

RESEARCH ARTICLE

Job insecurity and health among industrial shift workers: The role of organizational context

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Abstract

The aim of the study was to test the relationship between perceived job insecurity and self-rated health among one of the most vulnerable, yet understudied occupational groups, i.e. industrial shift workers. Specifically, we tested (i) the incremental contribution of job insecurity in predicting employees' physical, general and mental health by controlling for the effects of basic working conditions and (ii) the moderating effects of working conditions on the relationship between job insecurity and health. The hypotheses were grounded on the assumptions of the psychological climate framework and the Conservation of Resources theory. We used a survey-based cross-sectional methodology to collect data among 459 industrial shift workers. The results showed that job insecurity represents one of the most important work stressor among this working population. Additionally, we found that several basic working conditions moderated the negative relationship between job insecurity and employees' health – namely, job demands, job control and role clarity.

Keywords

job insecurity, self-rated health, working conditions, industrial shift work

Rezumat

Scopul studiului de față este acela al testării relației dintre insecuritatea percepută a locului de muncă și starea de sănătate auto-raportată, în cadrul uneia dintre cele mai vulnerabile categorii profesionale, dar foarte puțin studiate, anume a lucrătorilor industriali care lucrează în schimb de ture. În mod specific, am testat (i) validitatea incrementală a variabilei insecuritatea la locul de muncă în predicția stării de sănătate fizice și mentale, după controlul efectelor condițiilor de muncă și (ii) rolul moderator al condițiilor de muncă în relația dintre insecuritatea locului de muncă și starea de sănătate. Ipotezele au fost fundamentate pe baza Teoriei Conservării Resurselor. Studiul de față are un design transversal și a fost realizat pe un lot de 459 de angajați din mediul industrial, care lucrează în schimb de ture. Rezultatele evidențiază că insecuritatea locului de muncă reprezintă unul dintre cei mai importanți stresori în rândul acestei categorii profesionale. De asemenea, se constată că anumite condiții de muncă, precum solicitările postului, autonomia și ambiguitatea de rol moderează relația negativă dintre insecuritatea locului de muncă și starea de sănătate a angajaților.

Cuvinte cheie

insecuritatea locului de muncă, sănătate auto-evaluată, condiții de muncă, munca în schimb de ture din mediul industrial

Résumé

Le but de l'étude était de tester la relation entre la perçue insécurité d'emploi et la santé autoévaluée parmi l'un des groupes professionnels le plus vulnérable, néanmoins peu étudié, à savoir les travailleurs postés en industrie. Plus précisément, nous avons testé (i) la contribution incrémentale de l'insécurité d'emploi dans la prédiction de la santé physique, générale et mentale des employés en contrôlant les effets des conditions élémentaires de travail et (ii) les effets modérateurs des conditions de travail sur la relation entre l'insécurité d'emploi et de la santé. Les hypothèses ont été fondées sur les suppositions du cadre de climat psychologique et de la Théorie de la conservation des ressources. Nous avons utilisé une méthodologie transversale basée sur des sondages pour recueillir des données chez 459 travailleurs

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postés en industrie. Les résultats ont montré que l'insécurité d'emploi représente l'un des plus importants facteurs du stress professionnel dans cette population des travailleurs. En outre, nous avons constaté que plusieurs conditions élémentaires de travail ont modéré la relation négative entre l'insécurité d'emploi et la santé des employés - à savoir la demande d'emploi, le contrôle d'emploi et la clarté des rôles.

Mots-clés

l'insécurité d'emploi, la santé autoévaluée, les conditions de travail, le travail posté en industrie

Introduction

Despite the conclusive evidence on the negative effects of job insecurity, interest in this research topic is still vivid and topical, as evidenced in recent publications (e.g., Bernhard-Oettel, De Cuyper, Schreurs, & De Witte, 2014; László et al., 2010; Vander Elst, Van den Broeck, De Cuyper, & De Witte, 2014). One of the reasons why this is the case stems from the nature and dynamics of the contemporary labour market: Unpredictable and volatile conditions in today's working life raise the feelings of job insecurity among many employees. Accordingly, job insecurity has been identified as an important work stressor that leads to impaired health (Cheng & Chan, 2008; De Witte, 1999; De Witte, 2005; Maslić Seršić & Trkulja, 2009; Sverke, Hellgren, & Näswall, 2002).

Detrimental effects of job insecurity on employees' health have so far been demonstrated among white-collar, and to some less extent, blue-collar workers. For example, in their meta-analysis, Sverke et al. (2002) report findings obtained among 21 independent samples of white-collar workers, as compared with 13 independent samples of blue-collar workers. In contrast, there is fairly scarce evidence on the relationship between job insecurity and health among industrial shift workers, a particular subgroup of blue-collar workers. What distinguishes these workers from other working populations? We see three arguments that support the notion that industrial shift workers represent one of the most vulnerable segments of the labour market. First, as other blue-collar workers, they are on average less educated and more dependent on paid work (De Witte, 1999). Second, shift work raises the risk of many health problems (e.g., heart diseases, Tüchsen, Hannerz, & Burr, 2006). Third, research suggests that, when compared to day workers, industrial shift workers experience higher

levels of job insecurity, and are more exposed to nearly every unfavourable working condition (e.g., noise, vibrations, monotonous repetitive tasks, low decision latitude, interpersonal conflicts) (Bøggild, Burr, Tüchsen, & Jeppesen, 2001). Accordingly, we aim to test the relationship between job insecurity and health among industrial shift workers by accounting for the most relevant aspects of work environment. Therefore, we acknowledge two potential roles of working conditions that could dim the relationship between job insecurity and health if not taken into account: as antecedents and as moderators.

Specifically, we set two related aims. First, we investigate the incremental contribution of job insecurity in predicting health, after controlling for relevant working conditions in the context of industrial shift work. By doing so, we try to expand the knowledge on the job insecurity effects among one understudied, yet notable proportion of working population. Second, we test the moderating role of working conditions in the relationship between job insecurity and health. Thereby, we contribute to the theoretical knowledge on the environmental factors that have the potential to weaken or strengthen the effects of job insecurity. From a practical point of view, environmental factors are susceptible to modifications, which makes findings on its moderating effects more applicable in planning the interventions. Accordingly, knowledge on the moderating potential of working conditions may have relevant implications in designing HR strategies aiming to decrease the detrimental effects of job insecurity.

