Cohort Profile

Cohort Profile: The German Ageing Survey (DEAS)

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Why was the cohort set up?

Population ageing and longevity - as observed in Germany - is not simply a phenomenon of an increasing number of old people: it also involves a range of qualitative and structural changes affecting older people. For this reason the German Federal Government, aiming to improve the quality of its monitoring efforts on older people in Germany, launched the German Ageing Survey (DEAS) in the mid 1990s, under the auspices of the Federal Ministry for Family Affairs and Senior Citizens (BMFuS, now German Federal Ministry for Family Affairs, Senior Citizens, Women, and Youth, BMFSFJ). In 1996, the first wave of the survey was conducted by two collaborating research groups: the Research Group on Ageing and the Life Course at the Freie Universität in Berlin; and the Research Group on Psycho-Gerontology at the University of Nijmegen in The Netherlands. From the year 2002 onwards, the German Centre of Gerontology in Berlin (DZA) has been responsible for the conduct and ongoing development of the study. The DEAS is funded by the BMFSFJ. Fieldwork for all waves (1996–2014) is carried out by the Bonn-based Institute for Applied Social Sciences (infas).

The primary goal of the project is to provide a representative national database containing information describing the living conditions of the country's middle-aged and older population and to study diversity within the older section of the population, the process of ageing as it affects individuals and processes of social change as they relate to old age and ageing. For this purpose, a cohort-sequential design has been set up combining large cross-sectional samples with longitudinal samples. The design of the DEAS permits three different perspectives for analyses: (i) analysis of social change; (ii) analysis of intra-individual change; and (iii) analysis of historical changes affecting individual ageing trajectories.

Who is in the cohort?

Cross-sectional samples (baseline samples) are drawn up every 6 years (in 1996, 2002, 2008 and 2014 so far). Each baseline sample is followed over time, so that longitudinal data were collected in the years 2002, 2008, 2011 and 2014 (see Figure 1). The next panel data collection will take place in 2017 and it is planned to draw up the next baseline sample in 2020.

The DEAS baseline samples are nationally representative for adults aged from 40 to 85 years. The samples are based on a two-stage sampling methodology: Firstly, a random sample of 290 municipalities was drawn in 1996 from the total of 12 000 municipalities that existed in Germany at that time. In each baseline year, the local population registries of these 290 municipalities provided the basis used to sample the population of people living in the
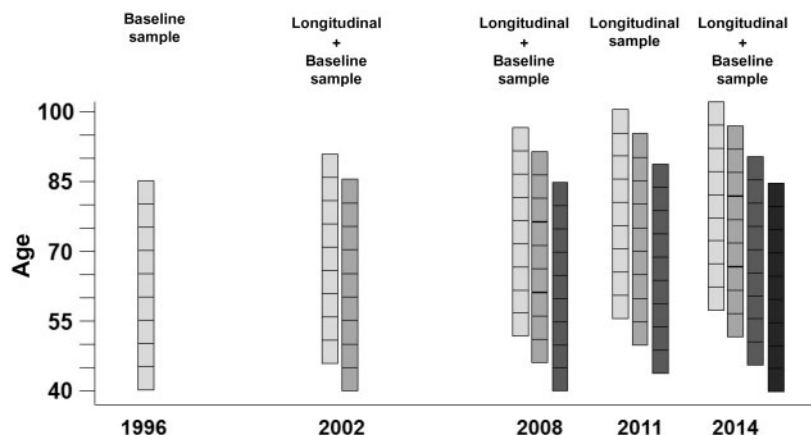
Figure 1. DEAS sample design.

community in private households, aged between 40 and 85 years. All baseline samples have been disproportionally stratified into three age groups (40–54, 55–69 and 70–85 years), gender and region (East and West Germany). The oldest age group, along with the group of men and of East Germans, were oversampled to ensure that there would be a reasonable number of participants in pertinent demographic subgroups, such as men in old age living in East Germany, and for follow-up. Cross-sectional weights are computed for every baseline year. They are used to adjust for the disproportional stratification against the population distribution in each relevant year, which is obtained from the national micro census data (obtained from the Federal Statistical Office, based in Wiesbaden).

