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MANUSCRIPT

Long-term associations of psychosocial working conditions with depressive symptoms and work-related emotional exhaustion: Comparing effects in a 5-year prospective study of 1949 workers in Germany.

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Keywords: work-related emotional exhaustion; burnout; depressive symptoms; depression; psychosocial working conditions

Abstract

Objective To test the hypothesis that psychosocial working conditions are more strongly associated with subsequent work-related emotional exhaustion (core component of burnout) than with depressive symptoms at follow-up.

Methods A five-year cohort study (2011/2012-2017), based on a random sample of persons in employments subject to payment of social contributions aged 31–60 years (Study on Mental Health at Work; S-MGA; $N=1949$), included self-reported measures of organisational demands (organisational layoffs and restructuring), task-level demands (work pace and amount of work) and job resources (influence at work, possibilities for development, control over working time, role clarity), all taken from the COPSOQ, except the organisational demands that were single-item measures. Work-related emotional exhaustion and depressive symptoms were measured with the Oldenburg Burnout Inventory and the Patient Health Questionnaire-9, respectively.

Results Cochran Q-tests revealed stronger associations between psychosocial working conditions and work-related emotional exhaustion only for amount of work ($p = 0.013$) and control over working time ($p = 0.027$). No differences were observed for the Demands and Resources Indexes, capturing overall exposure to psychosocial working conditions. The same differences were observed in a subsample including only participants who remained at the same employer from baseline to follow-up, although more psychosocial working conditions were associated with work-related emotional exhaustion than with depressive symptoms. Supplementary analyses employing dichotomous measures of work-related emotional exhaustion and depressive symptoms confirmed these results.

Conclusions Overall, the findings provide limited evidence supporting the hypothesis that psychosocial working conditions are more strongly associated with work-related emotional exhaustion than with depressive symptoms.

Introduction

In the occupational health literature, it is established that being exposed to adverse psychosocial working conditions poses a risk to mental health (Aronsson et al. 2017; Madsen et al. 2017; Rugulies et al. 2017; Theorell et al. 2015). Depressive symptoms, clinical depression and burnout, especially its core component emotional exhaustion, have been among the most commonly examined outcomes of a poor psychosocial work environment (Niedhammer et al. 2021). Symptomatic manifestations of depression include anhedonia (loss of pleasure and interest), dysphoria (depressed mood), fatigue and loss of energy. As they may occur in different spheres of an individual's life, depressive symptoms are considered domain-free psychological manifestations. On the other hand, symptoms of burnout, which is commonly defined as a syndrome consisting of emotional exhaustion, cynicism and a reduced sense of personal accomplishment at work (Schaufeli and Taris 2005), are conceived as domain-specific manifestations that result from a chronic exposure to job-induced stressors.

A long-debated question in the literature is whether the two constructs of depression and burnout capture distinct rather than overlapping psychological phenomena (Bianchi et al. 2015; Maslach and Leiter 2016b). Recent meta-analyses showed mixed findings concerning the empirical distinction between the two constructs. Specifically, one meta-analysis (Bianchi et al. 2021) found strong meta-analytic correlations between depression and burnout, suggesting that the two constructs are poorly differentiated. The most problematic overlap is typically observed between depression and emotional exhaustion, which refers to physical, emotional and cognitive depletion, symptoms that also characterize depressed individuals. In other meta-analyses, however, correlations were such that, despite suggesting some overlap, they left room for a conceptual and empirical distinction between the two constructs (Koutsimani et al. 2019; Meier and Kim 2021).

Such a mixed evidence signals that the conceptual distinction between burnout and depression is still an open issue. A way to shed light onto this question is to examine the respective nomological networks (i.e., the expected associations with other related constructs, including potential antecedents and consequences) of burnout and depression (Bianchi and Schonfeld 2018). In particular, comparing the role of psychosocial working conditions (job demands and job resources) as potential antecedents of burnout and depression could help elucidating whether the latter two represent different or overlapping psychological responses to adverse work-related exposures. Researchers supporting that the two constructs coincide, claim that burnout is essentially a depressive response to unresolvable stress occurring in the work context (Bianchi and Schonfeld 2018). Indeed, the dysphoric symptoms that can be observed in both depression and burnout might be a manifestation of the same underlying process of helplessness, powerlessness and loss of gratification deriving from repeated unsuccessful coping with stressful work experiences (Bianchi et al. 2018). The established evidence (Aronsson et al. 2017; Madsen et al. 2017; Rugulies et al. 2017; Theorell et al. 2015) suggesting that the exposure to adverse psychosocial working conditions is a risk factor for both burnout and depression, supports the notion that these mental affections share a similar aetiology. However, a stringent test of whether or not burnout and depression share a common work-related psychosocial aetiology requires one to formally compare the effects that psychosocial working conditions have on the two conditions. Given the afore-mentioned characterization of burnout and depression as domain-specific and context-free ailments, respectively, one might expect that psychosocial working conditions, being an expression of the work context, are more strongly associated with manifestations of job-related health, such as burnout, than they are with context-free outcomes such as depression. This is line with Warr's well-being model (Warr 2011), according to which stressors acting in a certain domain will primarily affect well-being outcomes in the same domain, while they only indirectly affect well-being in other life domains (or context-free well-being). A stronger role of

psychosocial working conditions in the prediction of burnout would thus suggest a nomological network that supports the conceptual distinction between the two constructs. As opposite to this, findings revealing that burnout and depression share similar work-related psychosocial antecedents, would suggest that these two conditions mirror the same adverse response to chronic job stressors.

To date, the sparse research available examining the relative contribution of psychosocial working conditions (i.e., job demands and job resources) to work-related emotional exhaustion and depressive symptoms reveals a mixed picture (Ahola and Hakanen 2007; Bianchi and Schonfeld 2018; Hatch et al. 2019; Schonfeld et al. 2019). A major problem of the existing research is that none of the studies performed a formal test comparing the associations between psychosocial working conditions and the two mental health outcomes, thereby limiting conclusions about potential differences in terms of nomological network.