Our hypotheses are derived from two theoretical backgrounds. First, we base our selection of the psychosocial working conditions on the assumptions of psychological climate, an integrated theoretical framework that identifies the most readily observable and

psychologically meaningful aspects of the work environment (James & James, 1989). Second, the hypothesized main and moderating effects are grounded in the Conservation of Resources (COR) theory which acknowledges the importance of subjective perceptions as well as the objective environmental conditions (Hobfoll, 1989; 2001). In the following paragraphs we first set the working scene by explicating the core assumptions of the Psychological Climate theory, and then discuss our hypothesis according to the COR theory.

Accounting for the effects of work environment: A psychological climate perspective

Psychological climate dimensions refer to the work environment as it is cognitively represented in terms of its psychological meaning and significance to the employees (Parker et al., 2003). Accordingly, this approach posits that individuals play an active role as perceivers, and that the dimensions of psychological climate are a function of both – individuals' characteristics involved in the cognitive processing of work environment as well as the characteristics of work environment being perceived (Jones & James, 1979). Thus, applying the psychological climate framework to identify the relevant attributes of work environment has a particular resonance in studying the effects of the subjective experience of job insecurity: It is the subjective interpretation of the reality, rather than the reality itself that shapes employees' feelings, thoughts and reactions (Lazarus & Folkman, 1984).

According to James and James (1989), employees cognitively represent their work environments in terms of four higher-order schemata: job characteristics, role characteristics, manager and co-workers' characteristics. Within each of these categories, we identified those working conditions that have a particular potential to add to (job control, role clarity, managers' and peer work-related support) or use up (job demands and interpersonal conflicts) employees' personal resources in the context

of industrial shift work. We will briefly discuss each of them in line with the COR theory.

Study hypotheses: Applying the assumptions of the COR theory

According to the COR theory, personal resources can be divided into those inherent to individuals and those that can be found in the environment (Hobfoll, 1989; 2001). Regardless of their source, all resources have the following in common: They are valued by the individuals or serve for the attainment of other valuable resources. People are generally motivated to retain and protect the existing resources, as well as to obtain and foster new ones (Hobfoll, 1989). Accordingly, we develop our hypotheses along the three basic assumptions of the COR theory (Westman, Hobfoll, Chen, Davidson, & Laski, 2004). First, employees with greater resources are more capable of resource gain and less vulnerable to resource loss. By contrast, those with fewer resources are less capable of resource gain and more vulnerable to resource loss (assumption underlying H_1). Second, employees are likely to experience psychological stress or ill-being when resources are threatened with loss (assumption underlying H_2). Finally, employees will try to protect themselves from resource loss by employing other available resources (assumption underlying H_3).

Working conditions and health

Based on the psychological climate categorization of work environment perceptions, we identify six working conditions that have the potential either to add to (i.e., job control, role clarity, managers' and peer support) or use up (i.e., job demands and interpersonal conflicts) other valuable resources. Job control refers to the authority over performing task assignments in terms of their content, schedule, pace, etc. (Karasek, 1979). Role clarity is a working condition that helps reduce uncertainty regarding one's responsibilities at work by encompassing clear instructions and expectations from employees (Panaccio & Vandenberghe, 2011). Managers'

and peer support include various aspects of work-related support (e.g., supportive feedback, emotional support and encouragement) (Edwards, Webster, Van Laar, & Easton, 2008). Job demands consist of high workload, unrealistic time pressures and work pace (Karasek & Theorell, 1990). Finally, interpersonal conflicts encompass various kinds of negative behaviours among co-workers, such as personal harassment and bullying (De Cuyper, Baillien, & De Witte, 2009). In particular, we posit that job control, role clarity, managers' and peer support represent supportive working conditions that carry the potential of resource gains, and as such represent valuable environmental resources. On the other hand, job demands and interpersonal conflicts represent the demanding conditions that may lead to resource loss (Westman et al., 2004). Accordingly, employees who work in environments characterized by high levels of job demands and interpersonal conflicts have fewer environmental resources. In line with the COR theory, employees with more resources are more capable of resource gain and less vulnerable to resource loss. The opposite is the case for employees who work in demanding conditions: They possess less environmental resources and as a consequence, are less capable of gaining new resources and more vulnerable to losing the existing ones. Since health represents a valuable personal resource that, among the other, depends on the environmental factors, we propose that supportive working conditions relate positively, whereas demanding working conditions relate negatively to various indicators of employees' health. Previous empirical findings are consistent with this notion (e.g., Inoue & Kawakami, 2010; Lee & Ashforth, 1996; Roelen et al., 2014; Schreurs, van Emmerik, Notelaers, & De Witte, 2010). Accordingly, the presented theoretical and empirical arguments are summarized in the following hypothesis:

H₁: Job control, role clarity, managers' and peer support are positively related, whereas job demands and interpersonal conflicts are negatively related to employees' self-rated physical, general and mental health.

Job insecurity and health

Employment represents a valuable personal resource because it enables access to manifest (i.e., financial income) and latent benefits (e.g., the sense of purpose, societal status and social network) that are unique to the employment situation (Jahoda, 1982; Selenko & Batinic, 2013). According to the COR theory, when people perceive the threat of job loss, they will experience psychological stress or ill-being. Perception of job insecurity may be particularly detrimental in the context of manufacturing shift work. Industrial shift workers possess less personal and environmental resources, (e.g., education, job control and work-related support), a state that makes them potentially more vulnerable to resource loss (i.e., current employment) and less capable of resource gain (i.e., new employment) (Westman et al., 2004). Negative effects of job insecurity on employees' health were empirically supported in cross-sectional and longitudinal research designs (for meta-analyses, see Cheng & Chan, 2008; Sverke et al., 2002). Accordingly, we hypothesize the following:

H₂: Job insecurity is negatively related to employees' self-rated physical, general and mental health, above and beyond the contribution of basic working conditions.

Moderating effects of working conditions on the relationship between job insecurity and health

Finally, we probe the moderating effects of working conditions on the relationship between job insecurity and health. More specifically, when threatened with job loss, employees will employ other available resources, in themselves or in their work environment, in order to protect their employment (Westman et al., 2004). Therefore, we suppose that supporting working conditions will buffer, whereas demanding working conditions will boost the negative relationship between job insecurity and employees' health. Previous studies provide partial support for this notion. For example, job control buffered the detrimental effect of job insecurity on employees' well-

being among a heterogeneous sample of Belgian workers (Schreurs et al., 2010). High levels of work-based support, which referred to support from colleagues and supervisors, alleviated negative relationship between job insecurity and work related well-being (Lim, 1996). To the best of our knowledge, the remaining working conditions were not tested as moderators of the job insecurity-health relationship. Therefore, we set our third hypothesis as follows:

H_{3a}: Job control, role clarity, managers' and peer support will buffer the negative relationship between job insecurity and employees' self-rated physical, general and mental health. More specifically, the negative relationship between job insecurity and health will be weaker when employees perceive higher levels of job control, role clarity, managers' and peer support.

