The multilevel determinants of workers' mental health: results from the SALVEO study

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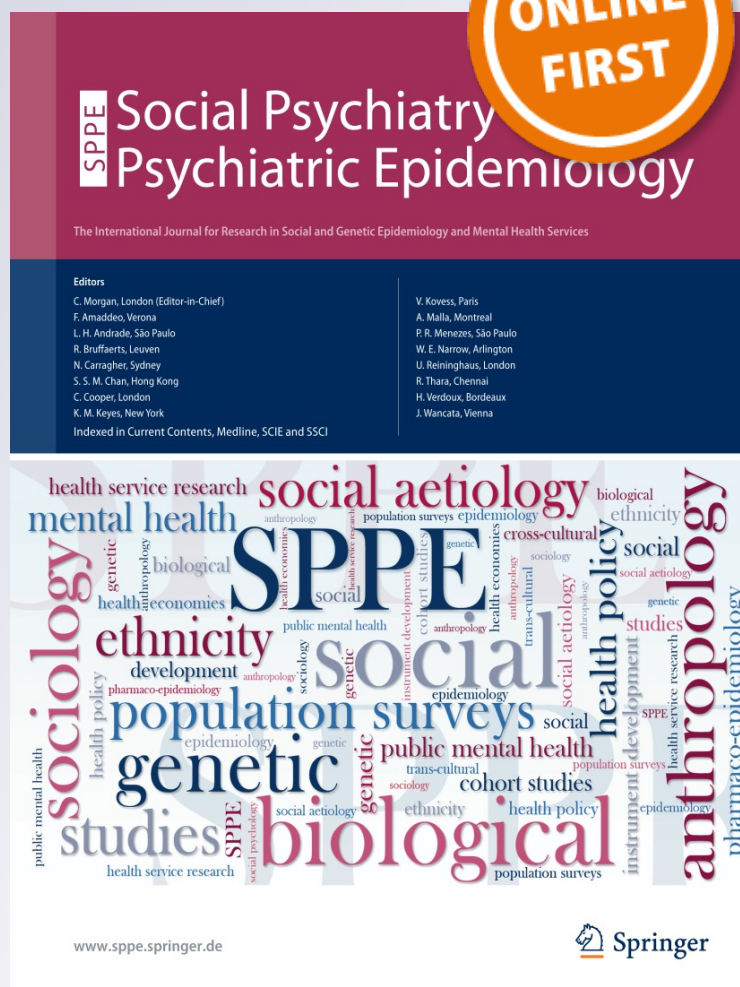# The multilevel determinants of workers' mental health: results from the SALVEO study

Alain Marchand · Pierre Durand · Victor Haines III · Steve Harvey

Abstract

Purpose This study examined the contribution of work, non-work and individual factors on workers' symptoms of psychological distress, depression and emotional exhaustion based on the multilevel determinants of workers' mental health model.

Methods Data from the SALVEO Study were collected in 2009–2012 from a sample of 1,954 employees nested in 63 workplaces in the province of Quebec (Canada). Multilevel regression models were used to analyse the data.

Results Altogether, variables explain 32.2 % of psychological distress, 48.4 % of depression and 48.8 % of emotional exhaustion. Mental health outcomes varied slightly between workplaces and skill utilisation, physical and psychological demands, abusive supervision, interpersonal conflicts and job insecurity are related to the outcomes. Living in couple, having young children at home, family-to-work conflict, work-to-family conflict, strained marital and parental relations, and social support outside the workplace associated with the outcomes. Most of the individual characteristics also correlated with the three outcomes. Importantly, non-work and individual factors modulated the number and type of work factors related to the three outcomes.

Conclusion The results of this study suggest expanding perspectives on occupational mental health that fully recognise the complexity of workers' mental health determinants.

Keywords Mental health · Work conditions · Family · Social network · Individual characteristics

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Introduction

Despite the large number of studies carried out over the last two decades, there are still important debates about the causes of mental health problems in the workforce [10, 16]. Many studies have pointed out the role of occupations and work conditions related to decision latitude, demands, social support and rewards. These conditions are at the very heart of the dominant demands-control [39], demands-control-support [40], effort-reward imbalance [66], and the job demands-resources [26] theoretical frameworks. However, studies on the etiology of mental health problems underscore the non-work and individual factors which are often neglected in work-stress studies [10, 16]. Also, few studies examine the relative contribution of work conditions when non-work and individual characteristics are accounted for, and few research design conduct joint analyses of workers' work and non-work experiences that would allow us to disentangle how these many conditions contribute to psychological distress, depression and burn-out simultaneously.

The aim of the study is to analyse the contribution of the multilevel determinants of workers' mental model that integrates work, non-work and individual factors to the

examination of symptoms of psychological distress, depression and the emotional exhaustion component of the burnout process.

The multilevel determinants of workers' mental health

The multilevel determinants of workers' mental health are modelled here in response to previous work-stress models that have failed to integrate, theoretically and empirically, components of the social environment (i.e., workplace, family, social network) in which are embedded workers. The integrative model we advance views workers within their broader social environment composed of various structures with which they interact in their daily lives. These interactions can be sources of pleasure and well-being, but they can also be sources of suffering that may affect the psychic balance. Micro–macro and agency-structure sociological approaches define social structures and agent personality as conditions of social action that determine a set of constraints and resources that shape individuals' contingencies, locations, and opportunities [6, 7, 19, 29, 69]. At the macro level, macrosocial structures represent social arrangements tied to the economic, political and cultural systems, as well as to the system of stratification, diversification, and social integration of a society at the national level. At the meso level, structures of daily life constitute intermediate arrangements between individuals and macrosocial structures that organise the basis of everyday life, routines, and affective ties. These include the workplace, the family, and the social network. At the micro level, agent personality represents the constraints and resources associated with reflexivity, rationality, creativity, demography, affect, the body, biology, representations, perceptions, motivations, habits, and attitudes [6, 19, 29, 69]. Agent personality is thus not limited to psychological traits or personality structure as understood in psychology. It is an overall representation of individual-specific conditions constructed around the body, the mind, and the social environment. The relationships between the agent and the social structures are dialectical as they produce reciprocity and interaction as action modalities that may result in unintended consequences unanticipated by agents [7, 29]. Workers' mental health problems can thus be viewed as unintended consequences of action being influenced simultaneously by social structures and agents' constraints-resources. Constraints are stressors that have the potential to affect an individual's adaptability [58] and to lead to potential imbalances in one's physiological and mental systems [24]. Resources are protective factors against environmental stressors, but they are not necessarily effective for everyone [57].