The target population in 1996 was defined as community-dwelling German citizens ($n = 4838$). In 2002, a sample of German citizens ($n = 3084$) was drawn up, along with a separate sample of non-German citizens residing in Germany ($n = 586$). Since 2008, however, a single sample containing both German and non-German citizens has been drawn up from the community-dwelling population in Germany (2008: $n = 6205$; 2014: $n = 6002$).

The response rates for the baseline samples are defined as the proportion of respondents with whom valid interviews were conducted against the gross sample of eligible individuals. DEAS response rates are low as compared with other European surveys on ageing,[1] but are similar to other surveys conducted in Germany. Over recent years one can see a trend of decreasing participation rates in surveys all over the Western world, but this phenomenon is most pronounced in Germany.[2] The DEAS aimed to mitigate this decrease in participation rates by, for example, increasing the incentives for respondents: €10 have been paid to participants since 2008. Despite this, however, response rates for baseline samples decreased from 50.3% to 27.1% between 1996 and 2014 (see Table 1).

Sample selectivity can be observed, as participation rates tend to be lower in large cities, among women and in both the middle-aged (40 to 54 years) and oldest age groups (70 to 85 years). Such selectivity effects are, however, small and the distribution of such socio-demographic characteristics as family composition, marital status, household size, employment status and education in the weighted baseline samples is very close to the distribution within the population of Germany.[3] Up to 2014, a total of 20 715 individuals aged between 40 and 85 years at first interview have participated in the DEAS.

How often have they been followed up?

Baseline participants who gave written consent were recontacted for further waves of data collection in 2002, 2008, 2011 and 2014. To enhance the quality of the longitudinal sample,[4] people willing to participate in the panel are generally allowed to miss out on one or more panel waves without being excluded from the address pool.

Panel attrition is high in the first re-interview but attenuates in subsequent follow-ups (see Table 2), a phenomenon that is familiar to other panel studies.[5] To reduce attrition, the interval between panel waves was reduced from 6 to 3 years from 2008 on, and efforts were intensified to update the address pool and to increase participants' compliance (e.g. by sending greeting cards and booklets along with study results). As a consequence, the retention rate - defined as valid re-interviews as a proportion of the number of valid interviews in the baseline year - has increased (see Table 2). The most obvious sign of improvement is the fact that the retention rate based on the 2008 baseline sample was considerably higher (41.4%) in 2014 than the 2002 figure based on the 1996 baseline sample (31.5%). Up to 2014, a total of 6622 individuals had participated at least twice. Vital statistics were updated in every follow-up for all respondents who gave their written

Table 1. DEAS baseline samples 1996, 2002, 2008 and 2014

Survey years	1996	2002		2008	2014
	Germans	Germans	Non-Germans	Germans and non-Germans	Germans and non-Germans
Sample sizes (*n*)					
Gross sample of eligible people[a]	9613	8164	2343	17 366	22 139
Respondents: valid face-to-face interviews	4838	3084	586	6205	6002
Respondents: additional questionnaires	4034	2787	484	4442	4295
Rates (%)					
Response rate[b]	50.3	37.8	25.0	35.7	27.1
Additional questionnaires[c]	83.4	90.4	82.6	71.6	71.6
Other					
Birth cohorts	1911–56	1917–62	1917–62	1923–68	1929–74
Age at interview	40–85	40–85	40–85	40–85	40–85
Average duration of face-to-face interview (in minutes)	67	82	82	83	100

[a]Gross sample of municipal registries excluding non-eligible persons (those living in an institutional setting such as a nursing home and persons who do not speak German.
[b]Valid interviews as a proportion of the gross sample of eligible people.
[c]Number of questionnaires filled in as a proportion of valid face-to-face interviews.

