

STUDY DESIGN ARTICLE

The Study on Mental Health at Work: Design and sampling

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Abstract

Aims: The Study on Mental Health at Work (S-MGA) generates the first nationwide representative survey enabling the exploration of the relationship between working conditions, mental health and functioning. This paper describes the study design, sampling procedures and data collection, and presents a summary of the sample characteristics. **Methods:** S-MGA is a representative study of German employees aged 31–60 years subject to social security contributions. The sample was drawn from the employment register based on a two-stage cluster sampling procedure. Firstly, 206 municipalities were randomly selected from a pool of 12,227 municipalities in Germany. Secondly, 13,590 addresses were drawn from the selected municipalities for the purpose of conducting 4500 face-to-face interviews. The questionnaire covers psychosocial working and employment conditions, measures of mental health, work ability and functioning. Data from personal interviews were combined with employment histories from register data. Descriptive statistics of socio-demographic characteristics and logistic regressions analyses were used for comparing population, gross sample and respondents. **Results:** In total, 4511 face-to-face interviews were conducted. A test for sampling bias revealed that individuals in older cohorts participated more often, while individuals with an unknown educational level, residing in major cities or with a non-German ethnic background were slightly underrepresented. **Conclusions:** **There is no indication of major deviations in characteristics between the basic population and the sample of respondents. Hence, S-MGA provides representative data for research on work and health, designed as a cohort study with plans to rerun the survey 5 years after the first assessment.**

Key Words: Well-being, burnout, depressive symptoms, functioning, employment, psychosocial working conditions, work ability

Introduction

Systematic reviews of work environment and mental health indicators such as depressive symptoms [1] and depression [2, 3] provide evidence of the impact of job strain, decision latitude or bullying. According to Theorell et al. [1] limited evidence is given by longitudinal studies with a high degree of methodological quality for working conditions such as effort reward imbalance, social support, psychological demands or job insecurity. As seen in the referenced literature within these reviews there is a strong orientation to studies from English-speaking or Scandinavian countries or the Netherlands and a lack of longitudinal studies based on a representative sample in several

other countries, including Germany. Therefore, an independent reanalysis based on other samples and within a range of other national contexts is relevant for better understanding how widely and strongly the evidence applies.

A further indicator of mental health is burnout, with exhaustion as its core dimension. The associations between burnout and psychosocial working conditions have been analysed in a review by Seidler et al. [4]. In comparison with reviews of depressive symptoms they found even fewer longitudinal studies; precisely six studies were seen to be of sufficient quality and none of these were from Germany. A total of

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five of these studies considered selected occupational groups from the health sector or human services and not representative samples of all employees.

In epidemiological and public health research the investigation of mental health focusses on the negative spectrum of mental health such as burnout or depression. One reason for this focus is, that mental disorders lead to higher rates of absenteeism and constitute a leading cause of early retirement in Europe [5]. New developments in the field of positive psychology are moving towards positive attributes of mental health, thus highlighting aspects of well-being that have been neglected to date, such as the balance of positive and negative affects, life satisfaction, and subjective well-being [6]. Supporters of this move consider a view of mental health as reduced to its negative spectrum to be too narrow [7]. Even a broader view of mental health is still unidirectional and thus insufficient to describe the range of possible outcomes, as it does not reflect the impact of mental health on a person's functioning.

This impact of mental health on a person's functioning considers limitations in daily activities and participation restrictions, while considering environmental and personal factors. These components in conjunction with impairments in body functions or structures are key elements of the International Classification of Functioning, Disability, and Health (ICF) coordinated by the World Health Organization (WHO) [8]. The scope of functioning thus encompasses more than the assessment of symptomatology and the diagnosis of mental disorders. Therefore, it provides an important link between mental health and workforce participation. Functioning according to the ICF is not limited to a single life domain. Accordingly, the assessment of work ability is included as a related measurement of work-related functioning [9]. Work ability takes into account '[...] health and functional capacity, but [...] is also determined by professional knowledge and competence (skills), values, attitudes, and motivation, and work itself' [10]. The latter determinants such as motivation are part of the theoretical framework of work ability, but they are not included in the original assessment.

