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The rise of mental health problems, inequality and the role of job strain in Germany

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ABSTRACT

The prevalence of mental health problems among the working population has increased sharply since the turn of the millennium in Germany. Secondary analyses of the BIBB/BAuA employment surveys from 1999, 2006 and 2012 showed that, whereas in 1999 only about 4 to 6% of respondents reported mental health problems, this number had grown to 20% or higher in 2012. In this article, we investigate if this sharp increase in mental health problems, measured in terms of self-reported regular occurrence of four specific indicators during the preceding 12–month period, corresponds to a similar increase in social inequality; how different occupational social classes (European Socioeconomic Classification: ESeC) were affected between 1999 and 2012; and whether increasing job strain (mental strain, rigid work organization, ergonomic strain) can explain the increase in mental health problems among different occupational classes. We analyze job strain in relation to a) the increase in the prevalence of self-reported mental health problems and b) the differential development of these problems within different occupational social classes using a decomposition method. Results confirm an increasing trend of mental health problems. Inequality in mental health has also increased, but only slightly. Different occupational subgroups follow distinct trajectories, with particularly steep increases among social service occupations. Job strain, especially mental strain, increases the frequency of mental health problems, but explains only a minor part of the trend.

1. Introduction

Over the last two decades, reports compiled by health insurance providers and survey-based research have shown an increase in the prevalence of mental health problems within the German population (Barr, Kinderman & Whitehead, 2015; Baumeister et al., 2015; Jorm, Patten, Brugha & Mojtabai, 2017; Knieps & Pfaff, 2015; Marschall, Hildebrandt, Sydow & Nolting, 2016, p. 22). Baumeister et al. (2015), for instance, found an increase from 13% to 28% between 1997 and 2012 in northeast Germany. Researchers in the fields of public health and human resources paid attention to this trend, with research making it clear that there are occupation-specific risks affecting the prevalence of mental health problems (Leka & Nicholson, 2019). However, it is unclear how these occupation-specific risks develop over time - especially since the occurrence of mental health problems in the population as a whole seems to have increased.

A recent study in France shows that the development of mental health problems varies between occupational groups (Telle-Lamberton et al., 2018). This raises the question of whether there have been changes in occupation-specific mental health risks parallel to the sharp increase in the prevalence of mental health problems and a rapidly changing world of work.

We examine whether the increase in mental health problems since the beginning of the 21st century coincides with patterns of social class inequality in mental health.

Furthermore, we provide a detailed picture of the social inequality in mental health by differentiating lower grade professional occupations, which form the lower salariat class, since this social class includes a large proportion of employees in the modern world of work and combines occupations with quite different content.

Poor working conditions do not only negatively impact physical health, but also lead to mental health problems (Bamberger et al., 2012; Milner et al., 2017). Changes in working conditions therefore provide a potential explanation for the rapid increase in mental health problems in recent decades. Between 1999 and 2012, there were a number of relevant developments in the German labor market – a labor market that had previously been characterized by comparatively strong employment protection legislation and unemployment support

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(OECD, 2004). Particularly significant were a number of reforms implemented between 2002 and 2004, commonly referred to as the 'Hartz reforms' and sometimes described as the most important reforms of the German welfare system for many decades (Knuth, 2006). Among other things, these reforms significantly cut unemployment benefits. Increasingly, employers have made use of the opportunity to hire employees on fixed-term contracts, leading to the steady growth of a separate sector of flexible employment (Eichhorst & Marx, 2011; Keller & Seifert, 2013). Junghanns and Morschhäuser (Junghanns & Morschhäuser, 2013) have argued that employees are expected to be more flexible and take more direct responsibility. At the same time, they experience greater job insecurity and more pressure to perform. This increase in pressure and competition seems to have led to more job strain (Kalyal, Berntson, Baraldi, Näswall & Sverke, 2010; Klandermans & van Vuuren, 1999). We therefore also explore whether changes in the work environment between 1999 and 2012 have contributed to the increasing trend of mental health problems. To this end, we analyze the role of various sources of mental job strain and their growth over time. We expect that the degree to which individuals are affected by these processes explains, at least in part, the rise of mental health problems (H1).

