

# Importance of psychosocial work factors on general health outcomes in the national French SUMER survey

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<b>Aim</b>	To examine the associations between psychosocial work factors and general health outcomes, taking into account other occupational risk factors, within the national French working population.
<b>Methods</b>	The study was based on a large national sample of 24 486 women and men of the French working population who filled in a self-administered questionnaire in 2003 (response rate: 96.5%). Psychosocial work exposures included psychological demands, decision latitude, social support, workplace bullying and violence from the public. The three health indicators studied were self-reported health, long sickness absence (>8 days of absence) and work injury. Adjustment was made for covariates: age, occupation, work status, working hours, time schedules, physical, ergonomic, biological and chemical exposures. Men and women were studied separately.
<b>Results</b>	Low levels of decision latitude, and of social support, and high psychological demands were found to be risk factors for poor self-reported health and long sickness absence. High demands were also found to be associated with work injury. Workplace bullying and/or violence from the public also increased the risk of poor health, long sickness absence and work injury.
<b>Conclusion</b>	Psychosocial work factors were found to be strong risk factors for health outcomes; the results were unchanged after adjustment for other occupational risk factors. Preventive efforts should be intensified towards reducing these psychosocial work exposures.
<b>Key words</b>	Psychosocial work factors; self-reported health; sickness absence; work injury; workplace bullying; workplace violence..

## Introduction

Various types of occupational exposures are known to be risk factors for health. Chemical exposures may be risk factors for cancer and cardiovascular diseases [1], ergonomic exposures for musculoskeletal disorders [2], physical and psychosocial exposures for cardiovascular diseases [3] and psychosocial work factors for mental disorders [4], for example. But only few studies have explored the respective effects of these various types of occupational risk factors simultaneously on general health outcomes and especially the association of psychosocial work factors with health outcomes taking into account other occupational risk factors [5–7].

The job strain model, elaborated by Karasek and Theorell [8] through the Job Content Questionnaire (JCQ) [9], is probably the most used theoretical model of job stress and is composed of three main components: psychological demands, decision latitude comprising two sub-scales, skill utilization and decision authority, and social support at work from colleagues and supervisors. The combination of high levels of psychological demands and low levels of decision latitude (job strain) may increase the risk of deleterious effects on health, especially cardiovascular diseases and mental health. Health risks may also be increased by low levels of social support.

Another psychosocial risk factor for health at work has been found to be workplace bullying [10,11]. Research on this newly recognized risk factor has only recently emerged. Most of the studies about the health effects of bullying have dealt with mental health outcomes, and only very few studies have been performed on the impact of bullying on general health outcomes [5,12].

The objectives of this study were to examine the associations between psychosocial work factors, including

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Karasek's factors, workplace bullying and violence from the public (i.e. patients, clients, customers, etc.), and health outcomes, taking into account other occupational factors related to the work situation (occupation, work status, working hours and time schedules) and to other work environment exposures (chemical, biological, physical and ergonomic) in the national French working population.

## Methods

The SUMER survey is a national periodical cross-sectional survey from the DARES (French ministry of labour) [13,14]. Its objective is to describe occupational risks in order to define preventive strategies and research priorities in France. The SUMER survey is based on a network of voluntary occupational physicians, in charge of compulsory medical examinations of employees, who collect the data for a random sample of their employees. Each occupational physician selected 40 employees of the population of employees seen during the period of collection using a random method (one employee of 10 or 15). Occupational medicine is mandatory for all employees in France. The SUMER survey performed in 2003 included for the first time a self-administered questionnaire and the JCQ and some general health indicators. One employee out of two asked to participate to the SUMER survey was invited to fill in this self-questionnaire.

The self-questionnaire included the JCQ for the three dimensions of psychological demands (nine items), decision latitude (nine items) and social support (eight items). The French version of the JCQ has already been used and validated elsewhere [15]. Furthermore, in a previous paper [16], we studied the psychometric properties of this French version in the SUMER sample and found satisfactory internal consistency, factorial and convergent validity. The three scores of psychological demands, decision latitude and social support were constructed according to the recommendations by Karasek [9] and dichotomized at the median of the total sample.