In consideration of the above, the present study aims to compare the prospective associations of a selected number of psychosocial working exposures with work-related emotional exhaustion and depressive symptoms. We considered work-related emotional exhaustion because it is the only component of burnout measured in many studies (Aronsson et al. 2017) and, as shown by the afore-mentioned evidence, it presents the most problematic overlap with depressive symptoms (Bianchi et al. 2021). Using the established Job Demands-Resources model (Demerouti et al. 2001) as a theoretical framework to conceive psychosocial working conditions, we considered organisational demands (organisational restructuring and organisational layoffs) and task-level demands (work pace and amount of work) as job demands acting as potential risk factors for symptoms of work-related emotional exhaustion and depressive symptoms, and influence at work, possibilities for development, role clarity,

and control over working time as job resources acting as potential protective factors against them.

In summary, in the present study we aimed to test the following hypothesis:

Organisational (organisational restructuring and layoffs) and task-level (work pace and amount of work) demands and job resources (influence at work, possibilities for development, role clarity, and control over working time) at baseline are more strongly associated with work-related emotional exhaustion than with depressive symptoms at follow-up.

Methods

Participants

We used data from the German Study on Mental Health at Work (S-MGA), which is a nationwide representative employee cohort study consisting of a baseline survey conducted in 2011/2012 and a follow-up survey conducted in 2017 (Rose et al. 2017). The study population was enrolled through the register of Integrated Employment Biographies (IEB) of the Institute for Employment Research (IAB) at the German Federal Employment Agency. This register covers all employees subject to social security contributions, constituting more than 80% of the workforce in Germany, exempting civil servants, self-employed workers and freelancers. At baseline, the target population consisted of all persons employed in Germany on December 31st 2010, born 1951-1980 (Rose et al. 2017). Figure 1 shows a flow-chart depicting the selection process we adopted to obtain the final sample included in the main analysis. The final sample consisted of 1949 participants who were employed at baseline and had non-missing information on gender, age, Socio Economic Position (SEP), psychosocial working conditions, work-related emotional exhaustion and depressive symptoms. All data were

collected by means of computer-assisted interviews at the participants' home (Rose et al. 2017). Table 1 presents the main socio-demographic characteristics of the study sample. Men and women were equally distributed, the mean age was 46 years ($SD = 7.3$) and the most prevalent SEP was represented by medium skilled workers (39%). Table 2 shows participation in the study at baseline (out of the sample drawn), at follow-up (among participants at baseline) and in the cohort (out of the sample drawn) by gender, age and SEP. As shown in the last column of Table 2, as compared to the sample drawn ($n=13,590$; see Figure 1), participation in the cohort was independent of gender ($p=0.148$) but increased with age ($p < 0.001$) and SEP ($p < 0.001$).

Measures

Work-related emotional exhaustion

Emotional exhaustion related to the work domain was measured using the 8-item emotional exhaustion component of the Oldenburg Burnout Inventory (Demerouti and Bakker 2008). The component consists of the following items: "There are days when I feel tired even before work", "After work, I often need longer times for rest than I used to in order to get fit again", "The burden of my work is quite manageable", "More and more often at work I feel emotionally drained", "After my work, I usually feel quite fit for my leisure activities", "After my work, I usually feel worn out and weary", "Usually I can manage my workload well", and "During my work I feel totally fit". The following response options were used: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4). The scores were reversed for the positively worded items. For each participant, the scale score for work-related emotional exhaustion was calculated as the mean over all the available items and ranged from 1 to 4, with higher scores indicating higher levels of work-related emotional exhaustion. At baseline, Cronbach's α was 0.82, while inter-item correlations ranged between 0.16 and 0.52. In supplementary analyses (Online resources 1-4), we employed a dichotomous measure of

work-related emotional exhaustion based on a cut-off point score ≥ 3 on the continuous scale indicating high work-related emotional exhaustion, while values below were regarded as indicating low work-related emotional exhaustion. Although the chosen cut-off point was more conservative than the one proposed elsewhere (2.25; (Peterson et al. 2008)), we decided to adopt it in line with the wording of the response options. Specifically, values ≥ 3 corresponded to the response options “Strongly agree” and “Agree” for the negatively worded items and to the response options “Strongly disagree” and “Disagree” for the positively worded items.

Depressive symptoms

Depressive symptoms were measured using the 9-item Patient Health Questionnaire (PHQ-9; (Löwe et al. 2004)), consisting of the following items: “Over the last 2 weeks, how often have you been bothered by any of the following problems?”, “Little interest or pleasure in doing things”, “Feeling down, depressed or hopeless”, “Difficulty falling asleep or sleeping or increased sleep”, “Tiredness or feeling unable to have energy”, “Decreased appetite or excessive need to eat”, “Bad opinion of yourself”, “Difficulty concentrating on something”, “Slowed speech/movement or restlessness (“fidgety”)", “Thoughts that you would rather be dead or want to self-inflict pain”, to be answered using the response options: “Not at all” (0), “Several days” (1), “More than half the days” (2) and “Nearly every day” (3). The continuous score for PHQ-9 was calculated as the sum of all available items and ranged from 0 to 27, with higher scores indicating more depressive symptoms (Spitzer et al. 1999). At baseline, Cronbach’s α was 0.83 and inter-item correlations ranged between 0.21 and 0.50. In supplementary analyses (described below), we employed a dichotomous version of the PHQ-9 applying the score of 10 or above that represents a validated screening threshold for major depressive disorder (Kroenke et al. 2001; Manea et al. 2015), hereafter labelled “depressive symptoms dichotomised”.

Psychosocial working conditions

Job demands

Organisational restructuring and organisational layoffs were measured with the following items, respectively: “Was there any fundamental restructuring or reorganization in your immediate work environment?” and “Were there any dismissals in your immediate work environment within the last 2 years?”, to be answered using the dichotomous response format “yes” or “no”.

