81.6% | 69.0% | 55.9% | 41.5% | 3 | 0.000 |
| 3 | 80.1% | 67.7% | 58.4% | 39.7% | 3 | 0.000 |
| 4 | 82.3% | 73.3% | 58.0% | 47.8% | 3 | 0.000 |
| LASI | India | 1 | 8.7% | 5.5% | 1.1% | 3.2% | 3 | 0.021 |
| SAGE | China | 1 | 4.3% | 5.4% | 4.1% | 3.1% | 3 | 0.031 |
| Ghana | 1 | 49.0% | 42.2% | 34.8% | 22.0% | 3 | 0.000 |
| India | 1 | 11.2% | 8.1% | 6.4% | 2.5% | 3 | 0.000 |
| Mexico | 1 | 9.4% | 8.5% | 9.5% | 6.4% | 3 | 0.677 |
| Russia | 1 | 7.3% | 4.8% | 3.2% | 3.7% | 3 | 0.000 |
| South Africa | 1 | 33.7% | 28.3% | 26.4% | 26.5% | 3 | 0.002 |
| SHARE | Europe | 1 | 31.9% | 31.1% | 26.1% | 19.4% | 3 | 0.000 |
| 2 | 33.1% | 32.2% | 24.2% | 16.9% | 3 | 0.000 |
| 4 | 38.9% | 38.1% | 31.3% | 21.4% | 3 | 0.000 |
| 5 | 36.1% | 35.0% | 24.3% | 15.3% | 3 | 0.000 |
| TILDA | Ireland | 1 | 46.7% | 52.1% | 43.6% |  | 2 | 0.000 |
| 2 | 51.1% | 57.1% | 47.8% |  | 2 | 0.000 |

Table 11. Distribution of any participation across self-rated health group by study, cohort and wave.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Self-rated health | | |  |  |
| Study | Cohort | Wave | good | moderate | poor | df | p-value |
| 10/66 | Cuba | 1 | 40.4% | 37.4% | 32.7% | 2 | 0.038 |
| 2 | 53.3% | 43.9% | 22.7% | 2 | 0.000 |
| Dominican Republic | 1 | 33.9% | 38.1% | 31.5% | 2 | 0.085 |
| 2 | 65.0% | 56.3% | 45.8% | 2 | 0.000 |
| India | 1 | 23.1% | 21.8% | 21.0% | 2 | 0.724 |
| Puerto Rico | 1 | 30.3% | 21.5% | 13.7% | 2 | 0.000 |
| 2 | 59.4% | 53.9% | 23.3% | 2 | 0.000 |
| Rural China | 1 | 12.9% | 6.3% | 5.0% | 2 | 0.006 |
| 2 | 23.0% | 17.3% | 8.2% | 2 | 0.022 |
| Rural Mexico | 1 | 26.8% | 22.0% | 16.7% | 2 | 0.065 |
| 2 | 39.6% | 44.6% | 30.8% | 2 | 0.108 |
| Rural Peru | 1 | 88.0% | 73.8% | 54.5% | 2 | 0.000 |
| 2 | 69.3% | 65.4% | 38.9% | 2 | 0.031 |
| Urban China | 1 | 6.8% | 3.5% | 2.4% | 2 | 0.102 |
| 2 | 28.5% | 16.5% | 7.5% | 2 | 0.000 |
| Urban Mexico | 1 | 27.7% | 26.8% | 18.6% | 2 | 0.205 |
| 2 | 41.5% | 39.6% | 12.7% | 2 | 0.000 |
| Urban Peru | 1 | 80.6% | 69.8% | 45.7% | 2 | 0.000 |
| 2 | 78.1% | 62.2% | 20.0% | 2 | 0.000 |
| Venezuela | 1 | 60.5% | 57.1% | 55.8% | 2 | 0.296 |
| 2 | 64.9% | 41.5% | 19.6% | 2 | 0.000 |
| ALSA | South Australia | 1 | 57.2% | 46.4% | 39.9% | 2 | 0.000 |