Table 2. DEAS longitudinal samples 2002, 2008, 2011 and 2014

Survey year	2002	2008	2008	2011	2011	2011	2014	2014	2014
Baseline year	1996	1996	2002	1996	2002	2008	1996	2002	2008
Time span in years	6	12	6	15	9	3	18	12	6
Sample sizes (*n*)									
Valid re-interviews	1524	991	1000	1039	957	2858	887	866	2569
Additional questionnaires	1437	818	829	876	791	2338	749	729	2179
Rates (%)									
Retention rate[a]	31.5	20.5	32.4	21.5	31.0	46.1	18.3	28.1	41.4
Valid questionnaires[b]	94.3	82.5	82.9	84.3	82.7	81.8	84.4	84.2	84.8
Other									
Birth cohorts[c]	1911–56	1911–56	1917–62	1911–56	1917–62	1923–68	1911–56	1917–62	1923–68
Age at interview (years)	46–91	52–96	46–89	55–98	49–92	43–88	58–96	52–95	46–91

Note: [a]Valid interviews in the panel year as a proportion of valid interviews in baseline wave.
[b]Panel questionnaires completed as a proportion of valid face-to-face panel interviews.
[c]Possible range of birth cohorts.

consent to further contact in relation to the study. For those participants who were discovered to have died between waves, the date of death was obtained either from the relevant registration office or from relatives.

As is the practice with other panel studies, attrition rates are graded in relation to a variety of demographic and socioeconomic characteristics. In the DEAS, we observe that panel participants tend to be younger, healthier and better educated, and to have larger incomes and larger informal networks than respondents who drop out. However, it could be seen that these selectivity effects diminished in size after the interval between waves was reduced from 2008 on.[3] To allow adjustments to be made

for differential non-response in the successive panel waves, longitudinal weights are available.

What has been measured?

Face-to-face interviews are conducted in each wave. These interviews usually take place in the respondents' homes and are conducted by professional interviewers using a standardized questionnaire. In 1996 and 2002 the data were collected using paper-and-pencil interviews (PAPI). From 2008 on this approach was replaced by computer-assisted personal interviews (CAPI). In all waves, respondents are asked to fill out an additional written

questionnaire (either immediately or a few days after the oral interview). The language of both the interview and questionnaire is exclusively German. No proxy interviews are permitted. However, where a respondent requests, he or she may fill out the questionnaire with the help of the interviewer. In addition, those who do not have a sufficient knowledge of the German language may be supported by family members or other people present.

A very broad range of topics is covered in the DEAS. For reasons of comparability, many measures remain unchanged from wave to wave. In some cases, however, measures have had to be modified, deleted, or added - as required by current political or scientific discussion or in response to new findings in survey methodology and research on ageing. The interview mainly seeks to record data on household composition, family relationships, occupational status, personal network and health. The written questionnaire mainly deals with psychological measures and questions on such sensitive issues as religious or political affiliation, attitudes, income and sexual orientation. Two different objective tests are conducted to provide an indication of the respondent's cognitive and physical capacity: a digit-symbol test to assess perceptual speed[6] and a lung functioning test using a spirometer.[7] In addition to the data obtained directly during the survey, interviewer ratings and structural context data are available in order to describe respondent's home and neighbourhood. Table 3 shows the content of the DEAS data and gives examples of

measures and indicators. Most - but not all - measures and indicators listed are available for every wave of the study.

What has it found? Key findings and publications

DEAS data are used on a regular basis for social reports to the BMFSFJ on ageing and old age in Germany. In addition, researchers all over the world use them in their scientific work. A full list of known publications based on DEAS data is provided on the DZA Research Data Centre's website [www.dza.de/en/fdz/german-ageing-survey/publications.html]. To follow, we provide a selection of findings from the core topics of the DEAS: health and well-being, work and income, and family and social relationships.

Health and well-being

How healthy older people are, how their state of health evolves over time and what can be done to promote good health are major topics dealt with in research on ageing and old age. DEAS data provide the opportunity to investigate a number of indicators of health and well-being, as well as to analyse longitudinal trajectories, age and cohort differences and predictors of health and mortality. Findings show that later-born cohorts are healthier than earlier ones. Since 2008, this trend has only been detected for persons aged 65 and older, whereas it has actually

