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**Multiple psychosocial work exposures and well-being among employees:  
prospective associations from the French national Working Conditions  
survey**

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## **Abstract**

*Aims:* Working conditions, especially psychosocial work factors, are thought to influence mental health outcomes among working populations, but there have been few studies on well-being per se. We assessed the prospective associations between a wide variety of occupational factors, including psychosocial work factors (PWFs), and multiple exposure to these factors, and well-being among employees in France. *Methods:* This study was based on a nationally representative sample of 15,776 employees, including 6,595 men and 9,181 women, followed up from 2013 to 2016. Psychological well-being was assessed using the WHO-5 well-being index. Occupational factors included 20 PWFs, 4 factors related to working time/hours, and 4 physical work exposures. The associations of occupational exposures with poor well-being were estimated using weighted robust Poisson regression models in men and women separately. *Results:* Among the employees who rated their well-being as good in 2013, 10.3% of men and 16.8% of women had a poor well-being 3 years later. Most PWFs in 2013 were associated with poor well-being in 2016 among women, and half of them among men. An increase in the risk of poor well-being with the number of PWFs was found. Noise exposure was associated with poor well-being in women. *Conclusions:* The occupational factors associated with psychological well-being were mainly those related to the psychosocial work environment. A linear association was observed between the number of exposures to PWFs and well-being. Preventive policies focused on psychosocial work factors may be beneficial for well-being. More attention should be given to multiple exposures to these factors.

**Keywords:** working conditions, occupational exposures, psychosocial work factors, multiple exposures, well-being

## **Background**

Poor well-being may contribute to health problems and reduced longevity,<sup>1</sup> and may be associated with lower work engagement and productivity, and higher absenteeism.<sup>2</sup>

Two literature reviews suggested detrimental effects of psychosocial work factors (PWFs) on well-being.<sup>3,4</sup> Nevertheless, most of previous studies had a cross-sectional design and they often focused on the factors related to the job strain model (i.e. job demands, job control, and social support), therefore a limited number of exposures.<sup>3,4</sup> In addition, the studies assessing the impact of the exposure to multiple PWFs are lacking. One prospective study showed that the 1-year deterioration of well-being increased with an occupational stress score based on the exposure to 7 PWFs at baseline.<sup>5</sup>

This study aimed to examine the prospective associations of a large number of PWFs with poor well-being, as evaluated by the WHO-5 scale,<sup>6</sup> and to explore the effect of multiple occupational exposures on this outcome.

## **Methods**

### *Study participants*

As part of the periodic French Working Conditions survey conducted by the Ministry of Labour (DARES), a nationally representative sample of 30,274 people aged 15 years or more and working at the time of the survey in 2013 was invited to participate again in 2016. The data of the two survey waves were collected through a face-to-face interview followed by a self-administered questionnaire.

For the purpose of the present study, the sample was restricted to the 27,335 participants aged 15-65 years who were employees in 2013. Among the 26,041 (95.3%) who completed the questionnaire in 2013, the participation rate to the survey in 2016 was 74.9%. We excluded from the 19,513 resurveyed participants, 2,592 people who were not working at the time of the second survey, 24 aged over 65, 308 self-employed workers, and 813 non-respondents to the 2016 questionnaire, resulting in a sample of 15,776 employees including 6,595 men and 9,181 women.

### *Measurements*

Psychological well-being was assessed using the WHO-5 Well-Being Index, which is one of the validated scales to assess well-being.<sup>6</sup> Poor well-being was defined as a WHO-5 total score below 13. The studied outcome was the incidence of poor well-being in 2016 among the sample of those with good well-being in 2013.

The PWFs, measured in 2013, were inspired from various international concepts including some based on the Copenhagen Psychosocial Questionnaire (COPSOQ).<sup>7</sup> Multiple psychosocial work exposure was assessed globally and by grouping the PWFs into 5 categories (see Table I): demands at work (4 factors), work organization and job content (4 factors), interpersonal relationships (5 factors), work-individual interface (5 factors), and workplace violence (2 factors). More details may be found elsewhere.<sup>8-10</sup>

The other types of exposures were related to working time/hours (4 factors: long working hours, night work, shift work, unsocial work days) and physical working conditions (4 factors: exposures to fumes and dust, to toxic and dangerous products, to noise, and biomechanical exposure).

