Data Resource Profile

Data Resource Profile: Panel Study Labour Market and Social Security (PASS)

Mark Trappmann,[1,2]* Sebastian Bähr,[1] Jonas Beste,[1] Andreas Eberl,[1,3] Corinna Frodermann,[1] Stefanie Gundert,[1] Stefan Schwarz,[1] Nils Teichler,[1] Stefanie Unger[1] and Claudia Wenzig[1]

[1]Panel Study Labour Market and Social Security, Institute for Employment Research, Nuremberg, Germany, [2]Faculty for Social Sciences, Economics, and Business Administration, University of Bamberg, Bamberg, Germany and [3]University of Erlangen-Nuremberg, Institute of Labor Market and Socioeconomics, Nuremberg, Germany

*Corresponding author. Institute for Employment Research, Regensburger Str. 104, D-90478 Nuremberg, Germany. E-mail: mark.trappmann@iab.de

Data resource basics

The Panel Study Labour Market and Social Security (PASS), is a household panel survey of the German residential population oversampling households receiving welfare benefits.[1] Those benefits are paid to all households with insufficient income in which at least one person is of working age (15–65 years) and able to work. PASS is primarily designed as a data source for research into the labour market, poverty and the welfare state. However, there is a focus on the social consequences of poverty and unemployment including social exclusion and health outcomes.

Within each sampled household the head of the household is requested to complete a household questionnaire. Subsequently all household members aged 15 years or older are targeted with a person questionnaire. A household is counted as a respondent household if the household questionnaire and at least one person questionnaire have been completed. Data have been collected every year since 2006/07. Currently eleven waves of data are available to researchers.

Figure 1 gives an overview of the number of households in each wave. The numbers in the bars denote the proportion of all respondent households from the initial wave of a sample that are still responding in wave n. Households that moved abroad (altogether $n = 115$) or in which all members

died (altogether $n = 378$) are subtracted from the original sample size. New samples in PASS have response rates ranging from 25 to 35% calculated as the number of interviewed households divided by the number of households in the sample. In all waves and samples refusals followed by inability to contact the household are the main reasons for non-response. Detailed information on fieldwork and response rates is documented in the methods and field reports for each wave available at https://fdz.iab.de/en/FDZ_Individual_Data/PASS/PASS-SUF0617v2.aspx. The different samples will be described in the next section.

Data collected

PASS uses a dual-frame sampling design, combining a sample of the residential population of Germany with a sample of welfare-benefit recipients. When combined and weighted appropriately the complete sample can be projected to the German residential population.[2] Due to the resulting disproportionate stratification of the sample, statistical power for analyses concerning the bottom part of the income distribution is vastly increased.

Approximately half of the original wave 1 sample was drawn from an address database of a commercial supplier
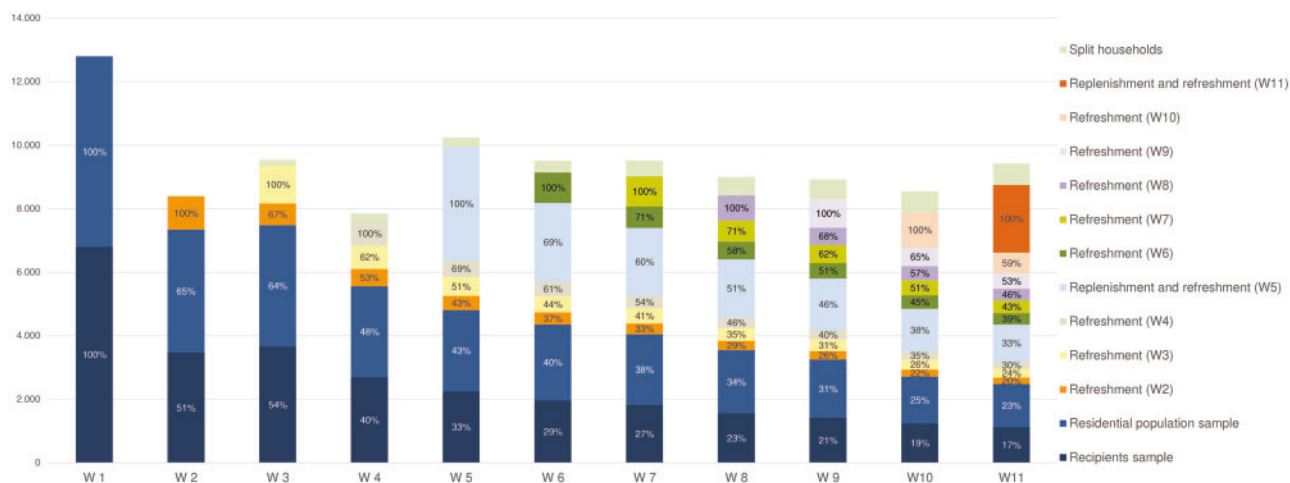
Figure 1. Number of households by sample in each wave.