Table 3. DEAS data 1996–2014

Topics	Examples
(Socio-) Demographics	Age, gender, household composition, parents, siblings, education, marital status, citizenship
Employment	Employment status, job details (ISCO, working hours, job quality), retirement
Activities	Leisure activities, voluntary work, religion
Family and social network	Numbers and demographics for children and grandchildren, quality of intergenerational relationships, intimate partner, kin relations, social network
Support	Provision and reception of informal (emotional, cognitive, financial and practical) help and care
Health	List of illnesses, visits to the doctor, subjective health, pain, sleep, functional health, health-related behaviour (smoking, physical activity, health care, medication)
Subjective well-being	Life satisfaction, emotional well-being, depressive symptoms, loneliness
Psychological resources	Self-efficacy, coping strategies
Housing	Characteristics of private household (owner/tenant, size, costs), characteristics related to retirement home, residential environment (infrastructure, shopping facilities, services for seniors)
Finances	Income (sources, amount, personal and household income), assets, debts
Attitudes, norms, values, stereotypes	Positive and negative self-perceptions of ageing, religiosity, political orientation, attitudes toward social security
Objective measurements (tests)	Digit-symbol test (since 2002)
	Lung function test (since 2008)
Context data	Structural data at district level (NUTS-3) (e.g., unemployment rate, average household income, population density). Structural data for place of residence (e.g., availability of doctors, public transport). Interviewers' rating to describe respondent's home and neighbourhood

NUTS, nomenclature of territorial units for statistics.

reversed for those aged 40 to 64 in relation to functional health and depressive symptoms.[8] In relation to self-rated health, the study has shown that what people include when they rate their state of health will depend both on their age and on differences between birth cohorts.[9]

Health and well-being are dependent on a wide range of personal and contextual resources and are also prone to social inequalities. DEAS data provide evidence of socioeconomic differences in health[10] and in risk factors for bad health, as well as in mortality predictions. In an effort to search for possible mechanisms by which socioeconomic status may be connected with health in later life, the role of negative emotion was analysed using DEAS data. It was found that negative emotion predicted health changes only in individuals with lower educational levels.[11] Several studies have pointed to the role of regional resources (gross domestic product per capita, supply of primary care) in health and well-being outcomes in later life.[12] In more prosperous districts, for example, more people aged 40 and older pursue regular exercise[13] than in less prosperous areas. It has been shown that positive affect predicts mortality in older adults even after controlling for self-rated health and physical activity.[14] Social and psychological resources for health and well-being have also been studied using DEAS data. There is evidence of a differential in the instrumental support provided by kin (with kinship relationships exposing a negative effect) as against non-kin (with non-kin relationships showing a positive effect) for the well-being of older adults.[15] Moreover, a number of studies have provided evidence in favour of the impact of self-perceptions of ageing on health and healthy behaviour - even in the face of a serious health event.[16–19]

Work, volunteering and income

To the extensive literature on older workers, the DEAS has contributed two new lines of results. First, although the rate of employment of older workers has increased since the mid 1990s, a majority continues to retire before the standard retirement age and individual plans and expectations in relation to retirement tend to lag behind changes in the regulations set out for retirement. Despite this, a considerable minority of people in Germany plan to retire before age 65 or even before age 60.[20,21] Second, remaining in employment after completing the transition into retirement has become increasingly common over the past few years. Using data from the DEAS and the English Longitudinal Study of Ageing (ELSA), it was shown that fewer people are forced to pursue post-retirement employment in Germany than in England, mainly for institutional and/or structural reasons.[22,23] Besides the occupational, financial and health factors that affect post-retirement employment,[24] psychological experiences of ageing also influence the decision to continue working after retirement.[25]

Comparing the 1996, 2002 and 2008 waves of the DEAS study, the financial situation of the majority of people aged 40 years and older in Germany appears to be quite satisfactory. However, income growth has been greater for individuals gainfully employed as compared with people in retirement who are dependent entirely on their pension income.[26] In addition, an increase was detected in people reporting low living standards and lack of financial resources between 1996 and 2008. To be more specific, widows who spent many years as housewives or in unemployment during their working life are at a higher risk of living in poverty in old age.[27]

Volunteering is more widespread among the highly educated than among those DEAS respondents with low educational status.[28] In addition, there are pronounced regional differences in rates of volunteering and social participation. In economically stronger districts the rate of volunteering is higher than in economically weaker ones, even after one has controlled for social inequality at an individual level.[29] Between 1996 and 2014, not only did the rates of volunteering in organizations increase in general, but also the rates for people volunteering in organizations with a particular focus on older people.[30] From a longitudinal perspective, it has been shown that volunteering affects subjective well-being differentially in the second half of life. Whereas volunteering affects well-being directly for people aged 45–84 years, it is only in the age groups around retirement (55–74 years) that volunteering turns out to be beneficial for subjective well-being not just by its direct effects, but also indirectly via its effects on self-efficacy.[31]