Work pace and amount of work were both taken from the Copenhagen Psychosocial Questionnaire (COPSOQ; (Nübling et al. 2006; Pejtersen et al. 2010)). Work pace was measured with the single item: “How often do you have to work very fast?”, to be answered using the following five response options: “Never/hardly ever” (0), “Seldom” (1), “Sometimes” (2), “Often” (3) and “Always” (4), with higher scores indicating higher levels of work pace. Amount of work was measured with a scale consisting of the four items: “How often: ‘...is your workload unevenly distributed so it piles up?’, ‘...do you not have time to complete all your work tasks?’, ‘...do you get behind with your work?’, ‘...do you have enough time to complete all your work tasks?’”, to be answered using the same response options employed for work pace. The scale for amount of work was calculated as the mean of the component items, if at least half of them were non-missing (Nübling et al. 2006; Pejtersen et al. 2010), and ranged from 0 to 4, with higher scores indicating higher levels of amount of work. Cronbach’s Alpha for amount of work was 0.84, with inter-item correlations ranging from 0.48 to 0.55.

Job resources

We included four job resources, namely influence at work, control over working time, possibilities for development and role clarity, all taken from the Copenhagen Psychosocial Questionnaire (COPSOQ; (Nübling et al. 2006; Pejtersen et al. 2010)). Influence at work was measured with a scale consisting of four items: “How often: ‘...do you have a large degree of influence on the decisions concerning your work?’, ‘...do you have a say in choosing who you work with?’, ‘...can you influence the amount of work assigned to you?’, ‘...do you have any influence on what you do at work?’”. Cronbach’s Alpha for influence at work was 0.71, with inter-item correlations ranging from 0.31 to 0.43. Control over working time was measured with a scale consisting of four items: “How often ...: ‘...can you decide when to take a break?’, ‘...can you take holidays more or less when you wish?’, ‘...can you leave your work to have a chat with a colleague?’” and “If you have some private business, is it possible for you to leave your piece of work for half an hour without special permission?”. Cronbach’s Alpha for control over working time was 0.74, with inter-item correlations ranging from 0.48 to 0.51. All items used to measure influence at work and control over working time had to be answered using the five response options: “Never/hardly ever” (0), “Seldom” (1), “Sometimes” (2), “Often” (3) and “Always” (4). Possibilities for development were measured with a scale consisting of three items: “Do you have the possibility of learning new things through your work?”, “Can you use your skills or expertise in your work?” and “Is your work varied?”. Cronbach’s Alpha for possibilities for development was 0.71, with inter-item correlations ranging from 0.42 to 0.46. Role clarity was measured with a scale consisting of three items: “Do you know exactly how much say you have at work?”, “Does your work have clear objectives?”, “Do you know exactly which areas are your responsibility?”. Cronbach’s Alpha for role clarity was 0.71, with inter-item correlations ranging from 0.36 to 0.53. All items used to measure role clarity and possibilities for development had to be answered using the five response options: “To a very small extent” (0), “To a small extent” (1), “Somewhat”

(2), “To a large extent” (3), “To a very large extent” (4). All scales measuring job resources were calculated as the means of the component items, if at least half of them were non-missing (Nübling et al. 2006; Pejtersen et al. 2010), and ranged from 0 to 4, with higher scores indicating higher levels of job resources.

Demands and Resources Indexes

We additionally created Demands and Resources indexes to capture the overall individual exposure to psychosocial working conditions. The Demands Index was calculated as the mean of the four job demands considered (i.e., organisational restructuring, organisational layoffs, work pace and amount of work). With regards to the single items measuring organisational restructuring and organizational layoffs, the response categories were coded 1 for “no” and 3 for “yes” (Conway et al. 2021). The Resources Index was calculated as the mean of the four job resources considered (i.e., influence at work, possibilities for development, control over working time and role clarity). The Demands and Resources Indexes were treated as continuous (main analyses) or dichotomized variables (supplementary analyses; see Online resources 1-4). Both the Demands and Resources Indexes ranged from 0 to 4, with higher scores indicating higher levels thereof. For the dichotomized version, the continuous scores were divided into quartiles, which were then grouped so that the most adverse condition (“highest quartile” for the Demands Index and “lowest quartile” for the Resources Index) was contrasted with the least adverse one (“lowest/low/high quartiles” for the Demands Index and “highest/high/low quartiles” for the Resources Index).

Confounders

We considered gender (men/women), age and Socio-economic position (SEP) as confounders. Age was introduced in the analysis as both age in years (linear) and age squared, as the association between age and depression is u-shaped (Busch et al. 2013; Nübling et al. 2006;

Schmitt et al. 2006). SEP was based on the four level ISCED skill level classification based on the International Standard Classification of Occupations (ISCO 08) (International Labor Office Staff 2012; Nübling et al. 2006); low skilled workers (ISCO main group 8) were placed in the same group as unskilled workers. Further, managers were placed in the same group as professionals in accordance with similar classifications (Nübling et al. 2006; Wirth et al. 2009). The main groups of ISCO 2008 1 and 2 were placed in skill level category 4, main group 3 in level 3, main groups 4-7 in level 2 and main groups 8 and 9 in level 1.

To identify participants who remained at the same employer from baseline to follow-up, we employed the following item at follow-up: “Are you still working in the same workplace [as stated in the last interview at baseline]?” (Börsch-Supan et al. 2013).

Statistical analyses

First, we calculated, at both baseline and follow-up, means and standards deviations of work-related emotional exhaustion and depressive symptoms, as well as percentage distributions of both outcomes in their dichotomous form. We checked for differences in relation to gender, age groups and SEP using ANOVAs and Chi-square tests for the continuous and dichotomous outcomes, respectively.