that covered 98.4% of the buildings with private households in Germany.[3] Target households were selected by choosing at random one household from each selected building (see[3] for details and [4] for a short summary). The other half of the sample was drawn from complete registers of recipients of welfare benefits. Both samples were drawn in a two-stage design with probability proportionate to size (PPS) in the same 300 postcode areas that served as primary sampling units.

The welfare-benefit recipient sample is refreshed annually by a sample of new entries to welfare benefits, who would otherwise not be represented in the welfare-benefit recipient sample. The population sample was refreshed before waves 5 and 11 to compensate for loss of statistical power due to panel attrition. These refreshments were drawn from official population registers.

The weighting scheme consists of three steps: design weights correspond to inclusion probabilities in the gross sample, propensity weights are estimated to compensate for non-response/attrition, and finally weights are calibrated to known population totals from official statistics. Details of the weighting scheme can be found in each year's data report (see [5] for the most recent one). A brief overview is given in [2,6]. PASS provides three different cross-sectional weighting factors on each level (household and person) corresponding to different populations of interest: one for the combination of all welfare-benefit samples, one for the combination of all population samples and one for the overall sample. In addition, staying probabilities are supplied that can be used to construct longitudinal weights.[2]

The PASS data are collected in a mix of computer assisted personal interviews (CAPI) and computer assisted telephone interviews (CATI). In waves 1–4 CATI was the default mode for households entering the panel whenever a telephone number was available. Since wave 5, the initial default mode

for new samples has been changed to CAPI. For each household, the previous wave mode then becomes the default mode for the subsequent wave. Mode switches are possible — even within households — whenever a household cannot be located or contacted or wishes to switch mode. Details of the fieldwork can be found in the yearly field and methods reports (see [7] for the most recent one). In wave 11 about two thirds of the interviews were conducted in CAPI.

Conceptually, panel members, once recruited, remain in the panel until they die or move abroad. In practice the majority of dropout occurs due to unsuccessful follow-up. German data-protection laws determine that refusals — unless they are situational, i.e. they do not generally refuse, but state reasons that can be considered temporary (e.g. being busy) — may not be re-approached. Temporary dropouts due to non-contact or situational refusals are re-approached in one more wave before they become permanent dropouts.

PASS uses an infinite degree contagion model in which persons moving into a participating household become panel members, and remain panel members even after leaving the household. When new household members move in with them, those become PASS members as well.

The PASS study provides data on the socio-economic situation of individuals and households in Germany. The data can be used to investigate how changes in people's employment status affect their living conditions and health status, and vice versa.

Household-level information is collected in the household questionnaire (see top of Table 1). The latter includes detailed questions about household composition, household income and material deprivation. Information on the duration and amount of welfare benefit receipt (Unemployment Benefit II) is collected retrospectively and covers the whole period between two consecutive interviews. It is stored as spell data in the scientific use file. For

