



The Perceived Occupational Stress Scale: A Brief Tool for Measuring Workers' Perceptions of Stress at Work

This is the peer reviewed (post-print) version of the following article:

Original

The Perceived Occupational Stress Scale: A Brief Tool for Measuring Workers' Perceptions of Stress at Work / Marcatto, F., Di Blas, L., Luis, O., Festa, S., Ferrante, D.. - In: EUROPEAN JOURNAL OF PSYCHOLOGICAL ASSESSMENT. - ISSN 1015-5759. - 38:4(2021), pp. a000677.293-a000677.306. [Epub ahead of print] [10.1027/1015-5759/a000677]

Availability:

This version is available at: 11368/2993413 since: 2022-03-09T09:58:53Z

Publisher:

Published

DOI:10.1027/1015-5759/a000677

Terms of use:

Some rights reserved. More details in the PostPrint rights section below.

License:

Attribution 4.0 International

Publisher copyright

--

(Article begins on next page)

The Perceived Occupational Stress Scale

A Brief Tool for Measuring Workers' Perceptions of Stress at Work

Francesco Marcatto¹ , Lisa Di Blas¹, Ornella Luis², Simone Festa³, and Donatella Ferrante¹

¹Department of Life Sciences, University of Trieste, Italy

²Human Resources Department, Municipality of Trieste, Italy

³Department of Education, Psychology and Communication, Suor Orsola Benincasa University, Naples, Italy

Abstract: This article aims to present the development and test the psychometric properties of the Perceived Occupational Stress (POS) scale, a new brief instrument aimed at rating a worker's perception of feeling stressed at work. Six studies are conducted on an overall sample of 1,805 Italian workers, to examine both the construct and concurrent validity of the POS scale. The results demonstrate the high internal consistency ($\alpha = .82$) and test-retest reliability ($r = .86$) of the POS scale, as well as its structural validity and concurrent validity with the Maslach Burnout Inventory ($r = .68$ with Emotional Exhaustion) and the Effort-Reward Imbalance Questionnaire ($r = .62$ with Imbalance and $r = .51$ with Overcommitment). Moreover, the POS scale is determined to uniquely contribute toward predicting stress-related health complaints, over and above indicators of workplace stressors, as measured by the Health and Safety Executive Management Standards Indicator Tool ($R^2_{\text{change}} = .06$). Overall, the present findings indicate that the POS scale is a valid and reliable instrument for self-reporting occupational stress levels, and it could be used together with existing risk assessment measures of stress, to obtain a comprehensive evaluation of work-related stress.

Keywords: stress perception, work-related stress, stress appraisal, perceived occupational stress, HSE-MS IT



Work-related stress is a major issue both for workers and employers. In Europe, stress is the second most frequent workplace health problem, after musculoskeletal disorders, and it has been estimated that 50–60% of all lost working days are due to work-related stress, with a cost of 20 billion a year to companies in the EU-15 countries alone (EU-OSHA, 2014). Indeed, workplace stress strongly increases the risk of developing physiological and psychological disorders, such as hypertension and burnout; it can also lead to negative organizational consequences, such as absenteeism and decreased work productivity (Colligan & Higgins, 2006).

An accurate assessment of work-related stress is critical for understanding the role of occupational stress as a risk factor for workers' well-being, as well as for developing interventions aimed at preventing or reducing stress at work.

Work-related stress is typically assessed following a *risk assessment* approach, which assumes that occupational stress can be risk assessed and managed like any other hazard. Accordingly, such an approach evaluates how workers are exposed to potential stressors in the workplace (Cox, 1998). Some risk assessment measures take into account objective data collected from administrative sources, such as sickness absences, work-related injuries, and turnover. In Italy, this is the case for the checklist developed by the Italian National Workers Compensation Authority (Barbaranelli et al., 2018). Such objective data are recorded as sentinel events since they are signals of the presence of work-related stress in the organization (Salminen, 2004). More frequently, however, risk assessments take the form of self-report questionnaires aimed at workers rating their exposure to stressors. The widely-used Health and Safety Executive Management Standards Indicator Tool (HSE-MS IT; Cousins et al., 2004), for example, asks workers to evaluate a set of job content and context areas, each of which represents a potential source of psychological or physical harm to them (Mackay et al., 2004).

The rationale behind the risk assessment approach is that the higher the exposure to a risk factor, the higher

the likelihood of negative behavioral and health outcomes. Therefore, it is crucial to identify the strongest stressors to plan an effective stress management intervention. This approach, however, has been criticized because it does not take into account the subjectivity of the stress experience. Different from physical hazards, indeed, the impacts of psychosocial hazards on individuals largely depend on how they subjectively perceive them (Rick & Briner, 2000). According to the transactional models of stress (Goh et al., 2010; Lazarus & Folkman, 1984), stressor effects occur only when people appraise them as threatening and have insufficient resources to cope with the situation. It is, as such, the perceptions of an individual, not the objective occurrence of an event, that determines her/his reaction to a potential stressor. Such a subjective appraisal is hypothesized to mediate the stressor-strain relationship (Cohen et al., 1983; Oliver & Brough, 2002; Webster et al., 2011). Practically, such a mediated model implies that a worker could develop effective coping strategies for dealing with some workplace stressors, thus, taking into their control the negative effects on her/him. At the same time, however, s/he could be idiosyncratically sensitive to other stressors, which could nonetheless exert a harmful effect even at low exposure levels.