Second, we performed multiple linear regression analyses to estimate standardized beta coefficients relative to the associations of the eight psychosocial working conditions, as well as the Demands and Resources Indexes, measured at baseline, with work-related emotional exhaustion and depressive symptoms measured at follow-up. For each association examined, we calculated both crude standardized regression coefficients (Model 1) and coefficients adjusted for gender, age (in years, linear), age (squared), SEP (categorical), as well as work-related emotional exhaustion and depressive symptoms at baseline. Entering in the regression

models the measure of the outcomes at baseline allowed us to establish whether psychosocial working conditions were related to changes in the outcomes between baseline and follow-up. Regression coefficients were considered statistically significant for p-values lower than 0.05. To compare the regression coefficients obtained for the associations of each individual psychosocial working condition, as well as the Demands and Resources Indexes, with the two outcomes, we ran heterogeneity tests by means of Cochran Q-tests in fixed-effect models, given that the coefficients were calculated on the same sample. The beta coefficients were considered significantly different for p-values of the Cochran Q-tests lower than 0.05.

We also performed one sensitivity analysis and a set of supplementary analyses. In the sensitivity analysis, we only included participants who remained at the same employer from baseline to follow-up ($n=1612$). We did so to check if the associations differed when only including participants with a more stable exposure, which can be assumed for those persons staying at the same employer over time (Burr et al. 2022). In the supplementary analyses (Online resources 1-4), we performed a series of multiple logistic regressions to check if the associations differed when treating work-related emotional exhaustion and depressive symptoms as dichotomous outcomes, indicating potentially clinically relevant mental health problems. All participants with work-related emotional exhaustion and/or depression at baseline were excluded. In these analyses, the Demands and Resources Indexes were entered either as continuous or dichotomised variables. For each association examined, we calculated both crude Odds Ratios (Model 1) and Odds Ratios adjusted for gender, age (linear and squared) and SEP (Model 2). For each individual psychosocial working conditions, as well as for the Demands and Resources Indexes, the differences in their associations with work-related emotional exhaustion and depressive symptoms dichotomised were tested assessing the heterogeneity of the regression coefficients by means of Cochran Q-tests. The analyses were conducted using SPSS 24 and Stata 13.

Results

Table 1 shows means, standard deviations and percentage distributions of work-related emotional exhaustion and depressive symptoms at baseline and follow-up, overall and stratified by gender, age (in three groups) and SEP. Overall, mean scores and percentage distributions were similar at baseline and follow-up, with the only exception of depressive symptoms dichotomised, whose prevalence was twice as high at follow-up than at baseline among unskilled and low skilled workers. Concerning the sample characteristics considered, the only significant difference was observed in relation to gender, with women presenting, at both baseline and follow-up, a higher mean score of depressive symptoms and a higher prevalence of depressive symptoms dichotomised than men.

Table 3 shows the results of the multiple linear regression analyses examining the associations of the individual psychosocial working conditions, as well as the Demands and resources Indexes, measured at baseline, with work-related emotional exhaustion and depressive symptoms, measured at follow-up. In Model 1 (crude associations), all factors were statistically significantly associated with work-related emotional exhaustion and depressive symptoms. In Model 2 (adjusted for gender, age linear and squared, SEP as well as work-related emotional exhaustion and depressive symptoms at baseline), however, only amount of work ($\beta = 0.064$; $p = 0.004$), control over working time ($\beta = -0.079$; $p = 0.021$) and the Resources Index ($\beta = -0.066$; $p = 0.022$) remained significantly associated with work-related emotional exhaustion, while only work pace ($\beta = -0.041$; $p = 0.037$) and possibilities for development ($\beta = -0.049$; $p = 0.018$) remained significantly associated with depressive symptoms. In Models 2, all the associations were in the expected direction (i.e., higher levels of demands and lower levels of resources were associated with more work-related emotional exhaustion and depressive symptoms), except for higher levels of work pace, which were associated with less depressive symptoms. The Cochran Q-tests revealed that only amount or

work ($p = 0.013$) and control over working time ($p = 0.027$) were more strongly associated with work-related emotional exhaustion than with depressive symptoms.

Table 4 shows the results of the sensitivity analysis examining the associations of the individual psychosocial working conditions, as well as the Demands and Resources Indexes, with subsequent work-related exhaustion and depressive symptoms among the subsample of participants who remained at the same employer between baseline and follow-up. The results showed that, in the fully adjusted models (Models 2), a higher number of psychosocial working conditions was significantly associated with work-related emotional exhaustion than it was the case for the analysis conducted on the full sample. More in detail, in addition to amount of work ($\beta = 0.086$; $p = 0.023$) and control over working time ($\beta = -0.097$; $p < 0.001$), which were associated with the outcome also in the analysis on the full sample, the Demands Index ($\beta = 0.053$; $p = 0.017$), as well as influence at work ($\beta = -0.043$; $p = 0.037$) and possibilities for development ($\beta = -0.058$; $p = 0.035$), were now significantly associated with work-related exhaustion, all in the expected direction. Regarding depressive symptoms, possibilities for development ($\beta = -0.08$; $p < 0.001$) were still associated with the outcome, while the association was no longer significant with amount of work. Finally, contrary to the analysis on the full sample, the Resources Index ($\beta = -0.057$; $p = 0.013$) was now significantly associated with depressive symptoms. The Cochran Q-tests confirmed the results of the analysis on the full sample, in that only amount of work ($p = 0.003$) and control over working time ($p = 0.027$) were more strongly associated with work-related emotional exhaustion than with depressive symptoms.

As a whole, in terms of significant associations between the factors and the outcomes considered, the supplementary analyses (Online resources 1-4) are in line with the main one. With reference to the fully-adjusted models, the only exceptions to the main analysis were

represented by the significant association between the continuous Demands Index and work-related emotional exhaustion as dichotomous variable and the lack of significant associations between all the factors considered and depressive symptoms dichotomised (Online resources 1 and 2). Regarding the supplementary analyses employing the dichotomised version of the Demands and Resources Indexes (Online resources 3 and 4), the associations observed were similar to those found in the main analysis. Most notably, however, contrary to the main analysis, we did not find any statistically significant differences (based on the Cochran Q-tests) in the associations of the individual psychosocial working conditions, as well as the Demands and Resources Indexes, with work-related emotional exhaustion and depressive symptoms when treated as dichotomous variables.