H_{3b}: Job demands and interpersonal conflicts will boost the negative relationship between job insecurity and employees' self-rated physical, general and mental health. More specifically, the negative relationship

between job insecurity and health will be stronger when employees perceive higher levels of job demands and interpersonal conflicts.

Method

Participants and procedure

Data were collected among 459 blue-collar shift workers employed in three organizations from the Croatian industrial sector. We approached participants via Human Resource departments and professionals in safety at work. Prior to data collection, participants received flyers which familiarized them with the general purpose of the study and stressed the voluntary nature, confidentiality and importance of participation for all parties involved. Each participant completed the paper-and-pencil questionnaire during work time or at home, if preferred. Anonymity was enhanced by instructing employees to return the questionnaires in specially marked boxes at their workplaces.

Table 1. The sample characteristics across organizations

	Total sample (N = 407)	Organization 1 (N = 295)	Organization 2 (N = 65)	Organization 3 (N = 47)	Difference
<i>N</i> (%)					
Gender					
Male	380 (93.4)	294 (99.7)	47 (72.3)	39 (83)	–
Female	27 (6.6)	1 (0.3)	18 (27.7)	8 (17)	
Education					
Primary school	27 (6.6)	18 (6.1)	7 (10.8)	2 (4.3)	–
High school up to 3 years	143 (35.1)	103 (34.9)	28 (43.1)	12 (25.5)	
High school up to 4 years	228 (56)	169 (57.3)	29 (44.6)	30 (63.8)	
Polytechnic or university	9 (2.2)	5 (1.7)	1 (1.5)	3 (6.4)	
<i>M</i> (<i>SD</i>)					
Age	44.38 (9.92)	46.11 (9.22)	38.94 (10.73)	41.06 (9.71)	<i>F</i> (2, 404) = 18.29***
Organizational tenure	19.88 (11)	23.37 (9.97)	10.25 (8.56)	11.30 (6.82)	<i>F</i> (2, 406) = 73.39***
Years of shift work	20.24 (10.88)	23.22 (9.99)	9.31 (7.28)	15.09 (9.42)	<i>F</i> (2, 398) = 58.75***

Notes: **p* < .05; ***p* < .01; ****p* < .001. Chi-square tests for gender and education could not be computed because more than 20% of expected counts were less than 5.

Organization 1 = petrochemical company; Organization 2 = organization from food production industry; Organization 3 = organization in daily press media.

We recruited the organizations which met the following criteria: they were engaged in

manufacturing shift work and varied in objective job insecurity.¹ The first

¹ We found a significant difference in subjective job insecurity (*F*(2,404) = 18.24, *p* < .001) between each organization: Organization 1 (*M* = 3.50, *SD* = 0.89), Organization 2 (*M* = 3.24, *SD* = 1.09) and Organization 3 (*M* = 2.64, *SD* = 0.85) (post hoc tests were performed with the Least Significant Difference (LSD) procedure).

organization (Organization 1) was a state-owned petrochemical company (response rate 42.14%). At the time of data collection, it has undergone the process of privatization and employees were informed about the restructuring and potential downsizing. According to the company's official annual report, the process of downsizing resulted in -23% of employees at the end of 2014, six months after our data collection. The second organization (Organization 2) was from the food production industry (response rate 54.17%), and the third one (Organization 3) was engaged in daily press media (response rate 39.17%). Both organizations were privatized and restricted several years ago.

Sample characteristics are presented in Table 1. Most participants in the study were males. Approximately 50% of the participants finished a 4-year secondary school program, about 35% had a 3-year secondary-school education, and less than 10% completed either primary school or some degree of the higher education (polytechnic or university). Compared with employees in Organizations 2 and 3, employees from Organization 1 were older, worked longer in current organization and in shifts. There were no significant differences between Organization 2 and 3 in these variables.

Measures

Working conditions. We measured six working conditions with the HSE Indicator Tool (Health and Safety Executive, 2004). Participants answered on a scale ranging from 1 ("never/strongly disagree") to 5 ("always/strongly agree"). **Job control** consisted of five items (sample item: "I have a say in my own work speed."). One item was omitted because it had a low factor loading on the corresponding latent factor ("My working time can be flexible"). The Cronbach's alpha was .72. **Role clarity** was measured with four items (sample item: "I am clear what is expected of me at work."). Again, we decided to exclude one item with low factor loading and extremely skewed distribution ("I know how to go about getting my job done."). The Cronbach's alpha for this measure was .76. **Managers' support** was assessed with 5 items (sample item: "My line manager encourages

me at work."). Cronbach's alpha was .85. The scale measuring **peer support** consisted of four items (item sample: "I get help and support I need from colleagues."). Its reliability was .77.

Job demands were measured with seven items (sample item: "I am pressured to work long hours"). We excluded one item ("I have to work very intensively") due to the low factor loading. The Cronbach's alpha was .80. **Interpersonal conflicts** were assessed with four items (sample item: "Relationships at work are strained."). Reliability was .83.

Job insecurity. To measure job insecurity we used four items validated by Vander Elst, De Witte and De Cuyper (2014). Answers were indicated on a scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The sample item was "I think I will lose my job in the near future". Reliability of this scale equalled .83.

Self-rated health. We used the Croatian version of the SF-36 health survey to measure employees' physical, general and mental health (Maslić Seršić & Vuletić, 2006). More specifically, **physical health** was measured with ten items assessing physical functioning. Participants indicated if and to what extent their health limits several daily activities, e.g. lifting or carrying groceries. The scale ranged from 1 ("Yes, limited a lot.") to 3 ("No, not limited at all."). Reliability of this scale was .92. **General health** was measured with five items. Sample item was "I seem to get sick a little easier than other people." with possible answers ranging from 1 ("definitely false") to 5 ("definitely true"). The Cronbach's alpha of this scale was .78. Finally, **mental health** consisted of five items. Participants answered how they felt during the past 4 weeks. Sample item was "How much of the time during the past 4 weeks have you felt calm and peaceful?". Scale ranged from 1 ("none of the time") to 6 ("all the time"). Reliability was .87. Where necessary, items were recoded. Finally, we transformed raw scale scores to a scale ranging from 0 to 100.

