



The impact of national legislation on psychosocial risks on organisational action plans, psychosocial working conditions, and employee work-related stress in Europe

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ABSTRACT

Work-related psychosocial hazards are recognised as a key priority in the future of work. Even though European Union (EU) legislation requires employers to assess and manage all types of risks to workers' health and safety associated with all types of hazards in the work environment, it does not include clear reference to psychosocial risks and work-related stress. In several EU member states, there is now more specific legislation on psychosocial risks that clarifies employer responsibilities. The aim of this study is to explore whether the introduction of specific legislation on psychosocial risks and/or work-related stress is related to organisations implementing action plans to prevent work-related stress, and in turn, better psychosocial working conditions (job demands and resources), and less reported work-related stress in the workforce. It does so by comparing EU member states and candidate countries that have introduced more specific legislation to those that have not, conducting multilevel modelling analysis by linking two representative European-level datasets, the 2014 employer European Survey of Enterprises on New & Emerging Risks and the 2015 employee European Working Conditions Survey. Findings indicate that the presence of specific national stress legislation is associated with more enterprises having a work-related stress action plan. The existence of action plans was found to be associated with increased job resources but not decreased job demands. Furthermore, only in those countries with specific national legislation on stress, job resources were found to be associated with less reported stress through the existence of organisational action plans. Findings lend support to the argument for more specific legislation on psychosocial risks/work-related stress in the EU. However, they also raise questions on whether current interventions implemented at organisational level to deal with work-related stress may be geared more towards the development of individual resources and less towards better work organisation and job design.

1. Introduction

Work-related psychosocial hazards are recognised as one of the key concerns to be addressed in modern working life across the world (Schulte et al., 2020). They refer to unfavourable working conditions in terms of the way work is organised and managed (e.g., high workload, long working hours, lack of autonomy and support at work, harassment and bullying at work) (Leka et al., 2015). There are several established theoretical models on the psychosocial work environment, such as the Job Demands Control model (Karasek, 1979), the Effort Reward Imbalance model (Siegrist, 1996) and the Job Demands Resources

model (Demerouti et al., 2001) which consider the influence of job demands, job resources (such as control/autonomy at work), and rewards on various individual and organisational health outcomes.

Studies based on these theoretical models have resulted in a wealth of evidence on the relationship between psychosocial hazards and negative outcomes such as work-related stress (see ILO – International Labour Organization, 2016; WHO, 2010), cardiovascular disease (e.g., Eller et al., 2009; Kivimaki et al., 2012), depression and anxiety (e.g., Madsen et al., 2017), and mortality (e.g., Taouk et al., 2020; Tsutsumi et al., 2006). Furthermore, psychosocial hazards have been found to be related to sickness absenteeism (e.g., Russo et al., 2021) and

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presenteeism (e.g., Navarro et al., 2018) as well as early exit from the workforce due to disability (e.g., Leineweber et al., 2019). To address challenges posed by psychosocial hazards, several policy responses (both regulatory and voluntary) have been implemented at the international, regional, and national levels (ILO – International Labour Organization, 2016).

In Europe, European Union (EU) legislation, and more specifically Council Directive 89/391/EEC of June 12, 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work (referred to as the framework directive on safety and health at work), requires employers to assess and manage all types of risks to workers' health and safety associated with all types of hazards in the work environment, including psychosocial risks. However, even though employee and employer surveys in Europe indicate high concern about these risks (Eurofound - European Foundation for the Improvement of Living and Working Conditions, 2017; EU-OSHA—European Agency for Safety and Health at Work, 2010; 2015, 2019), they also highlight that only about 20% of European enterprises inform their workers about them, let alone take any action to address them. This is disappointing given the investment at European level to raise awareness and provide appropriate tools to assist employers in preventing the potential negative impact of psychosocial hazards on their workers, in terms of poor physical and mental health and well-being, and organisations, in terms of their survival and sustainability.

There have been calls from several stakeholders for European Union legislation, and corresponding national law to be more specific in this area by including clear reference to psychosocial risks and work-related stress, since these terms are missing in the 1989 European framework directive (e.g., Ertel et al., 2010; ETUC – European Trade Union Congress, 2020; Leka et al., 2015a,b). Indeed, in several EU member states, there is now more specific legislation on psychosocial risks that clarifies employer responsibilities in this area. For example, in Belgium specific legislation in relation to psychosocial risks includes the Royal Decree of May 17, 2007 concerning the prevention of psychosocial load caused by work, including violence, harassment, and sexual harassment at work. While in Sweden, the “Organisational and Social Work Environment” provisions which came into effect on March 31, 2016, regulate knowledge requirements, goals, workloads, working hours, and victimisation (see European Commission, 2019). Some other countries instead use a soft law approach based on voluntary employer engagement, with guidelines and standards being preferred. For example, in the UK, the Management Standards for Work-related Stress were introduced by the Health and Safety Executive in 2004 as a voluntary approach in engaging employers to assess and manage psychosocial risks (MacKay et al., 2004).

The Covid-19 pandemic has resulted in raised awareness on the impact of psychosocial hazards on the health and well-being of the workforce and in numerous calls to prioritise them in policy and practice initiatives on the future of work (ILO - International Labour Organization, 2020). Indeed, nearly every review on the future of work identifies psychosocial hazards as one of the key priorities to be addressed (see for example, EU-OSHA—European Agency for Safety and Health at Work, 2018; ILO - International Labour Organization, 2019; Schulte et al., 2020). Managing psychosocial risks is also becoming more complex considering technological developments and trends of remote and hybrid work, the changing nature of employment contracts, and increasing workforce diversity that have all been accelerated since the Covid-19 pandemic. This new and evolving landscape creates challenges in terms of agile policy making (Leka, 2021).

Therefore, an urgent response is needed in policy and practice to effectively address psychosocial risks in a preventive way. This paper aims to contribute to current policy debates on the possible introduction of additional or more specific legislation on psychosocial risks in Europe (e.g., Eurocadres, 2022). The introduction of specific legislation in health and safety has the aim of reinforcing organisational action and good practices that will improve working conditions and related

outcomes. Therefore, the aim of this study is to explore whether the introduction of specific national legislation on psychosocial risks and/or work-related stress is related to having an organisational action plan to prevent work-related stress, and in turn, better psychosocial working conditions (in terms of job demands and resources), and less reported work-related stress in the workforce.

