Working Conditions and Health of Leaders in Three Service Sectors

By Franziska Pundt* and Marcel Lück

This study investigates the job demands, job resources, and health of leaders in three service sectors. The analyses are based on data of the 2018 BIBB/BAuA Employment Survey, a representative sample of the German labour force. The three service sectors trading, finance, and public services varied significantly in how leaders perceive job demands, job resources, psychosomatic health complaints, and musculoskeletal health complaints. Hardly any variation was found, however, in how demands and resources are associated with psychosomatic and musculoskeletal health complaints. These findings imply that service leaders' perceptions provide sector-specific patterns of demands and resources, which are well reflected in stress theory. The findings further imply that there is no need for sector-specific theories predicting health complaints. The article concludes with a discussion of practical implications for health promotion in the three service sectors and the promotion of leaders' health.

1. Introduction

The goal of this study is to investigate service leaders and their perceived working conditions and health. Although researchers emphasize that "leadership is central to the field of service management" (Benkenstein et al. 2017, p. 18), existing service research hardly pays any attention to service leaders' subjective health experiences. Therefore, this study aims to shed some light on service leaders' job demands, job resources and health. This topic is situated at the intersection of leadership research and stress research. We want to address this topic for at least five reasons.

First, subordinates are not the only service workers confronted with various job demands and job resources (e.g., Dormann et al. 2017); leaders are, too. Although it is often argued that leaders have become leaders *because* they have shown the ability to handle stress and problems well (e.g. Van Vugt et al. 2008), they do face a great deal of stress (Day et al. 2004; Hunter et al. 2011). Hence, it is important to understand the demands and resources (service) leaders are confronted with.

Second, knowing the demands and resources of service leaders helps evaluate leaders' health risks. Sickness absenteeism and presenteeism cause huge costs in organisations (Gosselin et al. 2013; Johns 2010). These costs are assumed to be higher for leaders than non-leaders, mainly because leaders earn higher wages, leadership positions have high requirements for timely output, and absent or impaired leaders are difficult to substitute (Pauly et al. 2008). Hence, detecting potential health risks allows for taking action to prevent absenteeism and presenteeism. In this study, we address psychological as well as physical health risks of leaders.

Third, individuals under stress tend to change their behaviour. If these individuals are leaders, their stress may also negatively affect their subordinates (Barling and Cloutier 2017; Harms et al. 2017; Kaluza et al. 2020). Leadership quality may suffer from leaders' stress by impaired decision-making processes (e.g. lower levels of cognitive functioning, increased use of heuristics, decreased likelihood of considering alternatives) (see Harms et al. 2017). Furthermore, stress changes leaders' behaviour towards subordinates (e.g. less support and professional development, less feedback, more destructive behaviour), which in turn can cause stress or burnout in subordinates (e.g. Barling and Cloutier 2017). Moreover, if their subordinates have direct customer contact, leaders may even affect customer outcomes (e.g. Kelloway and Myers 2019; Schuh et al. 2012). Therefore, analysing the potential for optimising

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leaders' working conditions and decreasing their stress levels may in turn also prevent health impairments among subordinates and customer dissatisfaction.

Fourth, subordinates not only react to leaders' behaviour or personality, they also follow their leaders as role models (Podsakoff et al. 1990). Given their positional power, leaders decide about subordinates' task-related, financial, and social opportunities. Thus, subordinates are motivated to observe and imitate their leaders' opinions and behaviour, also with regard to health-related issues (Franke et al. 2015). Therefore, leaders who cope badly with stress, who do not take health problems seriously and downplay demanding situations, or who show self-endangering behaviour (e.g. working very long hours, skipping breaks regularly, writing e-mails on weekends on a regular basis) are likely to foster a climate wherein their subordinates do the same.

Fifth, service leaders are confronted with specific environmental conditions, which also characterize their working conditions. Compared to other sectors (e.g. production), personnel changes and fluctuations are more common in the service sector. Service leaders, on average, face a higher incidence of fixed-term contracts and employees with shorter organisational tenure, more part-time work (e.g. resulting from more female employees) (own calculations based on the 2017 Microzensus, Federal Statistical Office of Germany 2018a), and rising rates of temporary hiring (Federal Employment Agency 2019). Hence, ensuring regular contacts with their subordinates and establishing a good working climate in service teams is more difficult for those leaders. With employment growth currently even higher in the service sector than in the production sector (Fuchs et al. 2019), these conditions are expected to remain challenging.

Although the service sector in general differs from other sectors (e.g. production), there are neither sector-specific stress theories nor specific findings comparing service leaders' working conditions and health in different service sectors. Therefore, we conducted an exploratory study to investigate the leaders' working situation in different service sectors in an unbiased manner. In order to include a broad range of working conditions and different service sectors, we used data of the 2018 BIBB/BAuA Employment Survey, a representative survey of the German labour force, with working conditions, education, and health as the main topics (Federal Institute for Occupational Safety and Health (BAuA) 2019). As we were interested in service leaders, we had to specify the kinds of services we wanted to investigate. As there are multiple service classifications and a lot of hybrid services, we decided to examine service leaders in three relatively well-defined economic sectors according to the NACE Rev. 2 classification (Eurostat 2008). We opted for the NACE categorisation for three reasons (Eurostat 2008): First, the classification is based on characteristics of the job activities, which is also one of the main perspectives in stress approaches (e.g. work design) and measures (e.g. risk assessment). Second, the NACE categories include relevant and clearly assignable job activities that are common in most of the EU countries. Third, using NACE allows for direct comparisons with other (European) studies using NACE and therefore provides opportunities for generalization. Thus, we believe that the three NACE-based service sectors cover the huge variety of service activities quite well. According to Beermann (2014), these sectors are:

- (1) *trading sector* (i.e. NACE sections G to J), including, for example, wholesale and retail trade, transportation and storage, accommodation and food services, information and communication
- (2) *finance sector* (i.e. NACE sections K to N), including, for example, financial, insurance and real estate services, professional and scientific services, as well as support service activities
- (3) *public sector* (i.e. NACE sections O to U), including, for example, public administration and defence, education, human health and social work activities, arts and entertainment.

Our study contributes to existing research in at least four ways. First, focusing on service leaders highlights the working situation of these leaders. Understanding leaders' demands, resources, and health risks is not only relevant for leaders' health but also an important prerequisite for fostering high leadership quality in the field of service work. Second, exploring a broad range of demands and resources in three different service sectors provides the potential for differentiated implications about workplace arrangements (i.e. reducing specific demands, fostering specific resources) or specific training requirements. Third, investigating the relationship between working conditions and health can shed some light on leaders' accumulated health risks in those specific service sectors. Finally, we explore the sector effect, the effect of being a leader (vs. non-leader), and their interaction on leaders' health. This allows us to examine whether leader-specific or intertwined leader-sector factors play a role when considering sector-specific health differences.