The foregoing discussion of the multiple dimensions of outcomes shows that an adequate analysis of psychosocial working conditions and mental health goes far beyond any simple association and that empirical studies need to account for this broad range of interrelated issues. This is the rationale behind the Study on Mental Health at Work (S-MGA) – a representative study of employees subjected to social security contributions in Germany – which was initiated by the German Federal Institute of Occupational Health and Safety and conducted in

collaboration with the Institute for Employment Research (IAB) and the Infas Institute of Applied Social Sciences.

The following research aims are addressed within the S-MGA study:

- (1) Examining the impact of past employment experiences and current working conditions on positive (well-being) and negative (depressive symptoms and burnout) dimensions of mental health;
- (2) Analysing the association between mental health, functioning and work ability;
- (3) Investigating in a second wave the predictive value of working conditions, mental health, and functioning for the prediction of employment status five years later.

S-MGA addresses the lack of representative data on mental health, work ability and functioning for the working population in Germany. This study generates the first nationwide representative survey enabling the exploration of the relationship between working conditions, mental health and functioning. Hence, the distributions of indicators can be utilised for comparison with a norm sample or for using this sample as natural control group within intervention studies.

This present paper gives an overview on the study design, sampling procedures and method of data collection of the S-MGA. Socio-demographic and economic characteristics were used for detecting differences between the sample of respondents and the population from which it was drawn.

Design and measurement procedures

S-MGA is a nationwide representative study of employees subjected to social security contribution aged 31–60 years in Germany. This age range was selected as the vast majority of people in employment are between 31–60 (i.e. they have finished their vocational training or studies and have not yet reached retirement age). S-MGA is designed as a panel study with a second assessment occurring 5 years after the first data collection, which ran from November 2011 to June 2012. The second wave will be completed by the middle of 2017, when the oldest participants will have reached the statutory retirement age.

Sampling and data collection

The sampling was based on data from the Integrated Employment Biographies (IEB), a register of the German Federal Employment Agency held by the IAB. This register covers employees who are subject

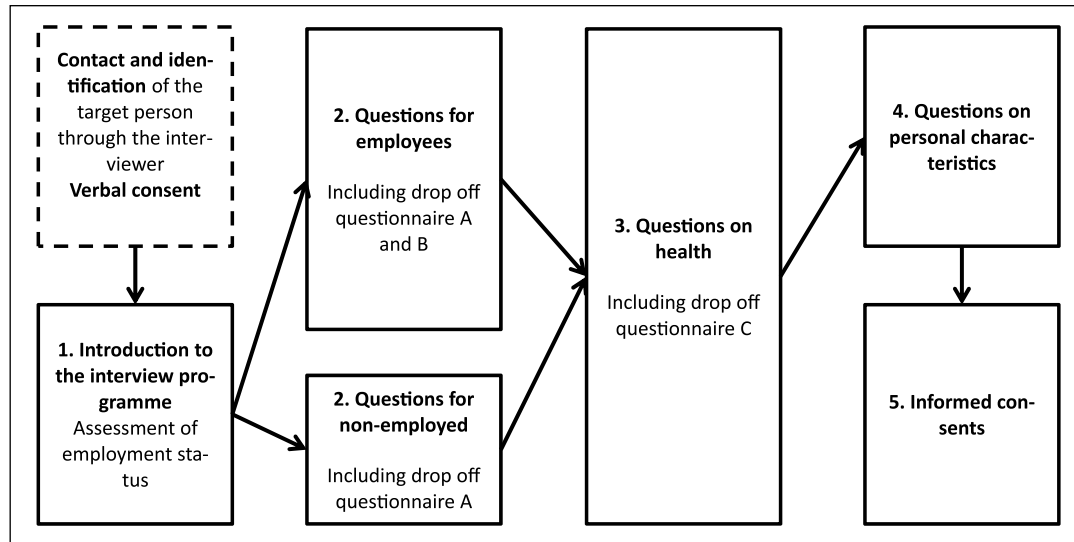


Figure 1. Structure of the interview programme [12] (modified version).
Drop-off questionnaires: well-being (A), burnout (B) and depressive symptoms (C).