Family, social relationships and support

Family relationships are strongly linked with physical and mental well-being. In old age in particular, relationships with partners and children are an important asset in helping to cope with everyday life and preserving autonomy. In the Western world, the range of private living arrangements have become more diverse and to some extent more fragile over the past decades. DEAS data demonstrate that ever fewer older parents are living close to their adult children. Nevertheless, the quality of relationships remains very high in terms of emotional closeness, frequency of contact and mutual assistance between the generations.[32,33] Inheritances from parents to children are common but such bequests have been found to be positively related to income position, thus implying a tendency to increase social inequality in the subsequent generation.[34] Migrant families in Germany, apart from exhibiting

slightly tighter relationships, show patterns of parent-child relationships quite similar to those of non-migrant families. There are, however, differences from migrant group to migrant group and such differences depend heavily, in their turn, on differences in terms of educational and financial resources.[35]

Due to the rich information about grandparenthood, DEAS-based studies have revealed that it is both being delayed and becoming less likely.[36] At the same time, the data show that the grandparent role is highly valued[37] and that the quality of relationships with grandchildren is positively related to the grandparents' level of life satisfaction and emotional well-being.[38] In general, relationships between grandparents and their older grandchildren are emotionally close, contact is frequent and financial transfers from grandparents to grandchildren have become more common.[39] However, the middle generation - the adult children - play a crucial role in these sorts of relationship: they are decisive in enabling or preventing contact between grandparent and grandchildren.[40]

Due to contemporary high rates of childlessness, a growing attention is being paid to elderly people who remained childless. Recent DEAS findings suggest that childless people are in a position to substitute missing offspring with non-relatives and are able in old age to rely on such ties, which appear to be very efficient in providing support.[41,42] In general, friends seem to be gaining in importance as providers of social integration and support to older people.[43] Health and life satisfaction in the second half of life depend, among other things, on the social engagement and emotional support received from within one's own social network.[44] However, such effects tend to vary depending on the type of relationship. In old age, for example, social activities with friends tend to promote positive feelings whereas activities with family members are more likely to produce ambivalence.[45]

What are the main strengths and weaknesses?

The main strengths of the DEAS are: (i) its cohort-sequential design, which equips its users to analyse both societal trends and individual trajectories (embedded within societal trends) and to disentangle age effects from cohort effects; (ii) its broad range of topics, which cover major aspects of the living situation of individuals in the second half of life, including their psychological resources; and (iii) the large and representative samples of the community-dwelling population in Germany. There are three main weaknesses of the DEAS: (i) most of the information gathered is based on self-reported data; (ii) the language of the interview is exclusively German; and (iii)

there is a high rate of attrition between the first and second interviews.

Can I get hold of the data? Where can I find out more?

Data from completed DEAS waves are put through a process of editing and anonymization. They are available to the scientific community free of charge through the DZA's Research Data Centre (FDZ). The questionnaires and a variety of data-documentations are published online, but for reasons of data protection it will be necessary to sign a data distribution contract before obtaining download access to the data. Access to the data is permitted exclusively for use in a scientific, non-profit context. An application form can be obtained from FDZ-DZA website [www.dza.de/en/fdz/german-ageing-survey.html] along with further details on the data set. Context data may only be used on site at the DZA, since the survey data may become sensitive when used in combination with regional context data. We recommend the use of the GeroStat information system [www.gerostat.de/en/index.html] to obtain a general overview of the content and to get an initial glimpse of the distributions of major indicators differentiated by year, age group, gender and region.

The DEAS in a nutshell

- The German Ageing Survey (DEAS) is a nationwide, longitudinal cohort study of the community-dwelling population in Germany aged 40 years and older. It provides a unique database for interdisciplinary research on changes and diversity in the living conditions of the middle-aged and older population as well as on the multifaceted processes of individual ageing.