In the following, we define the basic concepts of our research (job demands, job resources, and health) and provide an overview of the research on leaders' working conditions and health through our research questions.

2. Working Conditions and Health of Service Leaders

First of all, we describe leadership in service organisations. Leadership in general is described as any attempt to intentionally influence followers via communication (Yukl 2012). Transferred to the service context, this definition includes different activities by which service leaders can influence service employees, for example by setting goals (which are derived from the strategic goals of the service organisation), monitoring processes and results, and rewarding goal-directed behaviour of service employees (e.g. Nerdinger and Pundt 2018). Moreover, it is essential for leaders to promote the service-profit chain (Heskett et al. 1994), that is, to support satisfying service interactions between employees and customers by fostering positive emotions, a positive team climate, and the organisational identification and engagement of service employees (Kelloway and Myers 2019; Myrden and Kelloway 2015; Nerdinger and Pundt 2018; Schuh et al. 2012).

Specific statistics about leaders in different service sectors (e.g. their hierarchical levels, responsibilities) are rare. The results of the 2017 German Labour Force Survey at least provide some figures for the gender distribution (Federal Statistical Office of Germany 2018b). In the service sectors, 35 per cent of leaders in 2017 were women. Overall, more women worked as leaders in the public sector, for instance, in education (64.6 %), health and social work activities (61.3 %), and in public administration (40.6 %). In the trading sector, in wholesale and retail trade, transportation and storage, and accommodation and food services, 30.1 % of leaders were female, whereas female leadership in information and communication was 21.8 %. In the finance sector, insurance services had a female leadership ratio of 25.5 per cent, compared to 28.0 per cent in business services.

Recently, some reviews examined leaders' psychological health and well-being (Barling and Cloutier 2017; Harms et al. 2017; Kaluza et al. 2020; Zimber et al. 2015). These authors agree that a) previous studies show associations between leaders' job demands, job resources, and health on the one side and leadership behaviour and subordinates' experiences and behaviour on the other side. They also point out that b) more research is necessary to gain clarity about these associations and relevant moderating variables (Barling and Cloutier 2017; Harms et al. 2017; Kaluza et al. 2020; Zimber et al. 2015). The findings imply that leaders' health may be a result of their working conditions (i.e. resources and demands; Zimber et al. 2015) and that leaders' health is also associated with their behaviour towards subordinates, which in turn seems to affect subordinates' health (Harms et al. 2017; Kaluza et al. 2020). The last implication is not relevant for this study, but it highlights the profound impact of leaders' health on organisations, underlining the necessity to investigate the factors shaping leaders' health.

2.1. Job Demands, Job Resources, and Health

In line with two of the most popular stress theories, the Job Demands-Resources (JD-R) model (Demerouti et al. 2001) and the Conservation of Resources (COR) theory (Hobfoll 2001), job demands are aspects of the job that require sustained effort, forcing individuals to make extensive use of their resources. Therefore, job demands are assumed to produce physiological and psychological costs, leading to physical and psychological health impairments. Job resources are aspects of the job that foster the achievement of work goals, reduce job demands or their negative impacts, stimulate personal growth, and enable individuals to save resources or gaining new ones (Bakker and Demerouti 2007). Thus, job resources are assumed to be associated with physiological and psychological gains leading to health and well-being.

Health is a state of complete physical, mental, and social well-being (World Health Organisation 1986). This definition implies that physical and psychological health belong together. This can also be seen in health statistics: Although psychosomatic health complaints (e.g. exhaustion) tend to have slightly increased since the 1980s (Potrebny et al. 2017), musculoskeletal health complaints such as backache or pain in the neck are also important, still ranking among the most frequent health complaints (Eurofound 2017; based on the European Working Conditions Survey 2015). Therefore, we considered both kinds of health complaints in this study. According to Franke (2015), psychosomatic health complaints include, for example, headache, fatigue, exhaustion, or sleeping disorders, whereas musculoskeletal health complaints consist of backache, pain in neck and shoulders, in hands, knees, and others (see also Appendix A). In their agenda for future research, Barling and Cloutier (2017) emphasise the relevance of investigating leaders' physical symptoms, including major physical illnesses (e.g. cancer) but also minor physical illnesses (e.g. migraines, infections). Hence, by considering self-reported and concrete health complaints, this study contributes to this literature.

2.2. Research Questions on Leaders' Job Demands, Job Resources, and Health

Before reviewing the literature on leaders' health in detail, we introduce our research questions. Given the exploratory character of this study, we decided to ask research questions rather than derive hypotheses. The most important research questions for this study are the following:

RQ1: Do leaders have a higher or lower health risk compared to non-leaders in service sectors?

RQ2: Do leaders report varying levels of psychosomatic and musculoskeletal health complaints depending on the service sector?

RQ3: Do leaders' perceptions of job demands and job resources vary within the service sector?

RQ4: What are the most important predictors of psychosomatic and musculoskeletal health complaints of leaders depending on the service sector?

Regarding *RQ1*, the systematic review in Zimber et al. (2015) does not show consistent differences between leader samples and other samples (e.g. non-leaders, labour force, general public) regarding psychological health indicators such as burnout, depressive and psychosomatic symptoms, irritation, psychological stress, mental health, and well-being. Thus, leaders seem to be neither more nor less at risk of psychological health impairments compared to other occupational groups. Although the comparison groups in the review were diverse, the advantage of this study is that it is narrowed to the service sector and explores whether being a leader vs. non-leader affects the level of health complaints.

Regarding *RQ2*, the study of Beermann (2014, based on data of a previous wave of the BIBB/BAuA Employment Survey) showed differences in health outcomes between the trading, finance, and public sectors: The share of employees (i.e. leaders and subordinates) reporting more than three musculoskeletal complaints was highest in the trading sector (36 %) and lowest in the finance sector (23 %); the share of employees reporting more than three psychosomatic complaints was highest in the public sector (43 %) and lowest in the finance sector (36 %). Compared to agriculture, production, and building sectors, the service sectors tend to have slightly higher levels of psychosomatic health complaints and slightly lower levels of musculoskeletal complaints (Lohmann-Haislah 2012). In this study, we explore whether this pattern of complaints is valid for leaders in the three service sectors as well.