In addition, the self-questionnaire included items related to workplace bullying derived from Leymann's Inventory of Psychological Terror [17]. These items included 10 forms of bullying (see Appendix). Exposure to workplace bullying was defined by an exposure to at least one form currently. Another question was related to violence from the public and formulated as followed: 'Have you ever been exposed to verbal, physical or sexual aggression from the public within the previous 12 months?'

Health outcomes were constructed using items included in the self-questionnaire:

- (i) Self-reported health, based on a 10-level scale ranging from 'very poor' (coded 1) to 'very good' (coded 10). Poor self-reported health was defined by levels ranging from 1 to 5.

- (ii) Long sickness absence, defined by >8 days of sickness absence within the previous 12 months.
- (iii) Work injury, defined by the occurrence of at least one work injury (i.e. an accident resulting from work) within the previous 12 months.

Among the data collected by the occupational physicians, the following variables were here used as covariates for the present study (see Tables 1 and 2 for response categories):

- (i) age;
- (ii) occupations, coded using the French national classification of occupations that is close to the International Standard Classification of Occupations;
- (iii) work status;
- (iv) working hours;
- (v) time schedules;
- (vi) physical exposure: at least one exposure to noise ( $\geq 85$  db, shocks, impulses or other disturbing noises), thermic constraints (outdoor work,  $< 15^{\circ}\text{C}$ ,  $> 24^{\circ}\text{C}$  or humidity) or ionizing or non-ionizing radiation at least 20 h within the previous week;
- (vii) ergonomic exposure: at least one exposure to manual materials handling, postural and articular constraints (standing, walking, kneeling, crouching, twisting, arms above the shoulders, etc.), repetitions of the same movement or series of movements at high speed, vibrations (manual handling of vibrating tools and vibration from a fixed machine) or driving (driving of specialized machinery, car, lorry and bus) at least 20 h within the previous week;
- (viii) biological exposure: at least one biological exposure within the previous week;
- (ix) chemical exposure: at least one chemical exposure within the previous week.

The evaluation of all occupational exposures was done using national and European recommendations. Twenty-four items for physical exposures and 16 items for ergonomic exposures were included in the questionnaire using national or European guidelines (for example, European directive 90/269/EC for manual materials handling). For biological exposures, the French decree 94-352 was used: <http://www.legifrance.gouv.fr/WAspad/UnTexteDeJorf?numjo=TEFT9400313D>. Only the main sectors and situations at work leading to biological exposures were retained. Deliberate and potential exposures were distinguished. Characteristics of biological agents were also collected. This section included 62 items. For chemical exposures, 83 items were selected. This list of chemical agents was constructed on the basis on experts in toxicology and following three objectives: (i) including the most frequent used chemical agents, (ii) including the most dangerous agents for health and (iii) including some

**Table 1.** Occupational variables in the population studied

	Men ( <i>n</i> = 14 241)		Women ( <i>n</i> = 10 245)	
	<i>n</i>	%	<i>n</i>	%
Decision latitude				
High	7749	55	4346	44
Low	6236	45	5586	56
Psychological demands				
Low	5581	40	3606	37
High	8219	60	6155	63
Social support				
High	7882	57	5493	57
Low	5834	43	4149	43
Workplace bullying				
Non-exposed	11 856	83	8424	82
Exposed	2385	17	1821	18
Aggression from the public				
Non-exposed	12 270	86	7888	77
Exposed	1971	14	2357	23
Occupation				
Professionals, managers	2415	17	968	9
Associate professionals, technicians	3897	27	2787	27
Clerks, service workers	1416	10	5077	50
Blue-collar workers	6507	46	1409	14
Work status				
Apprenticeship	203	2	127	1
Trainees and state-supported contracts	33	0	75	1
Employees of firms supplying temporary staff	356	3	160	2
Contract of limited duration	308	2	444	4
Contract of unlimited duration	12 859	90	8199	80
Civil servants	482	3	1240	12
Working hours				
Full time	13 684	96	7547	74
Part time	557	4	2698	26
Work schedules				
Day work	10 546	74	8367	82
Shift work without night	1877	13	1329	13
Night work	771	6	340	3
Shift work including nights	1047	7	209	2
Physical exposure <sup>a</sup>				
Non-exposed	10 642	75	9099	89
Exposed	3599	25	1146	11
Ergonomic exposure <sup>a</sup>				
Non-exposed	6725	47	6186	60
Exposed	7516	53	4059	40
Biological exposure <sup>a</sup>				
Non-exposed	12 615	89	7935	77
Exposed	1626	11	2310	23
Chemical exposure <sup>a</sup>				
Non-exposed	7942	56	7350	72
Exposed	6299	44	2895	28