It does so by comparing EU member states and candidate countries that have introduced more specific legislation to those that have not and by conducting multilevel modelling analysis linking two representative European-level datasets, the 2014 employer European Survey of Enterprises on New & Emerging Risks (ESENER) and the 2015 employee European Working Conditions Survey (EWCS). The analysis is underpinned by the Job Demands Resources model, which proposes that working conditions can be categorized into two broad categories, job demands and job resources which, in turn, have a corresponding impact on health and performance outcomes (Bakker and Demerouti, 2017; Schaufeli and Taris, 2014).

2. Methods

2.1. Data source and participants

We first conducted a review of legislation on psychosocial risks and/or work-related stress in European countries (see next section). We then used data from two different European-level surveys that each used a multistage stratified random sampling design. The first was the second European Survey of Enterprises on New and Emerging Risks (ESENER-2) that was carried out in 2014 which records how health and safety is organised at workplaces across 36 European countries (EU-OSHA – European Agency of Safety and Health at Work, 2016). The survey encompasses public and private establishments with more than five employees, with ‘the person who knows best about health and safety in this establishment’ through computer assisted telephone interviewing. Data from 49,320 establishments was collected although we only included enterprises which had at least 10 employees and removed organisations from Iceland ($N = 35,765$) as this country was not included in the EWCS.

The second data source was the sixth European Working Conditions Survey (Eurofound - European Foundation for the Improvement of Living and Working Conditions, 2017). Based on face-to-face interviews in 2015 with 43,850 workers from 35 European countries the survey covers a range of employment statuses, working conditions, and worker health to capture the multifaceted dimensions of work in Europe. For the present study we filtered out participants who were not employees and did not work in organisations with at least 10 employees resulting in 24,702 respondents (50.4% female; Mean age = 42.7, SD = 11.5). The two datasets were chosen to allow for the analysis of the relationship between psychosocial risk management organisational practices reported through ESENER in 2014 and psychosocial working conditions and the experience of employee work-related stress as reported through the EWCS in 2015. Even though a more recent ESENER dataset exists, there was no recent EWCS complete dataset at the time of analysis due to the Covid-19 pandemic. Table 1 presents the sample characteristics from both datasets.

2.2. Measures

2.2.1. National-level legislation

A review of national level legislation was conducted for the 35 countries that were included in both the ESENER 2014 and EWCS 2015 datasets that were used in the analysis. The review included academic and grey literature, the ILO LEGOSH database, and Eurofound and EU-OSHA country profiles. From the included countries, nineteen (54%) had specific national legislation on psychosocial risks and/or work-related stress while sixteen (46%) had no specific national legislation. While the UK and Ireland had no specific legislation on psychosocial risks and/or work-related stress, there was indirect coverage of stress in

Table 1
Sample characteristics.

Country	ESENER			EWCS						
	Total	Org. size		Total	Org. size		Sex (%)		Age	
		10–249	250+		10–249	250+	Female	Male	Mean	SD
Albania	371	353	18	283	234	49	63.6	36.4	37.4	11.8
Austria	1069	863	206	613	311	302	51.9	48.1	41.2	11.1
Belgium	1206	1063	143	1747	800	947	50.6	49.4	42.4	10.8
Bulgaria	578	500	78	578	485	93	55.5	44.5	45.0	11.7
Croatia	555	482	73	569	333	236	50.8	49.2	43.3	10.9
Cyprus	560	536	24	471	358	113	49.5	50.5	37.4	12.1
Czech Republic	1185	1045	140	584	369	215	51.3	48.7	43.3	10.9
Denmark	1168	1002	166	756	294	462	48.5	51.5	46.3	11.4
Estonia	547	509	38	651	428	223	59.7	40.3	44.6	12.8
Finland	1143	1019	124	639	275	364	54.9	45.1	45.3	11.3
France	1669	1359	310	1092	455	637	50.1	49.9	42.6	10.9
Germany	1754	1324	430	1217	684	533	47.4	52.6	44.6	11.6
Greece	991	925	66	297	202	95	40.4	59.6	41.8	10.1
Hungary	1145	1009	136	519	377	142	54.5	45.5	44.2	10.1
Ireland	597	501	96	620	307	313	53.0	47.0	41.7	11.8
Italy	1656	1422	234	494	344	150	50.8	49.2	46.0	9.8
Latvia	540	477	63	534	406	128	59.9	40.1	44.8	12.6
Lithuania	587	501	86	622	511	111	57.9	42.1	44.5	12.4
Luxembourg	554	502	52	705	342	363	47.2	52.8	41.8	9.9
Malta	395	355	40	739	360	379	43.4	56.6	40.9	12.5
Montenegro	247	242	5	478	378	100	42.1	57.9	42.1	11.6
FYROM *	505	464	41	488	341	147	48.6	51.4	41.6	11.5
Netherlands	1131	927	204	711	256	455	50.8	49.2	43.6	13.2
Norway	1301	1233	68	742	366	376	55.0	45.0	42.8	12.8
Poland	1798	1470	328	540	377	163	55.6	44.4	40.9	11.6
Portugal	1062	918	144	430	271	159	57.0	43.0	43.4	10.5
Romania	590	481	109	504	376	128	43.8	56.2	41.6	10.2
Serbia	564	478	86	455	288	167	45.7	54.3	41.7	11.2
Slovakia	547	481	66	621	400	221	56.7	43.3	43.9	11.2
Slovenia	732	660	72	1043	547	496	53.9	46.1	43.6	9.7
Spain	2180	1931	249	1768	1004	764	48.3	51.7	42.0	10.6
Sweden	1120	967	153	790	319	471	51.1	48.9	45.0	12.0
Switzerland	1153	940	213	545	340	205	47.7	52.3	41.6	11.8
Turkey	1703	1520	183	709	508	201	27.2	72.8	35.0	9.8
United Kingdom	2862	2522	340	1148	399	749	49.1	50.9	42.8	12.5

Notes: * Former Yugoslav Republic of Macedonia.

the national level legal system (Table 2). We quantified this in the dataset whereby 0 indicated that a country does not have specific legislation on work-related stress and 100 indicated that a country has specific legislation on work-related stress (direct and indirect).

2.2.2. Work-related stress action plans

A single item from the ESENER-2 survey was used to assess the presence of an action plan (EU-OSHA – European Agency of Safety and Health at Work, 2016): “Do you have an action plan to prevent work-related stress?” Establishments responded with a “yes” or “no” which was scored dichotomously with a value of 100 representing the presence of such an action plan.