Regarding *RQ3*, in general, findings imply that leaders tend to have higher levels of quantitative job demands (e.g. workload, time pressure, deployment of knowledge), working time demands (e.g. longer working hours, working overtime, skipping breaks), and work-private life interferences (e.g. work-life conflicts, permanent availability), but also higher levels of influence (e.g. decision latitude, job control) compared to non-leaders (Lohmann-Haislah 2012; Nyberg et al. 2015; Skakon et al. 2011; Thomson et al. 2020; Wöhrmann et al. 2016). Comparing employees (including leaders) across sectors, physical demands (e.g. lifting heavy weights), ambient demands (e.g. working under conditions of noise), and demanding working times (e.g. shift work, working in the evening or on the weekend) are reported more often in the trading and public sectors than the finance sector, whereas there is no such uniform pattern for psychological demands and resources (Beermann 2014; Lohmann-Haislah 2012). Employees in the finance sector rather report higher levels of time pressure and being more often confronted with new tasks but also a higher degree of decision latitude; employees in the public sector tend to report more multitasking requirements, whereas employees in the trading sector have rather high levels of fast and repetitive work (Beermann 2014; Lohmann-Haislah 2012).

One particularly important demand in service work, as well as in leadership, is emotional labour (Dormann et al. 2017; Humphrey et al. 2008). Whereas most service jobs require the expression of specific emotions (e.g. a customer service worker should be friendly and positive, a nurse should show empathy and concern), Humphrey et al. (2008) suggest that leaders must be able to display very different emotions (friendliness and sympathy and anger and so on) depending on the situation (see also Nerdinger and Pundt 2018). As this can be highly demanding (Zapf 2002), we include emotional labour as a job demand. To our knowledge, there is no study so far comparing the emotional labour of leaders in the trading, finance, and public sector.

Overall, these findings imply that a) it is important to consider a wider range of demands and resources (i.e. physical, psychological, working time-related aspects) in order to characterize leaders' working conditions well (Wallin et al. 2014), and that b) sector-specific analyses can make the picture even clearer (Zimber et al. 2015). Hence, we consider all demands and resources which were assessed in the BIBB/BAuA Employment Survey and compare them across three service sectors.

To structure these analyses further, we divided the job demands into challenge and hindrance stressors (Cavanaugh et al. 2000). Challenge stressors are defined as demands that are stressful but accompanied by positive feelings of satisfaction and fulfilment, whereas hindrance stressors are defined as demands that inhibit or hamper leader's goal achievement (Cavanaugh et al. 2000). Based on this distinction, we investigated work intensity, knowledge use, emotional labour, and organisational changes as challenging demands. As hindrance demands, we examined monotony, lacking information, physical and ambient demands, job insecurity, and working at unusual times. As job resources, we examined autonomy, support from colleagues and from the supervisor, recognition at work, and work-life balance.

Regarding *RQ4*, the review in Zimber et al. (2015) revealed consistent findings for job demands being associated with higher levels of health impairment and for job resources being associated with lower levels of health impairment. It can be further assumed that leaders' state of

health depends on the accumulation of the demands and resources they face (Lohmann-Haislah 2012). For instance, it was shown that significant higher levels of decision latitude of leaders can explain health differences between leaders and non-leaders (Thomson et al. 2020). Therefore, we regress leaders' health indicators on all demands and resources simultaneously.

3. Methods

3.1. Sample

The 2018 BIBB/BAuA Employment Survey is a survey of a random representative sample of 20,012 employees who are at least 15 years old and work at least 10 hrs/week (Gensicke and Tsersich 2019). It was conducted by a professional survey institute using computer-assisted telephone interviewing. Two separate samples of landline and cellular telephone numbers were generated using Random Digit-Dialing procedure. In the landline sample, one person among eligible persons in the household (aged at least 15 years, employed) was randomly selected using the Kish Method (Kish 1949); in the cellular sample, participants had to be at least 15 years old, employed, and the main user of the cell telephone. Both samples were combined and weighted for probabilities of selection, undercoverage, and nonresponse. Weights were adjusted to the current working population structure of Germany with regard to gender, age, marital status, educational level, regional distribution, and occupational status (based on the 2017 Microzensus, Federal Statistical Office of Germany). Data were collected from October 2017 to April 2018. The mean interview duration was 42 minutes. The survey reached a response rate of 11.0 per cent, which was calculated using formula and disposition codes from the American Association for Public Opinion Research (AAPOR 2016).

Because weighted data can produce biased standard errors and inefficient estimates in ordinary least squares regressions (Winship and Radbill 1994), the unweighted sample of employees in service sectors (n = 14,048) was used. Service sectors were selected based on the classification of economic sectors NACE Rev. 2 (Eurostat 2008) and divided into three areas: trading sector (i.e. NACE sections G to J, n = 3,638), finance sector (i.e. NACE sections K to N, n = 2,769), and public sector (i.e. NACE sections O to U, n = 7,641). The separation of service sectors is based on Beermann (2014), who examined working conditions in service sectors based on the 2012 BIBB/BAuA Employment Survey.

Since leaders are the main group of interest in this article, service sector employees not in a leadership position (n = 9,750) were excluded from the analyses (except *Tab. 1*). Leaders were identified via the question "Are there any employees for whom you are the direct supervisor?", with response options 1 (Yes) and 2 (No). If respondents answered 1 (Yes), they were assumed to serve in a leadership role. Additionally, we validated the "yes" answers by controlling whether these employees have personnel (93 %), economic (48 %), and/or operational responsibility (82 %). Because of missing values, n = 20 service leaders could not be included in the analyses, meaning there are n = 4,278 service leaders left, including n = 1,071 leaders in the trading sector, n = 820 leaders in the finance sector, and n = 2,387 leaders in the public sector. Overall, our unweighted sample of leaders in the service sectors consists of 49 per cent men and 51 per cent women, with a mean age of 48 years (SD = 10.8 years). About 4 per cent had no vocational qualifications, 37 per cent had in-company, school-based vocational training or were simple, mid-level civil servants, 9 per cent completed advanced vocational training (e.g. master, craftsman, technician), and 50 per cent had a university or technical college degree.

3.2. Measures

In the following, the measures used in the study are described. The internal consistencies given are based on the sample of employees in service sectors (n = 14,048). Means, standard deviations, sample size, and post-hoc tests of the study variables for leaders in service sectors are displayed in *Tab. 3*. The exact wording of the items is shown in *Appendix A*.

Health Complaints: Health complaints were measured by eight items regarding psychosomatic complaints (e.g. headaches, dejection) and eight items regarding musculoskeletal complaints (e.g. pain in the back or neck). In both cases, the complaints were counted and integrated to a sum index, meaning that items range from 0 (*no complaints*) to 8 (*all complaints*). The use of this scale is similar to an earlier study investigating the effect of work intensity and work intensification on health complaints using data from the 2012 BIBB/BAuA Employment Survey (Franke 2015).