In this study, structures of daily life and agent personality are at the core of our analysis. As far as work is concerned, we may expect psychological distress, depression, and emotional exhaustion to vary according to workers' position and experiences in their respective firms, and across firms. Firms distinguish themselves around several characteristics related to their environment, economic sector, profitability, organisational culture, human-resources practices, occupational health and safety programme, and so forth. Therefore, the general context of the firm can be a source of variance in symptoms of mental health experienced by workers. Indeed, a recent study found that workers' cortisol secretions, which is a hormone associated with the physiological stress response of an individual and correlated with mental health symptoms [21], varied across workplaces even after adjusting for work hours, gender, age and work–non-work days [50].

Work organisation conditions experienced by workers within a firm can also contribute to mental health. They relate to task design, demands, social relations, and gratifications [48]. Task design is about the level of skill utilisation and decision authority workers are allowed when performing tasks. Better mental health status has been associated with higher levels of skill utilisation and decision authority [37, 62, 72]. Likewise, poorer mental health has been associated with higher work demands, including when these come in the form of physical demands (environment and individual efforts) [15, 49, 83], psychological demands (work pace, quantity of work, conflicts) [37, 59, 72], and contractual demands (number of working hours, irregular work schedule) [4, 27, 68]. As for social relations with colleagues and managers, when workers are supported at work it is known to be associated with fewer mental health problems [15, 43, 72]. However, abusive supervision [31, 52, 76] and social relationships involving aggression and violence at work frequently relate to poor mental health status [34, 35, 49, 55]. With respect to gratification from work, past research has shown that expectation of job recognition and career perspectives are related to better mental health [2], while job insecurity fosters decreases in mental health status [15, 18, 74].

Consideration of family and social network outside the workplace defines constraints and resources in terms of marital and parental status, strained marital and parental relations, levels of household income, and social support from one's social network outside the workplace. Fewer mental health problems are expected when living with a partner [4, 47, 80], in households with young children [42, 47, 79], and those that have low-strain relationships with spouse or children [8, 23, 47], higher household incomes [41, 84], less work-family conflicts [12, 33, 75], and greater access to the support of social network outside the workplace [22, 47, 73].

Characteristics of agent personality include gender, age, physical health, psychological traits (self-esteem, locus of

control), lifestyle habits (alcohol intake, smoking, physical activity), and stressful childhood events. Mental health problems are more prevalent for women [1, 47, 80], less with increasing age [15, 17, 47], and more prevalent when physical health problems are reported [47, 78, 86]. Higher self-esteem and an internal locus of control should lessen mental health problems [28, 47, 71]. Life habits that involve high levels of alcohol intake [5, 47, 85], tobacco use [46, 47, 85], and less physical activity [45, 56] all seem to increase the likelihood of mental problems. Finally, mental health problems may be more pronounced when stressful childhood events such as a parental death, divorce, and alcohol or drug problems in the family were experienced [47, 81].

In summary, the multilevel determinants of workers' mental model views work factors as one possible mechanism explaining workers' mental health considering other structures of daily life in which individuals are embedded as well as their individual characteristics. Therefore, analysis of workers' mental health must integrate the role of family situation, social network and characteristics of agent personality in order to examine the specific contribution of workplace stressors.

Materials and methods

Data

The SALVEO study was conducted in Canada and aimed to evaluate the contribution of work, family, individual characteristics and social network to workers' experience of mental health problems. Data were collected in 2009–2012 within 63 Canadian workplaces, randomly selected from a list of client companies of a large insurance company. These companies were invited by their insurer to participate in this study and those accepting the invitation were referred to the research team. At this stage, the response rate was 41.0 %, which is significantly higher than the ones usually found in organisational research [9], and the incidence insurance claims rate (2009–2012) for mental health problems were not significantly different between participating and non-participating companies. The workplaces were very diverse in terms of their products, services, and markets, with 19 in manufacturing and 44 in the service sector. Of the participating workplaces, 22 were unionised, and workplaces' workforce ranged 25–1,900 employees (average of 247.1 workers/workplace). In each workplace, researchers first sent a communication to inform all employees about the research project. Then, a random sample of employees was selected and invited by the researchers to individually complete a questionnaire on company time (excluding lunch and break

times) using a touch-screen monitor that helped reducing questionnaire' completion time. Questionnaire administration was supervised and supported by onsite trained research assistants. Participating workers signed an informed consent beforehand and were given the necessary instructions. Overall, 2,162 employees agreed to participate in the survey (response rate 71.3 %, range 51.2–100 %) and were employed as managers (9.7 %), supervisors (6.8 %), professionals (15.3 %), semi-professionals/technicians (15.4 %), office workers (27.2 %), skilled labourers (5.4 %) and unskilled/manual workers (20.2 %). After deleting cases with missing values, the available worker sample size was $n = 1,954$ employed individuals. The study protocol was approved by the ethical committees of the University of Montreal, McGill University, Laval University, Bishop's University, and Concordia University.

Measures

Mental health

Psychological distress was measured with the General Health Questionnaire (GHQ) short-form, 12-item scale [54] ($\alpha = 0.85$), and depression with the Beck Depression Inventory (BDI) 21-item scale [11] ($\alpha = 0.91$). Emotional exhaustion was assessed with five items from the Maslach Burnout Inventory (MBI) general survey [64] ($\alpha = 0.90$). Emotional exhaustion was retained because it is widely viewed as the most representative of the burnout syndrome [44, 53, 65], and a recent study showed emotional exhaustion, compared to cynicism and professional efficacy, to be the most important component correlated with workers diurnal cortisol profiles [51].