Table 1. Overview of the PASS questionnaire modules

Questionnaire modules of waves 1–11	1	2	3	4	5	6	7	8	9	10	11
Household level											
Household composition and housing situation	x	x	x	x	x	x	x	x	x	x	x
Net household income, savings and debts, material deprivation	x	x	x	x	x	x	x	x	x	x	x
Receipt of "Unemployment Benefit II": e.g. date of beginning & end, amount, cut-backs	x	x	x	x	x	x	x	x	x	x	x
Information on children in the household (child care, education, social participation)	x	x	x	x	x	x	x	x	x	x	x
Individual level											
Demographic information (e.g. marital status, migration, education and training, social origin)	x	x	x	x	x	x	x	x	x	x	x
Employment and unemployment											
Employment history: e.g. occupation, wages, job characteristics, receipt of "Unemployment Benefit I"	x	x	x	x	x	x	x	x	x	x	x
Job quality: e.g. intrinsic job quality, job satisfaction, job security, work–life-balance, Effort-Reward-Imbalance-Scale[8]							x	x	x	x	x
Contact to welfare agencies, participation in active labour market programmes (e.g. One-Euro-Jobs)	x	x	x	x	x	x	x	x	x	x	x
Health – basic module											
Frequency of visits to the doctor or hospital[9]	x	x	x	x	x	x	x	x	x	x	x
Health restrictions and disabilities	x	x	x	x	x	x	x	x	x	x	x
Subjective assessment of physical and mental health[10]	x	x	x	x	x	x	x	x	x	x	x
Health insurance	x	x	x	x	x	x	x	x	x	x	x
Health – focal topics											
Short Form Health Survey (SF-12)[11]			x		x		x				
Subjective assessment of employability			x				x	x	x	x	x
Health-related behaviour (smoking)			x		x		x				
Body height and weight			x		x		x				
Participation in health-promotion courses									x	x	x
Presentism							x	x			
Sporting activities (e.g. types of sport practised, frequency and duration of practise, social networks)[12]						x	x	x			
Memory power & concentration ability[13]							x				
Social networks and participation – basic module											
No. of close friends	x	x	x	x	x	x	x	x	x	x	x
Participation in organizations/clubs	x	x	x	x	x	x	x	x	x	x	x
Subjective assessment of social integration[17]	x	x	x	x	x	x	x	x	x	x	x
Social networks – focal topics											
Characteristics of friends[19]			x		x				x		
Social support[19]			x		x				x		
Personality traits											
'Big Five'[14]							x				
Self-efficacy[15]	x	x	x	x		x	x	x			x
Impulsiveness/risk aversion[20,21]										x	
Life satisfaction (e.g. general, health status, standard of living)[16]	x	x	x	x	x	x	x	x	x	x	x
Attitudes											
Work orientations[17]	x		x	x	x	x	x	x			
Gender-role attitudes		x				x			x		x
Awareness of stigma and prejudices[18]							x				

families with children under 15 years of age, additional questions address various aspects of children's social participation.

The personal questionnaire covers a large range of individual-level information (see bottom of Table 1), including basic socio-demographic characteristics. To map individuals' employment and unemployment histories, there are retrospective questions about periods of employment, unemployment and other activities (e.g. education). Monthly information on each activity (including the beginning and end dates) is provided as spell data. Questions with regard to employment refer to formal job characteristics (e.g. wages and working hours) as well as individuals' subjective assessment of job quality (e.g. job satisfaction and psychosocial stress). The latter is measured by a short version of the effort–reward imbalance (ERI) scale.[8]

For periods of unemployment respondents report the duration and amount of unemployment benefits. Those who receive means-tested welfare benefits are asked about their interactions with welfare agencies. In addition, there

are questions on participation in so-called One-Euro-Jobs, an active labour market programme (ALMP) for long-term unemployed welfare recipients with particularly poor labour market prospects.

Over the years, a growing part of the survey has been devoted to respondents' health. All waves of the PASS study include a basic set of questions referring to severe health restrictions and disabilities, the frequency of hospital stays and visits to the doctor,[9] and the subjective assessment of physical and mental health.[10] In every third wave, additional focal questions are part of the interview. Besides the 12-item Short Form Health Survey (SF-12, GSOEP version)[11] these questions address health-related behaviour (e.g. current and past smoking behaviour, participation in health-promotion courses) as well as body weight and height. Apart from that, questions focusing on particular aspects of health have been included in single waves of the study. For instance, whether and to what extent respondents were exercising was collected in a module on sporting activities from wave 6–8 (based on [12]). A test of memory power and concentration ability[13] was implemented in the seventh wave.

In addition, the study includes a variety of questions on personality traits (e.g. Big Five,[14] self-efficacy[15]) and work-related as well as general attitudes (e.g. life satisfaction,[16] work orientations,[17] awareness of stigma[18]). These questions were derived (and sometimes slightly adapted) from well-tested instruments of other studies or newly developed and tested multiple times before entering the panel using techniques like cognitive interviewing and field pre-tests with interviewer debriefings (see Table 1).