Support, recognition, and autonomy: Support from colleagues, support from the supervisor, and recognition at work was assessed by a single question each. Following Lohmann-Haislah (2012), autonomy was measured by three items. The measure is insufficiently reliable (α = .57), which might result in an underestimation of other variables. The response scale for all these items ranged from 1 (*never*) to 4 (*frequently*).

Work intensity, monotony, and knowledge: The measure of work intensity included five items referring to highly demanding situations at work (Franke 2015). Internal consistency of this scale was α = .72. Monotony was measured by two items providing information on highly spec-

ified work sequences and repetitive processes. The measure of knowledge included two items referring to two dimensions of cognitive demands at the workplace (Meyer and Hünefeld 2018). Although there is empirical support for assessing these items as indicators of monotony (e.g. Meyer et al. 2019) and knowledge (e.g. Meyer and Hünefeld 2018), both measures are insufficiently reliable (α = .57, respectively), raising the risk of underestimating their relationship to other variables. The scale of all three measures ranged from 1 (*never*) to 4 (*frequently*).

Lacking information: Lacking information was assessed by two items measuring how often the respondent was not informed about important changes and did not receive all necessary information to carry out his/her work properly. Internal consistency was α = .71. A scale from 1 (*never*) to 4 (*frequently*) was used.

Emotional burden: Emotional burden was measured by the question "During your work, how frequently does your job put you in situations that make you feel emotionally stressed?", with response options ranging from 1 (*never*) to 4 (*frequently*).

Ambient and physical demands: Ambient demands were measured by six items referring to respondents' work environment. Physical demands were assessed by four items measuring demanding physical working conditions. For both measures, the included items ranged from 1 (*never*) to 4 (*frequently*). Since the sum of demands was calculated, the measures of ambient and physical demands ranged from 6 (*never*) to 24 (*frequently*) and 4 (*never*) to 16 (*frequently*), respectively.

Organisational changes and job insecurity: The measure of organisational changes included eight items referring to several changes within the past two years. Since the sum of changes was calculated, the scale ranged from 0 (*no changes*) to 8 (*all changes*). Job insecurity was measured by the question "How high do you rate the likelihood to be fired in the near future?", with a response scale of 1 (*no risk at all*) to 4 (*high risk*).

Work-life balance and working at unusual times: Work-life balance was assessed by a single question: "When planning your working hours, how frequently are you able to take your family and leisure interests into account?", with possible responses ranging from 1 (*never*) to 4 (*frequently*). Working at unusual times was measured by a sum index of five items referring to shift work, work on Saturdays and/or Sundays at least once a month, and working time spent as stand-by duty, on-call duty, work on request. The scale ranged from 0 (*no unusual time factors*) to 5 (*all unusual time factors*).

Control Variables: Several control variables were examined to exclude alternative explanations for the effects of leaders' working demands and resources on health.

Working time was measured by the average working time/week, including long hours, secondary employment, and on-call service. *Occupational upper field* was included as a division of occupations into primary and secondary service sectors. Primary service sectors are supposed to distribute and promote production activities, whereas employees in secondary service sectors mainly perform intellectual work, driving industrial production through the use of human capital (Klauder 1990; Tiemann et al. 2008). The distinction of primary and secondary service sectors was calculated based on the 2010 German classification of occupations (Tiemann 2018). Finally, *age* and *gender* were included as control variables.

3.3. Analyses

To examine *RQ1* (i.e. health risks of leaders compared to non-leaders), we first performed a two-factorial analysis of variance to examine whether the mean values of health complaints differ between several factors: 1) leadership (leader vs. non-leader), 2) service sectors, 3) interaction term between leadership and service sectors. The results are displayed in *Tab. 1*. For examining *RQ2* (i.e. differences in leaders' health outcomes) and *RQ3* (i.e. differences in leaders' job demands and resources), we conducted additional analyses of variances for each of the study variables including only service leaders. These results are displayed in *Tab. 2* and *Tab. 3*. Finally, to answer *RQ4* (i.e. comparing demands and resources as predictors of health outcomes), we performed Ordinary Least Squares (OLS) regression analyses. The results for leaders' psychosomatic health complaints are displayed in *Tab. 4*; the results for leaders' musculoskeletal health complaints are shown in *Tab. 5*. Each column indicates the estimates of a separate regression model. For handling missing data, listwise deletion was used.

4. Results

First, service workers report significantly varying levels of psychosomatic and musculoskeletal complaints, depending on leadership responsibility and service sector, respectively (*Tab. 1*). Effect sizes of η^2 can range from zero to hundred percent of explained variance. Cohen (1988) suggested the following guidelines interpreting effect sizes: small (= .01), medium (= .06), and large (= .14). According to these rules of thumb, the effect size of the sector variable (η^2 = .01) is small but still larger than that of being leader vs. non-leader (η^2 = .001); consequently, we decided to limit further analyses to service sectors only. We focused on leaders to highlight their working situations.

Second, service leaders' health and working conditions vary between sectors (*Tab. 2*). Compared to other job demands and resources, physical demands explained most

Sources	*df*	Psychosomatic complaints *F*	Psychosomatic complaints Partial η^2	Musculoskeletal complaints *F*	Musculoskeletal complaints Partial η^2
Service Sector	2, 13,749	70.09	.01***	54.25	.01***
Leadership	1, 13,749	8.13	.001**	8.98	.001**
Service Sector x Leadership	2, 13,749	1.19	.000	1.12	.000
Working time	1, 13,749	102.40	.01***	1.50	.001
Age	1, 13,749	18.00	.000*	84.17	.01***
R^2			.02		.02
Adjusted R^2			.02		.02

Tab. 1: Results of the comparison of psychosomatic and musculoskeletal complaints concerning the service sector, leadership position and interaction term, as well as working time and age including the significance and effect sizes of the sector differences

Notes: *** $p < .001$ (two-tailed); ** $p < .01$ (two-tailed); * $p < .05$ (two-tailed).
Source: Own calculations based on the 2018 BIBB/BAuA Employment Survey, unweighted results.