2.2.3. Individual-level job demands

Three measures from the sixth EWCS (Eurofound - European Foundation for the Improvement of Living and Working Conditions, 2017) made up job demands as a latent factor. The choice of these items was informed by Eurofound research (2019). Quantitative demands (e.g., does your job involve working at very high speed?), emotional demands (e.g., does your job involve handling angry clients, customers, patients, pupils etc.), and pace determinants (e.g., is your pace of work dependent on automatic speed of a machine or movement of a product?) were each measured by three items. Quantitative demands items were rated on a five-point scale (ranging from “never” (0) to “always” (100), emotional demands items were rated on a seven-point scale ranging from “never” (0) to “all of the time” (100), and pace determinants were dichotomously scored with a “yes” (100) or “no” (0). Higher scores indicated higher levels of job demands.

2.2.4. Individual-level job resources

This latent factor consisted of four measures from the sixth EWCS (Eurofound - European Foundation for the Improvement of Living and Working Conditions, 2017) with the choice of items again informed by Eurofound (2019) research. Employee participation consisted of three items (e.g., you are consulted before objectives are set for your work). Four items, where three items were dichotomous “yes” (100) or “no” (0), measured job control (e.g., are you able to change your order of tasks?). Supervisor (e.g., your immediate boss provides useful feedback on your work) and colleague (e.g., your colleagues help and support you?) support were measured by seven and three items respectively. Unless otherwise specified, participants responded on a five-point scale ranging from “never” (0) to “always” (100), with a higher score indicating higher levels of job resources.

2.2.5. Individual-level work-related stress

Participants indicated their level of work-related stress on a single item from the sixth EWCS (Eurofound - European Foundation for the Improvement of Living and Working Conditions, 2017): “how often do you experience stress in your work?”. This was rated on a five-point scale ranging from “never” (0) to “always” (100). Higher scores indicated a higher level of stress.

2.3. Data analysis

The R-statistical software version 4.1.2 (R Core Team, 2021) was used for the data analysis. Three main R packages were used: *lavaan* version 0.6–9 for structural equation modelling (SEM; Rosseel, 2012),

Table 2
National-level legislation on psychosocial risks/work-related stress across European countries.

Country	National-level legislation
Albania	No
Austria	Yes
Belgium	Yes
Bulgaria	Yes
Croatia	Yes
Cyprus	No
Czech Republic	Yes
Denmark	Yes
Estonia	Yes
Finland	Yes
France	Yes
Germany	Yes
Greece	No
Hungary	Yes
Ireland	Yes*
Italy	Yes
Latvia	No
Lithuania	No
Luxembourg	No
Malta	No
Montenegro	No
Former Yugoslav Republic of Macedonia	No
Netherlands	Yes
Norway	Yes
Poland	No
Portugal	Yes
Romania	No
Serbia	No
Slovakia	No
Slovenia	No
Spain	No
Sweden	Yes
Switzerland	Yes
Turkey	No
United Kingdom	Yes*

Notes: Correct as of December 2021; * indirect coverage in legal system.

lme4 version for multilevel modelling (Bates, D. et al., 2015), and *tidyverse* version 1.3.1 for data manipulation (Wickham et al., 2019).

Statistical analysis was conducted according to the following five-stage approach. First, we standardised all items in our datasets as indexes ranging from 0 to 100. This allows for equality in range and variance as well as reducing multicollinearity (Kline, 2016). Dichotomous responses were coded as “0 = No” and “100 = Yes”. Second, the validity and reliability properties for both surveys have been confirmed in their technical guides (Eurofound, 2019), in addition to published studies elsewhere that draw on this data (e.g., Aldasoro and Cantonnet, 2021; Dediu et al., 2018; Houtman et al., 2020). Nevertheless, we carried out a confirmatory factor analysis on the job demands and job resources factors at the individual level from the sixth EWCS. The categorical least squares (cat-ULSMV) estimation (Morata-Ramírez and Holgado-Tello, 2013) procedure was used to fit the data to the proposed model which confirmed an appropriate fitting model (RMSEA = 0.07; SRMR = 0.06; CFI = 0.95; TLI = 0.94; $\chi^2 = 29543.1$, $df = 278$, $p < .001$), and reliability coefficients (Cronbach’s Alpha between .65 and .93; Byrne, 2012). The means of these items were then calculated to obtain an index score per person each for job demands and job resources, as well as each respective sub-factor.

Third, we linked the ESENER-2, the sixth EWCS and the national-level legislation datasets. We used data from the 35 countries included in both surveys: the 28 EU Member States along with Albania, FYROM, Montenegro, Norway, Serbia, Switzerland, and Turkey. Responses from ESENER-2 were aggregated to the national, industry and company size level to create an organisational action plan index. The index is calculated considering companies with 10–249 and 250+ employees within a specific sector (e.g., construction) in a specific country. This index was

assigned to each respondent of the sixth EWCS following the same criteria. This implies that each individual employee in the sixth EWCS was assigned the index score calculated from the ESENER-2 which is specific to the company size, industry, and country they belong to. With these two datasets linked, the final step was to create an additional variable representing whether the country has national-level legislation on work-related stress as previously explained.

Fourth, a path analysis in structural equation modelling (SEM) was fitted to the model proposed in Fig. 1. As data was moderately skewed, estimates were calculated using maximum likelihood with robust standard errors (MLR) (Lai, 2018). We used bias corrected bootstrapping (set at 1000 at 95% confidence intervals) to simulate the sampling distribution of the coefficients between countries with and without stress legislation. These tested the confidence intervals for the direct and indirect effects between work-related stress action plans, job demands, job resources and individual-level work-related stress.

Finally, a multilevel analysis was implemented to identify any unmeasured source of variation at the country level. We consider the country level because: a) we acknowledge that countries may differ in their ability to promote organisational action on stress management that is not explained by legislation only; and b) countries may differ in their capabilities to enforce legislation. Micro levels (e.g., industry and organisational size) could not be added because of limited data points even when clustered. We used a two-step Maximum Likelihood (ML) process. First, we had to ensure multilevel modelling is appropriate for our outcome variables by testing an unconditional model where only the dependent variable and the grouping variable were entered (model 0). Next, we added level predictors to assess regression coefficients as well as within and between levels effects. We did this by fitting models per each relevant path in our research (model 1) where work-related stress, job demands, job resources, and organisational stress actions plans were set as outcome variables.

3. Results

3.1. Correlations

Table 3 presents the descriptive statistics and correlations for the study measures. Internal reliability for all measures was acceptable ($\alpha > 0.65$). All relevant correlations were significant ($p < .05$).