### *Statistical analyses*

All analyses were performed in men and women separately.<sup>11</sup> Robust Poisson regression analyses were performed on weighted data in order to correct the potential sample bias due to non-response and attrition, and to extrapolate the results to the French working population of employees. The reported risk ratios (RR) were adjusted for age, marital status, occupation, economic activity of the company in 2013, life event(s) during childhood and between 2013 and 2016.

Sensitivity analyses were performed to assess the robustness of the results (i) after additional adjustment for full/part-time work, public/private sector, company size, and chronic disease, (ii) after additional adjustment for working/time hours and physical work factors in the study of the number of psychosocial work exposures, (iii) by including employees in 2013 who had another work status in 2016 (except retired), and (iv) by studying the association of changes in occupational exposures between 2013 and 2016.

## **Results**

In 2013, 5,051 men (weighted %: 77.1%) and 6,572 women (71.2%) had a good well-being. Among these employees, 10.3% among men and 16.8% among women rated their well-being as poor 3 years later ( $P < 0.001$ ). Study sample description may be found in Supplementary Tables S1-S3.

When each factor was studied separately, 9 of the 20 PWFs in 2013 were predictive of poor well-being in 2016 among men, and 16 among women (Table I). The RRs were of similar magnitude for all significant PWFs and only one gender-related interaction was found, for cognitive demands ( $P=0.027$ ). The risk of poor well-being increased with the number of factors, overall and within almost all categories of PWFs (Table II). This increase was however not significant for quantitative demands in men and for workplace violence in both genders.

Working time/hours and physical work exposures were not associated with well-being, except noise in women: RR (95% CI) = 1.45 (1.14-1.84).

In the sensitivity analyses, the results were very similar. The study of changes in exposure showed that employees exposed in both 2013 and 2016, and those exposed only in 2016 or 2013 (to a lesser extent) had an increased risk of poor well-being compared to employees not exposed at both waves (Supplementary Table S4).

## Discussion

In this study, a wide range of PWFs was prospectively associated with poor psychological well-being. Furthermore, our results showed an increased risk of poor well-being with multiple exposure to these factors. Among the other studied occupational factors, only noise was associated with poor well-being in women.

Our prospective study confirmed the associations reported by some previous cross-sectional studies between high quantitative demands,<sup>12,13</sup> low autonomy/control,<sup>13-15</sup> low social support,<sup>12-15</sup> low reward (close to our satisfaction factor),<sup>12</sup> work-family conflict,<sup>13,15</sup> job insecurity,<sup>13,14</sup> workplace violence<sup>12,13</sup> and poor well-being as assessed by the WHO-5. Our findings were also in agreement with previous reviews on prospective studies exploring mental health outcomes more broadly.<sup>16-18</sup> Our results additionally showed that both internal and external violence were associated with poor well-being. We also found associations with some other understudied PWFs including high demands for hiding

emotions, low meaning of work, low role clarity, high role conflict, and low sense of community in agreement with one previous cross-sectional study on well-being.<sup>13</sup> To our knowledge, no previous study explored the association of high cognitive demands and high changes at work with well-being. Our results regarding the association of changes in exposure with well-being are consistent with a previous prospective study on the same outcome,<sup>5</sup> and some prospective studies on other mental health outcomes.<sup>19,20</sup>

Major strengths of the study included prospective design and large national sample which made possible the stratified analyses by gender.<sup>11</sup> This stratification was justified by gender differences in the incidence of poor well-being, and in the prevalence of exposures and covariates. However, there were almost no gender-related interactions, except one between gender and cognitive demands showing that this factor was significant for women only. Well-being was measured using a validated scale,<sup>6</sup> and important covariates were taken into account. Another major strength concerned the wide range of studied PWFs. Inspired from the COPSOQ, our approach was connected to various theoretical models and concepts, including job strain or ERI models. Therefore, our results refined previous research by investigating the associations prospectively, including understudied PWFs, and broadening the concept of multiple exposures.