to social security contributions. This constitutes more than 80% of the German working population [11], with civil servants, self-employed individuals and freelancers not included by definition. Using these data allows the linkage of employment histories with the collected survey data and a comparison of sample characteristics with the register. Those eligible to participate were all employees subjected to social security contributions on the reference date of 31 December 2010 who were born between 1951 and 1980. In total, 4500 interviews were planned to be conducted. Due to the plans for conducting face-to-face interviews, a two-stage cluster sampling procedure was applied. First, municipalities in Germany were proportionately stratified by region and population size and 206 municipalities were randomly selected from the pool of 12,227. Second, a random gross sample of 13,590 addresses was drawn within selected municipalities.

In preparation for the field phase, a letter including information on the study purpose and data protection was sent to the addresses of the selected individuals 1 week prior to the first contact attempt. To increase the motivation to participate, the letter mentioned an incentive of EUR10 given for participating [12]. During the field phase all addresses were contacted by the interviewers up to a maximum of 31 times. The interviews were only conducted after respondents gave their informed consent to carry out the study. Data were collected face-to-face by computer-assisted personal interview (CAPI) by 243 trained interviewers at the homes of the respondents. Sensitive information on mental health was collected with a drop-off paper pencil questionnaire in an envelope handed out

directly to the study participants. The respondents filled it out directly and handed it back in a closed envelope. All respondents were asked whether they would give their written consent for saving the address data for a second wave of assessment. Additionally, a total of 425 study participants from two major cities were asked for their willingness to attend an occupational medical examination on physical and mental functioning.

Integrated Employment Biographies (IEB)

When participants gave their written permission, the survey data were linked to the IEB [13]. Data from the IEB comprise information from the notifications sent to social insurance as well as from the administrative processes of the German Federal Employment Agency. The data contain detailed information on employment status on a daily basis [14]. When participants gave their written permission, S-MGA included computation of several individual indicators such as employment status and wage from the IEB data.

Measurements

CAPI. The CAPI was evaluated in a pre-test with 200 interviews regarding the sequence and comprehension of questions in summer 2011. The sequence of the interview is depicted in Figure 1.

Detailed information on instruments and indicators is listed in Table I. The first part of the interview was concerned with employment and working conditions including the type of contract and working hours. Physical working conditions such as heavy

Table I. Content of the computer-assisted personal interview (CAPI) and the drop-off questionnaires.

Topics	Indicators
Socio-demographic information	Sex, age, education, vocational training, occupation, occupational status, marital status, cohabiting status, number of children in the household, net income, household income, migration status
Employment conditions	Employment status, permanent/ non-permanent employment contract, organisational changes, on/off-the job training
Working conditions	Working hours/week; shift work, physical working conditions; Copenhagen Psychosocial Questionnaire (COPSOQ): quantitative demands, cognitive demands, work-privacy conflict, influence at work, possibilities for development, degree of freedom at work, role clarity, social support, quality of leadership, insecurity at work Mobbing by colleagues, bossing
Work ability and functioning	Work Ability Index (WAI), Norwegian Functioning Assessment Scale (NFAS), Short-Form-12 Health Survey (SF-12)
Motivational and volitional factors	General Self-Efficacy (GSE) scale, Utrecht Work Engagement Scale (UWES), Reasoning about leaving the job/ employer (single items), intention to leave the job/ employer (single items), intention to apply/ already applied for pension (single items)
Personal co-factors	Inability to relax (FABA), Social support, critical life events, health-related behaviour (physical exertion, smoking, participation in preventive measures, sleeping behaviour), care giving
Mental health	job satisfaction, life satisfaction scale drop-off questionnaires: Patient Health Questionnaire for depressive symptoms (PHQ-9) Oldenburg Burnout Inventory (OLBI), Well-being: Scale of Positive and Negative Experiences (SPANE), Psychological Well-being Scale (PWB)