3.2. Testing the proposed model

The model (Fig. 2) tested demonstrated an acceptable fit (RMSEA = 0.06; SRMR = 0.03; CFI = 0.96, TLI = 0.87; $\chi^2 = 238.1$; $df = 3$; $p < .001$). As anticipated, path coefficients show that the presence of national-level stress legislation predicted more enterprises having a work-related stress action plan (standardised confidence intervals (C.I.) = 0.19–0.21, $p < .001$). In turn, work-related stress action plans were associated with an increased level of perceived stress (C.I. = 0.04–0.06, $p < .001$), job demands (C.I. = 0.02–0.05, $p < .001$) and job resources (C.I. = 0.09–0.12, $p < .001$) being reported, however these relationships were weak. Level of work-related stress within individuals was positively associated with levels of job demands (C.I. = 0.41–0.43, $p < .001$), but not with levels of job resources (C.I. = -0.03 – 0.00 , $p > .05$). This implies that while higher job demands were related to higher level of reported stress, the effect of job resources was not statistically significant. The negative correlation observed between job resources and job demands is consistent with the theoretically proposed interaction between these variables (Bakker and Demerouti, 2007).

Further country group comparisons were conducted to identify whether this single global model is sufficient to describe the data, or whether some or all paths vary by national-level stress legislation. Fig. 3 presents the standardised coefficients for this analysis. The figure shows that the indirect path coefficients going through job demands and the direct effect from action plans on stress are similar in both groups. There

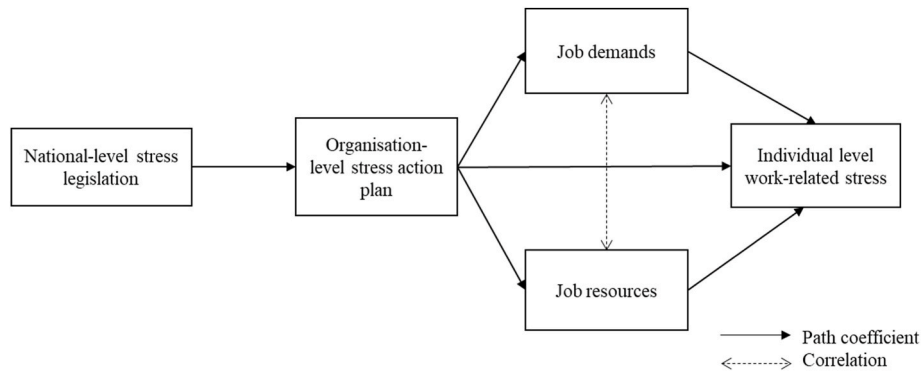


Fig. 1. Research model.

Table 3
Correlation matrix.

	Mean (SD)	1	2	3	4
1. Stress legislation ¹	–				
2. Action plans	39.6 (25.4)	.21***			
3. Stress	49.1 (28.4)	.01*	.05***		
4. Demands	34.7 (18.8)	.09***	.03***	.43***	
5. Resources	67.9 (17.7)	.06***	.11***	.09***	-.21***

Notes: 1 0 = No; 100 = Yes.
*p ≤ .05; **p ≤ .01; ***p ≤ .001.

is, however, a difference between countries when the indirect path through job resources is reviewed. The effect of job resources on stress is significant only in countries with stress legislation. This implies that job

resources reduce individual stress only for those countries with stress legislation. Although the action plans have a positive effect on both groups of countries, the magnitude of the effect is bigger for those countries with stress legislation.

We further confirmed these differences with a multigroup analysis. A multigroup analysis begins with the estimation of a 'reference model' in which all parameters are allowed to differ between groups (with and without legislation), and a 'constrained model' in which intercepts and path coefficients are fixed to those obtained from the global model. Then, both models are compared using a scaled chi-squared (χ^2) difference test. By implementing this procedure, we found that both models were significantly different (scaled χ^2 difference = 254, $p < .001$), indicating that there is group variation in the path coefficients that is not detected in the global model. To understand which paths are the same and which are different between groups, we sequentially constrained the

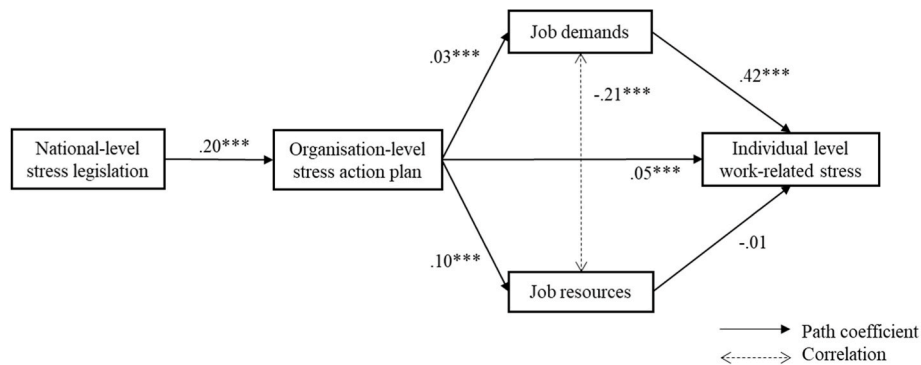


Fig. 2. Standardised coefficients for the proposed model. Note, ***p < .001.

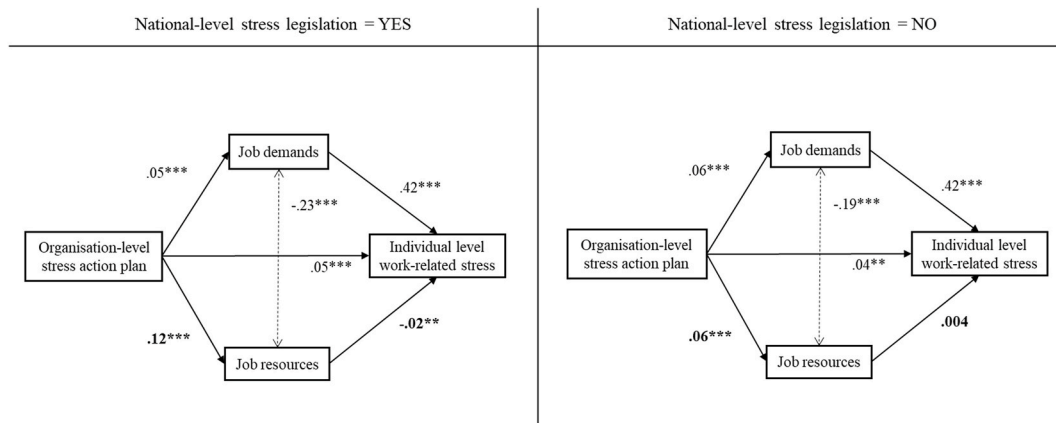


Fig. 3. Standardised coefficients for each country group. Note. **p < .01. ***p < .001.

coefficients of each path and re-fitted the model. By doing so, only two constrained models were significantly different from the reference model. The first significantly different model constrained the path from organisational action plans to job resources (scaled χ^2 difference = 9.77, $p < .01$). The second significant model constrained the indirect path from organisation-level stress action plans to individual-level work-related stress passing through job resources (scaled χ^2 difference = 13, $p < .01$). All the other constrained paths resulted in non-significant differences with the reference model. This confirms that national-level stress legislation facilitates the implementation of organisational action plans which will meaningfully increase job resources and, therefore, reduce stress at work.