The lower social classes more frequently report mental job strain, e.g. that their jobs offer a low scope of action, inflexible working hours, monotonous work (Hämmig & Bauer, 2013), and a high-level of job insecurity (Cho, Eum, Choi, Paek & Karasek, 2008). On the other hand, higher social classes more frequently report long working hours, a poor work-life-balance, being hard pressed for time, frequent interruptions (Hämmig & Bauer, 2013), high work intensity, and overall higher quantitative, cognitive and emotional requirements (Kristensen, Borg & Hannerz, 2002). Previous research has shown that these differences in job strain contribute to socioeconomic inequality in mental health. Specifically, the lower socioeconomic status groups more often report problems associated with mental health (Schütte, Chastang, Parent-Thirion, Vermeylen & Niedhammer, 2015). These known inequalities, along with the changes in the labor market outlined above and the overall increasing trend of mental health problems, lead us to hypothesize that the disadvantage of lower socioeconomic groups has increased (H2); and that this can be explained by increasing job strain (H3).

2. Methods

In the present study, data from the BIBB/BAuA employment survey were analyzed for the years 1999, 2006 and 2012 (Rohrbach, 2006; Rohrbach-Schmidt & Hall, 2013). This is a multi-wave employment survey of the German workforce. The Federal Institute for Vocational Education and Training (BIBB), in cooperation with the Institute for Employment Research (IAB), conducted the 1999 survey using computer-assisted face-to-face interviews. For the surveys conducted in 2006 and 2012, the Federal Institute for Occupational Safety and Health (BAuA) replaced IAB as BIBB's collaborative partner and the mode of data collection was changed to computer-assisted telephone interviews. For each wave, households were selected, either by random route (1999) or by random selection of telephone numbers (2006 and 2012). Within these households, an individual in the labor force above the age of 15 was selected using a random number method (Kish method). The response rates were 44% in both 2006 and 2012. In the 1999 wave, the response rate was not reported. However, as in the case of the later waves, BIBB published an extensive report documenting a high degree of representativity of the German workforce based on comparison with official statistics (Hartmann, Bielinski & von Rosenbladt, 1999). For the present analysis, a de facto anonymized scientific use file containing the original data was retrieved from the GESIS data archive. The employment survey has crucial strengths in terms of answering the research questions on changes over time we pose in this study. Being a repeated cross-sectional survey, it allows analysis of health inequality trends over an extended period and the large sample size enables comparisons between occupational groups. Most importantly, it contains detailed information about job characteristics and self-reported mental health.

The sample selected for this study included employed people in the former West Germany aged between 18 and 45 who worked at least 18 h per week. We excluded family workers, trainees and volunteers, apprentices, soldiers and prospective teachers, since these contract types are either temporary or, as in the case of family workers, not governed by the rules of employment contracts. Individuals in ESeC-groups 4 and 5 (see next section) were also excluded as they are mostly self-employed and several items of the job strain index were not applicable to them. We restricted the sample to the former West Germany, since the eastern German economy was still in transition towards a market economy during the first wave and had specific problems and developments related to this transition. The age restriction was introduced because the selected age group is more likely to be otherwise healthy and so as to focus on individuals who had gained most of their work experience under comparatively recent labor market conditions. Individuals who work very few hours were excluded due to their low attachment to the labor market and thus lower exposure to work related strain. The analysis sample included 23,434 individuals in total.

Mental health was derived from a survey question asking which medical conditions, out of a given list, the individual had regularly experienced in the last 12 months, either at work or on work days (answer options yes/no). The list of health conditions included four mental health indicators that were available for all waves: the occurrence of 'sleeping disorders', 'fatigue and exhaustion', 'nervousness and irritability' and 'depression'. The outcome variable measured the occurrence of multiple mental health problems, defined as at least three out of the four items (1), or otherwise (0). All analyses were replicated using a continuous score derived from a polychoric principal component analysis (PCA) that led to the same results, using the package 'polychoric' under Stata 14 (Kolenikov & Angeles, 2004). Results of the polychoric PCA are documented in Tables A1 and A2 in the appendix. Occupational social class was measured according to the European Socioeconomic Classification (ESeC) (Rose & Harrison, 2007; Wirth, Gresch, Müller, Pollak & Weiss, 2010 on the validity of the concept in the German context), which classifies occupational codes into different social classes. Additional criteria for the assignment of social class categories to individuals are the type of employment contract (e.g. self-employed or employee) and the status in employment, especially if the job includes supervisory or managerial tasks. ESeC also enabled a distinction between manual and non-manual jobs. Since class 2—lower salariat—includes a large proportion of the contemporary workforce and combines occupations with quite different content, this class was further divided into four subgroups that are more homogenous regarding social versus technical work content. Table 1 provides an overview of the seven ESeC classes analyzed in the present study.