Discussion

In the present five-year prospective study, we aimed to test the hypothesis that psychosocial working conditions at baseline were more strongly associated with work-related emotional exhaustion than with depressive symptoms at follow-up. Out of the associations examined between the eight selected psychosocial working conditions and the two outcomes, the hypothesis was supported for two factors only, namely amount of work and control over working time. In addition, we found no significant differences for both the Demands and Resources Indexes, indicating overall exposure to psychosocial working conditions, in their associations with subsequent work-related emotional exhaustion and depressive symptoms. In the sensitivity analysis including only those participants who remained at the same employer between measurement points, twice as many factors were associated with work-related emotional exhaustion than with depressive symptoms. However, in line with the main analysis, the associations were significantly different only for amount of work and control over working time. Overall, these results indicate that more psychosocial working conditions are prospectively associated with work-related emotional exhaustion than with depressive

symptoms, especially when the level of exposure is more stable; however, given that differences in the associations were observed only for two psychosocial working conditions, the findings provide limited evidence in support of the study hypothesis.

The present study represents a further empirical contribution to the ongoing debate about whether burnout, especially its core component emotional exhaustion, and depression represent distinct rather than overlapping constructs. While this question has been predominantly addressed by studies looking at the empirical distinction between the two constructs, far less attention has been paid to their distinct nomological networks, particularly when it comes to their differential associations with potential work-related antecedents. The few extant studies examining this issue show a mixed picture. In a 12-month follow-up study (Hatch et al. 2019), quantitative demands and job resources were differentially related to subsequent emotional exhaustion (after adjusting for previous depressive symptoms) and depressive symptoms (after adjusting for previous emotional exhaustion), although there was also evidence for a few job demands and resources being common predictors of the two outcomes. In another 3-year follow-up study (Ahola and Hakanen 2007), it was found that job strain was related to subsequent depression but that this association disappeared when burnout (conceived as the weighted sum of the three sub-components) was introduced in the model; opposite to this, the association between job strain and subsequent burnout remained significant also after adjusting for depression, suggesting that psychosocial working conditions contribute unique variance to burnout over and above depression. On the contrary, two studies (Bianchi and Schonfeld 2018; Schonfeld et al. 2019) found that different psychosocial working conditions (e.g., illegitimate work tasks and workplace social support) correlated with burnout and depressive symptoms in a similar way. However, the interpretation of these two studies is limited by their cross-sectional design. Altogether, comparing our findings with the available research is problematic as, contrary to the present

study, none of the aforementioned studies performed a formal test to examine whether the associations of the psychosocial working conditions with emotional exhaustion and depression were statistically different.

From a theoretical standpoint, the few differences observed in the associations between psychosocial working conditions and the two outcomes do not support a strong characterization of work-related emotional exhaustion as a domain-specific psycho-somatic reaction resulting from a chronic exposure to an adverse psychosocial work environment. This is in accordance with a recent line of research questioning the utility of burnout as a distinct construct *vis-à-vis* depression (Bianchi et al. 2015). Despite this, the finding that more psychosocial working conditions are significantly associated with work-related emotional exhaustion than with depressive symptoms is worth noting. This suggests that work-related emotional exhaustion might still present a nomological network that is broader than that displayed by depressive symptoms. This corroborates two recent meta-analyses (Koutsimani et al. 2019; Meier and Kim 2021) showing that the two constructs of burnout – and more specifically its emotional exhaustion component (Meier and Kim 2021) - and depression are correlated, but they can still be empirically distinguished.

Given the mixed picture provided by the current research, the fact that none of the previous studies have formally tested the differences in the associations of psychosocial working conditions with burnout and depression, as well as the limitations of the present study (described below), we conclude that further evidence is needed to establish whether or not the nomological networks of burnout and depression are compatible with the notion of two distinct, rather than overlapping, constructs.

Strengths and limitations

Major strengths of this study are the use of a prospective design, the incorporation of a number of psychosocial working conditions and the inclusion of a range of occupations and industries in a representative sample of the German working population. Notwithstanding this, the present findings should be interpreted in light of a series of limitations. A first limitation is that the underrepresentation of young participants and participants with low SEP might result in reduced statistical power and therefore less precise point estimates, as those participants typically experience poorer working conditions. However, the fact that we introduced age and SEP as confounders counteracts the potential impact of such an underrepresentation on the regression coefficients observed in our study. A second limitation is that emotional exhaustion was measured with specific reference to the work domain, which may have artificially inflated the associations between psychosocial working conditions and this outcome. This may – at least partly – explain that psychosocial working conditions were more strongly associated with emotional exhaustion than with depression, which was measured as a domain-free outcome. Future research should test differences in the associations of psychosocial working conditions with the two outcomes by employing context-free measures of emotional exhaustion, for instance by using the personal burnout dimension of the Copenhagen Burnout Inventory (Kristensen et al. 2005) or the vitality scale from the COPSOQ (Pejtersen et al. 2010). A third limitation could be related to the different response formats of the two scales used to measure work-related emotional exhaustion and depressive symptoms (the OLBI and the PHQ, respectively); more in detail, while the OLBI items investigate the degree to which respondents agree with statements regarding feelings and attitudes towards work without using a specific time window, the PHQ inquires the frequency of depressive symptoms in the last two weeks. The shorter time reference employed in the PHQ might partly account for the weaker associations with depressive symptoms than with work-related exhaustion. Experimental studies varying the response