The last step in our analysis aimed to identify any source of variance not explained by our main model. We implemented a two-level analysis accounting for variance at Level 1 (individual-EWCS/organisational-ESENER) and Level 2 (country). We fitted models without (model 0) and with predictors (model 1) for each outcome variable: work-related stress, job demands, job resources, and actions plans. Table 4 presents the standardised coefficients for the fixed and random effects of this analysis. Random effects are useful to partition the variance in the dependent variable and calculate the contribution of each level. Table 4 shows that all unconditional models (model 0) are highly significant when the country level is included (LTR $p < .001$). This implies that there is significant variation at the country level (Level 2) that is not explained at Level 1 (individual/organisational level). Model 1 for all

outcome variables follows a similar trend regarding the contribution of the country level when predictors are included.

Furthermore, the contribution of the country is low for most outcome variables as indicated by the random coefficients of 0.037 for stress, 0.066 for job demands and 0.067 for job resources. The variance explained by action plans (controlling for legislation) is lower as indicated by the random coefficients of 0.003 for stress, 0.006 for job demands, and 0.003 for job resources. However, for organisational action plans, a high amount of variance is explained by the country level (random coefficient of 0.486) in model 0. Congruent with our main research model depicted in Figs. 1 and 2, the impact of legislation is direct for action plans, but indirect for stress, job demands and job resources. Legislation is expected to impact these variables only through the implementation of organisational action plans. Table 4 further shows that in model 1, legislation has a high contribution to action plans (0.324), while the country effect goes down when legislation is added (0.259). This implies that legislation has a significant effect in addition to the country contribution to organisational action plans.

4. Discussion

The current study aimed to explore whether the presence of specific national legislation on psychosocial risks and/or work-related stress is related to having an organisational action plan to prevent work-related stress, and in turn, better psychosocial working conditions, and less reported work-related stress in the European workforce. The findings indeed indicate that the presence of specific national-level stress legislation is associated with more enterprises having a work-related stress action plan. These organisational-level work-related stress action plans were then found to be associated with an increased level of reported job demands, job resources and work-related stress.

Although, surprisingly, the existence of organisational-level work-related stress action plans was found to be associated with higher reported job demands and work-related stress, these observed associations were weak. A slightly stronger association was found between organisational-level work-related stress action plans and reported job resources. Therefore, the existence of national level legislation seems to result in more enterprises putting in place action plans (interventions) and increasing job resources. However, these action plans/interventions do not necessarily result in reducing job demands. This raises the question of the nature of the interventions put in place at the organisational level to deal with work-related stress. Job demands are best tackled through the implementation of primary-level interventions focusing on the prevention of work-related stress through improved work organisation and design (ILO – International Labour Organization, 2016; Leka et al., 2015). Based on the findings, it is questionable whether European enterprises are indeed putting in place primary-level interventions and may instead be implementing secondary or tertiary-level interventions which respectively aim to develop the resources and rehabilitation of an individual (ILO – International Labour Organization, 2016; Leka et al., 2015). The results from the ESENER-2 survey seem to confirm this assertion, as even though enterprises report taking actions to make changes to the way work is organised, the focus of the interventions tended to be more at the individual level through provision of training and counselling for employees and the set-up of conflict resolution procedures (EU-OSHA – European Agency of Safety and Health at Work, 2016).

In the global model, the level of work-related stress within individuals was significantly positively associated with job demands, and although there was a negative association with job resources, this was not significant. This is congruent with the central tenant of the Job Demands Resources Model (Demerouti et al., 2001) where job demands and job resources are differentially related with health outcomes. For job demands their primary association is with measures of worker strain – including work-related stress and burnout. Here, job demands elicit a stress process that depletes an individual’s energy and effort which

Table 4
Standardised random and fixed coefficients.

Outcome	Parameters ^a	Model 0		Model 1	
		Fixed	Random	Fixed	Random
Work-related stress	Level 1 Individual	-.019	.966	-.026	.770
	- Job demands ^b			.428***	.008
	- Job resources ^b			-.012	.000
	Level 2 Country		.038		.037
	- Action plans ^c			.013	.003
	LTR – Country	731 (1)***		519.47***	
	- Action plans			14.27***	
	Intraclass correlation (ICC)	.037		.055	
Job demands	Level 1 Individual	.017	.949	-.007	.947
	Level 2 Country		.061		.066
	- Action plans ^c			.031	.006
	LTR – Country	1071 (1)***		821***	
	- Action plans			47.0***	
	Intraclass correlation (ICC)	.061		.065	
	Level 1 Individual	-.033	.938	-.038	.939
Level 2 Country		.066		.067	
- Action plans ^c			.024	.003	
LTR – Country	1271 (1)***		721 (1)***		
- Action plans			11 (1)**		
Intraclass correlation (ICC)	.066		.066		
Action plans	Level 1 Organisational	-.151	.512	-.398**	.512
	Level 2 Country		.486		.259
	- Legislation			.455*	.324
	LTR – Country	15,824 (1)***		4537 (1)***	
	- Legislation			2.7 (1)	
	Intraclass correlation (ICC)	.487		.336	

Notes.
LTR: Likelihood-ratio test.
* $p < .05$ ** $p < .01$ *** $p < .001$.

^a All predictors have been scaled for computational efficiency and model convergence. Action plans are mean centred considering legislation as group.

^b Demands and resources are allowed to vary at the individual level (random slopes).