Control variables. We controlled for several socio-demographic and work-related variables in order to reduce the possibility of alternative explanations of obtained results: gender (0 = male, 1 = female), age (in years), education (1 = primary school, 2 = high school up to 3 years, 3 = high school up to 4 years, 4

= polytechnic or university)², organizational membership (recoded into two dummy variables with Organization 1 as the reference group), organizational tenure (in years), length of shift work (in years). Since there was a considerable overlap between age and organizational tenure ($r = .83$), as well as between age and years of shift work ($r = .85$), we only included age as a control variable in main analyses.

Data analyses

We analysed the data following two steps: (1) we inspected the construct validity of the measures by means of the confirmatory factor analysis (CFA); (2) we ran a set of moderated hierarchical regression analyses to test the main effects and interaction terms of job insecurity and six working conditions in predicting employees' physical, general and mental health. Prior to data analyses, participants with more than 10% of missing data on all scales (approximately 5.44%) and more than 50% of missing data on each of the scale (approximately 1.38%) were excluded from the study. In addition, we excluded participants with missing data on control variables (approximately 4.9%). The remaining missing values were replaced with the Expectation Maximization (EM) algorithm, an iterative procedure that results in unbiased or almost unbiased estimates of means, variances and covariances due to the inclusion of residual variance (Howell, 2007). The effective sample size was 407.

We conducted CFA in AMOS 22.0 (Arbuckle, 2013) with the maximum likelihood estimation procedure and the covariance matrix as the input for the analyses. The overall goodness-of-model-fit was evaluated with a combination of the following indices and the corresponding cut-off criteria: the standardized root mean square residual (SRMR) value below .08, the comparative fit index (CFI) value equal to or above .90 and the root mean square error of approximation

(RMSEA) value below .08 with the corresponding 90% confidence interval close to the RMSEA (Bentler, 1990; Browne & Cudek, 1993; Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003). The hypothesized measurement model was compared to the several nested models with the χ^2 -difference test.

The hypotheses were tested with three moderated hierarchical regression analyses by regressing the physical, mental and general health on independent variables in four successive steps. In step 1, we introduced the employees' socio-demographic and work-related control variables (age, gender, education, organizational membership). Six working conditions (job demands, job control, role clarity, managers' support, peer support and interpersonal conflicts) were entered in step 2. To test its incremental importance, we added job insecurity in step 3. Finally, in step 4, the six two-way interaction terms between job insecurity and each working condition were entered concurrently, namely job insecurity x job demands, job insecurity x job control, job insecurity x role clarity, job insecurity x managers' support, job insecurity x peer support and job insecurity x interpersonal conflicts. These variables were previously centred in order to minimize the problems related with multicollinearity between the interaction terms and the corresponding main effects (Cohen, Cohen, West, & Aiken, 2003). We plotted statistically significant interactions, and calculated simple slopes.

Results

Measurement model

The fit indices of the hypothesized 10-factor model with specified correlations between latent factors (job control, role clarity, managers' support, peer support, job demands, interpersonal conflicts, job insecurity, physical health, general health and mental health) were: $\chi^2 = 2848.46$, $df = 1280$,

² Since there were only 9 participants in the whole sample who finished polytechnics or university, and their jobs did not differ from participants with lower levels of education, we decided to merge categories 3 and 4 in main analyses. The results were identical regardless of the number of categories in this variable.

$p < .001$, CFI = .86, RMSEA = .055 [.052–.058], SRMR = .06. After we allowed several error correlations between the similar wording items³, the model fit improved: $\chi^2 = 2506.72$, $df = 1274$, $p < .001$, SRMR = .056, CFI = .89, RMSEA = .049 [.046–.052]. With the exception of slightly low CFI, the model showed a reasonable fit to the data. In addition, the fit of this 10-factor model was better than the fit of the several alternative models, namely: (1) the 5-factor model in which all items measuring working conditions loaded on one factor ($\Delta\chi^2 = 788.63$, $\Delta df = 35$, $p < .001$, SRMR = .066, CFI = .82, RMSEA = .061 [.059–.064]); (2) the 8-item model in which all items measuring health loaded on one factor ($\Delta\chi^2 = 1081.79$, $\Delta df = 17$, $p < .001$, SRMR = .09, CFI = .79, RMSEA = .066 [.064–.069]) and (3) the 1-factor model ($\Delta\chi^2 = 4126.61$, $\Delta df = 45$, $p < .001$, SRMR = .118, CFI = .52, RMSEA = .1 [.097–.102]). All

items loaded significantly and positively on their respective latent factor.

Descriptive statistics

Means, standard deviations, reliability coefficients and correlations between the study variables are presented in Table 2. It is noteworthy to mention that job insecurity related negatively to all three indicators of employees' self-rated health: correlations with physical and mental health were small, while the correlation with general health was moderate (Cohen, 1988). Job demands and interpersonal conflicts correlated negatively, whereas job control, role clarity, managers' and peer support correlated positively with physical, general and mental health. Correlations were largest with mental and smallest with physical health.

Table 2. Means, standard deviations and correlations between study variables

	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Female	–	–	1														
2. Age	44.38	9.92	.02	1													
3. Education	–	–	-.10	-.12*	1												
4. Organization 2	–	–	.37**	-.24**	-.11*	1											
5. Organization 3	–	–	.15**	-.12*	.08	-.16**	1										
6. Job demands	2.29	0.66	.22**	-.20**	.05	.44**	.23**	1									
7. Job control	3.14	0.76	-.17**	.15**	.08	-.33**	.01	-.33**	1								
8. Role clarity	4.58	0.57	-.11*	.13*	.05	-.21**	-.10*	-.35**	.33**	1							
9. Managers' support	3.54	0.84	-.29**	.21**	.01	-.37**	-.24**	-.54**	.51**	.43**	1						
10. Peer support	3.68	0.73	-.32**	.08	.11*	-.42**	-.14**	-.44**	.48**	.33**	.73**	1					
11. Conflicts	2.16	0.82	.39**	-.13*	-.09	.46**	.12*	.63**	-.36**	-.37**	-.64**	-.62**	1				
12. Job insecurity	3.36	0.96	.01	.14**	-.03	-.05	-.27**	.01	-.21**	-.03	-.05	-.05	.02	1			
13. Physical health	77.93	23.38	-.15**	-.21**	.07	-.22**	.00	-.20**	.16**	.11*	.20**	.18**	-.22**	-.15**	1		
14. General health	64.31	18.89	-.20**	-.19**	-.03	-.19**	-.01	-.41**	.26**	.18**	.34**	.34**	-.41**	-.30**	.46**	1	
15. Mental health	67.40	17.65	-.20**	.00	-.02	-.28**	-.07	-.46**	.31**	.26**	.45**	.39**	-.47**	-.22**	.38**	.68**	1