- The DEAS uses a cohort-sequential design. The initial wave of data collection for people aged 40 to 85 years took place in 1996 ($n = 4838$). New baseline samples were drawn up in 2002 ($n = 3670$), 2008 ($n = 6205$) and 2014 ($n = 6002$). Panel assessments took place in 2002, 2008, 2011 and 2014. Retention rates in the first re-interview range from 31.5% (baseline sample 1996) to 46.1% (baseline sample 2008). Currently, more than 33 000 interviews have been conducted with 20 715 individuals aged 40 and older.

- The DEAS covers a wide range of topics. The data obtained provide information on socioeconomic and demographic characteristics, household composition, housing, family structure, social networks, psychological resources, attitudes and physical and mental health.

Funding

References

1. Börsch-Supan A, Brandt M, Hunkler C *et al.* Data resource profile: The Survey of Health, Ageing and Retirement in Europe (SHARE). *Int J Epidemiol* 2013;**42**:992–1001.

2. Stoop I, Billiet J, Koch A, Fitzgerald R. *Improving Survey Response: Lessons Learned from the European Social Survey.* Chichester, UK: Wiley, 2010.

3. Klaus D, Engstler H. Daten und Methoden des Deutschen Alterssurvey (DEAS). [Data and methods of German Ageing Survey]. In: Mahne K, Wolff JK, Simonson J, Tesch-Römer C (eds). *Altern im Wandel. Zwei Jahrzehnte Deutscher Alterssurvey [Ageing in Social Change.* Two Decades of the German Ageing Survey]. Wiesbaden, Germany: Springer, 2017; in press

4. Michaud PC, Kapteyn A, Smith JP, van Soest A. Temporary and permanent unit non-response in follow-up interviews of the Health and Retirement Study. *Longitudinal and Life Course Studies* 2011;**2**:145–69.

5. Blom AG, Schröder M. Sample composition 4 years on: retention in Share Wave 3. In: Schröder M (ed). *Retrospective Data Collection in the Survey of Health, Ageing and Retirement in Europe.* Mannheim, Germany: MEA, 2011.

6. Hoyer WJ, Stawski RS, Wasylyshyn C, Verhaeghen P. Adult age and digit symbol substitution performance: a meta-analysis. *Psychol Aging* 2004;**19**:211–14.

7. Vaz Fragoso CA, Gahbauer EA, Van Ness PH, Concato J, Gill TM. Peak expiratory flow as a predictor of subsequent disability and death in community living older persons. *J Am Geriatr Soc* 2008;**56**:1014–20.

8. Wolff JK, Nowossadek S, Spuling SM. Altern nachfolgende Kohorten gesünder? Selbstberichtete Erkrankungen und funktionale Gesundheit im Kohortenvergleich [Diseases and functional health across cohorts]. In: Mahne K, Wolff JK, Simonson J, Tesch-Roemer C (eds). *Altern im Wandel. Zwei Jahrzehnte Deutscher Alterssurvey [Ageing in Social Change.* Two Decades of the German Ageing Survey]. Wiesbaden, Germany: Springer, 2017; in press.

9. Spuling SM, Wurm S, Tesch-Roemer C, Huxhold O. Changing predictors of self-rated health: disentangling age and cohort effects. *Psychol Aging* 2015;**30**:462–74.

10. Schöllgen I, Huxhold O, Tesch-Römer C. Socioeconomic status and health in the second half of life: findings from the German Ageing Survey. *Eur J Ageing* 2010;**7**:17–28.

11. Schöllgen I, Huxhold O, Schmiedek F. Emotions and physical health in the second half of life: Interindividual differences in age-related trajectories and dynamic associations according to socioeconomic status. *Psychol Aging* 2012;**27**:338–52.

12. Wurm S, Wolff JK, Schüz B. Primary care supply moderates the impact of diseases on self-perceptions of aging. *Psychol Aging* 2014;**29**:351–58.

13. Schüz B, Wurm S, Ziegelmann JP *et al.* Contextual and individual predictors of physical activity: Interactions between environmental factors and health cognitions. *Health Psychol* 2012;**31**:714–23.

14. Wiest M, Schüz B, Webster N, Wurm S. Subjective well-being and mortality revisited: differential effects of cognitive and emotional facets of well-being on mortality. *Health Psychol* 2011;**30**:728–35.