PASS interviews are conducted in German as well as in Russian, Arabic (since wave 10) and Turkish (until wave 9). The vast majority of foreign-language interviews is conducted by telephone by interviewers who are native speakers. All original questionnaires as well as English translations can be accessed on the website of our research data center (http://doku.iab.de/fdz/pass/Questionnaires_PASS_EN.zip for English versions).

PASS asks respondents aged 15–64 for consent to link their survey data to rich administrative data of the Federal Employment Agency. These include full employment biographies containing exact information on wages, occupations, employers, times in unemployment and benefits received as well as participation in active labour market programmes.[22] Consent rate for linkage to these administrative data is 94% for wave 10 participants aged 15–64. The combined dataset is available to external scientific users as PASS-ADIAB.[23] The most recent version, PASS-ADIAB7515, includes PASS data up to wave 9 and administrative data from 1975 to 2014.

Data collection is funded by the Federal Ministry of Work and Social Affairs as part of the general funding of

research by the Institute for Employment Research (IAB) according to §55 of Social Code II. IAB is an independent research institute within the German Federal Employment Agency.

Acknowledging that welfare-benefit recipients who have below-average education and are less integrated into society are a hard to survey population,[24] PASS uses a range of methods to increase data quality.

In each year, the fieldwork is preceded by an extended in-person interviewer training of 8 hours for each interviewer who is new to the survey and 6 hours for each interviewer with prior wave experience in the study. The training focuses on standardized interviewing, navigating through the instrument as well as on refusal conversion.

During the fieldwork itself an adaptive fieldwork design[25] is used to optimize the outcome of the fieldwork by increasing response rates or by balancing response rates between subgroups, increasing the effort for groups underrepresented in the survey so far.[26–28] This adaptive survey design is based on detailed paradata[29,30] including timing and detailed outcomes of each contact attempt.

Incentives are paid in cash (ten euros per wave) to increase cooperation. These incentives are prepaid unconditionally for panel respondents and paid conditional on participation to first-time respondents (an experiment[31] has shown that unconditional cash incentives are superior to a promised lottery ticket, increasing response rates and reducing attrition bias in several sociodemographic variables).

Mode switches between CATI and CAPI are used to optimize response rates (under budgetary restrictions). Non-contacts in one mode are switched to another mode. A refusal conversion is implemented in CATI mode and administered by specially trained and successful interviewers. The mixed-mode design has been shown to reduce non-response bias of means and proportions to near zero whereas measurement error was unaffected.[32]

The data are factually anonymized. The main steps involved are deletion of all regional information below state level and categorizing nationalities and countries of origin as well as family structures.

PASS has implemented an extensive panel maintenance and respondent tracking. Proactive tracking measures include advance letters, thank you letters, and season's greeting postcards that include free online and mail options to notify the survey agency of address changes. In addition, several registers are searched for new addresses.

Methodological research into the data quality of PASS is regularly published in peer-reviewed journals. This research benefits from the unique opportunity to link the survey data to administrative data (given informed consent) and to link survey data and administrative data to the

paradata of the survey. While the first allows research into measurement error, the latter also allows research into non-response error.[33]

For example, Kreuter et al.[33] have shown that initial non-response bias of means and proportions vanishes over the course of the fieldwork and that at the same time measurement error bias of these means and proportions does not increase. For welfare benefit receipt there is initially a substantial measurement error bias that decreases across time.[34–37] Sakshaug and Kreuter[38] find only small non-response, measurement and linkage consent bias of means and proportions for most variables they investigate. Trappmann et al.[39] showed that the weighting scheme effectively reduces attrition bias of means and proportions due to events between waves. Josten and Trappmann[40] investigated interviewer effects on a looping question. West et al.[41] and Sinibaldi et al.[42] investigated the potential of interviewer observations and of commercial micro-geographical data for non-response adjustment.

Data resource use

As a multiple-topic survey open to users from different countries and academic fields, PASS has attracted a large number of users. We are aware of almost 300 publications based on PASS over the past 11 years (A full publication list can be viewed at http://www.iab.de/580/section.aspx/Projekt/k060821f35). Thus, the focus here must be on health-related publications based on the PASS data.