Notes: * $p < .05$; ** $p < .01$;

Education: 1 = Primary school, 2 = High school up to 3 years, 3 = High school up to 4 years and Polytechnic or university; Organization 2 = organization from food production industry (the reference group is Organization 1 (petrochemical company)); Organization 3 = organization in daily press media (the reference group is Organization 1 (petrochemical company)).

³ Correlations were specified between the errors of the following items: "I have a choice in deciding how I do my work." and "I have a choice in deciding what I do at work" (job control); "I am clear what is expected of me at work." and "I am clear what my duties and responsibilities are." (role clarity); "I am a subject to personal harassment in the form of unkind words or behaviour." and "I am a subject to bullying at work" (interpersonal conflicts); "Walking more than one mile" and "Walking several blocks"; "Walking several blocks" and "Walking one block" (physical health); "Have you felt so down in the dumps nothing could cheer you up?" and "Have you felt downhearted and blue?" (mental health)

Regression analyses

The model consisting of socio-demographics, organizational membership, six working conditions, job insecurity and interaction terms between job insecurity and working conditions explained significant proportions of variance in three dependent variables, in descending order: general health (37.4%), mental health (34%) and physical health (15.3%).

The socio-demographic and work-related control variables explained a significant proportion in physical (11.6%), general (10.5%) and mental health (9.8%). In particular, age was negatively related with physical and general health. Furthermore, females reported lower levels of general health. Organizational membership was a significant predictor of three health indicators: employees working in food production industry had lower levels of physical, general and mental health and employees working in daily press media had lower level of mental health when compared with employees working in petrochemical company.

Hypothesis 1. As predicted, job control related positively to general health, while managers' support related positively to mental health, after accounting for socio-demographics and work-related variables. By contrast, job demands and interpersonal conflicts related negatively to general and mental health. Contrary to H_1 , the remaining working conditions were not significantly

associated with employees' physical, general and mental health. Accordingly, we found partial support for H_1 .

Hypothesis 2. When introduced in Step 3, job insecurity was negatively related with employees' physical, general and mental health. In particular, it explained additional 1.4% of variance in physical health after controlling for socio-demographics, organizational membership and working conditions. In contrast, none of the six working conditions had a significant contribution in explaining employees' physical health in Step 3. Job insecurity explained additional 5% in general health. From six working conditions, only job demands and interpersonal conflicts remained negatively related to general health. Beta-coefficients of job insecurity, job demands and interpersonal conflicts were approximately equal: -.25, -.26 and -.18, respectively. When introduced in Step 3, job insecurity explained additional 3.5% of variance in mental health. Managers' support remained positively related, whereas job demands and interpersonal conflicts remained negatively related to mental health. Analogous to general health, job insecurity had an approximately equal contribution in explaining mental health as three working conditions: beta-coefficient of job insecurity was -.20, while beta-coefficients of manager' support, job demands, and interpersonal conflicts were .17, -.20, and -.19, respectively.

Table 3. The summary of moderated regression analyses

	Physical health				General health				Mental health			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
Female	-.03	-.00	.01	.01	-.11*	-.04	-.02	-.01	-.07	.00	.02	.03
Age	-.29***	-.31***	-.30***	-.30***	-.26***	-.29***	-.26***	-.27***	-.09	-.13**	-.11*	-.11*
Education	.01	.02	.02	.02	-.09	-.08	-.08	-.06	-.06	-.06	-.06	-.05
Organization 2	-.29***	-.20**	-.23***	-.22***	-.22***	.06	-.00	-.02	-.30***	-.03	-.08	-.09
Organization 3	-.07	-.03	-.07	-.06	-.06	.08	-.00	-.04	-.12*	.03	-.04	-.06
Job demands		-.07	-.06	-.03		-.29***	-.26***	-.23***		-.23***	-.20**	-.18**
Job control		.07	.04	.06		.10*	.05	.09		.08	.03	.06
Role clarity		.01	.01	.03		-.02	-.02	-.02		.03	.03	.04
Managers' support		.12	.11	.14		.08	.07	.08		.18*	.17*	.17*
Peer support		-.08	-.08	-.10		.05	.05	.02		.01	.01	-.01
Conflicts		-.07	-.07	-.08		-.17**	-.18**	-.19**		-.18**	-.19**	-.21**
Job insecurity			-.13*	-.12*			-.25***	-.25***			-.20***	-.21***
Job insecurity x job demands				-.08				-.14*				-.11
Job insecurity x job control				.03				-.18**				-.08
Job insecurity x role clarity				-.03				.11*				.10†
Job insecurity x managers' support				-.13				.12				.01
Job insecurity x peer support				-.05				-.13				-.03
Job insecurity x conflicts				-.13				-.01				-.03
R^2 (adjusted)	11.6	13.6	14.9	15.3	10.5	29.1	34.1	37.4	9.8	29.5	32.9	34
ΔR^2	12.7***	3.3*	1.4*	1.7	11.6***	19.4***	5***	4.2***	10.9***	20.5***	3.5***	2.1†

Note: † $p = .05$; * $p < .05$; ** $p < .01$; *** $p < .001$

Education: 1 = Primary school, 2 = High school up to 3 years, 3 = High school up to 4 years and Polytechnic or university; Organization 2 = organization from food production industry (the reference group is Organization 1 (petrochemical company)); Organization 3 = organization in daily press media (the reference group is Organization 1 (petrochemical company)).