^c Action plans are allowed to vary at the country level (random slopes) and controlled by legislation.

incurs both at a psychological and physical level (Teoh et al., 2020; van Emmerik et al., 2009). In comparison, job resources are primarily associated with positive manifestations of well-being such as work engagement and motivation. This is attributed to job resources' role in helping an individual reach goals, grow, develop, and learn (Bakker et al., 2003). These findings emphasise the need for more holistic understanding of worker well-being, including more positive facets and not only work-related stress.

The negative relationship observed between job demands and job resources is congruent with the extant research (Bakker and Demerouti, 2017; Teoh et al., 2020). Crucially, the effect sizes observed here were not strong, supporting the proposition that job demands and job resources are not opposite ends of the same spectrum. Instead, although related, they remain independent of each other – implying that high job resources can exist even in workplaces that experience high job demands.

Further analysis indicated that in those countries with specific national legislation on stress, there was a significant indirect relationship between both job demands (positive) and job resources (negative) and reported stress through the existence of organisational action plans as also confirmed by the multilevel analysis. However, no indirect effect was found for job resources in those countries without legislation on stress. This might imply that specific national level legislation on stress may facilitate the implementation of organisational action plans which increase job resources and, therefore, reduce stress at work. On the other hand, there was no difference between the two groups of countries in relation to job demands which reinforces the question in relation to the type of interventions that are being implemented by European enterprises.

This study aimed to contribute to current policy debate on the possible introduction of further or more specific legislation on psychosocial risks in the Europe Union. While recognising that some of the relationships observed in this study are weak, the study does provide evidence that the introduction of specific national-level legislation on work-related stress is associated with more organisations having an action plan to tackle work-related stress. Therefore, this study lends support to the argument that making European legislation more specific might result in more organisational action on work-related stress. Several authors have criticised the lack of inclusion of specific terms, such as psychosocial risks or work-related stress, in the EU framework directive on health and safety at work (e.g., Ertel, et al., 2010; ETUC – European Trade Union Congress, 2020). Considering the current and ongoing debate on whether new legislation on psychosocial risks should be introduced at EU level as part of the need to prioritise dealing with psychosocial risks in the future of work (Leka, 2021), the results of this study indicate that there might be positive benefits associated with such an approach. However, other policy approaches should also be considered and used to achieve positive outcomes in this area.

In addition, findings indicate that only in those countries where specific legislation on psychosocial risks and/or work-related stress exists, this is associated with less reported work-related stress in the workforce through the existence of more organisational-level action plans, and more reported job resources. This is an interesting finding that deserves further exploration and may indicate that the introduction of specific legislation may result in the development of organisational action plans that lead to increased job resources and decreased work-related stress. On the other hand, the finding that there is no difference between countries with and without legislation as concerns the relationship between organisational action plans and job demands, raises the question of the kinds of interventions that are being implemented and whether these focus on the primary level (organisational) or secondary and tertiary levels (individual). In light of rapid technological developments and changes in the way work is organised and managed, it is important that further emphasis is put on the need to implement a preventive approach in addressing psychosocial risks and work-related stress by improving work organization and design and not only

increasing individual resources.

The introduction of specific legislation in occupational health and safety has the aim of reinforcing organisational action and good practices that will improve working conditions and related outcomes (EU-OSHA—European Agency for Safety and Health at Work, 2010). The current study findings provide some supporting evidence to this notion.

4.1. Strengths and limitations of this study

The study has several strengths. First, it provides clear evidence of the relationship between specific national legislation and organisational action on work-related stress. The study was based on data from large and nationally representative samples using robust survey items developed and tested to ensure validity and reliability across an international context (Eurofound 2017; 2019). The sample size allowed for adequate statistical power to perform multilevel modelling analysis and link the two representative European-level datasets. Second, the multilevel perspective employed allowed us to integrate data collected at the individual level (i.e., the sixth EWCS) with data collected at the organisational level (i.e., ESENER-2) and to test how factors at a higher level, such as national legislation and organisational actions, are related to the perception of psychosocial working conditions and health outcomes of individual workers (Heck and Thomas, 2015). Utilising and integrating existing datasets not only allow for more novel research questions to be considered but also increases the utility and value of existing datasets (Longhi and Nandi, 2015) that underpin the decision making of policy makers. Third, by drawing on three different data sources we reduced the likelihood of common method variance inflating the effect sizes of observed relationships (Podsakoff et al., 2003).

There are also some important limitations, which must be acknowledged. First, the study is based on cross-sectional data, which do not allow us to draw conclusions about causality. Second, the use of self-reported data on the employee perceptions of the psychosocial work environment and work-related stress (EWCS) does allow for the possibility of common method variance (Podsakoff et al., 2003) and therefore a risk of overestimation of the real association for the relationships involving work-related stress. This, however, does not impact the significance of the findings between specific legislation and organisational action, and worker responses are drawn from three different data sources from three different, sequential, points in time. In addition, the relationships between demands, resources and stress are well established in the literature (ILO – International Labour Organization, 2016; WHO, 2010). Third, we only carried out multilevel analyses across two levels. We were not able to converge three-level models that included industry and organisational size. This is likely due to the lack of appropriate clustering data, whereby some countries did not have all industries represented while in other countries there were some industries with very few workers clustered within them. Finally, although this study contains a large number of cases at the lower, individual level, at the higher, national level there were only 35 countries. The implication of this includes reduced variability in responses that could also undermine power (Teoh et al., 2021). However, this is a common issue in situations where there are limited cases at the higher level and in particular when making national level comparisons (Meuleman and Billiet, 2009). While not ideal (Dusetzina et al., 2014), we also factored in the company size and sector of an individual in addition to their country to increase the range of responses and precision within the organisational action plan index.

5. Conclusion

Psychosocial hazards are recognised as a key priority to be addressed in the future of work. Managing psychosocial hazards is expected to become increasingly complex in light of rapid technological developments, changes in the employment relationship and workforce

diversity. Therefore, there is an urgent need to implement agile policy and actions geared towards prevention (Leka, 2021). While there have been calls in the last two decades to adopt specific legislation on risks emanating from psychosocial hazards at work, this option has not been implemented in all European countries, despite evidence that specific legislation provides clarity on employer responsibilities and motivates organisations to implement appropriate actions to tackle occupational health and safety risks (EU-OSHA—European Agency for Safety and Health at Work, 2019). In the aftermath of the Covid-19 pandemic, psychosocial hazards and mental health at work have gained renewed focus and so have calls for the introduction of specific EU legislation to address them. The findings of the current study provide support to this notion since more organisational action on work-related stress was identified in those countries that have already adopted specific legislation. Furthermore, a link was identified between the existence of organisational action plans, the provision of more job resources and less reported work-related stress in those countries with specific legislation. The fact that a similar link was not discovered between organisational action plans and a reduction in job demands raises questions on the types of interventions organisations choose to implement which may be more secondary and tertiary rather than primary in nature (therefore aiming at the provision of individual resources, and rehabilitation rather than at healthy work organisation and design). Given the accelerated changes in work organisation that are currently under way, it is important that any legislation and policies that may be introduced in this area, prioritise and clarify these interventions for employers. Further support to organisations will also be necessary for the design and implementation of these interventions. Finally, this research has demonstrated how analysis of large-scale representative data at European level can support evidence-based knowledge development that can provide useful insights in policy and practice.