A further limitation of the risk assessment approach is that its effectiveness depends on whether it represents all relevant stressors in a given workplace. Even if some questionnaires, such as the aforementioned HSE-MS IT or the Stress Questionnaire (Mucci et al., 2015), assess multiple organizational dimensions, some potential stressors might be left out. Hence, they might fail to recognize some important stress sources and, as a result, yield a false sense of safety.

Applying a measure of risk exposure, together with a measure of perception of occupational stress – that is, a measure of how an individual considers that they are working under stressful conditions – could overcome these limitations and provide scholars and practitioners with a comprehensive assessment of work-related stress. High perceived stress scores, combined with high-risk exposure to different workplace stressors, would allow for identification of the ones which are associated with the workers' perceptions of occupational stress and which should, therefore, be the main targets for stress management interventions. Conversely, high perceived stress scores observed in workplaces with a low-risk exposure would suggest that the actual organizational stressors have not been properly identified and there is a need to refine the specific indicators. Lastly, high levels of perceived stress are a proxy for strain outcomes. Perceived stress has traditionally been demonstrated to be a significant predictor of psychological outcomes such as depression, anxiety, and psychosomatic complaints (for reviews, see Mimura & Griffiths, 2004;

Örücü & Demir, 2009). These are as well as burnout, a severe outcome of a person's prolonged exposure to work-related stress (Schaufeli & Buunk, 2002).

In accordance with these premises, workers' appraisals of their perceived stress levels should be systematically taken into account, in addition to the traditional risk assessment, to validly and reliably measure work-related stress. Nevertheless, to our knowledge, no questionnaire is currently available for specifically measuring how an individual subjectively feels stressed at work. In fact, existing measures of stress perception, such as the Perceived Stress Scale (PSS; Cohen et al., 1983), are aimed at assessing a global perception of stress, without distinguishing between stress at work and stress from different sources. Work and non-work stresses are related to each other, but they are not overlapping constructs. In fact, by the spillover effect, the stress in one's personal life can exacerbate stress at work, and vice versa (Grandey & Cropanzano, 1999; Tait et al., 1989), but each form of stress has unique effects on a person's physical and mental health outcomes (Smith, 2000). Therefore, global perception of stress can be considered at most a proxy for occupational stress perception, but more specific measures are required to measure subjective work stress levels.

Further measures of stress at work that currently exist, such as the Job Stress Questionnaire (JSQ; Caplan et al., 1975), the Effort-Reward Imbalance Questionnaire (ERI-Q; Siegrist et al., 2004), and the Job Content Questionnaire (JCQ; Karasek et al., 1998) generally present good psychometric properties but are aimed at evaluating specific antecedents of work-related stress, rather than workers' perceptions of feeling stressed. The ERI-Q, for example, is based on the Effort-Reward Imbalance model (Siegrist et al., 2004), which states that work-related stress arises when there is a lack of fairness at work, so that effort is greater than reward. Another stress risk factor, according to this model, is the personality trait of overcommitment (i.e., the tendency to overextend oneself as a result of striving toward continuously high achievement, due to an underlying need for approval and recognition at work; Siegrist, 2008). The ERI-Q, therefore, allows an individual to rate their effort-reward imbalance levels and overcommitment but does not enable them to specify whether, and to what extent, they feel they work under stressful conditions.

Lastly, perceived work-related stress has also been measured by administering a single-item measure (Houdmont et al., 2012; HSE, 2012; Marcatto et al., 2014; Smith, 2000). Single-item measures are quick and easy to administer (Wanous & Reichers, 1996), but it is advised against their use for assessing abstract or complex constructs because they could mean different things to different raters (Fuchs & Diamantopoulos, 2009). However, a recent study

of the construct validity of a single-item measure of perceived job stressfulness showed that respondents do indeed consider a wide range of factors to arrive at an overall rating, although most of the respondents converged into considering job demands and personal effect as the most important frames of reference (Houdmont et al., 2019).

Generally, multi-item measures outperform single items in terms of predictive validity and are needed to rate complex constructs validly and reliably (Loo, 2002). Therefore, it has been contended that the use of single-item measures should be approached with caution and limited to special circumstances (Diamantopoulos et al., 2012). In brief, no valid and reliable multiple-item questionnaire is currently available that is specifically aimed at rating perceived work-related stress, despite the theoretical relevance and the practical utility of this in applied settings. We have, therefore, developed a new short scale to be applied instead of “a crude single item surrogate indicator of job stressfulness” (HSE, 2012, p. 14). Our scale could be easily used along with existing risk assessment measures of occupational stress. We propose that the combined use of our scale with a risk assessment measure allows the limits of each method to be overcome and increases the accuracy of predicting behavioral and health outcomes.

The Development of the Perceived Occupational Stress (POS) Scale

We developed the scale that is herein presented to provide a short scale, with representative items that tap into occupational stress only, to be administered with risk assessment work-related stress questionnaires. Its brevity represents an advantage when you consider some of the lengthy measures that often must be administered during working hours, with the paradoxical consequence of putting added pressure on workers, who then have to work harder to catch up on the lost time. At the same time, being a multi-item measure, it should satisfy psychometric properties more convincingly than single-item measures. In addition, an accurate selection of items that are well focused on subjectively perceived stress at work helps workers to avoid confounding this with their stress that is unrelated to work, which can be measured using additional instruments on perceived general stress.