lifting and awkward body postures were assessed by seven questions. The main focus was on self-reported psychosocial working conditions, which were assessed by questions from the Copenhagen Psychosocial Questionnaire (COPSOQ) [15]. Information about work ability came from the Work Ability Index (WAI) [16], and the interviewee's functioning was investigated by the Short-Form-12 Health Survey [17] and by a German translation of the Norwegian Functioning Assessment Scale (NFAS) [18]. Motivational factors were covered by the General Self-Efficacy Scale (GSE) [19] and the Utrecht Work Engagement Scale (UWES) [20]. Additional motivational and volitional aspects such as the intention to leave the job and/or the employer or to apply for a pension were supplemented by single items. Positive attributes of mental health such as, life satisfaction [21] and job satisfaction were included, supplemented by items on personal co-factors (critical life events, health-related behaviour, social context), inability to relax due to work involvement assessed by a subscale from the German questionnaire FABA [22], and socio-demographic information.

Drop-off paper questionnaire. Sensitive questions to emotional and psychological well-being [6] as well as depressive symptoms and burnout were addressed by a drop-off questionnaire handed out during the interview. Specifically, depressive symptoms were assessed by the Patient Health Questionnaire (PHQ-9) [23] and burnout was represented by the main dimension of exhaustion from the Oldenburg Burnout Inventory (OLBI) [24].

Non-respondents' questionnaire. Additionally, a short questionnaire was given to non-respondents refusing an interview after the initial contact. These non-respondents were asked for information on socio-demographics, self-rated health and work ability.

Statistical analysis. The accuracy of the sampling process was checked by comparing socioeconomic and demographic characteristics between the basic population, the gross sample, and the sample of respondents. Percentage differences between the basic population and sample of respondents were calculated for these characteristics. Multivariate analysis was conducted by logistic regression with 14 socio-demographic and socioeconomic parameters as covariates. The analysis is based on the gross sample of $n = 13,590$ and the binary outcome is participation versus non-participation in the interview. A value of 1 is assigned if the individual belongs to sample of respondents.

Results

Altogether 4511 interviews were conducted and each interview was checked for inconsistent responses. According to the standards of the American Association for Public Opinion Research (AAPOR) [25] there was a contact rate of 90.6% and a response rate of 35.7%. The refusal rate was 53.7%, in line with the trend of declining willingness to participate in surveys in Germany [26]. The addresses were contacted 3.5 times on average. The completion of an interview required an average of 3.7 contacts and the interview lasted an average of 65.6 minutes.

The acceptance of employees surveyed to support the study was very high: 87.4% declared their written consent to remain in the panel, 74.6% gave their written consent to merge occupational data from the IEB ($n = 3591$), and 69.6% of respondents from Berlin and Dresden agreed to an occupational medical examination. The comparison between the basic population, the gross sample and the sample of respondents shows only slight differences in characteristics at the first and second level of sampling (Tables II and III). Individuals in cities with 100,000 to 500,000 residents are underrepresented (-2.8% points) and those from the State of Saxony are overrepresented ($+4.8\%$). A minor underrepresentation is observed for individual characteristics such as sex (men: -1.4%), age (birth cohorts from 1975 to 1980: -3.0%), place of employment (western parts of Germany -5.6%), unknown education (-3.0%), nationality (non-German: -2.6%) and occupation (simple services: -3.2%).

The results of the logistic regression analysis controlling for 14 regional and individual characteristics are displayed in Table IV. The multivariate analysis provides only a poor fit to the data: only 2% (pseudo $R^2 = 0.02$) of the variance is accounted for by the full model.

The short questionnaire for those, who refused to participate was filled out by 341 individuals. The information provided by non-respondents deviates slightly from that of respondents concerning subjectively-perceived health and work ability. Non-respondents consider their health status to be very good or good slightly more frequently (63.0% versus 57.4%). The assessment of perceived work ability exhibits the opposite trend: respondents attribute to themselves slightly higher work ability than non-respondents (84.2% versus 70.3%).