Strain, our mediating variable, was operationalized along two dimensions that closely follow the demand-control model (R. A. Karasek, 1979): 'mental strain' (deadlines, interruptions during work, demand for skills for which training has not been provided, working on multiple tasks at the same time, working at full capacity) and 'rigid work organization' or 'low job decision latitude' (precise work instructions, routine work). Since we have to ensure consistency over time and focus primarily on the role of negative job characteristics, we do not exactly replicate the scale developed for these two dimensions of job strain by R. Karasek et al. (1998) and prefer to talk about 'rigid work organization' instead of 'job decision latitude'. In addition, results were compared to a similar analysis of ergonomic strain (standing, carrying heavy loads, smoke, dust, heat, cold, oil, working in a constrained posture, wearing protective clothing, noise). Respondents were asked in this survey if they experienced these conditions "frequently", "sometimes", "rarely" or "never". The items were condensed into additive indices for each dimension. Figures A1 and A2 in the appendix

Table 1
Overview of ESeC classes and case numbers.
Source: BIBB/IAB/BAuA employment survey, 1999, 2006 and 2012.

ESeC Class	Common Term	%	N
1 Higher salariat	Large employers, higher grade managers and professionals	12	2904
2a Low. Salariat: Social	Lower grade professional occupations (Secondary education teaching professionals, Primary and pre-primary education teaching professionals, Special education teaching professionals, Social science and related professionals, Writers and creative or performing artists, Religious professionals, Health associate professionals (except nursing), Nursing and midwifery associate professionals, Pre-primary education teaching associate professionals, Special education teaching associate professionals, Other teaching associate professionals, Social work associate professionals, Artistic, entertainment and sports associate professionals, Religious associate professionals, Fashion and other models)	2	296
2b Low. Salariat: Tech	Higher grade technical occupations (Physical and engineering science technicians, Computer associate professionals, Optical and electronic equipment operators, Ship and aircraft controllers and technicians, Life science technicians and related associate professional)	9	2173
2c Low. Salariat: Hierarch	Supervisory and lower grade managerial occupations (Sales, Marketing and Development Managers, Managers of small enterprises)	8	1874
2d Low. Salariat: Admin	Administrative occupations (Archivists, librarians and related information professionals, Public service administrative professionals, Finance and sales associate professionals, Business services agents and trade brokers, Administrative associate professionals, Customs, tax and related government associate professionals, Police inspectors and detectives, Secretaries and keyboard-operating clerks, Numerical clerks, Other office clerks)	6	1458
3 Intermediate Occ.	Intermediate occupations	16	3699
6 Lower Sup./Technici.	Lower grade supervisors and technicians	14	3157
7 Lower sales/service	Lower grade sales and service occupations	9	2074
8 Lower technical	Lower grade technical occupations	13	3111
9 Routine	Routine occupations	11	2598
Total		100	23,344

describe the main explanatory variables over time and by social class. Tables A3 and A4 document the correlation structure and a principal component analysis that shows the existence of the two dimensions and the factor loadings of the single items on them.

The first analysis, referring to H2, described how the prevalence of mental health problems developed over time. The binary indicator 'prevalence of multiple mental health problems' was analyzed using logistic regression models. Chi^2 tests for a trend in inequality ('Chow test') were performed. The results were weighted for the size of each occupational group within each class by transferring them to the distribution for the year 1999. This excludes the possibility that changes between classes can be entirely attributed to changes in their occupational composition.

In the second analysis, we controlled for possible confounding factors in multiple regression models and decomposed the contribution of the detailed measures for job strain on a) the increasing prevalence of mental health problems (H1) and b) their differential development by social class (H3), applying the Karlson/Holm/Breen (KHB) method (Karlson, Holm & Breen, 2012; Kohler, Karlson & Holm, 2011). The motivation for this approach was twofold. First, coefficients between reduced and full nonlinear probability models cannot be compared directly (Karlson et al., 2012; Mood, 2010). Second, the decomposition analysis estimated the contribution of the change in stress variables over time with respect to the development of mental health problems between 1999 and the later time points 2006 and 2012, respectively. Due to the sensitivity of the decomposition to the chosen link function, all the decomposition analyses from binary dependent variable models were re-run as probit models. We controlled for sex, age, education (according to the classification scale developed by the project Comparative Analysis of Social Mobility in Industrial Nations (CASMIN)) and year of survey, since these characteristics usually correlate with health and social class.