Workplace

Skill utilisation, decision authority, psychological demands, and social support from colleagues and the supervisor were derived from the Job Content Questionnaire [38]. Responses were based on a 4-point Likert scale (strongly disagree-strongly agree). Skill utilisation consisted of six items (ex: my job requires that I learn new things, $\alpha = 0.80$). Decision authority contained three items (ex: my job allows me to make a lot of decisions on my own, $\alpha = 0.79$). Psychological demands were measured by nine items (ex: my job requires working very fast, $\alpha = 0.73$). Social support from colleagues was measures with four items (ex: the people I work with are helpful in getting the job done, $\alpha = 0.83$), and four items for the support from the supervisor (ex: my supervisor is helpful in getting the job done, $\alpha = 0.89$). Physical demands, recognition, career perspectives and job insecurity were derived from the Effort–Reward Imbalance questionnaire

[67]. Responses were based on a 4-point Likert scale (strongly disagree-strongly agree). Physical demands were based on a single item (my job is physically demanding). Recognition contained six items (ex: I receive the respect I deserve from my superiors, $\alpha = 0.82$), career perspectives 4 items (ex: my job promotion prospects are poor, reverse coding, $\alpha = 0.69$), and job insecurity 2 items (ex: I have experienced or I expect to experience an undesirable change in my work situation, $\alpha = 0.65$). Abusive supervision was measured with 15 items from Tepper abusive supervision questionnaire [76] (ex: tells me my thoughts or feelings are stupid, $\alpha = 0.91$). Responses are based on a 5-point scale (1 = I cannot remember him ever using this behaviour with me, 6 = He uses this behaviour very often with me). Interpersonal conflicts during the previous 12 months contained five items from Harvey and colleagues questionnaire (ex: have you had an argument with someone, $\alpha = 0.80$). Response are based on a 4 point scale (1 = never, 4 = very often) [36]. Workplace harassment was measured using three 4-point Likert indicators (1 = never, 4 = very often) from the Quebec Health and Social Survey [25]. The respondent was to indicate whether, during the previous 12 months, he or she had been subjected to physical violence or intimidation and/or been the object of unwelcome remarks or actions of a sexual nature in the workplace.

Family

Marital status was coded 1 for people married or living in a civil union and 0 for others. Parental status measured the presence (yes/no) of minor children in the household. Household income was determined using a 10-point ordinal scale (1 = less than $20,000, 12 = $120,000 and more). Marital strains was assessed with four binary items (false-true, no-yes) taken from Wheaton (ex: your partner doesn't understand you, $\alpha = 0.70$) [82]. Parental strains had three items (false/true) taken from Wheaton (ex: a child's behaviour is a source of serious concern to you, $\alpha = 0.60$) [82]. Work–Family conflict was measured with the Gutek and colleagues instrument with responses based on a 5-point scale (strongly disagree-strongly agree) that distinguish both directions of the conflict [32]; the first one being work-to-family spillover (four items, ex: my work takes up time that I'd like to spend with family/friends, $\alpha = 0.79$) and the second family-to-work spillover (4 items, ex: I'm often too tired at work because of the things I have to do at home, $\alpha = 0.74$).

Social network

Social support outside the workplace was based on four items (no–yes) from the Statistics Canada National

Table 1 Sample descriptive statistics

	Mean/ proportion	SD	Min–max
Mental health			
Psychological distress	2.16	2.62	0–12
Depression	7.10	7.13	0–54
Emotional exhaustion	1.69	1.36	0–6
Work			
Skill utilisation	17.72	3.38	6–24
Decision authority	8.62	2.00	3–12
Physical demands	2.01	0.97	1–4
Psychological demands	23.44	3.86	10–36
Working hours	40.64	10.75	6.5–168
Irregular work schedule	1.51	0.79	1–4
Support colleagues	12.51	1.95	4–16
Support supervisor	11.91	2.59	4–16
Abusive supervision	18.56	6.34	15–69
Interpersonal conflicts	7.38	2.23	2–20
Harassment	3.24	0.63	1–9
Recognition	15.67	2.63	5–20
Career perspective	10.36	2.39	4–16
Job insecurity	3.79	1.31	2–8
Family			
Marital status (in couple)	0.69		0–1
Presence of minor children	0.48		0–1
Household income	6.93	3.38	1–12
Marital strains	0.44	0.90	0–4
Parental strains	0.21	0.57	0–3
Family–work conflicts	8.19	2.82	4–20
Work–family conflicts	9.90	3.50	4–20
Network			
Social support (outside work)	0.82		0–1
Agents			
Gender (female)	0.49		0–1
Age	40.81	10.92	17
Physical health	1.06	1.30	0–10
Alcohol	5.58	7.73	0–80
Smoking	2.85	6.48	0–60
Physical activities	4.13	2.06	1–7
Self-esteem	19.36	3.45	2–24
Internal locus of control	19.51	4.58	0–28
Childhood stressful events	1.16	1.31	0–7

$n = 1,954$

Population Health Survey [20] asking respondents if they had a confidant, someone to count on in a crisis situation, someone to count on when making personal decisions, someone who makes them feel loved and cared for. The scale was dichotomised as low (0 = 0–3) and high

$(1 = 4)$ social support in order to correct for high asymmetry.

Agent characteristics

Gender was coded 0 for males and 1 for females. Age was measured in years starting at Cycle 1 and was indexed two years for each subsequent cycle. Physical health was a count of the number of physical health problems from a list of 29 possibilities (ex: heart problems, cancer, arthritis, etc.). Self-esteem ($\alpha = 0.87$) was measured with Rosenberg's 5-point (disagree–agree), six-item scale [63], and internal locus of control ($\alpha = 0.84$) with Pearlin and Schooler's 5-point (disagree–agree), seven-item scale [58]. Alcohol intake was measured using the summation of daily drinks consumed over the last week (Canadian standard drink equivalents for beer, wine, and spirits). Smoking was based on a count of the weekly number of cigarettes and physical activity was a measure of the monthly frequency of one or more physical activities over 15 min in duration. Stressful childhood life events were determined by a count of Wheaton's 2-point (no–yes) 7 items of events happening before age 18 (ex: 2 weeks at the hospital, parental divorce, parents' alcohol or drug abuse, etc.) [82].

Table 1 presents descriptive statistics of the study sample.