<sup>a</sup>Within the previous week.

emerging agents. All these exposures were evaluated within the previous week, as well as the duration of exposure (number of hours per week). For chemical exposures, the intensity of exposure (very low, low, high, very high and taking into account the limit exposure value) was also collected. The intensity of exposure could be either measured or evaluated by occupational physicians. The questionnaires of the SUMER survey may be seen using the following inter-

net link: <http://www.travail.gouv.fr/IMG/pdf/Qsumer021.pdf>.

At the first stage, the associations between psychosocial work factors and health outcomes were studied using the chi-square test. The associations between covariates and health outcomes were also studied using the same test. At the second stage, logistic regression analysis was used to adjust for covariates. Psychosocial work factors,

**Table 2.** Age and health outcomes in the population studied

	Men ( <i>n</i> = 14 241)		Women ( <i>n</i> = 10 245)	
	<i>n</i>	%	<i>n</i>	%
Age (years)				
<30	2986	21	2253	22
30–39	4375	31	3004	29
40–49	4096	29	3002	29
≥50	2784	19	1986	20
Self-reported health				
Good	12 477	89	8615	85
Poor	1589	11	1469	15
Sickness absence of >8 days <sup>a</sup>				
No spell	12 370	87	8522	83
At least one spell	1871	13	1723	17
Work injury <sup>a</sup>				
No injury	13 298	93	9794	96
At least one injury	943	7	451	4

<sup>a</sup>Within the previous 12 months.

as well as all covariates, were included simultaneously as independent variables. Three models were performed using poor self-reported health, long sickness absence and work injury as a dependent variable. The reference category of the independent variables was the category that had the lowest prevalence of the health outcomes studied. The interaction between low decision latitude and high psychological demands (job strain) was tested by the inclusion of an interaction term in the logistic regression model, but no significant interaction was found. Statistical analysis was performed using SAS (SAS Institute), and separately for men and women.

## Results

The total sample of the SUMER survey included 49 984 employees. Among them, 25 380 employees were invited to fill in the self-questionnaire including the JCQ. The response rate was 96.5%, as 24 486 employees responded to the self-questionnaire, 14 241 men and 10 245 women. The description of the sample is shown in Tables 1 and 2 according to sex, for all studied variables.

Table 3 provides the results of the associations between psychosocial work factors and health outcomes. Low decision latitude, low social support and high psychological demands were risk factors for poor self-reported health, sickness absence and work injury, except psychological demands that were not significantly associated with sickness absence and work injury for men. The employees exposed to workplace bullying or violence from the public had also higher rates of poor self-reported health, long sickness absence and work injury.

Table 3 shows the results of the associations between covariates and health outcomes. All these associations

were significant except work status that was not associated with sickness absence for women, working hours that were associated with work injury for women only and biological exposure that was associated with work injury only.

Most of the strong associations observed in Table 3 between psychosocial work factors and health outcomes remained significant after adjustment for covariates (Table 4). Workplace bullying, violence from the public and the three Karasek's job stress factors were found to be risk factors for health outcomes. The non-significant associations were the following: decision latitude and social support were not associated with work injury and workplace bullying was not associated with work injury for women either. The associations between psychological demands and sickness absence on one hand and between violence from the public and self-reported health on the other hand were borderline significant for men.

The associations between covariates, especially the other work environment exposures, and health outcomes were diminished, except for work injury (Table 4). Physical, ergonomic (except for women), biological and chemical exposures were found to be risk factors for work injury. Physical exposure for both sexes and chemical exposure for men were found to be risk factors for long sickness absence. Shift work and/or night work were found to be associated with long sickness absence among men and with work injury among women. Part-time work was observed to be a protective factor for work injury for women. Work status was associated with health outcomes, as male trainees were more likely to be injured and female trainees more likely to report poor health. Civil servants also reported poorer health among women. Employees of firms supplying temporary staff and those with a contract of limited duration were less likely to take long sickness absence and to report poor health among men. The strong associations between occupation and health outcomes were still found, as social gradients in health were marked, especially for work injury. Older age was found to be a risk factor for self-reported health and long sickness absence and a protective factor for work injury.