Sources	*df*	Service Sector *F*	Service Sector Partial η^2
Psychosomatic complaints	2, 4,249	21.07	.01***
Musculoskeletal complaints	2, 4,264	24.69	.01***
Support from colleagues	2, 3,672	1.84	.00
Support from supervisor	2, 3,580	1.83	.00
Recognition	2, 3,592	5.38	.00**
Autonomy	2, 4,248	77.26	.04***
Work intensity	2, 4,248	77.26	.04***
Monotony	2, 4,275	27.11	.01***
Knowledge	2, 4,275	28.29	.01***
Lacking information	2, 4,245	9.92	.00***
Emotional burden	2, 4,274	116.76	.05***
Ambient demands	2, 4,275	52.55	.02***
Physical demands	2, 4,275	135.69	.06***
Organisational changes	2, 4,275	2.46	.00†
Job insecurity	2, 3,644	17.19	.01***
Work-life balance	2, 4,266	8.76	.00***
Working at unusual times	2, 4,275	44.00	.02***
Working time	2, 4,267	42.13	.02***
Age	2, 4,244	27.16	.01***

Notes: *** $p < .001$ (two-tailed); ** $p < .01$ (two-tailed); * $p < .05$ (two-tailed); † $p < .10$ (two-tailed).
Source: Own calculations based on the 2018 BIBB/BAuA Employment Survey, unweighted results.

Tab. 2: Results of the comparison of leaders in three sectors concerning all variables including the significance and effect sizes of the sector differences

of the variation ($\eta^2 = .06$), closely followed by emotional burden ($\eta^2 = .05$), work intensity ($\eta^2 = .04$), and autonomy ($\eta^2 = .04$). The effect sizes for psychosomatic and musculoskeletal complaints were small ($\eta^2 = .01$, respectively). *Tab. 3* shows the means, standard deviations, sample sizes, and post-hoc tests of the study variables. Compared to the other service sectors, we found a significantly higher prevalence of ambient demands, physical demands, monotony, and working at unusual times in the trading sector. For the finance sector, employees report significantly higher levels of resources (e.g. knowledge, autonomy, and work-life balance) but also extended working hours. The public sector is characterized by significantly higher levels of emotional burden, higher age, and more secondary service sector and female employees. With respect to service leaders' health, psychosomatic and musculoskeletal complaints are reported significantly more often in the trading and public rather than the finance sector. In general, the results for service leaders are in line with previous studies comparing employees (including leaders) across sectors (Beermann 2014; Lohmann-Haislah 2012). Overall, the results indicate that there are specific patterns of working conditions in each of the three service sectors. Hence, predicting health complaints requires a separate consideration of demands and resources.

Tab. 4 shows that, in all three sectors, work intensity, lacking information, emotional burden, and organisational changes are significantly linked to psychosomatic complaints. If service leaders experience their work as intense and emotionally demanding, and if they go through a lot of organisational changes or do not get all necessary information, they report more psychological health impairments. Higher levels of psychosomatic complaints of leaders in the trading sector are further associated with lower levels of support from colleagues ($\beta = -.27$), cognitive demands ($\beta = -.28$), and work-life balance ($\beta = -.17$), as well as higher levels of job insecurity ($\beta = .20$) and physical demands ($\beta = .06$).

Interestingly, in the trading sector, a higher degree of working at unusual times is significantly accompanied by fewer psychosomatic complaints ($\beta = -.26$). With respect to the finance sector, we found that leaders report significantly fewer psychosomatic impairments when they felt they had a good work-life balance ($\beta = -.35$). Regarding the public sector, the more leaders receive support from colleagues, and the more they perceive their work as cognitively demanding, the less likely they are to report psy-

		Trading sector[a]			Finance sector[b]			Public sector[c]			Post-hoc
Variables		*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	
1	Psychosomatic complaints	2.40	2.39	1,067	1.94	2.23	813	2.56	2.41	2,372	a>b, c>b
2	Musculoskeletal complaints	1.92	1.95	1,069	1.36	1.59	818	1.79	1.80	2,380	a>b, c>b
3	Support from colleagues	3.71	0.62	927	3.70	0.64	570	3.75	0.57	2,178	ns
4	Support from supervisor	3.30	0.91	912	3.38	0.84	550	3.35	0.85	2,121	ns
5	Recognition	2.84	0.99	914	2.96	0.93	555	2.96	0.93	2,.126	ns
6	Autonomy	3.33	0.74	1,063	3.64	0.49	812	3.32	0.69	2,376	b>a, b>c
7	Work intensity	3.30	0.53	1,071	3.31	0.51	820	3.30	0.54	2,387	ns
8	Monotony	2.67	0.92	1,071	2.37	0.87	820	2.54	0.88	2,387	a>c>b
9	Knowledge	3.16	0.69	1,071	3.37	0.58	820	3.28	0.59	2,387	b>c>a
10	Lacking information	2.38	0.82	1,061	2.26	0.77	811	2.41	0.78	2,376	a>b, c>b
11	Emotional burden	2.35	0.97	1,070	2.31	0.90	820	2.77	0.91	2,387	c>a, c>b
12	Ambient demands	11.30	4.66	1,071	9.28	3.97	820	10.52	4.15	2,387	a>c>b
13	Physical demands	9.66	3.64	1,071	7.19	3.15	820	9.35	3.65	2,387	a>c>b
14	Organisational changes	3.28	1.93	1,071	3.25	1.81	820	3.15	7.78	2,387	ns
15	Job insecurity	1.50	0.70	1,039	1.50	0.64	806	1.38	0.62	1,802	a>c, b>c
16	Work-life balance	3.30	0.89	1,069	3.46	0.80	818	3.40	8.81	2,382	b>c>a
17	Working at unusual times	1.27	1.14	1,071	0.82	1.01	820	1.09	1.20	2,387	a>c>b
18	Working time	43.73	12.74	1,068	45.85	12.31	819	41.67	10.89	2,383	b>a>c
19	Occupational upper field	1.36	0.48	1,031	1.57	0.50	767	1.71	0.46	2,333	c>b>a
20	Age	46.29	10.92	1,060	48.02	10.86	812	49.20	10.57	2,375	c>b>a
21	Gender	1.40	0.49	1,071	1.38	0.49	820	1.60	0.49	2,387	c>a, c>b

Notes: gender (1 = male, 2 = female), occupational upper field (1 = primary service sector, 2 = secondary service sector); ns = not significant.
Source: Own calculations based on the 2018 BIBB/BAuA Employment Survey, unweighted results.