Hypothesis 3. We found no support for H_3 concerning physical health. However, when introduced in Step 4, interaction terms additionally explained 4.2% of variance in general health. The regression lines for three significant interaction terms are plotted in Figure 1 (job insecurity x job demands), Figure 2 (job insecurity x job control) and Figure 3 (job insecurity x role clarity). As hypothesized, job demands boosted the negative relationship between job insecurity and general health. In particular, job insecurity was negatively related to general health under the condition of high job demands ($B = -7.30$, $p < .001$). By contrast, the relationship was not significant under the condition of low job demands ($B = -2.12$, $p > .05$). Job control did not buffer the negative relationship between job insecurity and general health, as we predicted. On the contrary, the relationship

was negative when employees perceived high levels of job control ($B = -7.83$, $p < .001$), and not significant when they perceived low levels of job control ($B = -1.59$, $p > .05$). In line with H_3 , role clarity was a buffer of the negative relationship between job insecurity and general health: the regression line was steeper under the conditions of low ($B = -6.74$, $p < .001$) compared to high role clarity ($B = -2.68$, $p < .05$). Finally, interaction terms additionally explained 2.1% of variance in mental health. Only the interaction between job insecurity and role clarity was marginally significant ($p = .05$). The regression lines are plotted in Figure 4. Job insecurity related negatively to mental health under the condition of low role clarity ($B = -5.29$, $p < .001$). This relationship was not statistically significant under the condition of high role clarity ($B = -2.05$, $p > .05$).