Krug and Eberl[43] used the data to investigate the negative effect of unemployment on health. Their analysis is mainly based on a self-assessed scale (0 to 10) on health satisfaction. By using the 11 point scale variable in combination with the long-running panel data the authors were able to perform a dynamic panel model (system generalized methods of moments (GMM)) and thus account for unobserved confounders and reversed causality. Due to the variety of health variables in the PASS the authors were able to run some robustness checks with mental health and self-rated health and thus could further strengthen their findings. The findings support the causality thesis that unemployment leads to bad health. Further, the authors showed that the negative effect of unemployment on health is partially explained by the loss of self-perceived social status and not through the loss of income or social status by objective measures.

Unger et al.[44] used the data for an article analysing the effect of labour-market transitions on physical and mental health using the SF-12 scale. This scale covers 12 questions assessing health-related quality of life, addressing mental and physical health functioning in 6 questions each. Using wave 3 and 6 of PASS and a combination of the differences

in difference approach with Propensity Score Matching they focused on within-person changes in health after changes in employment status (job loss and re-employment separately) using a control group with similar characteristics and a similar probability of the respective transition who were continually (un-)employed. They made use of the possibility to merge PASS with administrative employment records, thus utilizing more precise information on changes in employment status that even include short interruptions that respondents tend to underreport in surveys. They hypothesized and found that age is an important factor in how re-employment and job loss affect health and that women and men are affected differently. Older men were affected most severely by job loss, whereas re-employment was found to improve mental health only in women aged 31–44 years.

Other publications in subject areas relevant to readers of the *International Journal of Epidemiology* shall briefly be mentioned. Hollederer and Voigtländer[45] estimate the effect on health of becoming unemployed and on the chances of finding a new job. Hajek and König[46] investigate the moderating effect of personality traits in the relation between informal caregiving and well-being. Eggs[47] examines the interrelation of employment, benefit receipt and self-rated health using fixed-effects models. Further publications describe the health (satisfaction) of welfare recipients compared with the general population.[48–50]

Strengths and weaknesses

The main strength of the PASS data are the large number of cases (∼10 000 household / ∼15 000 persons per wave), specifically the large number of unemployed and welfare recipients in a sample that can be projected to the general population of Germany. This makes PASS ideally suited to investigate the interdependence of labour-market participation, poverty and health. The panel structure of the data and the long observation history make PASS attractive for the estimation of causal effects and individual health trajectories. The rich set of variables from the survey can further be augmented by linking PASS to administrative data about the labour market.

On the downside all health measures in PASS are self-rated measures. No diagnoses or physical samples can be accessed in the dataset. Thus, there might be a threat of dependent measurement error between exposure and outcome measures.[51]

Certainly, the potential of the PASS data for epidemiological research could be increased by linkage to objective health data, which would also allow an assessment of the validity of the self-reported health measures in the survey. While this is clearly an option for the future, it is

complicated by the decentralized German health insurance system. Currently 43 private and 110 public health insurance providers exist in Germany.[52,53] The terms of linkage have to be negotiated with each insurance separately in compliance with regulations on data protection according to §75, Social Code X.

Data resource access

The PASS data are available to non-profit research as a scientific use file at the research data center of the Federal Employment Agency at the Institute for Employment Research. The form to order the data can be accessed at http://fdz.iab.de/en/FDZ_Data_Access/FDZ_Scientific_Use_Files.aspx

The data are organized as a user friendly long file. This means that an interview with one person (household) in one year is a row in the person (household) dataset. Identical questions asked in different years are coded in the same variable. Apart from the person and household datasets, there are weight datasets, register datasets and spell datasets for biographical data collected in spell format.

Rich documentation including all questionnaires, the field and methods reports and the data reports for all waves of the panel and a user guide[54] can also be accessed via the research data center (RDC) website at https://fdz.iab.de/en/FDZ_Individual_Data/PASS/PASS-SUF0617v2.aspx

Data are supplied in the format of the statistical software Stata. The doi of the current wave release is 10.5164/IAB.PASS-SUF0617.de.en.v2.

For the PASS dataset combined with the administrative data (PASS-ADIAB), data access is restricted to onsite data access at one of the many locations worldwide [outside Germany in Ann Arbor (USA), Cornell (USA), Berkeley (USA), Harvard (USA), Los Angeles (USA), Princeton (USA), Essex (UK), London (UK)] of the RDC. https://fdz.iab.de/en/FDZ_Data_Access/FDZ_On-Site_Use.aspx

Data users are requested to cite the doi and all documentation and sources they consulted in order to be able to use the PASS data. The peer reviewed data set descriptions found here may be ideally suited as short reference.