## Discussion

Low decision latitude, high psychological demands and low social support were associated with poor self-reported health and long sickness absence. High demands also increased the risk of work injury. Workplace bullying and violence from the public were strongly associated with all health indicators, except bullying that was not a significant risk factor for work injury for women. These associations remained significant after adjustment for age and other occupational factors.

This study was based on a large national sample of men and women within the French working population. All analyses were done separately for men and women,

**Table 3.** Bivariate associations between psychosocial factors at work, covariates and health outcomes

	Men			Women		
	Poor health (%)	Sickness absence (%)	Work injury (%)	Poor health (%)	Sickness absence (%)	Work injury (%)
Decision latitude	***	***	***	***	***	***
High	8	10	6	11	13	3
Low	15	17	8	17	20	5
Psychological demands	***	NS	NS	***	***	***
Low	9	13	7	10	15	3
High	13	13	6	17	18	5
Social support	***	***	*	***	***	*
High	8	11	6	9	14	4
Low	16	16	7	21	21	5
Workplace bullying	***	***	***	***	***	*
Non-exposed	9	12	6	12	16	4
Exposed	20	18	9	26	23	5
Aggression from the public	***	***	***	***	***	***
Non-exposed	11	13	6	14	16	4
Exposed	14	17	8	18	21	6
Age (years)	***	***	***	***	*	***
<30	7	14	10	10	16	6
30–39	9	11	7	12	16	4
40–49	12	14	6	16	16	4
≥50	18	14	4	22	19	3
Occupations	***	***	***	***	***	***
Professionals, managers	7	7	1	11	11	2
Associate professionals, technicians	10	10	4	12	15	4
Clerks, service workers	12	16	6	15	18	4
Blue-collar workers	13	17	11	21	22	7
Work status	**	*	***	***	NS	***
Apprenticeship	7	16	14	7	13	6
Trainees and state-supported contracts	3	15	18	20	15	3
Employees of firms supplying temporary staff	7	10	14	13	12	9
Contract of limited duration	8	9	6	11	14	6
Contract of unlimited duration	12	13	6	14	17	4
Civil servants	13	16	7	18	18	8
Working hours	NS	NS	NS	NS	NS	**
Full time	11	13	7	15	17	5
Part time	12	14	5	15	16	3
Work schedules	***	***	***	**	***	***
Day work	11	12	6	14	16	3
Shift work without night	13	18	9	18	20	9
Night work	10	15	7	16	19	9
Shift work including nights	14	18	8	18	24	9
Physical exposure	***	***	***	***	***	***
Non-exposed	11	12	5	14	16	4
Exposed	14	17	10	19	24	8
Ergonomic exposure	***	***	***	***	***	***
Non-exposed	10	11	4	13	16	4
Exposed	13	15	9	17	18	6
Biological exposure	NS	NS	***	NS	NS	***
Non-exposed	11	13	6	14	16	3
Exposed	12	14	9	16	18	8
Chemical exposure	***	***	***	***	*	***
Non-exposed	10	11	4	14	16	3
Exposed	13	16	9	17	18	7

Chi-square test: \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

something considered to be important in occupational epidemiology [18]. Except for a difference between men and women regarding workplace bullying that

was associated with work injury for men, and not for women, no other difference was observed between sexes for psychosocial risk factors in our study. The rate of

**Table 4.** Multivariate associations between psychosocial work factors, covariates and health outcomes: results from logistic regression analysis (OR, 95% CI)