Analysis

Multilevel regression analyses [30, 70] were conducted on data following a hierarchical structure in which workers ($n_1 = 1,954$) were nested within workplaces ($n_2 = 63$). The first multilevel regression model determined the overall mean of psychological distress, depression, and emotional exhaustion, as well as their variability by individual and workplace. Next, the variables concerning the work situation were introduced into the equation in order to verify their contributions to the three outcomes before controlling for family situation, social network and personality of the agent. The variables describing family, social network, and the personality of the agent were then entered by group, then together, in order to determine whether the effects of the workplace were modified by the other structures for daily life and/or the personality of the agent. The model parameters were estimated by the iterative generalised least-squares method (IGLS) using MLwiN 2.26 [61]. In the analyses, all independent variables were centred on their respective means, with the exception of the dichotomous variables. Finally, because of the number of variables embedded in the regression analysis, all p-values were corrected for multiple testing with the Benjamin and Hochberg method [14].

Results

Table 2 presents bivariate correlations between the study's variables. All mental health outcomes are correlated, with a stronger correlation between psychological and depression followed by depression and emotional exhaustion.

Psychological distress

In Table 3, Model 1 reports the overall mean of psychological distress, and the results reveal significant variation of psychological distress at both workers and workplaces levels. The intraclass correlation (ρ) indicates that workplaces accounted for 1.2 % of the total variation in psychological distress.

Model 2 reports the associations for work variables and indicates statistical significance for skill utilisation, decision authority, psychological demands, support from supervisor, abusive supervision, work recognition, and job insecurity. Model 3 controls for the contribution of family situation factors, and psychological demands and support from the supervisor are no longer significant. Model 4 controls for social support outside the workplace that suppresses interpersonal conflicts. In Model 5, agent personality is controlled for and the results reveal that skill utilisation, decision authority, and job recognition are no longer significant. Model 6 contains all variables and shows that abusive supervision and job insecurity are associated with psychological distress. Moreover, some family-related variables (living in couple, marital and parental stress, work–family conflicts), and the personality of the agent (sex, physical health status, alcohol consumption, physical activity, self-esteem, internal locus of control) were also statistically significant. This last model explained 37 % of the variation in psychological distress between workplaces and 32 % between workers. From the 1.2 % of variance that was between workplaces, the percentage of variation was now 0.9 % ($p < 0.05$).

Depression

Using the same modelling approach, the results of Model 1 (Table 4) show significant variation in depression at both the worker and workplace levels. Workplaces accounted for 1.0 % of the total variation in depression.

Model 2 indicates statistical significance for skill utilisation, psychological demands, support from colleagues and supervisor, abusive supervision, interpersonal conflicts, work recognition, career perspective, and job insecurity. Model 3 includes family situation and psychological demands and support from colleague and the supervisor, job recognition and career perspective are no longer significant. Family situation also suppresses physical

Table 2 Correlation matrix of the study's variables (Pearson's r)

Variable legend (row/column numbers):

1. Psychological distress
2. Depression
3. Exhaustion
4. Skill utilisation
5. Decision authority
6. Physical demands
7. Psychological demands
8. Working hours
9. Irregular work schedule
10. Support colleagues
11. Support supervisor
12. Abusive supervision
13. Interpersonal conflicts
14. Harassment
15. Recognition
16. Career perspective
17. Job insecurity
18. Marital status (in couple)
19. Presence of minor children
20. Household income
21. Marital strains
22. Parental strains
23. Family–work conflicts
24. Work–family conflicts
25. Social support
26. Gender (female)
27. Age
28. Physical health
29. Alcohol
30. Smoking
31. Physical activities
32. Self-esteem
33. Internal locus of control
34. Childhood stressful events