15. Merz EM, Huxhold O. Wellbeing depends on social relationship characteristics: comparing different types and providers of support to older adults. *Ageing Society* 2010;**30**:843–57.

16. Wurm S, Tesch-Römer C, Tomasik MJ. Longitudinal findings on aging-related cognitions, control beliefs, and health in later life. *J Gerontol B Psychol Sci Soc Sci* 2007;**62**:156–64.

17. Wurm S, Tomasik MJ, Tesch-Römer C. On the importance of a positive view on ageing for physical exercise among middle-aged and older adults: Cross-sectional and longitudinal findings. *Psychol Health* 2010;**25**:25–42.

18. Wurm S, Benyamini Y. Optimism buffers the detrimental effect of negative self-perceptions of ageing on physical and mental health. *Psychol Health* 2014;**29**:832–48.

19. Wurm S, Tomasik MJ, Tesch-Römer C. Serious health events and their impact on changes in subjective health and life satisfaction: the role of age and a positive view on ageing. *Eur J Ageing* 2008;**5**:117–27.

20. Engstler H, Romeu Gordo L. Der Übergang in den Ruhestand: Alter, Pfade und Ausstiegspläne [Retirement age, pathways into retirement and exit plans of older workers]. In: Mahne K, Wolff JK, Simonson J, Tesch-Römer C (eds). *Altern im Wandel. Zwei Jahrzehnte Deutscher Alterssurvey [Ageing in Social Change.* Two Decades of the German Ageing Survey]. Wiesbaden, Germany: Springer, 2017; in press.

21. Engstler H. Erwerbsbeteiligung in der zweiten Lebenshälfte und der Übergang in den Ruhestand [Employment in the second half of life and pathways into retirement]. In: Tesch-Römer C, Engstler H, Wurm S (eds). *Altwerden in Deutschland. Sozialer Wandel und individuelle Entwicklung in der zweiten Lebenshälfte [Ageing in Germany].* Wiesbaden, Germany: Springer, 2006.

22. Scherger S, Lux T, Hagemann S, Hokema A. *Between Privilege and Burden. Work Past Retirement Age in Germany and the UK.* Bremen, Germany: Zentrum für Sozialpolitik, 2012.

23. Hokema A, Scherger S. Working pensioners in Germany and the UK: quantitative and qualitative evidence on gender, marital status, and the reasons for working. *J Popul Ageing* 2016;**9**:91–111.

24. Engstler H, Romeu Gordo L. Arbeiten im Ruhestand – Entwicklung, Faktoren und Motive der Erwerbstätigkeit von Altersrentenbeziehern [Working past retirement – trends, determinants and individual motives of working pensioners]. In: Kistler E, Trischler F (eds). *Reformen auf dem Arbeitsmarkt und in der Alterssicherung – Folgen für Einkunftslagen im Alter [Reform of the Labor Market and Provision for Old Age].* Düsseldorf, Germany: Hans-Böckler-Stiftung, 2014.

25. Fasbender U, Deller J, Wang M, Wiernik BM. Deciding whether to work after retirement: the role of the psychological experience of aging. *J Voc Behav* 2014;**84**:215–24.

26. Motel-Klingebiel A, Simonson J, Romeu Gordo L. Materielle Sicherung [Financial security]. In: Motel-Klingebiel A, Wurm S, Tesch-Römer, C (eds). *Altern im Wandel. Befunde des*

Deutschen Alterssurveys [Ageing in Social Change. Results from the German Ageing Survey]. Stuttgart, Germany: Kohlhammer, 2010.

27. Engstler H, Wolf T, Motel-Klingebiel A. Die Einkommenssituation und -entwicklung Verwitweter in Deutschland [Situation and trends in the income of the widowed in Germany]. *Vierteljahrshefte zur Wirtschaftsforschung* 2011;**80**:77–102.

28. Naumann D, Romeu Gordo L. Gesellschaftliche Partizipation: Erwerbstätigkeit, Ehrenamt und Bildung [Employment, volunteering, and education]. In: Motel-Klingebiel A, Wurm S, Tesch-Römer C (eds). *Altern im Wandel. Befunde des Deutschen Alterssurveys [Ageing in Social Change.* Results from the German Ageing Survey]. Stuttgart, Germany: Kohlhammer, 2010.