In a third step, we applied the decomposition for each class separately in order to investigate to what extent job strain variables can explain the differing levels of increase in mental health problems for each social class (H3).

3. Results

Fig. 1 shows how the prevalence of reporting three or more mental health problems develops by social class, showing a strong increase over the analyzed period. Whereas in 1999, only about 4 to 6% of respondents reported multiple mental health problems, this number had grown to 20% or higher for all social classes in 2012. We also observe an increase in inequality between classes according to the Chi^2-based association measures, with a Cramer's V coefficient of 0.06 in 1999 and 0.08 in 2012. Likelihood ratio tests for separate models by year confirm that the increases are statistically significant. Employees in the lower occupational classes 6 and 9, as well as the sub-group of social services (2a) within class 2, were particularly affected by a disproportionate growth of syndrome prevalence. However, with respect to the overall increase in mental health problems, the increase in inequality is modest.

Table 2 presents the results of the regression models corresponding to Fig. 1, confirming that the prevalence of mental health problems has increased at a statistically significant rate over the years (see Model 1, Table 2).

Decomposition estimates that separate a direct effect from an indirect, mediated effect show that, of the total increase of mental health problems between 1999 and 2006, 16% can be explained by changes in the job strain indicators (refers to logistic regression). From 1999 to 2012, the contribution of the different job strain variables accrues to 8% of the growth in mental health problems. These results show that an increase in self-perceived job strain parallels an increase in mental health problems, but does hardly explain it.

Our final set of analyses, concerning the decomposition of the contribution of mental job strain to the increase in mental health problems, shows that these job characteristics play a stronger role in the rise in mental health problems in the service-oriented classes 2a, 2b, 3 and 7. However, they do not affect the rise in mental health problems in the lowest social classes 8 and 9 (Table 3).

4. Discussion

Previous studies have suggested that a correlation exists between job characteristics and mental health (Bonde, 2008; De Moortel, Vandenheede & Vanroelen, 2014; Netterstrøm et al., 2008), while an ongoing discussion has emerged concerning the links between rising levels of job stress and the sharp increase in the prevalence of mental health problems (Junghanns & Morschhäuser, 2013; Kalyal et al., 2010; Klandermans & van Vuuren, 1999). Our results add to this body of knowledge by analyzing the contribution of changes in job strain to the rise in mental health problems. We pay special attention to the analysis of changes in social inequality and how they relate

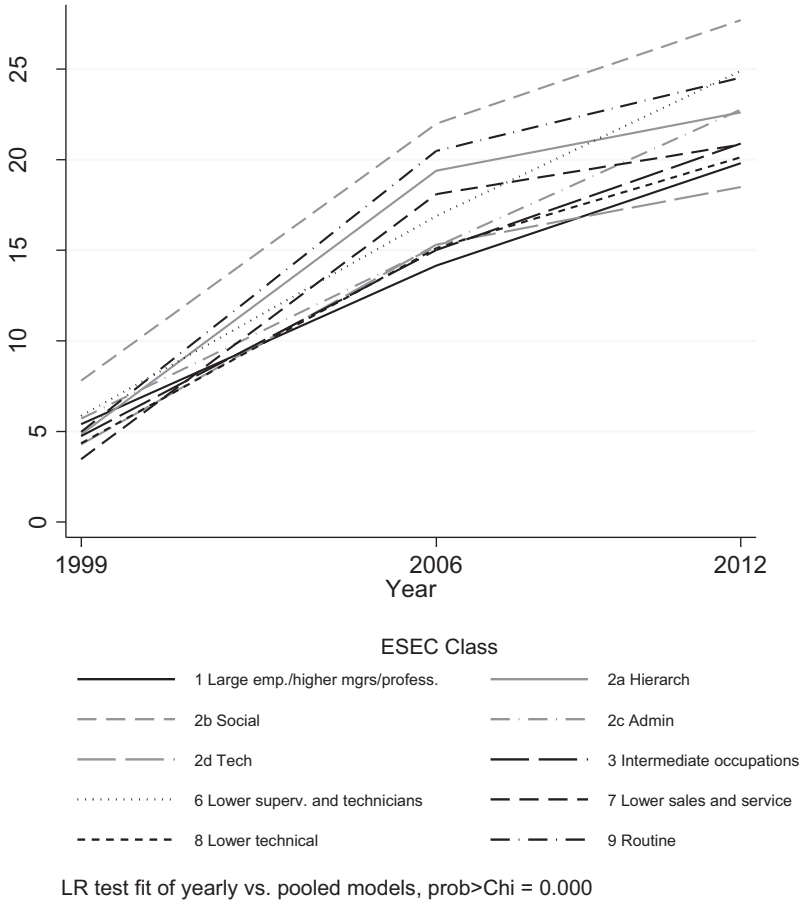

Fig. 1. Prevalence of multiple mental health problems by occupational group (%) (Binary variable).

to mental health problems over time.