Profile in a nutshell

- PASS was set up as a population-based panel study for the investigation of welfare-benefit dynamics and the material and social consequences of benefit recipiency in Germany. Benefit recipient households are oversampled and new entries to benefit receipt are added to the sample each year. This makes PASS a unique database for the evaluation of the consequences of unemployment and benefit receipt.
- PASS was initiated in 2006/07 and has collected yearly data on about 15 000 respondents in 10 000 households since then.
- Participants report detailed information about their labour-market participation and history, income and deprivation, social inclusion and self-rated health.
- Thus, PASS is well suited for the analysis of the interrelation between unemployment and health and its moderating and mediating effects.
- PASS data have been linked to rich administrative data on individual labour-market and programme-participation histories of the respondents.
- The PASS data are available as a scientific use file at the research data center of the Federal Employment Agency at the Institute for Employment Research (10.5164/IAB.PASS-SUF0617.de.en.v2) https://fdz.iab.de/en/FDZ_Data_Access/FDZ_Scientific_Use_Files.aspx. Linked survey and administrative data are available for onsite use https://fdz.iab.de/en/FDZ_Data_Access/FDZ_On-Site_Use.aspx.

Funding

Conflict of interest: None declared.

References

1. Trappmann M, Beste J, Bethmann A, Müller G. The PASS panel survey after six waves. *J Labour Mark Res* 2013;**46**:275–81.
2. M Trappmann. Weighting. In: Bethmann A, Fuchs B, Wurdack A (eds). *User Guide "Panel Study Labour Market and Social Security" (PASS)*. Nürnberg: Wave 6, FDZ-Datenreport, 2013, pp. 56–66.
3. Rudolph H, Trappmann M. Design und Stichprobe des Panels "Arbeitsmarkt und Soziale Sicherung" (PASS). In: Promberger M (ed). *Neue Daten Für Die Sozialstaatsforschung. Zur Konzeption Der IAB-Panelerhebung "Arbeitsmarkt Und Soziale Sicherung"*. Nürnberg: IAB-Forschungsbericht, 2007, pp. 60–101.
4. Trappmann M, Müller G, Bethmann A. Design of the study. In: Bethmann A, Fuchs B, Wurdack A (eds). *User Guide "Panel Study Labour Market and Social Security" (PASS)*. Nürnberg, Germany: Wave 6, FDZ-Datenreport, 2013, pp. 13–22.
5. Berg M, Cramer R, Dickmann C *et al. Codebook and Documentation of the Panel Study 'Labour Market and Social Security' (PASS)*. Nürnberg, Germany: Datenreport Wave 11, FDZ-Datenreport, 06/2018 (en).
6. Trappmann M. Weights. In: Bethmann A, Fuchs B, Wurdack A (eds). *User Guide "Panel Study Labour Market and Social*

Security" (PASS). Nürnberg: Wave 6, FDZ-Datenreport, 2013, pp. 81–99.

7. Jesske B, Schulz S. *Methodenbericht Panel Arbeitsmarkt und Soziale Sicherung PASS 11. Erhebungswelle 2017*. Nürnberg: FDZ-Methodenreport, 13/2018.

8. Siegrist J, Wege N, Pühlhofer F, Wahrendorf M. A short generic measure of work stress in an era of globalization—effort-reward imbalance. *Int Arch Occup Environ Health* 2009;**82**:1005–13.

9. Ziebarth NR. Measurement of health, the sensitivity of the concentration index, and reporting heterogeneity. *Soc Sci Med* 2010;**71**:116–24.

10. Ellert U, Lampert T, Ravens-Sieberer U. Messung der gesundheitsbezogenen Lebensqualität mit dem SF-8. Eine Normstichprobe für Deutschland. *Bundesgesundheitsbl - Gesundheitsforsch - Gesundheitsschutz* 2005;**48**:1330–37.

11. Andersen HH, Mühlbacher A, Nübling M, Schupp J, Wagner GG. Computation of standard values for physical and mental health scale scores using the SOEP version of SF-12v2. *J Appl Soc Sci Stud* 2007;**127**:171–82.

12. Lechner M. Long-run labour market and health effects of individual sports activities. *J Health Econ* 2009;**28**:839–54.