Operationally, we adopted a pragmatic approach and generated a small set of items that were representative of the most shared and commonly accepted concepts underlining work-related stress (DeVellis, 2017). No definition of work-related stress is fully accepted; nevertheless, there is a broad consensus on at least three definitional elements: (i) such stress is a reaction to excessive pressures at work, (ii) workers experience such stress when they cannot cope with the demands of their job, and (iii) such stress

can contribute to poor mental and physical health (Leka et al., 2003; NIOSH Working Group, 1999). We generated three items, accordingly, and we decided to include a fourth explicit item concerning workers’ awareness of the overall “stressfulness” of their work, as has already been done in several British nationally representative workforce surveys (Houdmont et al., 2010) as well as in previous studies (Houdmont et al., 2012; Marcatto et al., 2014; Rhee, 2010). The POS items are reported in Table 1.

Before administering the POS scale, we asked a panel of nine experts (work-related stress scholars, occupational psychologists, and occupational physicians) to rate the relevance of each item using a 4-point scale (1 = *not relevant*, 2 = *somewhat relevant*, 3 = *quite relevant*, 4 = *highly relevant*), to evaluate its content validity, that is, the degree to which the four items represented the basic components of the construct of interest (Waltz et al., 2010). For each item, we then computed the Content Validity Index (CVI) as the number of experts that had given a rating of either 3 or 4, divided by the number of experts. Table 1 demonstrates that all items received a CVI score of ≥ 0.78 , which indicates a high level of expert agreement on the relevance of each item (Polit et al., 2007).

In sum, the POS scale presents four items. Each participant has to self-report along a 5-point Likert scale, ranging from 1 (= *strongly disagree*) to 5 (= *strongly agree*); their answers are averaged across the four items to compute the POS score. Thus, the possible score range is from 1 (= *lowest perceived stress*) to 5 (= *highest perceived stress*). Participants are asked to provide ratings that reflect their work stress in the last 6 months. By other questionnaires (e.g., HSE-MS IT), we indicate this timeframe to encourage a relatively stable perception of occupational stress.

Research Project Overview

The six studies reported herein aimed to validate the new Perceived Occupational Stress (POS) scale by evaluating its psychometric properties, including internal consistency, test-retest reliability, construct and concurrent validity. Data were collected from six independent samples of Italian workers, with a total of 1,805 participants. Further detail, along with the aims and sample specifics for each study, is herein presented as follows.

The aim of Study 1 was to analyze the basic psychometric properties of the POS scale, namely, the underlying structure of the four items and their internal consistency (samples 1 and 2). Study 2 investigated the test-retest reliability of the POS scale with a delay of 4 weeks between the two measurement occasions (sample 3). Study 3 explored the concurrent validity of the POS scale and a single-item measure of occupational stress with another measure of work-related stress, the ERI-Q (sample 4).

Table 1. Content Validity Index (CVI) scores of the Perceived Occupational Stress (POS) scale items

POS item	CVI
My work is stressful (<i>Il mio lavoro è stressante</i>)	0.78
Thinking about my work makes me feel tense (<i>Pensare al mio lavoro mi mette in agitazione</i>)	0.89
At work I feel under pressure (<i>Mentre lavoro mi sento sotto pressione</i>)	0.89
My work has negative effects on my health (<i>Il mio lavoro ha effetti negativi sulla mia salute</i>)	0.78

Note. The original Italian items are reported in italic.

Study 4 extended the results on concurrent validity by further evaluating the associations between the POS scale, the single-item measure, and the Maslach Burnout Inventory (MBI; sample 5). Study 5 investigated the construct validity of the POS scale by testing whether it measured a different psychological variable from the participant’s exposure to occupational stressors. Specifically, we examined whether it accounted for an additional prediction of stress-related health complaints about the HSE-MS IT, further exploring a concurrent mediation model, with perceived stress mediating the impact of risk exposure on health complaints (sample 6). Lastly, Study 6 compared the results from different groups of respondents and provided normative scores for the POS scale (all six samples were combined to obtain a normative sample). Table 2 provides an overview of the six studies’ aims, samples, and measures.

Sampling Procedure

Data were collected in Southern (samples 1 and 5) as well as in Northern Italy (samples 2-4 and 6). Samples 1, 3, and 5 were composed of workers who were available to participate in the studies (convenience sampling). The workers in samples 1 and 3 were from a mix of different sectors, while the workers from sample 5 were employed in the human services sectors (medical services, social services, human resources, and education). Research assistants individually invited the participants to take part in the research project, balancing them by gender and age and collected self-reports from the workers. The data from samples 2,

4, and 6 were collected from public sector employees at the beginning of mandatory work-related stress assessment sessions, which the work organizations themselves conducted. The main demographic descriptive statistics of the samples in the studies are reported in Table 3.

The research conformed to the provisions of the Declaration of Helsinki and all ethical guidelines were followed as required when conducting human research, including adherence to the legal requirements in Italy. Additional ethical approval was not required since there was no treatment involved in the research, including medical, invasive diagnostics, or procedures, which might have caused psychological or social discomfort for the participants, nor were any patients the subject of data collection.

Analyses: Overview

All participants’ data were included in the analyses, except six participants in Study 5 who failed to complete the last part of the questionnaire and were therefore excluded.