Our results confirm the strong increase in mental health problems among the workforce found by other studies (Barr et al., 2015; Baumeister et al., 2015). We also found social inequality in mental health problems, as has been shown in previous studies (Wojciech, Magdalena, Magdalena, Elżbieta & Wojciechb, 2015). We add to the existing body of knowledge by showing that social inequality in mental health problems has increased over time, but not nearly as much as the overall level of mental health problems. This increase in inequality can be partially attributed to members of the lower social classes – i.e. lower supervision/technicians and routine jobs – having a steeper increase in mental health problems than members of other social classes. In addition, a remarkable variation exists within the lower grade professional occupations. Hence, we cannot confirm our second hypothesis: that it is mainly lower social classes who are increasingly affected by mental health problems.

In contrast to other analyses of health inequality (e.g. Leka & Nicholson, 2019), we divided the lower salariat class (ESeC class 2, lower grade professionals) into four subgroups. The ESeC class 2 encompasses highly educated employees representing a large share of the workforce in a modern, knowledge-based economy. By dividing this class into subgroups, we are able to take into account the diversity of job content and tasks. Our findings support this approach, identifying distinct trends for the different subgroups. The social service occupations (2a) were particularly affected by mental health problems and experienced a steeper increase over time compared to the other subgroups within class 2, which is in line with previous findings in a French study (Telle-Lamberton et al., 2018). This result raises the question of why precisely these occupations experience such a large increase in mental health problems. One explanation could be a rising acceptance and more open discussion of mental health problems within these occupations. Alternatively, there may have occurred other changes affecting work environments in the German labor market during the period (1999–2012) that we did not observe, but that affecting employees in class 2a occupations more than employees in other occupations. As a limitation, also compositional changes in the workforce that differ by social class and were not controlled in our models. To exemplify, while we hold gender constant in the main models, the proportion of mothers or single parents might change over time, too, and could be held constant in our analyses.

We can confirm the results from previous research that job characteristics have an impact on mental health (Bamberger et al., 2012). With the results of this study, we can furthermore show that, as expected (Hypothesis 1), job characteristics, especially psychological job strain, also play a role in the increase of mental health problems in the overall working population; however, these strains can only partly explain this increase. For example, the large increase in mental health problems in the lower social classes cannot be explained by these stress variables, as expected in Hypothesis 3. On reason for this finding could be that our measures capture changes in job characteristics best for service occupations, but less adequately for manual and routine occupations.

Although the comparability over time of the data we used is strong when compared to other sources, and although we performed a number of checks, our analysis still has some limitations with respect to changes over time. A causal attribution of our findings to job characteristics would be inappropriate, since jobs can influence the development of such changes patterns other ways than a direct causal impact. Although we were able to control for a comprehensive set of observed variables, we can by no means guarantee that our models covered all the information we would need to ensure that the populations we compared were homogeneous in their composition. The selection process into jobs

Table 2
Prevalence of multiple mental health problems (logit model).