Discussion

This present paper gives an overview on design, sampling and data collection of S-MGA, the first nationwide representative cohort study on psychosocial working conditions, mental health and functioning in Germany. A total of 4511 interviews were conducted with employees aged 31–60 years and subject to social security constituting a response rate of 35.7%. By comparing the basic population with the sample of respondents there are only minor deviations concerning the distribution of socio-demographic characteristics giving no indication for a sampling bias.

The response rate of 35.7% is in line with the trend of declining willingness to participate in surveys in Germany [26] and other epidemiologic studies [27]. Thus, questions of participation and refusal

should be considered in this context. Additionally, the question of whether non-response is a serious issue regarding bias depends on both the proportion of non-responders as well as the difference between responders and non-responders according to the measured variables. Using data from the register enables the direct comparison of the population in the register with not only the gross sample but also the sample of respondents within the survey. The results of these comparisons reveal only minor differences for the observed variables. Furthermore, multivariate analysis shows that socio-demographic and socioeconomic parameters explain a mere 2% of the variance. Hence, these parameters are hardly useful in explaining participation in this study. Based on the assessment of representativeness as well as the two selectivity analyses mentioned, the quality of the sample can reasonably be rated as quite high. The results from the non-response questionnaire likewise give no indication of systematic bias due to individual health status. Some indications such as the underrepresentation of individuals with unknown education or occupations among simple services or regional differences may be valuable clues for the adjustment of possible confounders.

The current study is based on a sample which is to be prospectively followed as a cohort over a period of 5 years. The application of a longitudinal design is an important attribute of any analytical study aiming at causal associations. Hence, the primary focus of systematic reviews is on follow-up studies by filtering out cross-sectional studies [2,3], which yields reviews with only few original studies.

The second wave of the current study takes place in the first half of 2017. There is a realistic chance of a good response in the second wave of assessment, since 87% declared their willingness to remain within the panel. Additionally, attrition will likely be minimized by conducting panel maintenance, which includes regular contacts with respondents, and by an incentive of EUR20 for participation in the second assessment.

One of the main strengths of the current study is its use of the register of the German Federal Employment Agency as a sampling frame as well as additional linked information. The use of the register adheres to a clear and straightforward definition of the population studied and as such the limitations are known explicitly. This population-based register holds the complete records for all employees subjected to social security contributions in terms of employment history and several individual characteristics. By definition, this register is more a work-related than a community-based sampling frame, which would typically include, for instance, homeworkers or retired or

Table II. Comparison of population ($N = 21,471,156$), gross sample ($n = 13,590$) and sample of respondents ($n = 4511$); regional characteristics.

Characteristics	Population ^a	Gross sample ^b	Respondents ^c	Difference
	(P)		(R)	(R-P)
	%	%	%	%
Federal State				
Schleswig-Holstein	3.3	3.4	2.4	-0.9
Hamburg	2.1	1.7	1.3	-0.8
Lower Saxony	9.6	8.8	8.5	-1.1
Bremen	0.7	0.8	0.5	-0.3
North Rhine-Westphalia	21.5	20.6	20.4	-1.2
Hesse	7.6	7.1	6.7	-0.8
Rhineland-Palatinate	4.9	4.6	4.9	0.0
Baden-Württemberg	13.5	12.6	13.6	0.1
Bavaria	15.9	14.7	15.1	-0.8
Saarland	1.2	1.3	1.4	0.1
Berlin	3.5	4.9	4.4	0.9
Brandenburg	3.1	2.9	3.0	-0.2
Mecklenburg-Vorpommern	2.0	2.1	2.6	0.6
Saxony	5.1	9.4	9.9	4.8
Saxony-Anhalt	3.1	2.5	2.6	-0.5
Thuringia	2.8	2.5	2.8	0.0
BIK classification by size of region				
Below 2000 residents	2.1	2.1	2.6	0.4
2000 up to less than 5000 residents	2.9	3.0	3.3	0.4
5000 up to less than 20,000 residents	8.1	8.0	8.4	0.3
20,000 up to less than 50,000 residents	11.9	11.3	12.2	0.3
50,000 up to less than 100,000 residents, type of structure 2/3/4 (peripheral area)	8.3	8.0	8.8	0.5
50,000 up to less than 100,000 residents, type of structure 1 (core area)	2.3	2.1	2.0	-0.3
100,000 up to less than 500,000 residents, type of structure 2/3/4 (peripheral area)	15.8	15.1	16.0	0.2
100,000 up to less than 500,000 residents, type of structure 1 (core area)	14.5	13.0	11.7	-2.8
500,000 and more residents, type of structure 2/3/4 (peripheral area)	9.9	9.7	10.8	0.8
500,000 and more residents, type of structure 1 (core area)	24.2	27.8	24.3	0.1
Total in %	100.0	100.0	100.0	
Total (abs.)	21,471,156	13,590	4511	