To examine the dimensionality of the POS scale, a principal axis factor analysis was performed on the dataset, with a parallel analysis applied to define the optimal number of factors to extract and rotate (Garrido et al., 2013; Horn, 1965). The data were checked for sampling adequacy and sphericity using the Kaiser–Meyer–Olkin (KMO) and Bartlett’s tests. Cronbach’s α , as well as the test-retest reliability, were observed. Simple correlations and regression analyses served to examine the external concurrent correlates of the POS scale and test the hypothesized mediation role of perceived work stress, between risk exposure and health complaints. Statistical analyses were conducted using IBM SPSS Statistics 23 and Amos 23 (IBM Corporation, USA).

Study 1

This study aimed to analyze the basic psychometric properties of the POS scale, namely, the underlying structure of the four items and the internal consistency of the scale. We designed the POS scale to measure a single construct and, therefore, we expected a single-factor solution to summarize a large variance proportion of the POS items.

Table 2. Overview of the studies included in the present research

	Study 1	Study 2	Study 3	Study 4	Study 5	Study 6
Aim	Scale structure, internal consistency	Test-retest reliability	Concurrent validity	Concurrent validity	Construct validity	Normative data
Sample(s)	Samples 1, 2	Sample 3	Sample 4	Sample 5	Sample 6	All samples
Measure(s)	POS	POS	POS, ERI-Q	POS, MBI	POS, HSE-MS IT, Health Complaints	POS

Note. POS = Perceived Occupational Stress; ERI-Q = Effort-Reward Questionnaire; MBI = Maslach Burnout Inventory; HSE-MS IT = Health and Safety Management Standards Indicator Tool.

Table 3. Samples involved in the studies

	Sample 1 (N = 321)	Sample 2 (N = 188)	Sample 3 (N = 187)	Sample 4 (N = 775)	Sample 5 (N = 160)	Sample 6 (N = 174)	Total (N = 1,805)
Area	Southern Italy	Northern Italy	Northern Italy	Northern Italy	Southern Italy	Northern Italy	
Type of workers	Heterogeneous	Public sector	Heterogeneous	Public sector	Human services	Public sector	
Gender (% female)	53.9	64.4	49.2	79.4	60.6	60.3	66.6
Age group (%)							
18–29	31.5	1.1	22.6	2.6	17.5	1.8	11.0
30–39	17.8	14.0	7.0	22.4	10.6	7.8	16.7
40–49	18.1	34.1	11.8	35.1	21.3	36.5	28.4
50–59	25.9	46.4	51.6	34.7	36.3	43.7	37.0
60 or more	6.9	4.5	7.0	5.2	14.4	10.2	6.9

Note. The "human services" sample was composed of workers from the following sectors: medical services, social services, human resources, and education.

Table 4. Factor analysis eigenvalues, parallel analysis eigenvalues (average and 95th percentile), factor loadings, item-total and inter-item correlations of the Perceived Occupational Stress scale items

POS item	Actual eigenvalues	Average eigenvalues	95th percentile eigenvalues	Factor loadings	Item-total correlations	Inter-item correlations		
						Item 2	Item 3	Item 4
1	2.60	1.10	1.17	.77	.59	.54	.47	.49
2	0.59	1.03	1.06	.80	.64	–	.51	.55
3	0.45	0.97	0.99	.82	.65		–	.64
4	0.36	0.90	0.94	.84	.69			–

Note. POS = Perceived Occupational Stress.

Method

Participants and Procedure

Two samples were collected to obtain a wide sample, including different categories of workers from different areas of Italy. Sample 1 was a convenience sample of 321 workers (53.9% female, with 31.5% aged 19–29 years) from different sectors in Southern Italy; sample 2 was collected in Northern Italy and comprised 188 public sector workers (64.4% females, with 46.4% aged 50–59 years). The two samples were combined to create a total of 509 participants (58.8% female, with 33.2% aged 50–59 years).

Measures

The participants received a self-report questionnaire presenting the POS scale and demographic items.

Results

A principal axis factor analysis was conducted to assess the underlying structure of the four POS items. Preliminarily, we checked data for sampling adequacy: the Kaiser–Meyer–Olkin (KMO) value was .78, that is, higher than

the conventional value of .70, which indicated that the sampling was adequate (Hair et al., 2006). In addition, Bartlett’s test of sphericity ($\chi^2(6) = 699.07, p < .001$) indicated that the inter-item correlations were large enough and, therefore, factor analysis was appropriate. The eigenvalues suggested a general factor that accounted for 65% of the total variance. Parallel analysis (Garrido et al., 2013; Horn, 1965) supported a single-factor solution since only the first observed eigenvalue was greater than those generated by the parallel analysis. Table 4 reports both the observed eigenvalues and those generated by parallel analysis, item-factor loadings, item-total, and inter-item correlations. The model fit indices of this solution were as follows: CFI = .99, SRMR = .01, and RMSEA = .01 (LO90 = .01, HI90 = .08).¹ Cronbach’s α coefficient of the POS scale was .82.

Study 2

This study investigated the test-retest reliability of the POS scale, with an interval of 4 weeks between the two measurement occasions.

¹ On the basis of the CFA modification indices, the error terms of items 1 and 2 were allowed to covary.

Method

Participants and Procedure

A convenience sample of 187 workers from different sectors was collected in Northern Italy (49.2% females, 51.6% aged 50–59 years). The participants received a self-report questionnaire and, 4 weeks later, they were contacted by a research assistant who reminded each participant to fill out the questionnaire once again. A total of 165 participants completed the questionnaire at the two-time points.

Measures

The self-report questionnaire included the POS scale and demographic items.