Credit author statement

Aditya Jain: Conceptualisation, Literature review, Policy analysis, Abstract, Discussion, Revisions, **Luis D. Torres:** Analysis, Method, Results, Revisions, **Kevin Teoh:** Results, Discussion, Revisions, **Stavroula Leka:** Conceptualisation, Literature review, Policy analysis, Introduction, Discussion, Revisions.

Declaration of competing interest

None.

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References

- Aldasoro, J.C., Cantonnet, M.L., 2021. The management of the new and emerging musculoskeletal and psychosocial risks by EU-28 enterprises. *J. Saf. Res.* 77, 277–287.
- Bakker, A.B., Demerouti, E., 2007. The job demands-resources model: state of the art. *J. Manag. Psychol.* 22 (3), 309–328.
- Bakker, A.B., Demerouti, E., 2017. Job demands–resources theory: taking stock and looking forward. *J. Occup. Health Psychol.* 22 (3), 273.
- Bakker, A.B., Demerouti, E., De Boer, E., Schaufeli, W.B., 2003. Job demands and job resources as predictors of absence duration and frequency. *J. Vocat. Behav.* 62 (2), 341–356.
- Bates, D., et al., 2015. Fitting linear mixed-effects models using lme4. *J. Stat. Software* 67 (1), 1–48.
- Byrne, B.M., 2012. *Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming*. Routledge/Taylor & Francis Group.
- Council Directive 89/391/EEC of 12, June 1989. On the introduction of measures to encourage improvements in the safety and health of workers at work. *Orkesterjournalen L 183*, 1–8, 29.6.1989.
- Dediu, V., Leka, S., Jain, A., 2018. Job demands, job resources and innovative work behaviour: a European Union study. *Eur. J. Work. Organ. Psychol.* 27 (3), 310–323.
- Demerouti, E., Bakker, A.B., Nachreiner, F., Schaufeli, W.B., 2001. The job demands-resources model of burnout. *J. Appl. Psychol.* 86 (3), 499–512.
- Dusetzina, S.B., Tyree, S., Meyer, A.M., Meyer, A., Green, L., Carpenter, W.R., 2014. *Linking Data for Health Services Research: A Framework and Instructional Guide*. Agency for Healthcare Research and Quality, Rockville, MD.
- Eller, N.H., Netterström, B., Gyntelberg, F., et al., 2009. Work-related psychosocial factors and the development of ischemic heart disease. *Cardiol. Rev.* 17, 83–97.
- Ertel, M., Stiljanow, U., Iavicoli, S., Natali, E., Jain, A., Leka, S., 2010. European social dialogue on psychosocial risks at work: benefits and challenges. *Eur. J. Ind. Relat.* 16 (2), 169–183.
- Eurocadres, 2022. EndStress.eu campaign reaches the European Parliament. Available at <https://www.eurocadres.eu/news/the-endstress-eu-campaign-reaches-the-european-parliament/>.
- ETUC – European Trade Union Congress, 2020. ETUC position on a new EU strategy on Occupational Safety and Health. Adopted at the Executive Committee Meeting of 22–23 October 2019. Available at https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12673-Health-&-Safety-at-Work-EU-Strategic-Framework-2021-2027-/F1290873_en.
- European Commission, 2019. A critical evaluation of the EU policy context. Peer Review on “Legislation and practical management of psychosocial risks at work”, Stockholm (Sweden), 3–4 October 2019, DG Employment, Social Affairs and Inclusion. Available at <https://ec.europa.eu/social/main.jsp?catId=89&furtherNews=yes&newsId=9803&langId=en>.
- Eurofound - European Foundation for the Improvement of Living and Working Conditions, 2017. *Sixth European Working Conditions Survey – Overview Report (2017 Update)*. Publications Office of the European Union, Luxembourg.
- Eurofound - European Foundation for the Improvement of Living and Working Conditions, 2019. *Working Conditions and Workers' Health*. Publications Office of the European Union, Luxembourg.
- EU-OSHA—European Agency for Safety and Health at Work, 2010. *European Survey of Enterprises on New and Emerging Risks: Managing Safety and Health at Work*. European Risk Observatory Report. Office for Official Publications of the European Communities, Luxembourg.
- EU-OSHA - European Agency for Safety and Health at Work, 2015. *Second European Survey of Enterprises on New and Emerging Risks (ESENER-2)*. Publications Office of the European Union, Luxembourg.
- EU-OSHA – European Agency of Safety and Health at Work, 2016. *Second European Survey of Enterprises on New and Emerging Risks (ESENER-2). Overview Report: Managing Safety and Health at Work*. Publications Office of the European Union, Luxembourg.
- EU-OSHA—European Agency for Safety and Health at Work, 2018. *Foresight on New and Emerging Occupational Safety and Health Risks Associated Digitalisation by 2025*. European Risk Observatory report. Publications Office of the European Union, Luxembourg. <https://osha.europa.eu/en/publications/foresight-new-and-emerging-occupational-safety-and-health-risks-associated/view>.
- EU-OSHA—European Agency for Safety and Health at Work, 2019. *Third European Survey of Enterprises on New and Emerging Risks (ESENER 3): First Findings*. Publications Office of the European Union, Luxembourg.
- Heck, R.H., Thomas, S.L., 2015. *An Introduction to Multilevel Modeling Techniques*. Routledge, New York, NY.
- Houtman, I., van Zwieten, M., Leka, S., Jain, A., de Vroome, E., 2020. Social dialogue and psychosocial risk management: added value of manager and employee representative agreement in risk perception and awareness. *Int. J. Environ. Res. Publ. Health* 17 (10), 3672.
- ILO - International Labour Organization, 2016. *Workplace Stress: A Collective Challenge*. ILO, Geneva.
- ILO - International Labour Organization, 2019. *Work on a brighter future*. Global Commission for the Future of Work. https://www.ilo.org/global/publications/books/WCMS_662410/lang-en/index.htm.
- ILO - International Labour Organization, 2020. *Work-related psychosocial risks during the Covid-19 pandemic*. Available at https://www.ilo.org/global/topics/safety-and-health-at-work/resources-library/publications/WCMS_748638/lang-en/index.htm.
- Karasek, R.A., 1979. Job Demands, Job Decision Latitude, and Mental Strain: Implications for Job Redesign. *Adm. Sci. Q.* 24 (2), 285–308.
- Kivimäki, M., Nyberg, S.T., Batty, G.D., et al., 2012. Job strain as a risk factor for future coronary heart disease: collaborative meta-analysis of 2358 events in 197,473 men and women. *Lancet* 380, 1491–1497.
- Kline, R.B., 2016. *Principles and Practice of Structural Equation Modeling*, 4th. The Guilford Press, New York.
- Lai, K., 2018. Estimating standardized SEM parameters given nonnormal data and incorrect model: methods and comparison. *Struct. Equ. Model.: A Multidiscip. J.* 25 (4), 600–620.
- Leineweber, C., Marklund, S., Aronsson, G., Gustafsson, K., 2019. Work-related psychosocial risk factors and risk of disability pension among employees in health and personal care: a prospective cohort study. *Int. J. Nurs. Stud.* 93, 12–20.
- Leka, S., 2021. *The future of working in a virtual environment and occupational safety and health: Discussion paper*. European Agency for Safety & Health at work. Available at <https://osha.europa.eu/en/publications/future-working-virtual-environment-and-occupational-safety-and-health>.
- Leka, S., Jain, A., Iavicoli, S., Di Tecco, C., 2015a. An evaluation of the policy context on psychosocial risks and mental health in the workplace in the European Union: achievements, challenges, and the future. *BioMed Res. Int.* 2015 (213089), 18. <https://doi.org/10.1155/2015/213089>.