^aIntegrated Employment Biographies (IEB) of all employees subject to social security contribution aged 31–60 years in Germany on the reference date.

^bSample drawn from the IEB.

^cSample of respondents.

BIK: type of region according to a German classification system based on area size, population size and density.

non-employed individuals. Data concerning addresses are well maintained and linked to the register, which is valuable from the perspective of the interviewer in the field attempting to contact a sampled individual.

The database of the register covers more than 80% of the German working population. Civil servants, the self-employed and freelancers are not included. The focus on dependent employment is a limitation of the study and for the generalizability of conclusions based on it. Another limitation is given by the age of the participants, restricted to those between 31–60 years of age. The oldest participants

in the first wave of assessment will have reached the statutory retirement age by the second wave. Therefore, older aged cohorts are still covered by this study, whereas those 30 years or younger are by definition excluded. This exclusion is grounded in practical reasons, such as excluding those not finished with their vocational training or studies. This strategy implies the loss of younger cohorts who may have different experiences of the changing labour market. However, especially in younger aged cohorts, long-term positioning in the labour market very often occurs at older and older ages due to longer phases of

Table III. Population ($N = 21,959,394$) and sample of respondents ($n = 4511$) compared by individual characteristics.

<i>Characteristics</i>	Population ^a (P)	Gross Sample ^b	Respondents ^c (R)	Difference (R-P)
	%	%	%	%
Sex				
Male	50.9	49.7	49.5	-1.4
Female	49.1	50.3	50.5	1.4
Year of birth				
1951-1956	16.9	17.3	20.1	3.2
1957-1962	22.5	21.9	23.4	0.9
1963-1968	25.3	24.8	24.4	-0.9
1969-1974	18.9	19.6	18.7	-0.2
1975-1980	16.3	16.3	13.4	-3.0
East/West marker of business establishment				
East	16.0	19.8	21.2	5.2
West	84.0	80.1	78.4	-5.6
No answer	0.0	0.2	0.4	0.4
Education				
Secondary modern, middle school without professional training	8.7	8.7	7.2	-1.5
Secondary modern, middle school with professional training	52.5	52.0	53.5	1.0
General qualification for university entrance without professional training	0.8	0.8	0.7	-0.1
General qualification for university entrance with professional training	4.8	4.8	5.7	0.9
Polytechnic degree	3.9	3.9	4.8	0.9
University (academic) degree	7.0	7.3	8.3	1.3
Education unknown	22.3	22.4	19.3	-3.0
No answer	0.0	0.2	0.4	0.4
Marginal employment				
Employment subject to social insurance contribution	88.0	88.1	88.9	0.8
Marginally employed	12.0	11.7	10.7	-1.3
No answer	0.0	0.2	0.4	0.4
Occupational status and working hours				
Unknown	0.1	0.1	0.1	0.0
Full time	68.4	68.1	67.3	-1.1
Part time	31.3	31.5	32.1	0.8
Homeworker, apprentice etc.	0.2	0.2	0.1	-0.1
No answer	0.0	0.2	0.4	0.4
Nationality				
Unknown	0.1	0.0	0.0	-0.1
German	92.7	93.1	94.9	2.2
Other than German	7.3	6.8	4.7	-2.6
No answer	0.0	0.2	0.4	0.4
Daily wages in categories				
Daily wage below EUR50	31	31.5	29.4	-1.7
Daily wage EUR50 up to less than EUR85	25.2	25.3	24.0	-1.2
Daily wage EUR85 up to less than EUR120	21.6	21.7	23.2	1.6
Daily wage EUR120 and more	22.2	21.4	23.1	0.9
No answer	0.0	0.2	0.4	0.4
Occupational classification by Blossfeld				
Other, status (i.e. impaired)	0.0	0.0	0.0	0.0
Other, no answer (i.e. internships)	0.7	0.7	0.8	0.1
Agrarian occupations	1.2	1.2	1.2	0.0
Simple manual occupations	11.8	11.6	10.1	-1.7
Qualified manual occupations	11.6	11.8	11.9	0.3
Technicians	4.7	4.5	5.5	0.8
Engineers	3.2	3.2	3.8	0.6