formats might shed light onto the impact that this might have on the results. A fourth limitation is that we considered the emotional exhaustion component of burnout only. Although emotional exhaustion is considered as the core component of burnout and a necessary element of its definition, there is controversy as to whether it is also to be considered sufficient (Guseva Canu et al. 2021; Schaufeli 2021). In particular, burnout is typically regarded as a syndrome of which emotional exhaustion and cynicism represent crucial components, whereas reduced professional efficacy is considered less central in its definition (Maslach and Leiter 2016a). A fifth limitation is that, given the small size of the prospective associations of the psychosocial working conditions with both exhaustion and depression, our sample size has limited power to detect significant differences in the regression coefficients. Such a limited size might be due to the temporal separation of five years between the exposures and the outcomes, which might have diluted the impact of the former on the latter. Yet, the same differences were detected in the sensitivity analysis including only those who remained at the same employer, which might capture a more stable exposure to psychosocial working conditions. A sixth limitation is that, although we considered a number of critical psychosocial working conditions, the selection did not cover the entire spectrum of potential antecedents of the two outcomes. Finally, given the sampling procedure, we had no information about the association of psychosocial working conditions with work-related emotional exhaustion and depressive symptoms among employees younger than 31 years or older than 60 years, as well as among those employees who were not subject to mandatory social security contributions (this applies to civil servants, self-employed individuals and freelancers). The biases introduced by either the study sampling frame or non-response might have led to an underrepresentation of employees with poor working conditions.

Practical implications

In addition to its theoretical relevance, the question of whether psychosocial working conditions present similar or different associations with burnout and depression has merit also for its practical implications. In particular, establishing that psychosocial working conditions are more strongly associated with burnout than with depression would imply that it is necessary, from the occupational health standpoint, to monitor burnout symptoms in the working population and relate them to modifiable risk and protective factors linked with the psychosocial work environment. If, however, psychosocial working conditions are similarly associated with burnout and depression, as our findings to a large extent suggest, the conclusion would be that it is sufficient to monitor depressive symptoms and clinical forms of depression among workers. Since clinical depression is nosologically established, while typically there are no clinically validated diagnostic criteria to classify individuals with burnout (Bianchi et al. 2021), focusing on depressive symptoms would have the advantage of enabling a more clear identification of employees in need of treatment. This might be particularly relevant for those employees presenting suicidal ideation, which is not covered in measures of burnout (Bianchi et al. 2021). Despite this, given the finding that some psychosocial working conditions are associated to a higher degree with the work-related emotional exhaustion component of burnout than with depressive symptoms, our study suggests that monitoring burnout symptoms could still be a useful additional mental health indicator in order to identify preventable risk factors in the psychosocial work environment.

Conclusion

The present study, based on a five-year prospective design, does not support a clear distinction between work-related burnout and depression in terms of their nomological network (antecedents linked to the psychosocial work environment), despite there is indication that work-related emotional exhaustion is more broadly affected by the

psychosocial work environment than it is the case for depressive symptoms. Further research, however, is needed in light of the current state of the art and the limitations of the present study. Achieving more solid evidence about such a distinction may have important practical implications in terms of occupational prevention at different levels.

Statements and Declarations

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Data Availability A scientific use file (SUF) containing both wave 1 and wave 2 of the cohort is available at the Research Data Centre of the Federal Institute of Occupational Safety and Health (doi: 10.48697/smga.w1w2.suf.).

Conflict of interest The authors have no conflicts of interest to declare.

Ethical approval The study was conducted according to the guidelines of the Declaration of Helsinki and was approved by the Ethics Committee of the Federal Institute for Occupational Safety and Health (BAuA; approval number 006_2016_Müller, 6 March 2016). All employees in the sample were contacted by mail and the interviews were only conducted after each respondent gave their informed oral consent (Rose et al. 2017). A written consent was given for the willingness to participate at follow-up.

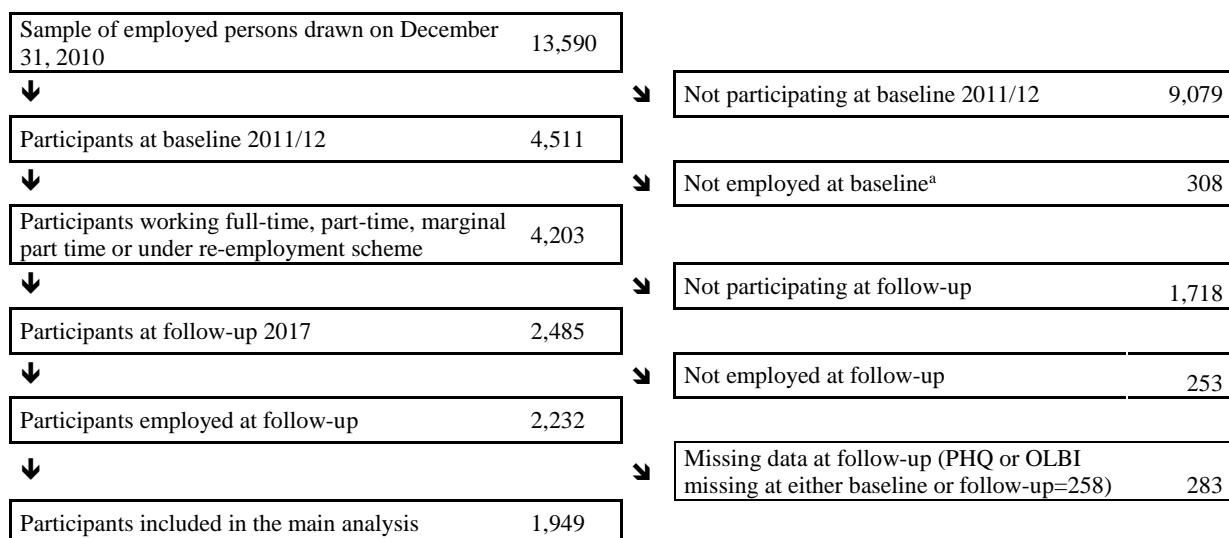
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Figure 1. Flow-chart of participants' selection (main analysis)



^aThese participants were not employed anymore at the time of the interview, which on average occurred 13 months (range 11-17) after sampling. “Not employed” comprises persons not working full-time, part-time, marginal part-time or persons in a re-employment scheme.