Tab. 3: Results of the comparison of leaders in the three sectors concerning all variables including the means, standard deviations, sample sizes, and post-hoc tests of the sector differences

	Trading sector		Finance sector		Public sector	
Variables	β	SE_B	β	SE_B	β	SE_B
Support from colleagues	-.27*	.13	-.21	.15	-.30**	.11
Support from supervisor	-.14	.09	-.20	.12	-.14†	.08
Recognition	.02	.08	-.03	.11	-.07	.07
Autonomy	-.13	.10	-.35†	.19	-.11	.08
Work intensity	.73***	.15	.53*	.21	.77***	.12
Monotony	.10	.08	.19	.11	.04	.06
Knowledge	-.28*	.11	-.07	.18	-.22*	.10
Lacking information	.19*	.09	.26*	.13	.24**	.08
Emotional burden	.70***	.08	.66***	.11	.62***	.07
Ambient demands	.03	.02	.07†	.03	.04*	.02
Physical demands	.06*	.02	-.04	.04	.04†	.02
Organisational changes	.20***	.04	.16**	.05	.22***	.03
Job insecurity	.20*	.10	.23†	.14	.23**	.09
Work-life balance	-.17*	.09	-.35**	.13	-.13†	.08
Working at unusual times	-.26***	.07	-.05	.12	.04	.06
Working time	.02*	.01	.00	.01	.00	.01
Occupational upper field	-.08	.17	.38*	.18	-.02	.13
Age	-.02***	.01	.00	.01	-.02**	.01
Gender	.42**	.15	.34†	.20	.36**	.12
R^2	.39***		.34***		.33***	
Adjusted R^2	.38***		.31***		.32***	
N	827		487		1,481	

Notes: gender (0 = male, 1 = female), *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .1$.
Source: Own calculations based on the 2018 BIBB/BAuA Employment Survey, unweighted results.

Tab. 4: Results of the comparison of leaders in the three sectors concerning all variables, including the significance and regression coefficients of the prediction of psychosomatic complaints

	Trading sector		Finance sector		Public sector	
Variables	β	SE_B	β	SE_B	β	SE_B
Support from colleagues	-.22*	.11	-.02	.11	-.23**	.08
Support from supervisor	.06	.08	-.21*	.09	-.04	.07
Recognition	.02	.07	.05	.08	-.07	.06
Autonomy	-.07	.09	-.18	.13	-.05	.07
Work intensity	.10	.13	-.05	.15	.15	.10
Monotony	.22**	.07	.21*	.08	.18***	.05
Knowledge	.00	.10	-.12	.13	-.07	.08
Lacking information	.10	.08	.13	.10	.07	.06
Emotional burden	.29***	.07	.29***	.08	.23***	.05
Ambient demands	.03†	.02	.06*	.02	.04**	.01
Physical demands	.16***	.02	.02	.03	.10***	.02
Organisational changes	.10**	.03	.06	.04	.13***	.03
Job insecurity	.10	.08	.17†	.10	.05	.07
Work-life balance	-.20**	.07	-.05	.09	-.10†	.06
Working at unusual times	-.09	.06	-.06	.09	.07	.05
Working time	.00	.01	.00	.01	.00	.00
Occupational upper field	-.21	.14	-.02	.13	-.30**	.11
Age	.01*	.01	.02**	.01	.01**	.00
Gender	.55**	.13	.56***	.14	.58***	.10
R^2	.31***		.22***		.26***	
Adjusted R^2	.29***		.19***		.25***	
N	828		487		1,483	

Tab. 5: Results of the comparison of leaders in the three sectors concerning all variables, including the significance and regression coefficients of the prediction of musculoskeletal complaints

Notes: gender (0 = male, 1 = female), *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .1$.
Source: Own calculations based on the 2018 BIBB/BAuA Employment Survey, unweighted results.

chosomatic complaints (β = -.30 and β = -.22, respectively). Leaders in the public sector, who perceive more job insecurity and ambient demands, report fewer psychosomatic complaints. Please note that the reported findings are adjusted for working time, occupational upper field, age, and gender. Overall, these control variables explain a total of 2–5 per cent of the variance, while the selected resources and working conditions explain another 30–34 per cent of psychosomatic complaints.

Tab. 5 shows that, in each service sector, emotional burden and monotony are central demands for predicting musculoskeletal health complaints. The more service leaders experience their work as emotionally demanding or monotonous, the more musculoskeletal complaints they report. In the trading sector and in the public sector, support from colleagues (β = -.22 and -.23, respectively), physical demands (β = .16 and .10, respectively), and organisational changes (β = .10 and .13, respectively) are significantly linked to leaders' musculoskeletal complaints. In the trading sector, leaders report significantly fewer physical impairments when they felt they had a good work-life balance (β = -.20). Monotony (β = .22). Physical demands (β = .16), by contrast, show stronger associations with musculoskeletal health complaints compared to the other sectors. In the finance sector, experiencing support from the supervisor is significantly related to fewer musculoskeletal complaints (β = -.21). In comparison to the other sectors, sector ambient demands (β = .06) and emotional burden (β = .29) in the finance sector are more strongly related to physical impairments. In the public sector, ambient demands are moderately linked to musculoskeletal health complaints (β = .04), whereas support from colleagues (β = -.23) and organisational changes (β = .13) show higher coefficients compared to other sectors. Again, the reported findings are adjusted for working time, occupational upper field, age, and gender. Considering these control variables, the total explanation of the variance reaches 4–8 per cent, while the selected resources and working demands explain another 16–23 per cent of the variance in the prediction of musculoskeletal complaints.

5. Discussion

5.1. Theoretical Implications

In this study, we focused on service leaders and their working conditions and health. We explored several demands and resources, as well as psychosomatic and musculoskeletal health complaints, of leaders in three service sectors: trading, finance, and public services. We wanted to know whether leaders have higher health risks compared to non-leaders (*RQ1*), whether leaders vary in health complaints (*RQ2*), job demands, and resources

(*RQ3*), or in the prediction of health complaints (*RQ4*), depending on the service sector. In the following, we summarize our main findings and discuss some theoretical implications.

Regarding *RQ1*, the small (albeit significant) main effect of leadership (being a leader vs. non-leader) implies that leaders and non-leaders (i.e. subordinates) do not differ much in their subjective health reports. This finding is in line with Zimber et al. (2015), who showed that leaders seem to be neither more nor less at risk of psychological health impairments than other occupational groups. Our finding strengthens and specifies this result in that we directly compare service leaders and service subordinates. Moreover, the fact that our finding seems to be valid for musculoskeletal complaints as a physical health indicator serves to broaden the results of Zimber et al. (2015). Hence, as Barling and Cloutier (2017) have argued, it is important to address leaders' (and subordinates') psychological *and* physical symptoms.