| 3 | 57.6% | 48.9% | 49.1% | 2 | 0.005 |
| 6 | 73.2% | 55.6% | 61.5% | 2 | 0.002 |
| 7 | 82.9% | 70.2% | 76.5% | 2 | 0.159 |
| 9 | 62.7% | 60.0% | 80.0% | 2 | 0.683 |
| 11 | 55.0% | 28.9% | 16.7% | 2 | 0.003 |
| 12 | 64.9% | 52.2% | 20.0% | 2 | 0.111 |
| CHARLS | China | 1 | 10.8% | 8.4% | 3.9% | 2 | 0.000 |
| 2 | 12.4% | 10.7% | 6.0% | 2 | 0.000 |
| COURAGE | Finland | 1 | 84.2% | 74.7% | 62.2% | 2 | 0.000 |
| Poland | 1 | 51.1% | 42.2% | 33.7% | 2 | 0.000 |
| 2 | 58.7% | 46.9% | 31.9% | 2 | 0.000 |
| Spain | 1 | 49.4% | 37.8% | 27.6% | 2 | 0.000 |
| 2 | 46.4% | 37.5% | 21.9% | 2 | 0.000 |
| ELSA | United Kingdom | 1 | 74.3% | 61.5% | 48.2% | 2 | 0.000 |
| 2 | 77.9% | 66.2% | 55.0% | 2 | 0.000 |
| 3 | 75.8% | 65.8% | 52.7% | 2 | 0.000 |
| 4 | 75.4% | 60.9% | 50.9% | 2 | 0.000 |
| 5 | 75.5% | 60.6% | 52.7% | 2 | 0.000 |
| 6 | 75.5% | 61.7% | 50.0% | 2 | 0.000 |
| 7 | 74.8% | 60.7% | 52.1% | 2 | 0.000 |
| HAPIEE | Czech Republic | 1 | 30.8% | 26.1% | 26.2% | 2 | 0.000 |
| Lithuania | 1 | 19.1% | 13.4% | 9.5% | 2 | 0.000 |
| Poland | 1 | 15.4% | 11.2% | 9.4% | 2 | 0.000 |
| HRS | Finland | 1 | 32.3% | 25.8% | 17.9% | 2 | 0.000 |
| 2 | 31.2% | 26.0% | 21.9% | 2 | 0.002 |
| KLOSA | South Korea | 1 | 75.0% | 68.0% | 54.1% | 2 | 0.000 |
| 2 | 84.8% | 76.2% | 54.7% | 2 | 0.000 |
| 3 | 82.2% | 76.5% | 52.4% | 2 | 0.000 |
| 4 | 86.5% | 77.8% | 53.4% | 2 | 0.000 |
| LASI | India | 1 | 5.6% | 8.4% | 9.4% | 2 | 0.141 |
| SAGE | China | 1 | 5.1% | 4.7% | 3.3% | 2 | 0.001 |
| Ghana | 1 | 47.6% | 48.4% | 23.5% | 2 | 0.000 |
| India | 1 | 14.5% | 9.0% | 5.6% | 2 | 0.000 |
| Mexico | 1 | 9.5% | 9.3% | 6.2% | 2 | 0.216 |
| Russia | 1 | 11.5% | 5.8% | 3.2% | 2 | 0.000 |
| South Africa | 1 | 35.5% | 31.5% | 21.0% | 2 | 0.000 |
| SHARE | Europe | 1 | 35.0% | 25.3% | 15.1% | 2 | 0.000 |
| 2 | 35.9% | 23.8% | 13.8% | 2 | 0.000 |
| 4 | 44.5% | 29.3% | 18.3% | 2 | 0.000 |
| 5 | 40.3% | 23.0% | 12.4% | 2 | 0.000 |
| TILDA | Ireland | 1 | 50.8% | 39.6% | 29.3% | 2 | 0.000 |
| 2 | 55.7% | 38.3% | 29.2% | 2 | 0.000 |

The results showed that the expected relationships was found as significant in most analyzed cohorts and waves. Thus, the results support the known-group validity of the harmonized variable.