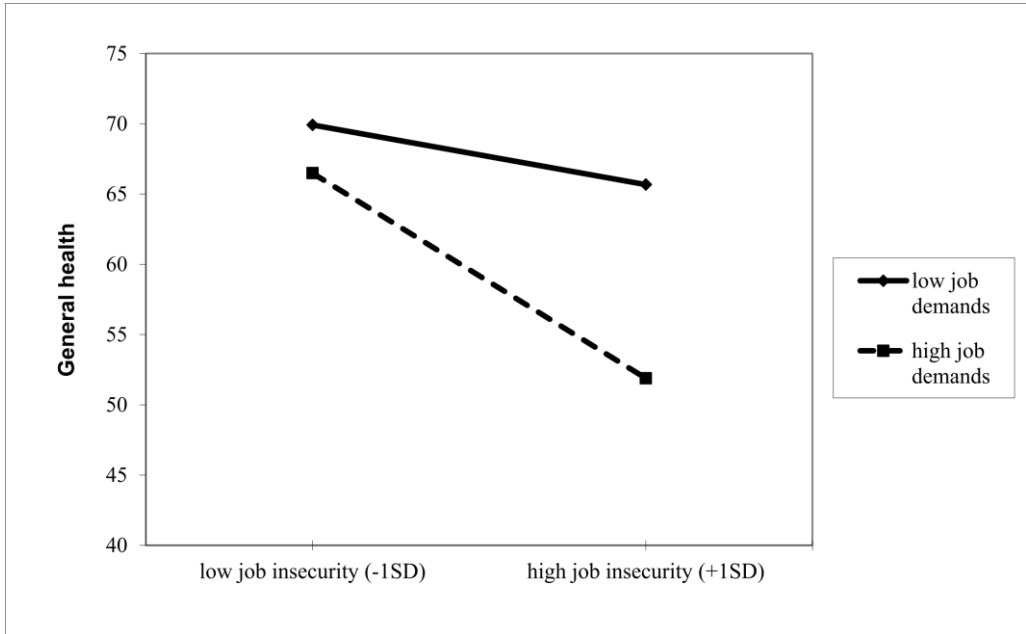


Figure 1. Interaction between job insecurity and job demands on general health

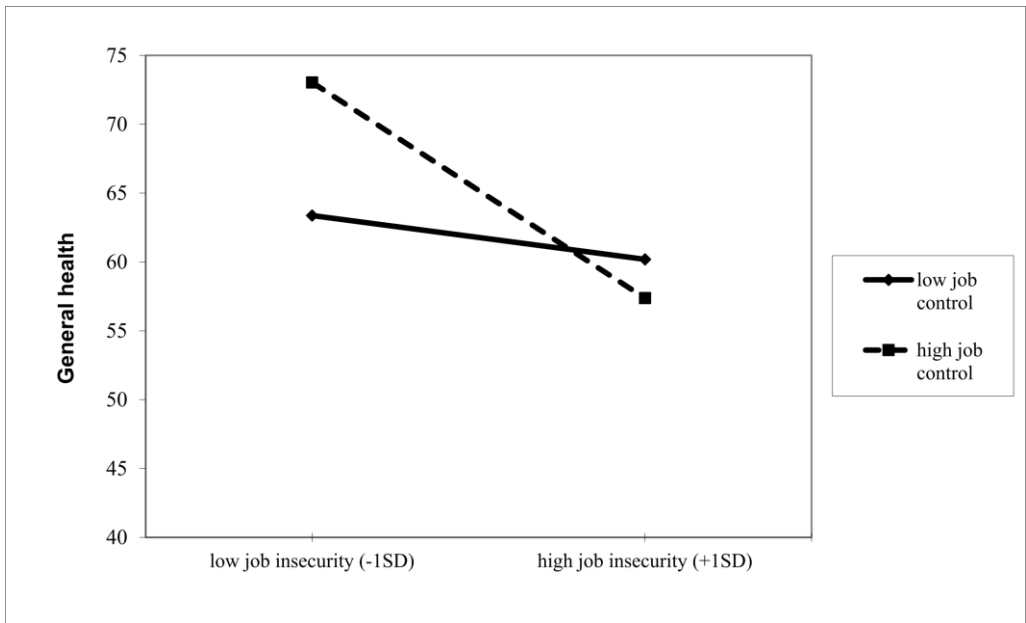


Figure 2. Interaction between job insecurity and job control on general health

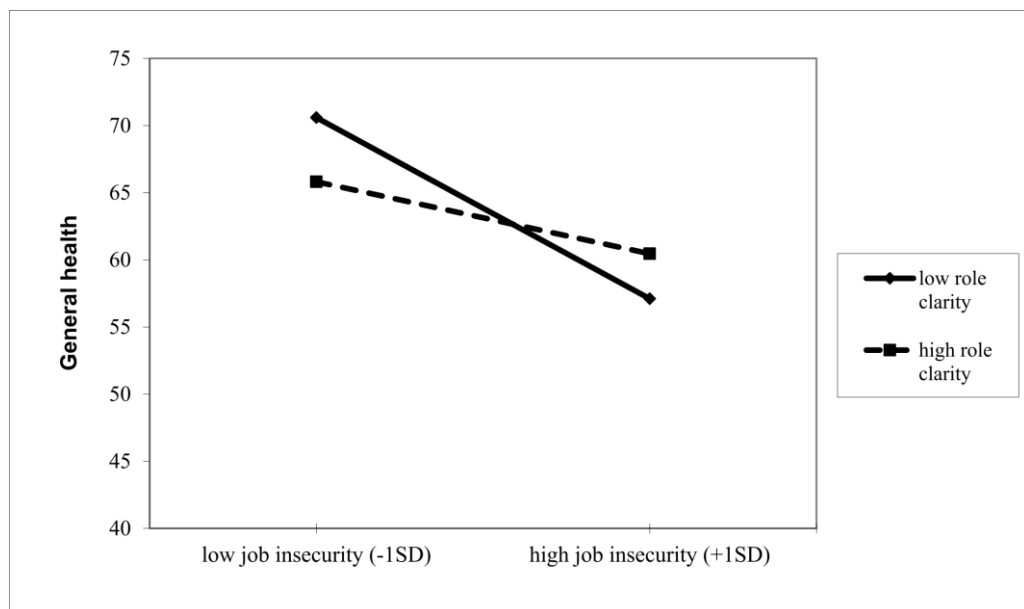


Figure 3. Interaction between job insecurity and role clarity on general health

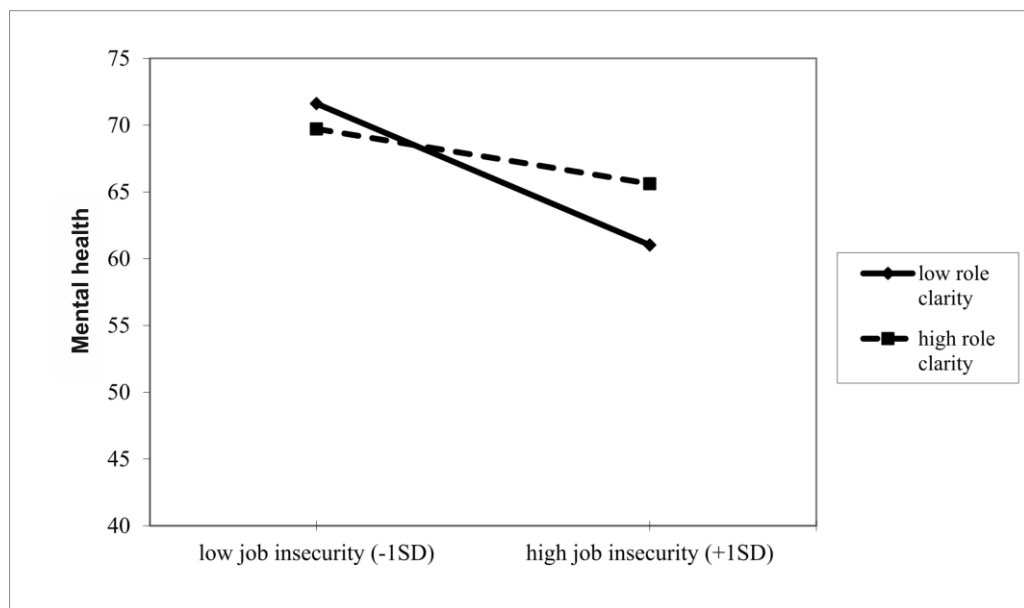


Figure 4. Interaction between job insecurity and role clarity on mental health

Discussion

This study aimed to contribute to the existing job insecurity literature by probing the relationship between the subjective experience of job insecurity and employees’ self-rated health in the context of industrial shift work.

Acknowledging the empirical evidence on the vulnerability of this occupational group, we aimed to gain more in-depth knowledge on the relationship between job insecurity and health by accounting for the effects of the most relevant working conditions. The particular

feature of this study concerns the psychological climate framework, on which we grounded the selection of the most relevant, psychologically meaningful aspects of the work environment – namely, job demands, job control, role clarity, managers' and peers support and interpersonal conflicts (James & James, 1989). Specifically, we tested: (i) the incremental contribution of job insecurity in predicting employees' self-rated physical, general and mental health by controlling for the effects of basic working conditions and (ii) the moderating effects of working conditions on the relationship between job insecurity and health.

The hypotheses were grounded on the assumptions of the COR theory. We found only partial support for H_1 . As expected, job demands and interpersonal conflicts were negatively related to employees' general and mental health after controlling for the background variables. Both working conditions have been characterized as demanding in the literature, implying that they exhaust employees' resources, such as health (e.g., Demerouti, Bakker, Nachreiner, & Schaufeli, 2000; Inoue & Kawakami, 2010; Taris, Schreurs, & Van Iersel-Van Silfhout, 2001). By contrast, job control and managers' support were positively related to general and mental health, respectively. According to the COR theory, these working conditions support the resource gain which makes them beneficial for employees' health (e.g., Lee & Ashforth, 1996). Contrary to our expectations, the remaining working conditions did not contribute to explaining variance in the health of industrial shift workers. Furthermore, none of the working conditions were significantly related to employees' self-rated physical health. One tentative explanation might relate to the selection effect: Employees who remain working in adverse psychosocial working conditions are the ones who are more persistent and have better health compared to those employees who have either changed jobs because they found it too difficult, or more likely, did not pass necessary medical examinations (Tüchsen et al., 2006). Accordingly, it would make sense to expect attenuated effects of working conditions due

to the possible range restriction in employees' health.

Our second hypothesis concerned the incremental contribution of job insecurity in predicting employees' self-rated health. We found consistent support for the notion that job insecurity represents one of the most important work stressors among the manufacturing shift workers. It explained a significant additional proportion of variance in all three indicators of health. In addition, compared with the six basic working conditions, job insecurity had one of the largest independent contributions to the perceptions of physical, general and mental health. These results are in line with the existing empirical evidence on the relative importance of job insecurity. For example, De Witte found that job insecurity was 'one of the least important amongst the most important stressors' (De Witte, 1999, p. 173-174). In his study, only skill utilization and workload demands had a greater contribution in explaining psychological well-being among the heterogeneous sample of white- and blue-collar workers. Two distinct features of our sample must be explicated when interpreting our results. First, participants in our study were mostly unskilled men with lower education. Losing the current job in the context of the Croatian labour market for most of them would imply a very low chance of finding a new one (The Croatian employment service, 2015), and as a consequence, an existential threat to them and their families. Second, the average age of our participants was 44.38 years ($SD = 9.92$, $C = 52$ years), whereas the average organizational tenure was 19.88 years ($SD = 11$, $C = 30$ years). In other words, a large portion of the participants spent the most part of their working lives in their current organization, an observation that implies that for most of them job security was a part of the psychological contract. Accordingly, perceived threat of losing a current job implies a serious breach of the psychological contract which has been identified as one of the most important mechanisms that explains negative consequences of job insecurity (De Witte, 2005; Sverke et al., 2004).