Regarding *RQ2* and *RQ3*, the analyses reveal that leaders in the three service sectors vary in their perceptions of job demands, resources, and health complaints. In the first instance, this implies that the three sectors seem to provide unique conditions, at least to some extent, which are linked to differing perceptions of working conditions and health. Hence, systematic analyses of sector effects potentially contribute to our understanding of leaders' working conditions and health (Zimber et al. 2015). The finance sector differs most from the other sectors. From a stress research perspective, leaders in the finance sector report more advantageous conditions than those in the other ones. Compared to the trading and the public sector, leaders in the finance sector report fewer health complaints, more challenging demands such as knowledge use (i.e. cognitive demands), and more resources (i.e. autonomy, work-life balance). Although leaders in the finance sector do not report much work at unusual times, they do report the longest working hours. Thus, in line with Karasek's (1979) idea of active jobs, this combination of high decision-making latitude (autonomy) and challenging demands may be one explanation for the better health outcomes reported by leaders in the finance sector compared to the other sectors. This positive demand-resource-pattern might result from rather favourable conditions of employment and human resource management. In the banking sector, for example, salaries are higher than the average across all occupations, unemployment rates are low, learning opportunities and participation in human resource development are high, and the (challenging) cognitive requirements are rated as high (Frank et al. 2014).

By contrast, leaders in the trading and the public sector tend to report hindrance demands: In the trading sector, monotony, physical and ambient demands, and working at unusual times (e.g. on weekends) in particular are reported to a higher degree, whereas the emotional burden is highest in the public sector. Both sectors more often report a lack of information and less autonomy than the finance sector. Thus, according to the stress research perspective, the combination of more hindrance demands and less autonomy in those two sectors may be one explanation for the higher number of health complaints stated (Cavanaugh et al. 2000; Karasek 1979). The less positive demand-resource patterns may result from structural characteristics in these sectors. Often-reported problems in the public sector include insufficient personnel allocation, deficits in the organisation of departments or working processes, and a lack of participation among employees (e.g. Brandl and Stelzl 2013). Furthermore, the high levels of emotional burden may result from the fact that public services often rely on co-production (e.g. in schools, city offices, job centres), which means regulating emotions is necessary for interacting successfully with customers and clients (Matiaske et al. 2015). Often-reported problems in the trading sector include comparatively low wages despite positive economic development (Rumscheidt 2018), longer shop opening hours resulting in more atypical working hours, and the high number of physical demands (e.g. heavy lifting in retail or catering, Leistner and Lohmann-Haislah 2015).

These different patterns of demands and resources are in line with previous findings in a mixed sample of leaders and subordinates in service sectors (Beermann 2014). But there are also similarities between the sectors: All three sectors on average reveal more psychosomatic complaints than musculoskeletal complaints. They do not differ regarding social support (from colleagues and supervisors) and recognition, and they all face work intensity and organisational change processes to a similar degree.

Regarding *RQ4* (i.e. associations between working conditions and health complaints), the regression analyses of psychosomatic health complaints on the working conditions indicate that work intensity, lacking information, emotional burden, and organisational changes are significant predictors in all three sectors. Likewise, work-life balance, job insecurity, and gender are important predictors. When it comes to predicting musculoskeletal health complaints, emotional burden is significant, too. Monotony, gender, and, to a lesser degree, age, ambient and physical demands become more important. Work intensity is not significant at all. These results imply that the health-promoting or health-impairing effects of working conditions are very similar in all three sectors despite mean level differences across sectors. This finding is in line with Van den Broeck et al. (2017), who compared four sectors (health care, industry, service, and public sector). Thus, there is no strong indication of sector-specific stress theories. It rather seems that certain working conditions are relevant for

predicting the respective health outcome, mostly irrespective of the contextual conditions of the specific sectors.

Some results of the regression analyses are surprising and will be mentioned briefly in the following: 1) The negative association between cognitive demands and psychosomatic health complaints was surprising. From the challenge stressor perspective, such demands can have negative (i.e. health-reducing) as well as positive effects (caused by the positive emotions resulting from challenging cognitive tasks). Possibly, the service leaders surveyed see the positive, challenging side rather than the negative, stressful side and therefore report fewer complaints. 2) In the trading sector, more frequent work at unusual times is accompanied to a significant degree by fewer psychosomatic complaints, even though one would expect a positive association here. As this is cross-sectional data, the direction of the effect is unclear. One explanation might be that only leaders with no or few psychosomatic complaints are able to work at unusual times. 3) Finally, it was surprising to see that leaders in the public sector, although they perceive more job insecurity and ambient demands, report fewer psychosomatic complaints. We can only speculate that third-variable effect by age or position may be one explanation: Possibly, younger leaders in the public sector perceive more job insecurity caused by contractual temporal limitations or their status as not-being public officials yet. And maybe these younger leaders experience more ambient demands because they are more likely to work at the front line (e.g. in open-plan offices or field services) compared to older leaders at higher hierarchical levels. At the same time, younger leaders might experience fewer psychosomatic complaints because of their age.

5.2. Practical Implications

The most important practical implications concern two issues: health promotion in the three service sectors and the health promotion of leaders. These issues are discussed below.

Health interventions, such as attempts to improve working conditions, need to be tailored to the needs of the targeted employees (e.g. Nielsen and Randall 2012). Our findings can provide guidance for organisations in the trading, finance, or public sector, where working conditions are particularly important: If an organisation's main focus is reducing or preventing psychosomatic health complaints, important topics in leader surveys were work intensity, lacking information, emotional burden, organisational changes, work-life balance, and job insecurity. If the organisation is interested in reducing or preventing musculoskeletal health complaints, the survey revealed emotional burden and monotony as the most important working conditions. The regression analyses suggest additional, sector-specific topics that might be relevant to assess. For example, social support from colleagues and cognitively stimulating tasks (knowledge) seem to foster leaders' psychosomatic health in the trading and public sectors, whereas autonomy is an important resource in the finance sector. For fostering musculoskeletal health, it is important, for example, to address social support from colleagues and organisational changes in the trading and public sectors, and to address social support from the supervisor in the finance sector. Additionally, the demands-resources patterns displayed for each service sector provide helpful benchmarks for organisations interested in the current state of their leaders' working conditions.

Regarding the second issue, the findings indicate that leaders' health is at least as important as subordinates' health. However, the latter is much more in focus. A central task of leaders is to care for their subordinates' health, for example, by reducing demanding working conditions and preventing burnout (Nerdinger and Pundt 2018). It is therefore not surprising that leader-specific health interventions largely pay attention to the duties and responsibilities leaders have regarding subordinate health (Barling and Cloutier 2017). For example, leaders are trained or coached in supportive (Hammer et al. 2011), constructive/transformational (Grant et al. 2009) or health-promoting leadership behaviour (Rigotti et al. 2014) or in identifying subordinates with psychological stress or burnout problems (Dimoff et al. 2016). These intervention studies imply that leaders can be trained to be more health-promoting. However, as the results of this study imply, there is a strong need for activities emphasising leaders' own health and especially their effect as role models in health issues (Barling and Cloutier 2017). One approach that combines leaders' own health care (i.e. self-care) and follower-oriented health care (i.e. staff-care) is Health-oriented Leadership (HoL) (Pundt and Felfe 2017). Recent studies support the meaning of leaders' self-care for the leaders' health (Pundt and Felfe 2017) as well as for being a role model for subordinates' health (Klug et al. 2019; Kranabetter and Niessen 2017).