Results

Cronbach's α coefficients of the POS scale were .83 and .84 on the first and second measurement occasions, respectively. The four-week test-retest correlation coefficient indicated a high reliability level ($r = .86, p < .001$).

Study 3

This study aimed to assess the external convergent validity of the POS scale and a single-item measure of occupational stress with the ERI-Q, a measure of work-related stress based on the Effort-Reward Imbalance (ERI) model (Siegrist et al., 2004). According to the ERI model, both an imbalance between efforts and rewards at work and a personality trait of overcommitment contribute to an increased risk of work-related stress. Therefore, we expected concurrent correlations of at least a moderate magnitude between the perceived stress measures and the scales of the ERI-Q, with the POS scale displaying stronger associations than the single-item measure (Diamantopoulos et al., 2012).

Method

Participants and Procedure

A sample of 775 public sector workers was collected in Northern Italy (79.4% females, 35.1% aged 40–49 years). The participants received a booklet containing the self-report measures of interest at the beginning of the mandatory work-related stress assessment sessions that were conducted by their organization.

Measures

The booklet contained the POS scale, the ERI-Q questionnaire, and demographic items. As suggested by Siegrist and colleagues (2014), we adopted the new 22-item version

of the ERI-Q instead of the former 23-item version (Siegrist, 1996; see Magnavita, 2007; Zurlo et al., 2010, for the Italian version). This comprises three scales: Effort (6 items, $\alpha = .70$ for the present sample), Reward (10 items, $\alpha = .77$), and Overcommitment (6 items, $\alpha = .71$). The questionnaire yields two scores: the Imbalance score, calculated as the ratio of the Effort/Reward scores, and the Overcommitment score. The Imbalance and Overcommitment scores were found to be significantly intercorrelated ($r = .48, p < .001$) for the sample.

The first item of the POS scale ("My work is stressful") was also analyzed separately as a single-item measure of occupational stress.

Results

Concurrently, the POS scale scores were substantially correlated with both the Imbalance ($r = .62, p < .001$) and Overcommitment ($r = .51, p < .001$) scores of the ERI-Q. The single-item measure displayed substantially lower correlations ($r = .53, p < .001$ with Imbalance and $r = .34, p < .001$ with Overcommitment). To statistically test the unique contribution of the POS scale over the single-item measure, two-step hierarchical regression analyses were conducted, with Imbalance and Overcommitment as the dependent variables and the single-item measure (step 1) and POS (step 2) as predictors, further controlling for the participant's age and gender (Table 5). In both analyses, at step 1 the single-item measure significantly predicted the ERI-Q dimensions, and at step 2 the POS scale accounted for an additional significant proportion of variance ($R^2_{\text{change}} = .11, p < .001$ for Imbalance and $R^2_{\text{change}} = .16, p < .001$ for Overcommitment).

In brief, the results were in accordance with our hypotheses and supported the external validity of the POS scale.

Study 4

This study was aimed at further exploring the concurrent validity of the POS scale and the single-item measure of occupational stress by examining their relationship with burnout, a severe outcome of work-related stress, as measured by the Maslach Burnout Inventory (MBI). According to Maslach's theory, three dimensions capture burnout: Emotional Exhaustion, Depersonalization, and reduced Personal Achievement (Maslach & Jackson, 1981). The Emotional Exhaustion dimension, that is, the perception of being emotionally overextended and exhausted at work, represents a core component of burnout. It is generally strongly associated with traditional occupational stress reactions, such as fatigue, job-related depression, and

Table 5. Hierarchical multiple regression analysis summary for the perceived occupational stress scales predicting ERI-Q Imbalance and Overcommitment

	ERI-Q Imbalance		ERI-Q Overcommitment	
	Step 1 β	Step 2 β	Step 1 β	Step 2 β
Predictors				
Gender	−.01	.05	.01	.07*
Age group	.10**	.09**	.06	.05
Single-item measure	.54***	.13**	.34***	−.15**
POS		.52***		.63***
Summary statistics				
Model F	105.96***	128.31***	33.38***	72.01***
Adjusted R^2	.29	.40	.11	.27
R^2_{change} F		137.94***		166.40***

Note. ERI-Q = Effort-Reward Imbalance Questionnaire; POS = Perceived Occupational Stress. * $p < .05$; ** $p < .01$; *** $p < .001$.

anxiety (Demerouti et al., 2001; Schaufeli & Enzmann, 1998), as well as with perceived stress (Durán et al., 2006; Jiménez-Ortiz et al., 2019). The Depersonalization dimension assesses another core component of burnout, which is associated with role stress and stressful events (Lee & Ashforth, 1996). Lastly, Personal Achievement has been shown to represent a final burnout component, though the weakest of the three. It weakly correlates with the other two MBI domains as well as with job stressors and behavioral outcomes (Lee & Ashforth, 1996; Schaufeli & Enzmann, 1998). In accordance with the MBI constructs, we hypothesized that the POS scores would be substantially associated with Emotional Exhaustion, whereas weaker associations were expected with Depersonalization and Personal Achievement. As in Study 3, we expected the associations of the single-item measure with the MBI domains to be weaker in comparison with the associations observed for the whole POS scale.

Method

Participants and Procedure

A data sample of 160 workers from the human services sectors (medical services, social services, human resources, and education) was collected in Southern Italy (60.6% females, 36.3% aged 50–59 years). The participants were approached by a research assistant and asked to fill out a booklet containing the self-report measures of interest.