13. Mehrbrot T, Gruber S, Wagner M. *Scales and Multi-Item Indicators – SHARE (Survey of Health, Ageing and Retirement in Europe)*. 2017. http://www.share-project.org/fileadmin/pdf_documentation/SHARE_Scales_and_Multi-Item_Indicators.pdf (28 December 2018, date last accessed).

14. Rammstedt B, John OP. Kurzversion des Big Five Inventory (BFI-K). *Diagnostica* 2005;**51**:195–206.

15. Schwarzer R. Optimistische Kompetenzerwartung: Zur Erfassung einer personellen Bewältigungsressource. *Diagnostica* 1994;**40**:105–23.

16. Richter D, Metzing M, Weinhardt M, Schupp J. *SOEP Scales Manual. SOEP Survey Papers*. Berlin: DIW/SOEP, 2013, p. 138.

17. Meßmann S, Bender S, Rudolph H *et al*. *Lebenssituation Und Soziale Sicherung 2005 (LSS 2005). IAB-Querschnittsbefragung SGB II. Handbuch-Version 1.0.0*. Nürnberg: FDZ-Datenreport, 2008.

18. Gurr T, Jungbauer-Gans M. Stigma consciousness among the unemployed and prejudices against them: development of two scales for the 7th wave of the panel study "Labour Market and Social Security (PASS)". *J Labour Market Res* 2013;**46**:335–51.

19. Wolf C. *Netzwerke Und Soziale Unterstützung*. Mannheim: GESIS-Working Papers, 2009.

20. Keye D, Wilhelm O, Oberauer K. Structure and correlates of the German version of the brief UPPS impulsive behavior scales. *Eur J Psychol Assess* 2009;**25**:175–85.

21. Kovaleva A, Beierlein C, Kemper CJ, Rammstedt B. *Eine Kurzskala zur Messung von Impulsivität nach dem UPPS-Ansatz: Die Skala Impulsives-Verhalten-8 (I-8)*. Mannheim: GESIS-Working Papers, 2012.

22. Antoni M, Dummert S, Trenkle S. *PASS-Befragungsdaten verknüpft mit administrativen Daten des IAB (PASS-ADIAB) 1975–2015*. Nürnberg: FDZ-Datenreport, 2017.

23. Antoni M, Bethmann A. PASS-ADIAB - linked survey and administrative data for research on unemployment and poverty. *Jahrb Natl Okon Stat*. doi:10.1515/jbnst-2018-0002.

24. Tourangeau R, Edwards B, Johnson TP (eds). *Hard-to-Survey Populations*. Cambridge: Cambridge University Press, 2014.

25. Wagner JR. *Adaptive Survey Design to reduce nonresponse bias*. Doctoral dissertation, University of Michigan, 2008.

26. Trappmann M, Müller G. Introducing adaptive design elements in the Panel Study "Labour Market and Social Security" (PASS). In: Canada Statistics (ed). *Beyond Traditional Survey Taking: Adapting to a Changing World*. Quebec: Proceedings of Statistics Canada Symposium, 2014.

27. Kreuter F, Müller G. A note on improving process efficiency in panel surveys with paradata. *Field Methods* 2015;**27**:55–65.

28. West BT, Elliott MR, Mneimneh Z, Peytchev A, Wagner J, Trappmann M. An examination of an interviewer-respondent matching protocol in a longitudinal CATI study. *J Surv Stat Methodol* 2018.

29. Couper MP. Measuring survey quality in a CASIC environment. *Proceedings of the Section on Survey Research Methods of the American Statistical Association*, 1998, pp. 41–49.

30. Kreuter F (ed). *Improving Surveys with Paradata: Analytic Uses of Process Information*, Vol. **581**. Hoboken, NJ: John Wiley & Sons, 2013.

31. Felderer B, Müller G, Kreuter F, Winter J. The effect of differential incentives on attrition bias. Evidence from the PASS Wave 3 incentive experiment. *Field Methods* 2018;**30**:56–69.

32. Levenstein R. *Nonresponse and Measurement Error in Mixed-Mode Designs*. Ph.D. Dissertation, Michigan, 2010. http://deepblue.lib.umich.edu/bitstream/2027.42/78764/1/rmlev_1.pdf (24 May 2018, date last accessed).

33. Kreuter F, Müller G, Trappmann M. Nonresponse and measurement error in employment research. Making use of administrative data. *Public Opin Q* 2010;**74**:880–906.