5.3. Limitations and Further Research

To our knowledge, this study is the first to examine the relationship between a range of working conditions and the psychosomatic and musculoskeletal health complaints of service leaders based on a large data set, representative of the German working population. However, our study has limitations that should be considered when interpreting the results. First, since cross-sectional data prohibits causal conclusions, reverse causation and alternate explanations may also be possible. Hence, replicating and extending the analyses in longitudinal studies is an interesting avenue for future research. For example, other leader outcomes such as attitudes (e.g. satisfaction, commitment)

and behaviour (e.g. engagement, counterproductive work behaviour) may add new insights. Furthermore, combining leaders' health with testing trickle-down effects on subordinates' health outcomes or even customer outcomes (e.g. climate perceptions, interaction quality) might be another interesting avenue for further research. Second, our study is based on self-reported measures, which might result in an overestimation of effects caused by common method biases (Podsakoff et al. 2003). However, former studies showed subjective health measures to be valid health status indicators (e.g. McGee et al. 1999; Miilunpalo et al. 1997). Future research may use further health-relevant measures to widen the scope: As health complaints tend to display long-term stress effects, subjective measures with a short-term focus (e.g. job-related stress, recovery) may be relevant early warning indicators. Others' ratings (e.g. peers, subordinates, partners) and objective measures (e.g. stress cortisol) provide other interesting possibilities. Third, we used single items to measure demands, resources, and health. Although single item measures on job satisfaction and other constructs are found to be valid (e.g. Wanous and Hudy 2001; Wanous et al. 1997), some measures can be improved. The measures of autonomy, monotony, and knowledge were insufficiently reliable, raising the risk of underestimating their relationship with other variables. Finally, our analyses are limited to leaders in three service sectors. In addition to our study, future research could examine differences between subordinates and leaders in multiple service sectors, combining self-reported measures and objective data. Given the heterogeneity across groups, future research should perform subgroup analyses with respect to gender and age groups. As a result, it may be possible to derive more concrete practical implications.

Appendix

Measures

Items	Scale
Psychosomatic complaints Please tell me whether you have suffered from any of the following health problems in the last 12 months during your work and/or on working days. We are interested in problems which have occurred frequently: General fatigue, lassitude or exhaustion Headaches Stomach and digestion complaints Nervousness or irritability Night-time sleep disturbances Dejection Physical exhaustion Emotional exhaustion	0 (*no*), 1 (*yes*)
Musculoskeletal complaints Please tell me whether you have suffered from any of the following health problems in the last 12 months during your work and/or on working days. We are interested in problems which have occurred frequently: Pain in the lower back (lumbago) Pain in the neck/shoulder area Pain in the hands Pain in the arms Pain in the hips Pain in the knees Swollen legs Pain in the legs feet	0 (*no*), 1 (*yes*)
Work intensity During your work, how frequently is it the case that you . . . have to work under strong pressure to meet deadlines or pressure to perform? . . . have to keep an eye on different tasks or processes at the same time? . . . are disturbed or interrupted at work, e. g. by other colleagues, poor-quality materials, machine malfunctions or telephone calls? . . . have to go to the limits of your capabilities? . . . have to work very quickly?	1 (*never*) to 4 (*frequently*)
Lacking information How often is it the case that you . . . are not informed at work in time about far-reaching decisions, changes or plans for the future? . . . do not receive all the information that is necessary for you to carry out your work properly?	1 (*never*) to 4 (*frequently*)
Support from colleagues How often do you receive help and support for your work from your colleagues when you need it?	1 (*never*) to 4 (*frequently*)
Support from supervisor And how often do you receive help and support for your work from your direct supervisor when you need it?	1 (*never*) to 4 (*frequently*)

Items	Scale
Recognition How often does your direct supervisor provide you with praise and recognition for good work?	1 (*never*) to 4 (*frequently*)
Autonomy How frequently does it occur in your job that you are able to . . . plan and organize your own work? . . . influence the amount of work that you are given? . . . decide when you can take a break?	1 (*never*) to 4 (*frequently*)
Monotony During your work, how frequently is it the case that . . . your work performance is prescribed to you down to the last detail? . . . the same process is repeated in every detail?	1 (*never*) to 4 (*frequently*)
Knowledge During your work, how frequently is it the case that . . . you are given new tasks that require understanding and getting familiar with? . . . you improve existing procedures or trying out something new?	1 (*never*) to 4 (*frequently*)
Emotional burden During your work, how frequently is it the case that your job puts you in situations that make you feel emotionally stressed?	1 (*never*) to 4 (*frequently*)
Ambient demands How frequently does it occur in your job that you have to work . . . under conditions of smoke, dust, gases, or vapours? . . . under conditions of cold, heat, wet, moisture, or draughts? . . . with oil, fat, dirt, and filth? . . . under conditions of bright light or under conditions of poor/ insufficient lighting? . . . under conditions of noise? . . . under conditions of disruptive noise?	1 (*never*) to 4 (*frequently*)
Physical demands How frequently does it occur in your job that you have to . . . work in a standing position? . . . lift and carry heavy loads? . . . use your hands to perform work that requires great dexterity, fast sequences of movement, or great strength? . . . work in a bent over, squatting, kneeling or lying posture, work above your head?	1 (*never*) to 4 (*frequently*)
Organisational changes In the last two years, have . . . new computer programmes been introduced? . . . new or clearly changed services been provided? . . . major restructuring or reorganisation efforts been implemented which affected your immediate working environment? . . . job cuts or dismissals taken place? . . . large numbers of independent contractors, assistants, interns or temporary agency workers been hired?	0 (*no*), 1 (*yes*)
. . . you had a new direct supervisor? . . . the levels of stress and working pressure increased, stayed the same, or decreased? . . . the specialist requirements of your work increased, stayed the same, or decreased?	1 (*increased*), 2 (*stayed the same*), 3 (*decreased*)
Job insecurity How high do you rate the likelihood to be fired in the near future?	1 (*no risk at all*) to 4 (*high risk*)
Work-life balance When planning your working hours, how frequently are you able to take your family and leisure interests into account?	1 (*never*) to 4 (*frequently*)
Working at unusual times Does your work involve shift work? Do you usually work on Saturday at least once a month? Do you usually work on Sunday at least once a month? Have you agreed to any of the following for your job? . . . Stand-by duty . . . On-call duty . . . Work on request	0 (*no*), 1 (*yes*)

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