Measures

The booklet presented the POS and MBI scales, together with demographic items. The MBI questionnaire (Maslach & Jackson, 1981; see Sirigatti & Stefanile, 1988, for the Italian version) was presented as a 22-item questionnaire that assessed the three dimensions of burnout: Emotional Exhaustion (9 items, $\alpha = .84$ for the present sample), Depersonalization (5 items, $\alpha = .83$), and Personal Achievement

(8 items, $\alpha = .77$). The MBI scales were significantly inter-correlated (Emotional Exhaustion and Depersonalization, $r = .39$, $p < .001$; Emotional Exhaustion and Personal Achievement, $r = -.35$, $p < .001$; Depersonalization and Personal Achievement, $r = -.25$, $p < .001$).

The first item of the POS scale was used in the analyses as a single-item measure of occupational stress.

Results

When the POS scores were correlated with the three MBI domains, the results demonstrated a high association with Emotional Exhaustion ($r = .68$, $p < .001$), a modest association with Depersonalization ($r = .30$, $p < .001$), and a weak correlation with Personal Achievement ($r = -.20$, $p = .013$). The single-item measure had substantially weaker correlations with the MBI domains ($r = .47$, $p < .001$ with Emotional Exhaustion, $r = .22$, $p = .005$ with Depersonalization, and $r = .01$, $p = .99$ with Personal Achievement). As in the previous study, two-step hierarchical regression analyses were conducted with the MBI domains as the dependent variables and the single-item measure (step 1) and POS (step 2) as predictors, further controlling for the participants' age and gender (Table 6). Results showed that, in each MBI domain, adding the POS scale significantly increased the variance explained by the regression models ($R^2_{\text{change}} = .23$, $p < .001$ for Emotional Exhaustion; $R^2_{\text{change}} = .04$, $p = .006$ for Depersonalization; and $R^2_{\text{change}} = .08$, $p < 0.001$ for Personal Achievement).

Study 5

This study aimed to further investigate the construct validity of the POS scale by examining whether it determined an individual psychological condition, which was correlated

Table 6. Hierarchical multiple regression analysis summary for the perceived occupational stress scales predicting MBI domains

	MBI Emotional Exhaustion		MBI Depersonalization		MBI Personal Achievement	
	Step 1 β	Step 2 β	Step 1 β	Step 2 β	Step 1 β	Step 2 β
Predictors						
Gender	.11	.09	-.17*	-.17*	.12	.14
Age group	.15*	.13*	-.15	-.16*	.19*	.20**
Single-item measure	.46***	-.13	.23**	-.03	-.01	.37**
POS		.76***		.33**		-.49***
Summary statistics						
Model F	17.40***	35.34***	5.22**	6.00***	2.36	6.07***
Adjusted R^2	.24	.47	.07	.11	.03	.11
R^2 change F		66.95***		7.65**		16.46***

Note. MBI = Maslach Burnout Inventory; POS = Perceived Occupational Stress. * $p < .05$; ** $p < .01$; *** $p < .001$.

yet distinct from exposure to occupational stressors. Specifically, following the transactional stress models (Goh et al., 2010; Lazarus & Folkman, 1984), we hypothesized that the workers' perceived stress levels uniquely contributed toward predicting their health complaints, over and above workplace stressors as measured by the HSE-MS IT. Firstly, we inspected concurrent associations between the POS scale, the HSE-MS IT, and a set of stress-related health complaints, such as back pain. Secondly, we conducted a hierarchical regression analysis to examine the unique contribution of the POS scores in concurrently predicting health complaints in addition to the HSE-MS IT variables, further exploring a mediation model. Specifically, we expected that exposure to workplace stressors would predict health complaints (Marcatto et al., 2016), though the stressors would exert their effects based on how an individual perceived and evaluated them, that is, via the mediation of an individual's appraisal of feeling stressed.

Method

Participants and Procedure

A sample of 174 public sector workers was collected in Northern Italy (60.3% females, 43.7% aged 50–59 years). The participants received a booklet containing the self-report measures of interest at the beginning of the mandatory work-related stress assessment sessions that were conducted by their organization. Six participants did not complete the last part of the questionnaire and were therefore excluded from the analysis.

Measures

In addition to the POS items, the booklet contained the HSE-MS IT, a health complaints measure, and demographic information.

The HSE-MS IT (Cousins et al., 2004; see Marcatto et al., 2011, for the Italian version) comprised a 35-item questionnaire aimed at evaluating their degree of exposure

to a set of occupational stressors, according to the Management Standards developed in the United Kingdom by the Health and Safety Executive. The HSE-MS IT evaluated seven intercorrelated scales: Demands (8 items, $\alpha = .85$ for the present sample), Control (6 items, $\alpha = .79$), Managers' support (5 items, $\alpha = .96$), Peer support (4 items, $\alpha = .88$), Relationships (4 items, $\alpha = .85$), Role (5 items, $\alpha = .85$), and Change (3 items, $\alpha = .79$). Higher scores in the HSE-MS IT scales indicated a lower exposure to stressors.