	Men			Women		
	Poor health	Sickness absence	Work injury	Poor health	Sickness absence	Work injury
Independent variables	<i>n</i> = 13 113	<i>n</i> = 13 232	<i>n</i> = 13 232	<i>n</i> = 9070	<i>n</i> = 9181	<i>n</i> = 9181
Low decision latitude (ref.: high)	<b>1.63***</b> , 1.44–1.85	<b>1.31***</b> , 1.17–1.47	1.03, 0.88–1.20	<b>1.24**</b> , 1.08–1.43	<b>1.33***</b> , 1.17–1.51	1.20, 0.95–1.51
High psychological demands (ref.: low)	<b>1.59***</b> , 1.40–1.80	1.11, 0.99–1.24	<b>1.19*</b> , 1.02–1.38	<b>1.73***</b> , 1.50–2.00	<b>1.23**</b> , 1.08–1.39	<b>1.34*</b> , 1.06–1.69
Low social support (ref.: high)	<b>1.61***</b> , 1.43–1.82	<b>1.27***</b> , 1.14–1.42	1.03, 0.89–1.20	<b>1.93***</b> , 1.68–2.20	<b>1.36***</b> , 1.21–1.54	1.08, 0.87–1.34
Workplace bullying (ref.: non-exposed)	<b>1.90***</b> , 1.66–2.17	<b>1.37***</b> , 1.20–1.56	<b>1.27**</b> , 1.06–1.52	<b>1.92***</b> , 1.66–2.21	<b>1.29***</b> , 1.12–1.48	1.08, 0.83–1.40
Aggression from the public (ref.: non-exposed)	1.14, 0.98–1.34	<b>1.37***</b> , 1.19–1.58	<b>1.54***</b> , 1.27–1.87	<b>1.22**</b> , 1.05–1.41	<b>1.37***</b> , 1.20–1.56	<b>1.35*</b> , 1.07–1.71
Age (years) (ref.: <30)	***	***	***	***	**	**
30–39	1.18, 0.97–1.42	<b>0.84</b> , 0.72–0.97	<b>0.76</b> , 0.63–0.92	<b>1.38</b> , 1.14–1.69	1.00, 0.85–1.18	<b>0.71</b> , 0.54–0.94
40–49	<b>1.85</b> , 1.54–2.22	1.03, 0.89–1.20	<b>0.67</b> , 0.55–0.81	<b>1.74</b> , 1.43–2.11	0.92, 0.78–1.09	<b>0.63</b> , 0.48–0.84
≥50	<b>3.19</b> , 2.64–3.85	<b>1.17</b> , 1.00–1.38	<b>0.48</b> , 0.38–0.62	<b>2.57</b> , 2.10–3.16	<b>1.26</b> , 1.05–1.50	<b>0.54</b> , 0.38–0.76
Occupations (ref.: professionals, managers)	***	***	***	***	***	***
Associate professionals, technicians	<b>1.56</b> , 1.27–1.92	<b>1.36</b> , 1.11–1.66	<b>2.77</b> , 1.80–4.25	0.98, 0.76–1.26	<b>1.39</b> , 1.09–1.78	<b>1.92</b> , 1.06–3.48
Clerks, service workers	<b>1.87</b> , 1.44–2.43	<b>2.05</b> , 1.62–2.61	<b>3.75</b> , 2.34–6.01	<b>1.33</b> , 1.04–1.69	<b>1.66</b> , 1.31–2.10	<b>2.06</b> , 1.15–3.70
Blue-collar workers	<b>1.97</b> , 1.58–2.46	<b>2.03</b> , 1.65–2.49	<b>6.73</b> , 4.41–10.26	<b>1.80</b> , 1.34–2.42	<b>2.09</b> , 1.58–2.78	<b>3.32</b> , 1.76–6.27
Work status (ref.: contract of unlimited duration)		**				
Contract of limited duration	0.75, 0.47–1.20	<b>0.54</b> , 0.35–0.84	0.80, 0.49–1.32	0.96, 0.69–1.35	0.82, 0.61–1.10	1.22, 0.78–1.92
Civil servants	0.78, 0.56–1.08	1.12, 0.84–1.49	1.15, 0.75–1.75	<b>1.26</b> , 1.01–1.56	0.98, 0.80–1.20	1.21, 0.87–1.68
Employees of firms supplying temporary staff	<b>0.63</b> , 0.40–0.99	<b>0.57</b> , 0.39–0.83	1.28, 0.91–1.81	0.90, 0.52–1.55	<b>0.48</b> , 0.28–0.82	1.42, 0.76–2.65
Trainees and state-supported contracts	–	1.01, 0.38–2.67	<b>2.72</b> , 1.08–6.88	<b>1.94</b> , 1.02–3.67	0.86, 0.43–1.70	0.71, 0.17–2.98
Apprenticeship	0.74, 0.39–1.41	1.12, 0.74–1.69	1.41, 0.91–2.19	0.70, 0.31–1.55	0.87, 0.49–1.53	1.02, 0.40–2.58
Part-time work (ref.: full time)	1.05, 0.78–1.41	1.13, 0.86–1.47	0.80, 0.52–1.23	1.04, 0.90–1.20	0.94, 0.83–1.08	<b>0.74*</b> , 0.57–0.97
Work schedules (ref.: day work)		**				***
Shift work without night	0.96, 0.81–1.13	<b>1.26</b> , 1.09–1.45	1.03, 0.85–1.25	1.01, 0.83–1.22	1.03, 0.86–1.23	<b>1.47</b> , 1.12–1.93
Night work	0.86, 0.66–1.11	1.11, 0.89–1.38	0.93, 0.68–1.27	1.27, 0.92–1.77	1.07, 0.79–1.45	<b>2.26</b> , 1.47–3.38
Shift work including nights	1.09, 0.88–1.33	<b>1.24</b> , 1.04–1.49	0.96, 0.75–1.23	1.12, 0.75–1.69	1.29, 0.91–1.83	1.41, 0.83–2.40
Physical exposure (ref.: non-exposed)	1.08, 0.94–1.24	<b>1.20**</b> , 1.06–1.35	1.17, 0.99–1.36	0.98, 0.80–1.19	<b>1.32**</b> , 1.11–1.56	<b>1.37*</b> , 1.03–1.82
Ergonomic exposure (ref.: non-exposed)	1.09, 0.95–1.25	1.10, 0.97–1.24	<b>1.39***</b> , 1.17–1.66	1.11, 0.97–1.27	1.06, 0.94–1.20	1.16, 0.94–1.46
Biological exposure (ref.: non-exposed)	1.12, 0.94–1.35	0.99, 0.84–1.16	<b>1.39**</b> , 1.14–1.70	0.93, 0.77–1.12	1.10, 0.93–1.31	<b>1.71***</b> , 1.30–2.24
Chemical exposure (ref.: non-exposed)	1.09, 0.96–1.24	<b>1.16*</b> , 1.03–1.31	<b>1.28**</b> , 1.09–1.50	1.16, 0.99–1.36	0.92, 0.80–1.07	<b>1.38**</b> , 1.08–1.76