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Psychological distress	1.00																	
2 Depression	0.74	1.00																
3 Exhaustion	0.49	0.60	1.00															
4 Skill utilisation	−0.20	−0.26	−0.22	1.00														
5 Decision authority	−0.21	−0.24	−0.23	0.63	1.00													
6 Physical demands	0.02	0.05	0.08	−0.10	−0.12	1.00												
7 Psychological demands	0.17	0.20	0.39	0.20	0.06	−0.02	1.00											
8 Working hours	0.04	0.03	0.06	0.11	0.10	0.04	0.15	1.00										
9 Irregular work schedule	0.05	0.07	0.15	0.13	0.08	0.11	0.22	0.13	1.00									
10 Support colleagues	−0.18	−0.24	−0.26	0.27	0.24	−0.11	−0.13	0.00	−0.05	1.00								
11 Support supervisor	−0.18	−0.25	−0.31	0.31	0.36	−0.15	−0.17	0.00	−0.04	0.37	1.00							
12 Abusive supervision	0.24	0.31	0.35	−0.16	−0.24	0.16	0.22	0.05	0.05	−0.21	−0.52	1.00						
13 Interpersonal conflicts	0.24	0.29	0.35	−0.12	−0.12	0.14	0.30	0.11	0.15	−0.27	−0.28	0.44	1.00					
14 Harassment	0.18	0.20	0.26	−0.09	−0.14	0.18	0.18	0.08	0.14	−0.18	−0.19	0.35	0.48	1.00				
15 Recognition	−0.29	−0.35	−0.40	0.32	0.35	−0.16	−0.24	−0.01	−0.07	0.51	0.62	−0.49	−0.40	−0.30	1.00			
16 Career perspective	−0.23	−0.29	−0.29	0.44	0.38	−0.12	−0.10	0.04	0.00	0.31	0.40	−0.28	−0.22	−0.15	0.51	1.00		
17 Job insecurity	0.27	0.29	0.37	−0.17	−0.21	0.10	0.21	−0.01	0.09	−0.27	−0.34	0.28	0.26	0.23	−0.47	−0.32	1.00	
18 Marital status (in couple)	−0.10	−0.09	−0.04	0.12	0.09	−0.06	0.03	0.02	−0.01	0.04	0.02	−0.07	−0.08	−0.10	0.06	0.07	0.00	1.00
19 Presence of minor children	−0.01	−0.03	−0.06	0.08	0.06	−0.04	0.05	−0.01	0.00	0.05	−0.01	−0.01	−0.04	−0.04	−0.01	0.02	0.02	0.51
20 Household income	−0.09	−0.14	−0.03	0.28	0.30	−0.26	0.21	0.11	0.12	0.06	0.06	−0.11	−0.05	−0.02	0.06	0.16	0.04	−0.47
21 Marital strains	0.21	0.23	0.14	−0.03	−0.02	−0.02	0.08	−0.02	0.07	−0.08	−0.05	0.07	0.07	0.01	−0.10	−0.09	0.10	0.06
22 Parental strains	0.14	0.14	0.08	0.00	0.00	0.02	0.07	0.01	−0.01	−0.02	−0.03	0.02	0.06	0.08	−0.07	−0.06	0.09	−0.01
23 Family–work conflicts	0.28	0.32	0.22	−0.13	−0.12	0.05	0.09	−0.04	−0.01	−0.13	−0.06	0.14	0.16	0.05	−0.19	−0.15	0.17	0.06
24 Work–family conflicts	0.34	0.40	0.56	0.00	−0.05	0.04	0.45	0.14	0.24	−0.20	−0.20	0.21	0.25	0.18	−0.30	−0.16	0.32	−0.10
25 Social support	−0.17	−0.24	−0.12	0.05	−0.02	−0.02	−0.04	−0.04	−0.05	0.13	0.17	−0.11	−0.05	−0.04	0.15	0.11	−0.10	−0.07
26 Gender (female)	0.09	0.09	0.09	−0.10	0.00	−0.30	−0.04	−0.13	−0.08	0.01	0.02	−0.05	0.01	0.07	0.04	−0.01	0.00	−0.19
27 Age	−0.07	−0.10	−0.08	0.15	0.10	−0.08	0.05	0.04	0.02	−0.04	−0.05	−0.02	−0.10	−0.02	0.00	0.09	0.01	−0.30
28 Physical health	0.19	0.27	0.25	−0.09	−0.09	−0.02	0.13	0.05	0.03	−0.13	−0.08	0.13	0.21	0.15	−0.15	−0.10	0.10	0.15
29 Alcohol	0.05	0.09	0.06	0.03	0.00	0.13	0.02	0.03	0.03	−0.01	−0.10	0.07	0.08	−0.03	−0.07	−0.03	0.04	0.04
30 Smoking	0.10	0.16	0.11	−0.07	−0.11	0.02	0.00	0.04	0.04	−0.08	−0.08	0.09	0.06	0.01	−0.08	−0.09	0.06	0.00
31 Physical activities	−0.14	−0.16	−0.07	0.12	0.10	0.00	0.09	0.01	0.04	0.01	0.06	−0.03	0.00	−0.01	0.04	0.04	−0.02	−0.15
32 Self-esteem	−0.34	−0.45	−0.27	0.30	0.26	−0.10	−0.03	−0.02	0.00	0.24	0.18	−0.09	−0.11	−0.04	0.28	0.22	−0.20	−0.07
33 Internal locus of control	−0.45	−0.56	−0.40	0.32	0.30	−0.04	−0.10	0.02	−0.02	0.29	0.27	−0.25	−0.23	−0.16	0.40	0.28	−0.30	−0.08
34 Childhood stressful events	0.17	0.23	0.17	−0.12	−0.12	0.09	0.07	0.02	0.02	−0.09	−0.07	0.14	0.18	0.13	−0.13	−0.16	0.09	0.04

Additional correlation block (variables 35–37, as printed at the bottom of the table):

Variable	Marital status (in couple)	Presence of minor children	Household income
Marital status (in couple)	1.00		
Presence of minor children	0.28	1.00	
Household income	0.43	0.23	1.00

Table 2 continued

Marital strains	0.33	0.16	0.09	1.00													
Parental strains	0.09	0.38	0.09	0.16	1.00												
Family–work conflicts	-0.07	0.07	-0.13	0.19	0.16	1.00											
Work–family conflicts	0.02	0.05	0.12	0.16	0.19	0.38	1.00										
Social support	-0.01	-0.04	0.02	-0.17	-0.01	-0.11	-0.15	1.00									
Gender (female)	-0.06	0.01	0.04	-0.01	0.05	-0.01	-0.01	0.08	1.00								
Age	0.10	0.10	0.21	-0.01	0.09	-0.16	0.08	-0.07	0.08	1.00							
Physical health	0.00	-0.02	-0.02	0.07	0.04	0.08	0.00	-0.06	0.18	0.10	1.00						
Alcohol	-0.02	-0.07	-0.01	0.00	-0.03	0.04	0.08	0.00	-0.24	-0.05	-0.03	1.00					
Smoking	-0.07	-0.02	-0.21	0.06	0.02	0.11	0.11	-0.06	-0.11	-0.03	0.03	0.22	1.00				
Physical activities	0.01	-0.04	0.17	-0.07	-0.02	-0.07	-0.05	0.08	0.05	-0.02	-0.07	0.05	-0.19	1.00			
Self-esteem	0.07	-0.02	0.11	-0.14	-0.13	-0.27	-0.22	0.21	-0.05	0.05	-0.13	-0.04	-0.06	0.11	1.00		
Internal locus of control	0.07	0.02	0.20	-0.21	-0.14	-0.37	-0.35	0.23	-0.02	0.02	-0.18	-0.04	-0.12	0.19	0.54	1.00	
Childhood stressful events	-0.07	-0.06	-0.15	0.07	0.05	0.09	0.11	-0.05	0.06	-0.11	0.23	0.02	0.12	-0.03	-0.09	-0.17	1.00

$r < -0.06$ and $r > 0.06$ are $p < 0.01$

demands. Model 4 controls for social support outside the workplace. Support for colleagues is now not significant, and social support outside the workplace suppresses decision authority. In Model 5, personality of the agent is controlled for and the results reveal that skill utilisation, support from colleague and the supervisor, interpersonal conflicts and job recognition are now not statistically significant, and agent personality suppresses physical demands. Model 6 contains all variables and shows that only physical and psychological demands and abusive supervision are associated with depression. Some family-related variables (marital status, marital and parental strains, work-family conflicts), and the personality of the agent (all variables) were also statistically significant. This last model explained 61 % of the variation in depression between workplaces and 48 % between workers. Overall, variation of depression between workplaces is no longer significant.

Emotional exhaustion

Table 5 presents the results for emotional exhaustion.