One limitation was related to attrition due to non-participation in 2016 and withdrawals from the labour market or from employee status. However, attrition bias was addressed by data weighting. Furthermore, our sensitivity analyses did not confirm a potential healthy worker effect. Although occupational factors and well-being were based on self-reported data, the potential reporting bias may be low due to the prospective design of our study. PWFs were not assessed using a validated questionnaire which may result in measurement errors and inaccurate estimates of the associations with poor well-being. Some rare PWFs were missing such as quality of leadership. Some covariates were also lacking such as social support outside work. However, most of the associations observed between PWFs and well-being persisted after other adjustment.

To conclude, the occupational factors prospectively associated with well-being were mainly those related to the psychosocial work environment. Many PWFs may have a negative impact on well-being and exposure to multiple PWFs may increase the risk of poor well-being still further.

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**Conflict of interest**

The authors declare that there is no conflict of interest.

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**Table I.** Prospective associations between exposures to psychosocial work factors in 2013 and poor well-being in 2016 after adjustment for covariates\*: results from weighted robust Poisson regression analyses in participants with good well-being in 2013.

Psychosocial work factors <sup>†</sup> (each factor studied separately)		RR (95% CI)	
		Men (N = 4532) <sup>‡</sup>	Women (N = 5967) <sup>‡</sup>
Demands at work	High quantitative demands	1.29 (0.96-1.72)	<b>1.57 (1.31-1.88)</b>
	High cognitive demands	0.86 (0.66-1.13)	<b>1.22 (1.01-1.47)</b>
	High emotional demands	0.84 (0.64-1.08)	1.09 (0.91-1.30)
	High demands for hiding emotions	<b>1.36 (1.04-1.77)</b>	<b>1.60 (1.32-1.95)</b>
Work organization and job content	Low influence	1.08 (0.83-1.41)	<b>1.22 (1.02-1.46)</b>
	Low degree of freedom	1.17 (0.91-1.51)	1.03 (0.86-1.24)
	Low possibilities for development	1.29 (0.97-1.69)	<b>1.37 (1.14-1.65)</b>
	Low meaning of work	<b>1.37 (1.05-1.78)</b>	<b>1.56 (1.32-1.85)</b>
Interpersonal relations	Low predictability	1.27 (0.98-1.66)	0.94 (0.79-1.12)
	Low role clarity	<b>1.45 (1.05-2.00)</b>	<b>1.49 (1.23-1.79)</b>
	High role conflict	1.09 (0.83-1.42)	<b>1.46 (1.22-1.74)</b>
	Low social support	<b>1.62 (1.24-2.11)</b>	<b>1.59 (1.34-1.89)</b>
	Low sense of community	<b>1.54 (1.18-2.00)</b>	<b>1.27 (1.07-1.51)</b>
Work-individual interface	Low job satisfaction	<b>1.56 (1.19-2.05)</b>	<b>1.75 (1.46-2.10)</b>
	Work-family conflict	<b>1.35 (1.01-1.80)</b>	<b>1.40 (1.17-1.69)</b>
	Job insecurity	<b>1.51 (1.11-2.05)</b>	<b>1.26 (1.03-1.53)</b>
	High changes at work	1.28 (0.98-1.68)	<b>1.34 (1.12-1.60)</b>
	Temporary employment	0.89 (0.50-1.58)	0.88 (0.66-1.17)
Workplace violence	High internal violence	<b>1.52 (1.16-1.99)</b>	<b>1.61 (1.36-1.91)</b>
	High external violence	1.10 (0.85-1.43)	<b>1.20 (1.00-1.44)</b>

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\* RR adjusted for age, marital status, occupation, and economic activity in 2013, life event(s) during childhood and between 2013 and 2016. RR in bold were significant at  $p < 0.05$ .