	Model 1		Model 2		Model 3	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Survey Year						
1999	Ref.		Ref.		Ref.	
2006	1.78*	0.06	1.67*	0.07	1.53*	0.07
2012	2.12*	0.07	2.01*	0.07	2.00*	0.07
ESeC—Classes						
1 Higher Salariat			Ref.		Ref.	
2a Social			0.11	0.21	0.09	0.21
2b Tech			0.20	0.11	0.34*	0.11
2c.Hierarch			0.26*	0.12	0.24*	0.12
2d Admin			−0.09	0.13	0.04	0.13
3.Intermediate Occ.			0.07	0.11	0.17	0.11
6.Lower Superv./Tech.			−0.31*	0.12	−0.07	0.12
7.Lower Sales/Service			−0.12	0.13	0.23	0.13
8.Lower technical			−0.55*	0.13	−0.07	0.13
9.Routine			−0.25	0.13	0.30*	0.14
Tenure yrs			0.01*	0.00	0.00	0.00
Age			0.14*	0.04	0.11*	0.04
Age^2			−0.00*	0.00	−0.00*	0.00
Male			−0.69*	0.06	−0.61*	0.07
Education: CASMIN scale						
1a No degree			Ref.		Ref.	
1b lower sec, no voc.			−0.11	0.34	−0.22	0.36
1c lower sec + voc.			−0.21	0.33	−0.34	0.34
2a med sec, no voc			−0.23	0.33	−0.42	0.34
2b med sec + voc			−0.02	0.38	−0.21	0.40
2c_voc upper sec + voc			−0.12	0.33	−0.39	0.35
2c_gen upper sec, no voc			−0.12	0.39	−0.34	0.41
3a lower tier tertriary			−0.27	0.34	−0.49	0.36
3b university degree			−0.10	0.34	−0.33	0.36
Not German			0.27*	0.11	0.28	0.12
Working hrs/wk			0.04*	0.01	0.03*	0.01
$(Working\ hrs/wk)^2$			−0.00*	0.00	−0.00	0.00
Physical strain			1.68*	0.12	1.02*	0.12
Type of contract						
Permanent					Ref.	
Fixed-term					−0.10	0.10
Education						
Medium					Ref.	
Low					−0.13*	0.06
High					0.56*	0.09
Subcontract					−0.34	0.29
Mental strain					3.73*	0.17
Work organization					0.52*	0.10
Constant	−3.43*	0.05	−7.63*	0.85	−9.14*	0.89
Observations	23,344		23,344		23,344	

Data source: BIBB/IAB and BIBB/BAUA Erwerbstaetigenerhebung (Scientific Use File).
* $p < .05$.

Table 3
Explanatory power of psychological job characteristics for the rise in mental health problems (results from decomposition).

Social Class	Explanatory Power in%			
	Logit: 1999–2006	Logit: 1999–2012	Probit: 1999–2006	Probit: 1999–2012
1 Higher Salariat	17.4	7.8	17.3	7.8
2a Social	17.5	19.3	16.8	17.8
2b Tech	30.5	18.8	29.1	18.1
2c Hierarch	25.5	12.7	25.8	11.8
2d Admin	13.5	6.3	14.0	6.7
3 Intermediate Occ.	20.5	12.4	20.8	12.4
6 Lower Sup./ Technici.	15.9	6.9	16.8	6.9
7 Lower sales/ service	22.6	11.7	23.5	12.1
8 Lower technical	6.6	2.8	7.5	3.4
9 Routine	5.9	0.8	6.9	1.8

with greater strain may be a possible alternative cause; one that we were not able to disentangle from other mechanisms using cross-sectional data. Furthermore, changes over time can stem from various sources other than worsening working conditions, e.g. more openness about and focus on psychological difficulties or the change in the interviewing mode from face-to-face to telephone interviews in the study we used. One approach towards a better understanding of these changes would be to consider personality traits that may correlate with a higher probability of reporting mental health problems. Unfortunately, no such information is included in the dataset we used for our study. Furthermore, the low explanatory power of job characteristics with respect to the rise in mental health problems could be due to an incomplete measurement of the construct. Potentially, the job characteristics as measured describe the work of higher social classes better, or the questions were less well understood by the members of the lower occupational classes.

5. Conclusions

Our findings suggest no strong trend towards new inequalities in mental health. With respect to the policy implications of our findings, it can be concluded that human resource professionals should sharpen their awareness of mental health problems and develop strategies for promoting mental health, especially in sectors and occupational classes with a high rate of affected employees, such as the lower social classes (lower grade supervisors/technicians and routine jobs). In conclusion, differentiated analysis of ESeC class 2 is of great importance in future research seeking to understand social inequality in mental health and account for different job content and tasks, especially since our results show distinct trends in the different subgroups.

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Declaration of Competing Interest

The data was a secondary analysis based on factually anonymized data (scientific use file). Identifying information, such as names, places, ID numbers or additional identifiers associated with the study population, was not transferred to the authors. No attempt has been made by the authors to de-anonymize microdata and there has been no accidental de-anonymization.

Further information on ethics approvals are provided on individual request from the Ethics Committee of the data-producing institute BIBB: zentrale@bibb.de

The datasets generated and/or analyzed during the current study are available in the Data Archive for the Social Sciences (DAS) repository at GESIS, doi:10.4232/1.12247, doi:10.4232/1.11072, doi:10.7803/501.12.1.1.40 https://dbk.gesis.org/dbksearch/home.asp?db=e

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.mhp.2019.200175.

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