Model 1 shows significant variation of the outcome at both the worker and workplace levels. Workplaces accounted for 5.2 % of the total variation in emotional exhaustion. Model 2 reports associations for work variables and indicated statistical significance for skill utilisation, psychological demands, irregular work schedule, abusive supervision, interpersonal conflicts, harassment, and job insecurity. Model 3 controls for family situation and irregular work schedule and harassment lost their significance. Model 4 controls for social support outside the workplace, and harassment is now no longer significant. In Model 5, personality of the agent is taken into account and the results reveal no specific modifications regarding the association between work variables an emotional exhaustion. Model 6 contains all variables and shows that skill utilisation, psychological demands, abusive supervision, interpersonal conflicts and job insecurity are associated with emotional exhaustion. Some family-related variables (parental status, family–work conflicts, work-family conflicts), and the personality of the agent (age, physical health, internal locus of control) were also statistically significant. Model 6 explained 69 % of the variation in emotional exhaustion between workplaces and 49 % between workers. The percentage of variation left for workplaces was 1.8 % ($p < 0.01$).

At the end, multicollinearity tests were conducted because of correlated independent variables in multilevel regression models. Based on Model 6 of each outcome, the variance inflation factor (VIF) ranged 1.10–2.58 with an average of 1.49. These values are largely below the

Table 3 Results of multilevel regression modelling of psychological distress (unstandardised coefficients)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	2.168**	2.157**	2.672**	2.807**	2.003**	2.671**
Work						
Skill utilisation		−0.075**	−0.061*	−0.072**	−0.016	−0.018
Decision authority		−0.111**	−0.095*	−0.118**	−0.038	−0.057
Physical demands		−0.117	−0.164*	−0.111	−0.129*	−0.135
Psychological demands		0.066**	0.022	0.067*	0.050**	0.026
Working hours		0.008	0.008	0.007	0.010	0.009
Irregular work schedule		0.063	−0.030	0.050	0.075	−0.003
Support colleagues		−0.038	−0.005	−0.028	0.019	0.023
Support supervisor		0.085**	0.044	0.094**	0.064*	0.052
Abusive supervision		0.035**	0.027*	0.033**	0.030**	0.028*
Interpersonal conflicts		0.083	0.053	0.089**	0.040	0.029
Harassment		0.151	0.147	0.147	0.174	0.160
Recognition		−0.095**	−0.061	−0.091**	−0.035	−0.024
Career perspective		−0.046	−0.021	−0.043	−0.037	−0.019
Job insecurity		0.259**	0.181**	0.248**	0.188**	0.153**
Family						
Marital status (in couple)			−0.600**			−0.543**
Presence of minor children			−0.177			−0.117
Household income			−0.029			0.006
Marital strains			0.496**			0.358**
Parental strains			0.365**			0.259*
Family–work conflicts			0.084**			0.034
Work–family conflicts			0.135**			0.083**
Network						
Social support				−0.782**		−0.251
Agents						
Gender (female)					0.330*	0.295*
Age					−0.012*	−0.010
Physical health					0.131**	0.110*
Alcohol					0.016*	0.016*
Smoking					0.011	0.005
Physical activities					−0.104**	−0.090**
Self−esteem					−0.092**	−0.074**
Internal locus of control					−0.144**	−0.110**
Childhood stressful events					0.084	0.072
Random part						
Workplaces variance	0.081**	0.043	0.025	0.045*	0.062*	0.042*
Workers variance	6.797**	5.652**	5.123**	5.569**	4.797**	4.624**
ρ	0.012	0.008	0.005	0.008	0.013	0.009
Goodness-of-fit						
χ^2		670.35**	1,445.65**	700.72**	1,183.99**	1,738.08**
df		14	21	15	23	31
R^2 (workplaces)		0.250	0.368	0.252	0.278	0.366
R^2 (workers)		0.172	0.252	0.184	0.294	0.322

Benjamin and Hochberg method corrected p values for multiple testing

* $p < 0.05$; ** $p < 0.01$

Table 4 Results of multilevel regression modelling of depression (unstandardised coefficients)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	7.097**	7.098**	8.202**	9.673**	6.649**	8.671**
Work						
Skill utilisation		−0.321**	−0.278**	−0.309**	−0.085	−0.098
Decision authority		−0.176	−0.098	−0.200*	0.086	0.038
Physical demands		−0.208	−0.379*	−0.181	−0.317*	−0.315*
Psychological demands		0.219**	0.070	0.222**	0.167**	0.089*
Working hours		0.010	0.008	0.006	0.012	0.006
Irregular work schedule		0.245	−0.035	0.194	0.262	0.044
Support colleagues		−0.206*	−0.097	−0.165	0.007	0.026
Support supervisor		0.173*	0.055	0.210**	0.061	0.058
Abusive supervision		0.145**	0.118**	0.139**	0.126**	0.123**
Interpersonal conflicts		0.280**	0.200*	0.303**	0.100	0.081
Harassment		0.280	0.237	0.254	0.332	0.249
Recognition		−0.221*	−0.138	−0.205*	−0.006	0.007
Career perspective		−0.181*	−0.109	−0.166*	−0.137*	−0.103
Job insecurity		0.616**	0.314**	0.572**	0.321**	0.188
Family						
Marital status (in couple)			−1.031**			−0.752*
Presence of minor children			−0.799*			−0.534
Household income			−0.179**			−0.029
Marital strains			1.271**			0.701**
Parental strains			1.030**			0.576*
Family–work conflicts			0.240**			0.048
Work–family conflicts			0.497**			0.284**
Network						
Social support				−3.096**		−1.492**
Agents						
Gender (female)					0.935**	0.892**
Age					−0.050**	−0.050**
Physical health					0.618**	0.577**
Alcohol					0.057**	0.060**
Smoking					0.072**	0.057**
Physical activities					−0.257**	−0.222**
Self-esteem					−0.421**	−0.360**
Internal locus of control					−0.480**	−0.382**
Childhood stressful events					0.387**	0.334**
Random part						
Workplaces variance	0.525	0.243*	0.013	0.199	0.090	0.000
Workers variance	50.322**	38.927**	33.696**	37.683**	27.503**	26.236**
ρ	0.010	0.006	0.000	0.005	0.003	0.000
Goodness-of-fit						
χ^2		897.32	2,005.49	967.11	1,871.98	2,634.86
df		14	21	15	23	31
R^2 (workplaces)		0.302	0.488	0.342	0.545	0.606
R^2 (workers)		0.230	0.337	0.255	0.457	0.484