† Workers were classified into no/low or high exposure groups using the initial coding for the factors based on one item (emotional demands, role clarity, job insecurity, temporary employment, work-family conflict) and using the median of the total sample as cut-off for the factors based on more than one item.

‡ Reported results are those from complete case analyses that included participants with no missing data for the variables of interest (WHO-5 well-being score, all psychosocial work factors, covariates). The observed associations were similar using all available data for each psychosocial work factor.

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**Table II.** Prospective associations between exposures to psychosocial work factors in 2013 and poor well-being in 2016 after adjustment for covariates\*: results from weighted robust Poisson regression analyses in participants with good well-being in 2013.

	Number of Exposures †	RR (95% CI)	
		Men (N = 4532) ‡	Women (N = 5967) ‡
Demands at work	0	Ref.	Ref.
	1	1.11 (0.72-1.71)	1.21 (0.83-1.77)
	2	1.06 (0.65-1.71)	1.50 (1.05-2.15)
	3	1.07 (0.69-1.66)	2.12 (1.49-3.00)
	4	1.37 (0.85-2.20)	1.90 (1.32-2.72)
	<i>P for trend</i>	<i>0.350</i>	<b>&lt;0.001</b>
Work organization and job content	0	Ref.	Ref.
	1	1.20 (0.74-1.94)	1.40 (0.92-2.15)
	2	1.46 (0.94-2.27)	1.67 (1.10-2.52)
	3	1.42 (0.88-2.30)	1.94 (1.26-2.97)
	4	2.01 (1.15-3.50)	2.48 (1.57-3.93)
	<i>P for trend</i>	<b>0.048</b>	<b>&lt;0.001</b>
Interpersonal relations	0	Ref.	Ref.
	1	1.23 (0.69-2.19)	1.55 (1.12-2.15)
	2	1.18 (0.68-2.04)	1.64 (1.20-2.26)
	3	1.50 (0.87-2.61)	1.92 (1.39-2.65)
	4 or 5	2.28 (1.32-3.92)	2.53 (1.83-3.50)
	<i>P for trend</i>	<b>0.001</b>	<b>&lt;0.001</b>
Work-individual interface	0	Ref.	Ref.
	1	1.48 (0.81-2.72)	2.06 (1.41-3.01)
	2	1.40 (0.77-2.54)	2.76 (1.91-3.97)

	3	2.40 (1.30-4.43)	3.22 (2.23-4.63)
	4 or 5	2.34 (1.22-4.52)	3.21 (2.14-4.82)
	<i>P for trend</i>	<b>0.006</b>	<b>0.002</b>
Workplace violence	0	Ref.	Ref.
	1	1.39 (1.01-1.91)	1.51 (1.22-1.87)
	2	1.53 (1.09-2.14)	1.73 (1.38-2.17)
	<i>P for trend</i>	<i>0.551</i>	<i>0.187</i>
All psychosocial work factors <sup>§</sup>	Q1	Ref.	Ref.
	Q2	1.06 (0.64-1.74)	1.52 (1.07-2.15)
	Q3	1.41 (0.89-2.23)	2.39 (1.74-3.29)
	Q4	1.61 (1.06-2.46)	2.15 (1.59-2.90)
	Q5	2.01 (1.28-3.14)	3.17 (2.36-4.26)
	<i>P for trend</i>	<b>0.004</b>	<b>&lt;0.001</b>

\* RR adjusted for age, marital status, occupation, and economic activity in 2013, life event(s) during childhood and between 2013 and 2016.

† Multiple exposure was assessed by counting the number of PWFs for which the individual was classified as having high exposure, firstly for each category of PWFs, and secondly for all categories together.

‡ Reported results are those from complete case analyses that included participants with no missing data for the variables of interest (WHO-5 well-being score, all psychosocial work factors, covariates). The observed associations were similar using all available data for each psychosocial work factor.

§ Quintiles of the total number of psychosocial work exposures which ranged from 0 to 20