(Continued)

Table III. (Continued)

Characteristics	Population ^a (P)	Gross Sample ^b	Respondents ^c (R)	Difference (R-P)
	%	%	%	%
Simple services	16.7	16.0	13.5	-3.2
Qualified services	5.4	5.4	5.1	-0.3
Semi professions	8.6	8.9	11.2	2.6
Professions	2	2.1	2.4	0.4
Simple commercial and administrative occupations	9.6	9.6	8.6	-1.0
Qualified commercial and administrative occupations	21.5	22.1	22.5	1.0
Management	3.1	2.8	3.1	0.0
No answer	0.0	0.2	0.4	0.4
Total in %	100.0	100.0	100.0	
Total (abs.)	21,959,394	13,590	4511	

^aIntegrated Employment Biographies (IEB) of all employees subject to social security contribution aged 31 to 60 years in Germany on the reference date.

^bSample drawn from the IEB.

^cSample of respondents.

Table IV. Logistic regression analysis with survey participation as outcome ($n = 13,573$).

Variables	Odds ratio	95% CI	
Sex			
Male	X		
Female	0.978	0.891	1.074
Year of birth			
1951–1956	1.256	1.118	1.410
1957–1962	1.103	0.990	1.228
1963–1968	X		
1969–1974	0.987	0.881	1.105
1975–1980	0.810	0.710	0.923
East/West marker of business establishment			
East	1.178	1.068	1.299
West	X		
Marginal employment			
Employment subject to social insurance contribution	X		
Marginally employed	0.990	0.853	1.148
Occupational status and working hours			
Full time	X		
Part time	1.136	1.022	1.262
Daily wages in categories			
Daily wage below EUR50	0.913	0.798	1.043
Daily wage EUR50 up to less than EUR85	0.881	0.788	0.984
Daily wage EUR85 up to less than EUR120	X		
Daily wage EUR120 and more	0.919	0.817	1.035
Education			
Secondary modern, middle school without professional training	0.873	0.754	1.012
Secondary modern, middle school with professional training	X		
General qualification for university entrance without professional training	0.894	0.584	1.368
General qualification for university entrance with professional training	1.342	1.130	1.594
Polytechnic degree	1.301	1.066	1.587
University (academic) degree	1.225	1.029	1.459
Education unknown	0.918	0.826	1.021
Nationality			
German	X		
Other than German	0.773	0.654	0.914

Table IV. (Continued)