All independent variables were included simultaneously in the logistic regression analysis. Ref., reference category; OR, odds ratio; 95% CI, 95% confidence interval; bold, response category significant at 5%. Significance of independent variables: \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

response to the self-questionnaire was very satisfactory as it was >96%. Consequently, the selection bias may be considered as very low.

The self-questionnaire included a well-established instrument to measure psychosocial work factors, the JCQ and a validated French version of this instrument [16] that has been found to predict health outcomes and allows comparisons between studies. However, limitations have also been mentioned earlier regarding the model elaborated by Karasek [19]. The items of workplace bullying and violence from the public were derived from Leymann's instrument and from items commonly used in French national surveys. Evaluation of other occupational factors was based on a questionnaire filled in by occupational physicians using national and European recommendations. Furthermore, as they were evaluated by occupational physicians and consequently independently of the employees, they can be considered free from any reporting bias. As regards health outcomes, self-reported health is considered as a reliable health indicator compared with more objective measures of morbidity and mortality [20–22]. Self-reported sickness absence has been found to be a reliable measure of sickness absence as recorded by employers [23]. In addition, long spells of sickness absence are more closely related to health than short spells [24,25]. Work injury was regarded as a health indicator and may be considered as an indicator of the immediate effects of work conditions on health.

Several limitations are worth noting:

- (i) As the data were based on self-reporting for both psychosocial work factors and health outcomes, inflated associations may be suspected links to 'common method variance' through negative affectivity and other personality factors. However, previous research supports that personality factors may not be confounding factors in the relationship between job stress factors and health outcomes [26].
- (ii) A healthy worker effect may have operated and led to an underestimate of the association between occupational factors and health outcomes, as employees in poor health may have changed or left their jobs or as healthier workers may be more likely to work in more difficult jobs. For example, such a healthy worker effect may explain the protective associations found here between some categories of temporary workers and health outcomes.
- (iii) The study did not allow us to evaluate cumulative exposures, given that no information was available on the history of work and exposures. Consequently, this study focused mainly on the short-term effects of occupational exposures.
- (iv) As the study had a cross-sectional design, the conclusion about statistical associations may not be causal and reverse causation may not be excluded. However, previous studies comparing cross-sectional

and prospective analyses on the same data provided elements supporting at least to some extent the validity of cross-sectional results [27–29].