To assess the incidence of stress-related health issues, we utilized a nine-item health complaints questionnaire, comparable in content to the Subjective Health Complaints Inventory (Eriksen et al., 1999) and to other self-report health rating measures that are commonly employed in the literature (McDowell, 2006). The participants were asked how frequently they had suffered in the last 12 months from a set of nine health issues that are traditionally associated with work-related stress (e.g., gastrointestinal disorders, insomnia and sleep disorders, and back pain, see Table A1 in Appendix for the full list of items and descriptive statistics), rating these using a 5-point scale (from *Never* to *Always*). The values of skewness and kurtosis of each item fell well into an acceptable range of -2 to $+2$ (George & Mallery, 2010). A principal axis factor analysis supported a one-factor solution which accounted for 52% of the total variance with the following model fit indices: CFI = .99, SRMR = .03, and RMSEA = .02 (LO90 = .01, HI90 = .07). Therefore, a single measure of health complaints was obtained by aggregating the nine items, with higher scores indicating a higher frequency of health issues. Cronbach's α for this measure was .88.

Results

Table 7 presents the simple correlations between the POS scale, the HSE-MS IT, and stress-related health complaints. The results demonstrated that perceived stress levels were

Table 7. Correlations among the measures used in Study 5

Variable	1	2	3	4	5	6	7	8	9
1. POS	–								
2. Health Complaints	.54	–							
3. HSE-MS IT Demands	–.66	–.38	–						
4. HSE-MS IT Control	–.43	–.30	.44	–					
5. HSE-MS IT Managers' support	–.44	–.33	.30	.46	–				
6. HSE-MS IT Peer support	–.44	–.30	.38	.56	.58	–			
7. HSE-MS IT Relationships	–.53	–.46	.48	.54	.54	.51	–		
8. HSE-MS IT Role	–.41	–.42	.24	.63	.56	.55	.55	–	
9. HSE-MS IT Change	–.43	–.44	.30	.57	.65	.50	.58	.69	–

Note. HSE-MS IT = Health and Safety Executive Management Standards Indicator Tool; POS = Perceived Occupational Stress. All correlations are significant at $p < .001$.

significantly associated with health complaints, as well as with each HSE-MS IT domain.

Table 8 presents a two-step hierarchical regression analysis with health complaints as the dependent variable and the HSE-MS IT domains (step 1) and POS (step 2) as predictors, further controlling for the participant's age and gender. At step 1, the HSE-MS IT Demands and Change domains were significant predictors and the model predicted a substantial variance proportion of health complaints (Adjusted $R^2 = .34$). At step 2, POS accounted for an additional variance proportion of $R^2_{\text{change}} = .06$ ($p < .001$), whereas no HSE-MS IT domain was found to be significant anymore. These results indicated that an individual's perceived stress at work provided unique information in addition to their exposure to work stressors.

Further regression analyses were conducted to examine the hypothesis that an individual's stress appraisal mediated the relationship between their exposure to work stressors and their health complaints. Specifically, we inspected such a mediation model for the two HSE-MS IT domains which accounted for a significant unique variance proportion of health complaints after controlling for inter-correlations among the HSE-MS IT scales, namely, Demands and Change (see Table 8). The results are illustrated in Figure 1. HSE-MS IT Demands significantly accounted for both the POS scores and the health complaints levels, but, when both HSE-MS IT Demands and the POS variable were included as predictors of health complaints, the POS remained significant, while HSE-MS IT Demands did not. We tested the significance of this indirect effect using bootstrapping procedures with 5,000 samples. The bias-corrected bootstrapped standardized indirect effect was $-.33$ and the 95% confidence interval (CI) ranged from $-.43$ to $-.21$, thus the indirect effect was significant ($p < .001$), supporting a full mediation of the POS scale.

In the second model, HSE-MS IT Change significantly predicted both POS and health complaints. When HSE-MS IT Change and POS were simultaneously included as

predictors of health complaints, both remained significant, although the direct effect of HSE-MS IT Change was reduced in absolute size. The bias-corrected bootstrapped standardized indirect effect (with 5,000 samples) was $-.20$, with a 95% CI [$-.32, -.09$] ($p < .001$) and a partial mediation of the POS scale was suggested.

Study 6

This last study aimed to analyze whether the POS scores differed across the groups of participants and to provide normative scores. According to the existing literature, we expected the POS scale to be sensitive to different workgroups (Johnson et al., 2005) but not to demographic variables, such as gender and age (Andrisano-Ruggieri, et al., 2016; Galanakis et al., 2009).

Method

Participants and Procedure

To obtain an adequate sample size to provide normative scores, we combined the POS data collected in all six samples ($N = 1,805$).

Results

Analysis of variance (ANOVA) and t -tests were conducted to analyze whether the POS scores differed across the participants' age groups, genders, and workgroups. No differences in perceived stress emerged across the participants when they were compared in terms of age groups and gender (all $ps > .05$), though a significant effect was found based on the workgroup ($F(2, 1,801) = 13.61, p < .001, \eta^2_p = .01$). Post hoc tests with Bonferroni correction revealed that the human services workers ($M = 2.89, SD = 0.92, N = 160$) and samples of heterogeneous workers ($M = 2.75, SD = .95, N = 508$) demonstrated significantly

Table 8. Hierarchical multiple regression analysis summary for the HSE-MS IT and POS scales predicting health complaints

Predictors	Health complaints	
	Step 1 β	Step 2 β
Gender	.25***	.24***
Age group	.09	.05
HSE-MS IT Demands	-.24**	-.05
HSE-MS IT Control	.14	.12
HSE-MS IT Managers' support	.03	-.01
HSE-MS IT Peer support	-.04	.07
HSE-MS IT Relationships	-.16	-.10
HSE-MS IT Role	-.21	-.16
HSE-MS IT Change	-.20*	-.18
POS		.39***
Summary statistics		
Model F	9.94***	11.83***
Adjusted R^2	.34	.40
R^2_{change} F		18.47***

Note. HSE-MS IT = Health and Safety Executive Management Standards Indicator Tool; POS = Perceived Occupational Stress. * $p < .05$; ** $p < .01$; *** $p < .001$.

higher levels of perceived stress in comparison with the public sector workers (all $ps < .001$).