Variables	Odds ratio	95% CI	
Occupational classification by Blossfeld			
Agrarian occupations	0.925	0.656	1.306
Simple manual occupations	0.840	0.724	0.975
Qualified manual occupations	1.007	0.874	1.161
Technicians	1.277	1.063	1.534
Engineers	1.196	0.952	1.502
Simple services	0.825	0.718	0.947
Qualified services	0.955	0.799	1.142
Semi professions	1.337	1.160	1.542
Professions	1.277	0.966	1.687
Simple commercial and administrative occupations	0.855	0.738	0.991
Qualified commercial and administrative occupations	X		
Management	1.121	0.891	1.410
Other, no answer (i.e. internships)	1.152	0.746	1.778
Employment History			
Cumulative, years (lifetime)	1.008	1.001	1.014
Employment History			
Number of jobs (since 2004)	1.018	1.001	1.034
Experience with unemployment (lifetime)			
No	X		
Yes	1.014	0.905	1.136
Duration of unemployment			
Cumulative, weeks (since 2004)	1.000	1.000	1.000
BIK classification by size of region			
Below 2000 residents	1.560	1.212	2.008
2000 up to less than 5000 residents	1.490	1.197	1.855
5000 up to less than 20,000 residents	1.336	1.152	1.548
20,000 up to less than 50,000 residents	1.379	1.211	1.569
50,000 up to less than 100,000 residents, type of structure 2/3/4 (peripheral area)	1.432	1.237	1.657
50,000 up to less than 100,000 residents, type of structure 1 (core area)	1.085	0.832	1.413
100,000 up to less than 500,000 residents, type of structure 2/3/4 (peripheral area)	1.336	1.186	1.505
100,000 up to less than 500,000 residents, type of structure 1 (core area)	1.058	0.932	1.200
500,000 and more residents, type of structure 2/3/4 (peripheral area)	1.469	1.282	1.683
500,000 and more residents, type of structure 1 (core area)	X		
Cases		13,573	
Log likelihood		-84.400.697	
Pseudo-R²		0.0204	

BIK: type of region according to a German classification system based on area size, population size and density; CI: confidence interval; X: reference category.

education. Even among the German baby boomers one finds a proportion of almost 10% who were older than 30 years at the first experience of employment subject to social security contribution [28].

New data are already available from the first cross-sectional assessment conducted among employees subjected to social security contributions in Germany. This population-based survey contains information about the distributions of psychosocial working conditions (COPSOQ), motivational determinants (UWES), negative and positive attributes of mental health

(depressive symptoms, burnout, and well-being) and functioning. The assessment of psychosocial working conditions by the COPSOQ is well established within Danish cohort studies and adapted for the German working context [15] and outcomes like the PHQ [23] and SF-12 [17] have been applied to the general population in Germany. These distributions are useful as a means of comparison, as there is no other study available for Germany with a focus on this profile of exposure and outcome variables within a broad population of employees. Hence, the current study provides a

national reference sample for the distribution of psychosocial working conditions and for exhaustion as the core dimension of burnout.

Another important opportunity offered by this sample is to utilise it as a reference for defining a minimum level of work functioning, especially when making comparisons within intervention studies and evaluation research. This opportunity arises as a result of the sampling procedure. The starting point is the status of being employed on the date of sampling within the register. By definition, this is an important difference to community or population-based studies, which include non-employed individuals, homeworkers or those who retired early. As a consequence, this introduces some level of positive bias towards individuals, who – despite possible impairments in health and functioning – are still employed. This means that the sample of respondents constitutes a reference level for working populations with at least a minimum level of work functioning. This interpretation also applies to the empirical distributions of indicators for mental health or working conditions which give a picture of individuals still in work. Studies focusing on individuals with impaired health (e.g. return-to-work studies) can use these distributions for means of comparison and as a goal level for functioning.

S-MGA provides information which is highly relevant for objectives of the WHO. The mental health action plan of the WHO [29] conceptualizes mental health as a state of well-being which includes positive indicators and components of functioning. The fourth objective is circumscribed as aiming “[...] to strengthen information systems, evidence and research for mental health” (p. 22). Furthermore it contributes to objectives of the WHO’s global plan for worker’s health [30], such as providing and communicating evidence for action and practice.

In conclusion: S-MGA is a nationwide study based on a longitudinal design deploying high quality sampling with a focus on employment and working conditions, mental health and functioning. The population-based sample constitutes a reference and provides useful information for means of comparisons. In addition, the longitudinal design is especially well-suited for assessing the determinants of mental health, functioning, and participation at work. To the best of our knowledge there is no nationwide study in Germany with this combination of study features. This gives S-MGA great potential for future enquiries, and valuable insights into the relationship between work and health.

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