- Leka, S., Van Wassenhove, W., Jain, A., 2015b. Is psychosocial risk prevention possible? Deconstructing common presumptions. *Saf. Sci.* 71, 61–67.
- Longhi, S., Nandi, A., 2015. Working with Multiple Datasets: A Practical Guide to Using Panel Data (Pp. 79–104. SAGE Publications.
- MacKay, C.J., Cousins, R., Kelly, P.J., Lee, S., McCaig, R.H., 2004. 'Management Standards' and work-related stress in the UK: policy background and science. *Work. Stress* 18 (2), 91–112.
- Madsen, I.E.H., Nyberg, S.T., Magnusson Hanson, L.L., Ferrie, J.E., Ahola, K., Alfredsson, L., Batty, G.D., Ipd-Work Consortium, 2017. Job strain as a risk factor for clinical depression: systematic review and meta-analysis with additional individual participant data. *Psychol. Med.* 47 (8), 1342–1356.
- Meuleman, B., Billiet, J., 2009. A Monte Carlo sample size study: how many countries are needed for accurate multilevel SEM? *Survey Research Methods* 3 (1), 45–58.
- Morata-Ramírez, M., Holgado-Tello, F.P., 2013. Construct validity of Likert scales through confirmatory factor analysis: a simulation study comparing different methods of estimation based on Pearson and polychoric correlations. *International Journal of Social Science Studies* 1 (1), 54–61.
- Navarro, A., Salas Nicás, S., Moncada, S., et al., 2018. Prevalence, associated factors and reasons for sickness presenteeism: a cross-sectional nationally representative study of salaried workers in Spain, 2016. *BMJ Open*, 8:e021212. doi:10.1136/bmjopen-2017-021212.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88 (5), 879–903.
- R Core Team, 2021. R: a language and environment for statistical computing. In: R Foundation for Statistical Computing. Austria, Vienna. <https://www.R-project.org/>.
- Rosseel, Y., 2012. lavaan: an R package for structural equation modeling. *J. Stat. Software* 48 (2), 1–36.
- Russo, S., Ronchetti, M., Di Tecco, C., Valenti, A., Jain, A., Saverio Mennini, F., Leka, S., Iavicoli, S., 2021. Developing a cost-estimation model for work-related stress: an absence-based estimation using data from two Italian case studies. *Scand. J. Work. Environ. Health* 47 (4), 318–327.
- Schaufeli, W.B., Taris, T.W., 2014. A critical review of the job demands-resources model: implications for improving work and health. In: Bauer, G.F., Hämmig, O. (Eds.), Bridging occupational, organizational and public health: A transdisciplinary approach. Springer Science + Business Media, pp. 43–68.
- Schulte, P.A., Streit, J.M.K., Sheriff, F., Delclos, G., Felknor, S.A., Tamers, S.L., Fendinger, S., Grosch, J., Sala, R., 2020. Potential scenarios and hazards in the work of the future: a systematic review of the peer-reviewed and gray literatures. *Annals of Work Exposures and Health* 1–31.
- Taouk, Y., Spittal, M.J., Milner, A.J., LaMontagne, A.D., 2020. All-cause mortality and the time-varying effects of psychosocial work stressors: a retrospective cohort study using the HILDA survey. *Soc. Sci. Med.* 266 (113452) <https://doi.org/10.1016/j.socscimed.2020.113452>.
- Teoh, K.R.H., Hassard, J., Cox, T., 2020. Individual and organizational psychosocial predictors of hospital doctors' work-related well-being: a multilevel and moderation perspective. *Health Care Manag. Rev.* 45 (2), 162–172.
- Teoh, K.R.H., Hassard, J., Cox, T., 2021. Doctors' working conditions, wellbeing and hospital quality of care: a multilevel analysis. *Saf. Sci.* 135, 105115.
- Tsutsumi, A., Kayaba, K., Hirokawa, K., Ishikawa, S., & The jichi medical school cohort study group (2006). Psychosocial job characteristics and risk of mortality in a Japanese community-based working population: the jichi medical school cohort study. *Soc. Sci. Med.*, 63(5), 1276–1288.
- van Emmerik, H.I.J., Bakker, A.B., Euwema, M.C., 2009. Explaining employees' evaluations of organizational change with the job-demands resources model. *Career Dev. Int.* 14 (6), 594–613.
- Wickham, et al., 2019. Welcome to the tidyverse. *Journal of Open Source Software* 4 (43), 1686–1691.
- WHO – World Health Organization, 2010. Health Impact of Psychosocial Hazards at Work. WHO, Geneva.