34. Kreuter F, Müller G, Trappmann M. A note on mechanism leading to lower data quality of late or reluctant respondents. *Sociol Methods Res* 2014;**43**:452–64.

35. Bruckmeier K, Müller G, Riphahn RT. Who misreports welfare receipt in surveys? *Appl Econ Lett* 2014;**21**:812–16.

36. Bruckmeier K, Müller G, Riphahn RT. Survey misreporting of welfare receipt—respondent, interviewer, and interview characteristics. *Econ Lett* 2015;**129**:103–7.

37. Bruckmeier K, Hohmeyer K, Schwarz S. Welfare receipt misreporting in survey data and its consequences for state dependence estimates: new insights from linked administrative and survey data. *J Labour Mark Res* 2018; doi:10.1186/s12651-018-0250-z.

38. Sakshaug J, Kreuter F. Assessing the magnitude of non-consent biases in linked survey and administrative data. *Surv Res Methods* 2012;**6**:113–22.

39. Trappmann M, Gramlich T, Mosthaf A. The effect of events between waves on panel attrition. *Surv Res Methods* 2015;**9**:31–43.

40. Josten M, Trappmann M. Interviewer effects on a network size filter question. *J Off Stat* 2016;**32**:349–73.

41. West BT, Kreuter F, Trappmann M. Is the collection of interviewer observations worthwhile in an economic panel survey? New evidence from the German Labor Market and Social Security (PASS) Study. *J Surv Stat Methodol* 2014;**2**:159–81.

42. Sinibaldi J, Trappmann M, Kreuter F. Which is the better investment for nonresponse adjustment. Purchasing commercial auxiliary data or collecting interviewer observations?. *Public Opin Q* 2014;**78**:440–73.

43. Krug G, Eberl A. What explains the negative effect of unemployment on health? An analysis accounting for reverse causality. *Res Soc Stratif Mobil* 2018;**55**:25–39.

44. Unger S, Tisch A, Tophoven S. Age and gender differences in the impact of labour-market transitions on subjective health in Germany. *Scand J Public Health* 2018;**46**:49–64.

45. Hollederer A, Voigtländer S. Die Gesundheit von Arbeitslosen und die Effekte auf die Arbeitsmarktintegration. Ergebnisse im Panel Arbeitsmarkt und soziale Sicherung (PASS), Erhebungswellen 3 bis 7 (2008/09–2013). *Bundesgesundheitsbl* 2016;**59**:652–61.

46. Hajek A, König HH. The relation between personality, informal caregiving, life satisfaction and health-related quality of life: evidence of a longitudinal study. *Qual Life Res* 2018;**27**:1249–56.

47. Eggs J. *Unemployment Benefit II, Unemployment and Health*. IAB-Discussion Paper, Nürnberg, Germany, 2013.

48. Eggs J, Trappmann M, Unger S. *Grundsicherungsempfänger Und Erwerbstätige im Vergleich: ALG-II-Bezieher schätzen ihre Gesundheit schlechter ein*. Nürnberg, Germany: IAB-Kurzbericht, Nr, 2014.

49. Hollederer A, Voigtländer S. Gesundheit und Gesundheitsverhalten von Arbeitslosen. *WSI* 2016;**69**:381–5.

50. Unger S, Trappmann M, Eggs J. Arbeitslosigkeit und Gesundheit. In: Möller J, Walwei U (eds). *Arbeitsmarkt Kompakt. Analysen, Daten, Fakten. (IAB-Bibliothek, 363)*. Bielefeld: Bertelsmann, 2017, pp. 57–59.

51. VanderWeele TJ, Hernán MA. Results on differential and dependent measurement error of the exposure and the outcome using signed directed acyclic graphs. *Am J Epidemiol* 2012;**175**: 1303–10.

52. Liste deutscher privater Krankenversicherer. https://de.wikipedia.org/wiki/Liste_deutscher_privater_Krankenversicherer (28 December 2018, date last accessed)

53. GKV Spitzenverband. Krankenkassenliste. https://www.gkv-spitzenverband.de/krankenkassenliste.pdf (28 December 2018, date last accessed).

54. Bethmann A, Fuchs B, Wurdack A (eds). *User Guide "Panel Study Labour Market and Social Security" (PASS)*. Nürnberg: Wave 6, FDZ-Datenreport, 2013.