Finally, the associations between psychosocial work factors and health outcomes were studied after adjustment for covariates, age and other occupational factors. This is also one of the strengths of the study to examine psychosocial work factors and other occupational factors simultaneously as potential risk factors of health outcomes. This has seldom been done before [5–7], and exclusively for sickness absence. Consequently, the study was well adjusted for work-related variables, but non-work variables may be missing in the adjustment such as behavioural factors (smoking, alcohol consumption, physical activities, etc.) that may have an important role in explaining health status. Occupation can be regarded here as an indirect means to adjust for behavioural factors, as these factors are strongly graded according to the occupational status. As regards the study of sickness absence, potential confounding factors were not measured but might be important such as those related to work ethics and sickness absence culture [25].

Our study showed that low decision latitude, high psychological demands and low social support were associated with poor self-reported health. In previous studies, these factors were found to be significant risk factors of health status, health-related quality of life, self-reported health and health functioning [27,30–35]. Our study also found strong associations between the three factors of latitude, demands and support and sickness absence. Previous studies [6,36–40] showed associations between these factors, especially decision latitude and sickness absence. There have been only a few previous studies on work injury in relation to psychosocial work factors [41]. We found that high psychological demands were associated with work injury, whereas neither decision latitude nor social support were. This finding is in keeping with previous results indicating that long hours, overtime, psychological and emotional demands increase the risk for occupational injuries [42,43].

Only very few studies have been performed previously on the association between workplace bullying and violence from the public and health outcomes. Most of the outcomes studied in the literature have been related to mental health, but not to general health indicators as those studied here. We found that both workplace bullying and violence from the public were associated with self-reported health, long sickness absence and/or work injury. Previous studies reported a strong association between workplace bullying and mental disorders, especially depression [10,11,44–51]. Two other studies [5,12] found that workplace bullying was associated with an increase in sickness absence. Our findings are also in keeping with those by Swaen *et al.* [43] who found that conflicts with superiors and colleagues were

risk factors for being injured. We still lack studies on the health consequences of violence from the public. Nevertheless, it has been shown that this violence may account for a substantial part of work injury at least in the USA [52].

Regarding other findings of our study, several results may be underlined. Older age was associated with less work injury, in keeping with previous studies showing a relationship between lower age and non-fatal work injury [53]. We found strong occupational gradients for all three health indicators, as blue-collar workers, as well as clerks, were more likely to report poor health, long sickness absence and work injury, confirming previous results [54]. Shift work and/or night work were found to be risk factors for sickness absence for men and for work injury for women. Previous studies also showed that rotating shift work [55] and night work [56] were associated with work injury. Other occupational exposures (physical, ergonomic, biological and chemical) were strongly associated with work injury, and to a lesser extent to sickness absence, confirming previous results [57].

This study underlines the strong associations between psychosocial work factors and health outcomes in the national French working population taking into account other occupational factors. The psychosocial work environment should be the target of preventive actions to reduce exposure to psychological demands, bullying and violence from the public, as well as to increase decision latitude and social support. This study was the first opportunity to explore the impact of psychosocial work factors by Karasek, bullying and violence from the public on general health outcomes in the national French working population. These findings should encourage increasing research and prevention on this topic.

### Key points

- Psychosocial work factors were associated with general health outcomes taking into account other occupational factors.
- High psychological demands, low decision latitude, low social support, workplace bullying and/or violence from the public were found to be risk factors of poor self-reported health, long sickness absence and work injury.
- Psychosocial work factors including workplace violence should be the target of preventive actions.

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### Conflict of interest

None declared.

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## Appendix

Items of workplace bullying included in the self-administered questionnaire of the SUMER survey.

Somebody or some people behave as follows:

- (i) they ignore you;
- (ii) they are unkind to you;
- (iii) they do not give you the opportunity to express yourself;
- (iv) they make you ridiculous in front of others;
- (v) they criticize your work unfairly;
- (vi) they ask you to do useless or degrading tasks;
- (vii) they sabotage your work or keep you from doing it properly;
- (viii) they hint at your lack of balance;
- (ix) they tell you obscene or degrading things;
- (x) they start sex-related conversations insistently.

Response modalities: yes currently, yes in the past, no.