Table 1. Main characteristics of the study sample at baseline and their associations with work-related emotional exhaustion and depressive symptoms at baseline and follow-up.

	Sample ^a		Work-related emotional exhaustion ^b at baseline		Depressive symptoms ^c at baseline		Work-related emotional exhaustion ^b at follow-up		Depressive symptoms ^c at follow-up	
	<i>N</i> (%)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	% (<i>0=>3</i>)	<i>M</i> (<i>SD</i>)	(<i>0=>10</i>) ^d	<i>M</i> (<i>SD</i>)	% (<i>0=>3</i>)	<i>M</i> (<i>SD</i>)	(<i>0=>10</i>) ^d
All	1949 (100)		2.2 (0.5)	10	4.2 (3.5)	7	2.2 (0.5)	10	4.4 (3.5)	9
Gender			<i>p</i> =0.755	<i>p</i> =0.151	<i>p</i> <0.001	<i>p</i> <0.001	<i>p</i> =0.095	<i>p</i> =0.006	<i>p</i> <0.001	<i>p</i> <0.001
Men	950 (49)		2.2 (0.5)	9	3.7 (3.2)	5	2.2 (0.5)	8	3.9 (3.1)	6
Women	999 (51)		2.3 (0.5)	11	4.6 (3.8)	10	2.3 (0.6)	12	4.8 (3.7)	11
Age		46.0 (7.3)	<i>p</i> =0.329	<i>p</i> =0.865	<i>p</i> =0.631	<i>p</i> =0.887	<i>p</i> =0.510	<i>p</i> =0.675	<i>p</i> =0.334	<i>p</i> =0.173
31-40 yrs.	478 (35)		2.2 (0.5)	9	4.3 (3.5)	7	2.2 (0.5)	9	4.3 (3.2)	6
41-50 yrs.	879 (40)		2.2 (0.5)	10	4.2 (3.7)	7	2.3 (0.5)	11	4.5 (3.5)	9
51-60 yrs.	592 (30)		2.3 (0.5)	10	4.1 (3.4)	7	2.3 (0.5)	10	4.3 (3.6)	9
Socio-Economic Position			<i>p</i> =0.939	<i>p</i> =0.868	<i>p</i> =0.223	<i>p</i> =0.159	<i>p</i> =0.392	<i>p</i> =0.528	<i>p</i> =0.181	<i>p</i> =0.491
Unskilled, low skilled w. (ISCO gr. 8,9)	112 (6)		2.3 (0.6)	12	4.7 (3.6)	6	2.3 (0.6)	13	4.7 (3.6)	12
Medium skilled w. (ISCO gr. 4-7)	789 (39)		2.3 (0.5)	10	4.3 (3.8)	9	2.3 (0.5)	9	4.4 (3.5)	8
Semi-professionals (ISCO gr. 3)	557 (29)		2.2 (0.5)	9	4.1 (3.3)	7	2.2 (0.5)	10	4.5 (3.3)	9
Academics/managers (ISCO gr. 1,2)	511 (26)		2.2 (0.5)	10	4.0 (3.4)	6	2.2 (0.5)	11	4.1 (3.4)	7

^aIncludes employed participants at baseline with non-missing information on gender, age, Socio-Economic Position, psychosocial working conditions, work-related emotional exhaustion and depressive symptoms (see Figure 1). ^bScores range from 1 to 4. ^cScores range from 0 to 27. ^dDichotomised depressive symptoms.

Table 2. Participation in interviews at baseline, at follow-up and in the cohort by gender, age and Socio-Economic Position

	Baseline participation out of the drawn sample ^a		Participation at follow-up among baseline participants ^b		Estimated participation in the cohort out of the drawn sample ^c	
	<i>p</i> ^d	%	<i>p</i> ^d	%	<i>p</i> ^d	%
<i>Gender</i>	0.746		0.087		0.148	
Men		33		58		19
Women		33		60		20
<i>Age</i> ^e	<0.001		0.059		<0.001	
55-60		39		59		23
49-54		35		62		22
43-48		33		60		19
37-42		32		59		19
31-36		27		54		15
Socio-Economic Position (SEP)	<0.001		<0.001		<0.001	
Professionals, managers		38		66		25
Semi-professionals		38		62		24
Medium-skilled workers		32		55		17
Unskilled workers		29		51		15
Total		33		59		20

Note: The present table is based on published baseline attrition analyses (Schiel et al. 2018) and response fractions in the cohort analysed in the present study (see also Figure 1).

^aFraction participating at baseline ($n=4,511$) out of the drawn sample ($n=13,590$).

^bFraction participating at follow-up ($n=2,485$) among participants at baseline ($n=4,203$).

^cFraction participating in the cohort ($n=2,485$) out of the drawn sample ($n=13,590$) (estimated by multiplying the fraction responding at baseline with the fraction responding at of follow-up). Note that this fraction can be only estimated since follow-up response was only calculated among those employed at baseline.

^dSignificance level at $p<0.05$. The p value indicates the extent to which the whole categorical variable is associated with participation (based on χ^2 test).

^eAge categories as reported in Schiel et al (2018).

Table 3. Multiple linear regressions for the associations of psychosocial working conditions (job demands and job resources) and the Demands and Resources indexes at baseline with work-related emotional exhaustion and depressive symptoms at follow-up (n=1949).