Benjamin and Hochberg method corrected p values for multiple testing

* $p < 0.05$; ** $p < 0.01$

Table 5 Results of multilevel regression modelling of emotional exhaustion (unstandardised coefficients)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	1.674**	1.677**	1.742**	1.796**	1.593**	1.638**
Work						
Skill utilisation		−0.061**	−0.059**	−0.060**	−0.039**	−0.046**
Decision authority		−0.026	−0.016	−0.027	0.001	−0.003
Physical demands		−0.006	−0.026	−0.005	−0.005	−0.018
Psychological demands		0.102**	0.059**	0.102**	0.094**	0.058**
Working hours		0.002	−0.002	0.002	0.003	−0.001
Irregular work schedule		0.095**	0.021	0.092*	0.099**	0.033
Support colleagues		−0.025	−0.009	−0.023	−0.007	−0.004
Support supervisor		0.000	−0.006	0.002	−0.009	−0.007
Abusive supervision		0.021**	0.021**	0.021**	0.018**	0.021**
Interpersonal conflicts		0.051**	0.045**	0.052**	0.034*	0.031*
Harassment		0.133*	0.084	0.132	0.129*	0.083
Recognition		−0.028	−0.013	−0.027	−0.011	−0.002
Career perspective		−0.025	−0.020	−0.025	−0.019	−0.019
Job insecurity		0.146**	0.088**	0.144**	0.126**	0.086**
Family						
Marital status (in couple)			0.046			0.063
Presence of minor children			−0.210**			−0.194**
Household income			−0.020			−0.008
Marital strains			0.062			0.029
Parental strains			0.076			0.062
Family–work conflicts			−0.016			−0.032**
Work–family conflicts			0.153**			0.138**
Network						
Social support				−0.144		0.034
Agents						
Gender (female)					0.176**	0.115
Age					−0.008**	−0.008**
Physical health					0.106**	0.094**
Alcohol					0.006	0.007
Smoking					0.008	0.005
Physical activities					−0.025	−0.018
Self-esteem					−0.021*	−0.017
Internal locus of control					−0.050**	−0.029**
Childhood stressful events					0.012	0.006
Random part						
Workplaces variance	0.095**	0.022**	0.016**	0.022**	0.022**	0.017**
Workers variance	1.750**	1.204**	0.982**	1.201**	1.084**	0.927**
ρ	0.052	0.018	0.016	0.018	0.020	0.018
Goodness-of-fit						
χ^2		973.52	1,754.94	978.28	1,308.69	1,927.96
df		14	21	15	23	31
R^2 (workplaces)		0.595	0.683	0.597	0.623	0.687
R^2 (workers)		0.335	0.459	0.337	0.400	0.488

Benjamin and Hochberg method corrected p values for multiple testing

* $p < 0.05$; ** $p < 0.01$

threshold of 4 (sign) or 10 (serious) indicating multicol-linearity problems [13].

Discussion

This study has examined the contribution of the multilevel determinants of workers' mental health model, with an emphasis on the role of the workplace context and work organisation conditions on psychological distress, depression, and emotional exhaustion, when non-work and individual factors are taken into account. The results support the relevance of the proposed model that views workers' mental health as being the product of stress caused by constraints-resources brought to bear simultaneously by structures of daily life and agent personality. As work is concerned, the workplace level per se, accounts for a small part of the variation in psychological distress (1.2 %), depression (1.0 %) and emotional exhaustion (5.2 %). Moreover, when indicators of constraints-resources in structures of daily life and the personality of the agent are controlled for, the variation in depression across workplaces is no longer significant, and only 0.9 % of the variation in psychological distress, and 1.8 % in emotional exhaustion remained between workplaces. Therefore, workplaces are not strongly differentiating themselves on the level of mental health symptoms reported by their employees. Even if these small variances at the workplace level may be attributable to the relatively small numbers of workplaces ($n = 63$), the present study suggests that psychological distress, and depression symptoms levels are mostly comparable across organisations analysed here. Nevertheless, emotional exhaustion symptoms, as the major component of the burnout process, seems to be more elevated in specific firms, since larger variations in emotional exhaustion symptoms between workplaces were observed compared to psychological distress and depression.

Workers evaluation of work organisation conditions prove to be important within workplace constraints-resources associated with the three mental health outcomes studied here. Constraints-resources were, however, associated differently with the three outcomes. As for task design, a higher level of skill utilisation is associated with lower levels of depression and emotional exhaustion. This is consistent with previous studies [37, 62, 72] and highlights the importance of designing task that motivate and challenge the skill of workers. However, the level of decision authority is not associated with outcomes when other structures of daily life and personality of the agent are taken into account. As for work demands, work hours and schedule are not significant when controlled for family situation, social support outside the workplace and

individual characteristics. Higher physical demands are surprisingly related to a lower level of depression symptoms. Such a result may be explained by the way physical demands were measured, as they were indexed with only one item. It did not measure exposure to physical risk (exposure to contaminants, dust, lifting heavy objects, etc.), but more of the physical energy workers invested in their task. Such investment may require a better physical and general health to perform the job. For psychological demands, they are associated with higher level of depression and emotional exhaustion symptoms. This is consistent with previous studies [37, 59], but not with psychological distress [72] when other structures of daily life are accounted for. Regarding social relations, abusive supervision clearly appears as an important stressor associated with higher levels of psychological distress, depression, and emotional exhaustion. Such a style of supervision, based on sustained display of hostile verbal and nonverbal behaviours, excluding physical contact [77], is detrimental for mental health because supervisors are in relationship with subordinates on a day-to-day basis, and thus constituted a chronic stressor for those workers exposed to it. We also found that interpersonal conflicts at work were associated with a high level of emotional exhaustion symptoms. Social support from colleagues and the supervisor, as well as harassment, were not significant after controlling for non-work factors and personal characteristics. Concerning work gratifications, our results confirmed, as some previous studies did [15, 18, 74], that job insecurity is also a stressful condition associated with elevated levels of psychological distress and emotional exhaustion. However, neither job recognition nor career perspectives associate with the three outcomes when family situation, social support outside the workplace, and individual characteristics are controlled for.