29. Simonson J, Hagen C, Vogel C, Motel-Klingebiel A. Ungleichheit sozialer Teilhabe im Alter [Unequal social participation in old age]. *Z Gerontol Geriat* 2013;**46**:410–16.

30. Wetzel M, Simonson J. Engagiert bis ins hohe Alter? [Volunteering until old age?]. In: Mahne K, Wolff JK, Simonson J, Tesch-Römer C (eds). *Altern im Wandel. Zwei Jahrzehnte Deutscher Alterssurvey [Ageing in Social Change.* Two Decades of the German Ageing Survey]. Wiesbaden, Germany: Springer, 2017; in press.

31. Müller D, Ziegelmann JP, Simonson J, Tech-Römer C, Huxhold O. Volunteering and subjective well-being in later adulthood: is self-efficacy the key?. *Int J Dev Sci* 2014;**8**:125–35.

32. Mahne K, Motel-Klingebiel A. Familiale Generationenbeziehungen [Intergenerational relationships]. In: Motel-Klingebiel A, Wurm S, Tesch-Römer C (eds). *Altern im Wandel. Befunde des Deutschen Alterssurveys [Ageing in Social Change.* Results from the German Ageing Survey]. Stuttgart, Germany: Kohlhammer, 2010.

33. Motel A, Szydlik M. Private Transfers zwischen den Generationen [Intergenerational transfers]. *Zeitschrift für Soziologie* 1999;**28**:3–22.

34. Künemund H, Motel-Klingebiel A, Kohli M. Do intergenerational transfers from elderly parents increase social inequality among their middle-aged children? Evidence from the German Aging Survey. *J Gerontol B Psychol Sci Soc Sci* 2005;**60**:30–36.

35. Baykara-Krumme H. Reliable bonds? A comparative perspective of intergenerational support patterns among migrant families in Germany. In: Saraceno C (ed). *Families, Ageing and Social Policy Intergenerational Solidarity in European Welfare States.* Cheltenham, UK: Edward Elgar, 2008.

36. Leopold T, Skopek J. The delay of grandparenthood: a cohort comparison in East and West Germany. *J Marriage Fam* 2015;**77**:441–60.

37. Mahne K, Motel-Klingebiel A. The importance of the grandparent role: A class specific phenomenon? Evidence from Germany. *Adv Life Course Res* 2011;**17**:145–55.

38. Mahne K, Huxhold O. Grandparenthood and subjective well-being: moderating effects of educational level. *J Gerontol B Psychol Sci Soc Sci* 2015;**70**:782–92.

39. Hoff A. Patterns of intergenerational support in grandparent-grandchild and parent-child relationships in Germany. *Ageing Society* 2007;**27**:643–65.

40. Mahne K, Huxhold O. Social contact between grandparents and grandchildren: a three generation perspective. In: Arber S, Timonen V (eds). *Contemporary Grandparenting: Changing Family Relationships in a Global Context.* Bristol, UK: Policy Press, 2012.

41. Klaus D, Schnettler S. Social networks and support for parents and childless adults in the second half of life: convergence, divergence, or stability?. *Adv Life Course Res* 2016;**29**:95–105.

42. Schnettler S, Wöhler T. No children in later life, but more and better friends? Substitution mechanisms in the personal and support networks of parents and the childless in Germany. *Ageing Society* 2015;**36**:1–25.

43. Miche M, Huxhold O, Stevens NL. A latent class analysis of friendship network types and their predictors in the second half of life. *J Gerontol B Psychol Sci Soc Sci* 2013;**68**:644–52.

44. Huxhold O, Fiori KL, Windsor TD. The dynamic interplay of social network characteristics, subjective well-being, and health: The costs and benefits of socio-emotional selectivity. *Psychol Aging* 2013;**28**:3–16.

45. Huxhold O, Miche M, Schüz B. Benefits of having friends in older ages: differential effects of informal social activities on well-being in middle-aged and older adults. *J Gerontol B Psychol Sci Soc Sci* 2013;**69**:366–75.