	Mean (SD)	% answering 'yes'	Work-related emotional exhaustion							Depressive symptoms							P level for comparison between regression coefficients (Model 2)		
			Model 1 ^a				Model 2 ^b			Model 1 ^a				Model 2 ^b					
			β	SD	p	R ²	β	SD	p	ΔR ²	β	SD	p	R ²	β	SD		p	ΔR ²
<i>Job demands (continuous scores)</i>																			
Organisational restructuring (dichotomous)		47	0.090	0.023	<0.001	0.008	0.021	0.019	0.275	0.284	0.072	0.023	0.002	0.005	0.025	0.019	0.088	0.326	0.88
Organisational layoffs (dichotomous)		33	0.095	0.023	<0.001	0.009	0.016	0.019	0.419	0.283	0.060	0.023	0.008	0.004	-0.010	0.019	0.605	0.327	0.33
Work pace	2.7 (1.0)		0.135	0.022	<0.001	0.018	0.000	0.020	0.985	0.273	0.055	0.023	0.015	0.003	-0.041	0.020	0.037	0.329	0.15
Amount of work	1.8 (0.9)		0.269	0.022	<0.001	0.072	0.064	0.022	0.004	0.222	0.155	0.022	<0.001	0.024	-0.013	0.022	0.548	0.307	0.013
Demands Index	2.0 (0.6)		0.231	0.022	<0.001	0.053	0.039	0.021	0.062	0.239	0.135	0.022	<0.001	0.018	-0.015	0.020	0.476	0.313	0.06
<i>Job resources (continuous scores)</i>																			
Influence at work	1.7 (1.0)		-0.130	0.022	<0.001	0.017	-0.029	0.020	0.151	0.275	-0.101	0.023	<0.001	0.010	-0.004	0.020	0.858	0.320	0.38
Possibilities for development	2.8 (0.8)		-0.113	0.023	<0.001	0.013	-0.039	0.021	0.066	0.280	-0.142	0.022	<0.001	0.020	-0.049	0.021	0.018	0.312	0.74
Control over working time	2.2 (1.2)		-0.195	0.022	<0.001	0.034	-0.079	0.021	<0.001	0.262	-0.129	0.022	<0.001	0.017	-0.015	0.020	0.446	0.314	0.027
Role clarity	3.3 (0.6)		-0.074	0.023	<0.001	0.006	0.021	0.020	0.283	0.286	-0.100	0.023	<0.001	0.010	-0.013	0.019	0.485	0.321	0.22
Resources Index	2.5 (0.6)		-0.203	0.022	<0.001	0.041	-0.066	0.022	0.003	0.254	-0.179	0.022	<0.001	0.032	-0.032	0.021	0.135	0.300	0.26

^aStandardized linear regression coefficients indicating crude associations. ^bStandardized linear regression coefficients adjusted for sex, age (in years, linear), age (squared), SEP (categorical) and both work-related emotional exhaustion and depression at baseline. The individual psychosocial working conditions, the Demands and the Resources Indexes all range from 0 to 4. Significant coefficients (p<0.05) are in bold.

Table 4. Multiple linear regressions for the associations of psychosocial working conditions (job demands and job resources) and the Demands and Resource Indexes at baseline with work-related emotional exhaustion and depressive symptoms at follow-up among participants who remained at the same workplace across the 5-year follow-up (n=1612).

	Work-related emotional exhaustion										Depressive symptoms								
	Mean (SD)	% answering 'yes'	Model 1 ^a				Model 2 ^b				Model 1 ^a				Model 2 ^b				P level for comparison between regression coefficients (Model 2)
			β	SD	p	R ²	β	SD	p	ΔR ²	β	SD	p	R ²	β	SD	p	ΔR ²	
<i>Job demands (continuous scores)</i>																			
Organisational restructuring (dichotomous)		48	0.096	0.025	<0.001	0.009	0.029	0.021	0.154	0.325	0.080	0.025	0.001	0.006	0.039	0.020	0.056	0.350	0.73
Organisational layoffs (dichotomous)		33	0.099	0.025	<0.001	0.010	0.022	0.021	0.124	0.324	0.066	0.025	0.008	0.004	-0.004	0.020	0.155	0.350	0.37
Work pace	2.6 (1.0)		0.149	0.025	<0.001	0.022	-0.002	0.022	0.933	0.311	0.066	0.025	0.009	0.004	-0.036	0.021	0.089	0.351	0.26
Amount of work	1.8 (0.9)		0.297	0.024	<0.001	0.088	0.086	0.023	<0.001	0.251	0.155	0.025	<0.001	0.024	-0.009	0.023	0.683	0.330	0.003
Demands Index	2.0 (0.6)		0.250	0.024	<0.001	0.063	0.053	0.022	0.017	0.273	0.144	0.025	<0.001	0.021	-0.002	0.022	0.944	0.334	0.077
<i>Job resources (continuous scores)</i>																			
Influence at work	1.7 (0.9)		-0.139	0.025	<0.001	0.019	-0.043	0.020	0.037	0.316	-0.100	0.025	<0.001	0.010	-0.005	0.022	0.805	0.345	0.85
Possibilities for development	1.8 (0.8)		-0.135	0.025	<0.001	0.018	-0.058	0.020	0.035	0.318	-0.173	0.025	<0.001	0.029	-0.080	0.023	<0.001	0.330	0.47
Control over working time	2.2 (1.2)		-0.213	0.024	<0.001	0.045	-0.097	0.022	<0.001	0.297	-0.147	0.025	<0.001	0.021	-0.028	0.022	0.196	0.334	0.027
Role clarity	3.3 (0.6)		-0.087	0.025	<0.001	0.007	0.017	0.021	0.428	0.326	-0.126	0.025	<0.001	0.016	-0.037	0.021	0.156	0.340	0.069
Resources Index	2.5 (0.6)		-0.232	0.024	<0.001	0.053	-0.090	0.023	0.034	0.287	-0.205	0.025	<0.001	0.041	-0.057	0.023	0.013	0.316	0.31

^aStandardized linear regression coefficients indicating crude associations. ^bStandardized linear regression coefficients adjusted for sex, age (in years, linear), age (squared), SEP (categorical), and both work-related emotional exhaustion and depressive symptoms at baseline. The individual psychosocial working conditions, the Demands and the Resources Indexes all range from 0 to 4. Significant coefficients (p<0.05) are in bold.