Results obtained here support the theoretical model concerning the stressful role of constraints-resources embedded in the other structures of daily life that include family and social network outside the workplace. These structures promote life experiences and the possibilities for self-realisation, but they could also be sources of stress. All constraints-resources with the family associate with any one of the three outcomes, to the exception of family income. Less mental health symptoms were found for those living in couple (psychological distress, depression), having children in the household (emotional exhaustion), and experiencing family-to-work conflicts (emotional exhaustion). However, stressful marital and parental relationships within the household are marked by higher levels of psychological distress and depression. As for work-to-family conflicts, they appear to be an important chronic stressor, because they relate to more symptoms for all mental health outcomes analysed here. Family situation also modified the

relationship between work stressors and the three outcomes. When family situation is controlled for in the analysis, psychological distress is no longer associated with psychological demands and support from the supervisor, depression is no longer associated with psychological demands and social support from both colleagues and supervisor, and emotional exhaustion is no longer associated with irregular work schedule and harassment. Results in Table 2 may suggest the apparent confounding effect to be attributable to work-family conflicts as they are positively correlated with psychological demands, irregular work schedule and harassment, while negatively associated with support from colleagues and supervisor.

Concerning social support outside the workplace, it is associated with less symptoms of depression, while the relationships with psychological distress and emotional exhaustion were not significant. Furthermore, when it is controlled for, support from colleague is no longer significant with depression, and harassment lost its significant effect on emotional exhaustion. Social support outside the workplace seems to confound these associations, because it is associated with higher level of support from the supervisor, while there is as a small tendency to be related to less harassment (see Table 2).

The results also confirm the role of the agent personality in the theoretical model. Workers are not passive beings who are subservient to the social conditions in which they live since when they act, they bring with them constraints and resources peculiar to them and shaped by their bodies, minds, and social context. Being a woman was related to more symptoms of psychological distress and depression, while age was related to lower symptoms of emotional exhaustion. Physical health problem on its side associated with more symptoms for all outcomes, alcohol intake with higher levels of psychological distress and depression, and smoking with more symptoms of depression. Fewer symptoms of psychological distress and depression were found with higher level of physical activities, while self-esteem (psychological distress, depression) and internal locus of control (emotional exhaustion) were negatively associated with the outcomes. Also, agent personality apparently contributes to the confounding of skill utilisation (psychological distress, depression), decision authority (psychological distress), support from colleagues and supervisor (depression), and job recognition (psychological distress, depression). According to correlations of Table 2, the possible confounding effect seems to be attributable to personality traits, because self-esteem and internal locus of control are associated with higher levels of skill utilisation, decision authority, support from colleagues and supervision as well with a higher level of job recognition.

The present study nevertheless has limitations. Firstly, the data are cross-sectional, which implies that the observed relationships cannot be interpreted causally and will need to be replicated longitudinally. Some reverse causation might be possible, as workers suffering from mental symptoms may negatively evaluate their work conditions. Secondly, we cannot rule out the possibility of a common method variance bias, because all measurements were based on one source. However, workers came from 63 different firms, reducing therefore the bias attributable to measurements based on one specific context [60]. We also conducted a single unmeasured latent factor analysis with Mplus 7.11 as suggested by Podsakoff et al. [60] to verify if the latent factor accounted for variance and covariance between measurements. Results gave $\chi^2 = 19{,}193.70$, $df = 528$, $p < 0.0001$, suggesting the common method variance bias to be small. Thirdly, results cannot be generalised to the overall workforce as data came from a single insurance company, but the 63 firms sampled were diversified in terms of economic sectors, firm sizes, and unionisation. Fourthly, the companies' response rate of 41 % may also have introduced a selection bias, such as company experiencing more problems with workers' mental health might have been more willing to participate in the study. However, the response rate was significantly higher compared to the ones usually found in organisational research [9], and the incidence insurance claims rate (2009–2012) for mental health problems were not significantly different between respondent and non-respondent companies. Fifthly, the analysis does not take into account workplace factors related to the physical environment (dust, noise, cold, heat, toxic, etc.), human resources practices, health and safety resources or other elements in the work contract that allow employees to better balance work and family responsibilities. Sixthly, while we controlled for gender differences in the analysis, patterns of associations may be different between genders and would need to be investigated in future studies. Finally, psychological distress, depression, and emotional exhaustion are all correlated. Independent variables cannot be tested for difference in coefficients across the three outcome variables [3], which would have required the use of multivariate multilevel regression models with a larger sample size at the companies' level. Therefore, the contribution of independent variables for specifically psychological distress, depression and emotional exhaustion will require further studies.

Despite these limitations, this study demonstrates that the multilevel determinants of workers' mental health model explain a substantial part of the variance in psychological distress, depression, and emotional exhaustion. Based on this model, pathogenic work organisation conditions, as estimated here, appear more important for emotional exhaustion symptoms compared to psychological distress and depression. Furthermore, the results of this study clearly demonstrate that family situation, social

support outside the workplace, and personal characteristics are also in and of themselves important factors associated with workers' mental health. Not only they associate with mental health, they also modulate the number and the type of work stressors that related to mental health symptoms.

In the end, we need to consider broadening approaches in occupational mental health to avoid coming to erroneous conclusions about the relationship between work and mental health. Theoretical and empirical studies must recognise the complexity of workers' mental health determinants if we want to be better able to capture and intervene on what is going wrong with work organisation conditions experienced by the worker. This study therefore replies to previous claims that non-work and individual factors must be integrated in occupational mental health research to arrive at a better understanding of workers' mental health problems [10, 16]. For example, if non-work or individual factors appear as the primary explanation of mental health symptoms of workers in a particular company, interventions on work conditions that will help better coping with stressful life conditions will have a better chance to be successful in reducing mental health symptoms. More research is thus needed to help the development of diagnosis and corrective measures that will not just focus on the work factor, but also on other structures of daily life people are involved in, as well as individual characteristics on which interventions are possible.

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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