Finally, we found partial support for the moderating effects of working conditions on the relationship between job insecurity and health. Specifically, when added in the final step of the regression analyses, interaction terms accounted for additional 4.2% of the variance in the general health and 2.1% of the variance in the mental health. It is important to note that the amount of additional explained variance in general health exceeds those usually reported in the social science literature (McClelland & Judd, 1993). As hypothesized, role clarity buffered the negative relationship between job insecurity and two indicators of health (i.e., general and mental health). According to the COR theory, role clarity has been identified as the supportive working condition which facilitates comprehension of one's work responsibilities (Panaccio & Vandenberghe, 2011). It is possible that clear expectations and instructions reduce uncertainty at the workplace, and as a consequence, prompt feelings of control over insecure situation. Contrary to our hypothesis, high levels of job control boosted the negative relationship between job insecurity and general health: The slope was steeper among employees who perceived high vs. low levels of job control. This finding contrasts both – the theory, which suggests that job control is beneficial for workers since it increases the possibilities for active coping, reduces exposure to work stressors, etc. (Karasek, 1979), as well as the existing empirical findings on the buffering effect of job control (Schreurs et al., 2010). However, the following alternative interpretation may shed some light on these results. Under the circumstances of high job insecurity, workers' self-rated general health was similar regardless of the level of perceived job control. On the contrary, under the circumstances of low job insecurity, job control had the expected beneficial effect on workers' health: The level of self-rated general health was higher when employees perceived high vs. low level of control over their jobs. In other words, these results imply that job control has beneficial effect only under the condition of low job insecurity, whereas it doesn't have any effect under the condition of high job insecurity. Another possible, although tentative explanation

concerns the nature of the jobs characterized by higher control in the contexts of our study. More specifically, it is possible that higher levels of job control implied higher job positions and greater job responsibilities in the sample of industrial shift workers, which may depleted their resources, instead of supporting them, as we expected. Among the demanding working conditions, we found a significant interaction effect for job demands, which as hypothesized boosted the negative relationship between job insecurity and general health. Employees who feel that work demands exceed their resources (e.g., have too much task assignments in too short time period) may perceive a lack of control over their work situation. Accordingly, they are less effective in coping with an insecure situation which makes them more vulnerable to the experience of job insecurity.

Practical implications

The results of this study contribute to the existing knowledge on environmental factors which are susceptible to modifications and therefore, applicable in designing the HR interventions (e.g., Probst, 2005; Vander Elst, Baillien, De Cuyper, & De Witte, 2010). Unlike the previous studies, the selection of working conditions was grounded on the theoretically elaborated psychological climate framework that defines work environment in terms of its psychological meaning and significance to the employees (James & James, 1989). Accordingly, the findings on the moderating effects of job demands, job control and role clarity on the relationship between job insecurity and self-rated general and mental health may serve as guidelines in designing HR policies and interventions. The recommendation for the practitioners would be to strengthen workers' resources by creating beneficial work environments. More specifically, the negative effects of job insecurity may be less pronounced if workers did not perceive that the demands of their job exceed their resources. One of the HR strategies would be to provide them with sufficient resources to complete their work assignments (e.g., giving them realistic deadlines and sufficient breaks). In addition, by clarifying the work-related responsibilities

and expectations, managers may provide workers with more resources to perform their jobs adequately, and thereby reduce the feelings of job insecurity. Finally, although the results of this study suggest that job control may boost the negative effect of job insecurity on employees' general health implying that this feature of work environment should not be furnished, we believe this interpretation is too straightforward and oversimplified for two reasons. First, we found a significant positive main effect of job control on employees' general health. Second, according to the alternative interpretation of the interaction on Figure 2, job control has a positive, albeit limited effect on the health of industrial shift workers, found only in a situation of low job insecurity.

Limitations and recommendations for future research

The results of this study should be interpreted in light of several limitations. First, we used a cross-sectional research design which limits the possibility of drawing causal inferences. Although our hypotheses implied causal links between working conditions and employees' physical, general and mental health, as well as between job insecurity and three indicators of health, the opposite is also plausible. For example, employees with compromised health may indeed perceive their jobs more demanding or experience a lack of control over their work assignments. Furthermore, lower levels of health may prompt feelings of uncertainty related to one's current job position. Although the existing empirical findings support the implied causal order between the study variables (e.g., Hellgren & Sverke, 2003), future studies would surely benefit from a longitudinal research design.

The second drawback relates to the usage of self-report measures which increase the likelihood of the common method variance and may lead to inflated correlations. However, the core study variables in this study (e.g., job insecurity and dimensions of the psychological climate) by definition imply subjective perceptions. Therefore, gathering data from different sources other than self-

reports, would be inappropriate given the aims of our study. To reduce the possibility of common method bias, we followed the recommendations by Podsakoff, MacKenzie, Lee & Podsakoff (2003) (e.g., we highlighted the confidentiality and the anonymity of the participation, underlined that there were no right and wrong answers, etc.). Furthermore, simulation studies show that common method bias attenuates the strength of the interaction effects (Evans, 1985). Accordingly, it seems that common method bias did not affect our results to any substantial extent.

Third, we are aware of the possibility of social desirability which may attenuate the correlations due to the decreased variance. Although we underlined the confidentiality and anonymity of the participation, we cannot exclude the possibility that workers may have distorted their responses to some extent.

Finally, our participants were recruited from three specific industrial organizations employing mainly males with lower education. Accordingly, future studies conducted on more representative and heterogeneous samples would increase the generalizability of the results.

Conclusion

Overall, our results not only suggest that job insecurity represents one of the most important work stressor among the industrial shift workers, but also that some of the basic working conditions have the potential to either boost or buffer its negative association with job insecurity. As such, it contributes to the extensive evidence on detrimental effects of job insecurity in at least two distinct ways: (i) by addressing this issue among the understudied population of industrial shift workers; (ii) by applying the theoretically elaborated framework of psychological climate in investigating the effects of the psychologically meaningful aspects of the working environment.

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