Descriptive statistics for the POS scores in the normative sample are reported in Table 9. The results demonstrated that the observed scores covered the whole range of values, from a minimum of 1 to a maximum of 5. The mean POS score was higher than the median value, with a positive skewness indicating a tendency toward lower levels of perceived stress.

Discussion

We developed the POS scale to provide a quick way of rating work stress appraisal so that this information could easily be applied together with existing risk assessment measures that evaluate a person's exposure to organizational stressors. The need to develop such a new scale depends on the relevance of the cognitive appraisal process in the stressor-strain relationship, according to the transactional models of stress (Goh et al., 2010; Lazarus & Folkman, 1984). Despite its theoretical and practical relevance, to our knowledge no measure of perceived occupational stress has been developed so far, excluding single-item scales (easy to administer but with unsatisfactory psychometrically properties) or global measures of stress, which are psychometrically-valid instruments but are too broad to specifically measure occupational stress perception.

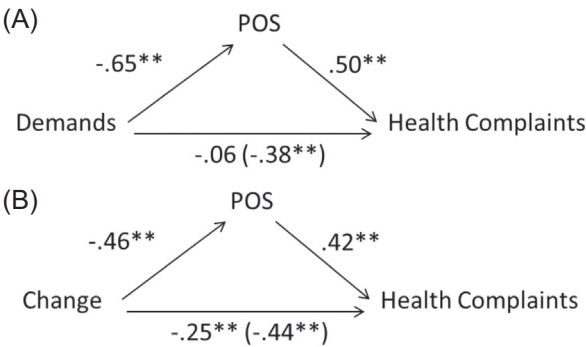


Figure 1. POS as mediator between HSE-MS IT Demands/Change and health complaints. The standardized coefficient reported in bracket is the linear association between Demands (A) and Change (B) and health complaints when POS is not statistically controlled. ** $p < .01$.

The findings from the present set of studies provide encouraging evidence that the POS scale is a reliable and valid instrument. Factor analysis revealed that a single factor underlies the four items (Study 1) and that the scale is internally consistent (Study 1) and test-retest reliable (Study 2). When compared with a single-item measure of perceived occupational stress, the POS scale was demonstrated to account for a larger variance proportion of both the ERI-Q scales, which assess work-related stress in accordance with the Effort-Reward Imbalance model (Study 3) and the components of the MBI burnout measure (Study 4). Moreover, POS scores were shown to uniquely contribute to predicting stress-related health complaints, over and above workplace stressors, as measured by the HSE-MS IT (Study 5), further mediating the relationship between exposure to workplace stressors and health outcomes. Overall, the present results support the external validity of the POS scale, further revealing that perceived levels of stress represent a distinct variable from exposure to work stressors and mediate the link between stressors and strain (Vasunilashorn et al., 2015).

In sum, the findings here reported suggesting that the POS scale could represent a new addition to the toolbox of scholars and practitioners. It can be used, for example, as an outcome variable, together with a risk assessment measure of stress, such as the HSE-MS IT, for identifying the stressors that are mostly responsible for a person's experience level of stress, and which should, therefore, be the main target of stress management interventions. Moreover, the POS scale might also be utilized as a mediator variable when exploring the stressor-strain relationship. Recent studies, for example, have illustrated how global perceived stress mediates the relationship between exposure to organizational stressors and depression (Lee et al., 2013), as well as between sleep quality and anxiety and depression symptoms in nurses (Zhang et al., 2018). With the POS scale, it will be possible to explore more

Table 9. Descriptive statistics and scores distribution of the POS scale in the normative sample (N = 1,805)

	POS
Mean	2.64
Median	2.50
Range	1–5
Standard deviation	0.93
% Floor (POS score = 1)	4.3
% Ceiling (POS score = 5)	1.4
Skewness	.28
Kurtosis	−.45
Percentiles	
20	1.75
50	2.50
80	3.50
90	4.00
95	4.25

Note. POS = Perceived Occupational Stress.

specifically the mediating role of personal appraisal of occupational stress in similar studies in the future.

Thanks to its short length, the POS scale is also useful whenever there is a need for a quick rating of the construct of perceived occupational stress, for example, when frequent monitoring of perceived stress is required, such as in studies on the biological markers of occupational stress.

Limitations and Future Directions

Some limits of the present studies must be acknowledged. First, we cannot exclude bias due to common method variance, since the present data were all collected through self-evaluations and were collected concurrently. Perceived stress must be self-reported, as it was in these studies, but further studies might include other, less-subjective measures, too, such as the objective matter of the workers' health conditions. Second, the discriminant validity of the POS scale with unspecific stress appraisal measures has not been tested. A weak correlation is expected between personal life stress and work-related stress because the work environment exerts an impact on everyday life and, in turn, the exposure to personal stressful events favors a person feeling under pressure at work, as well (Grandey & Cropanzano, 1999; Tait et al., 1989). Nevertheless, the POS scores should have stronger associations with risk assessment measures of occupational stress in comparison with global perceived stress measures. Third, our studies have involved many participants from different workplaces, from both Northern and Southern Italy, but we have not employed a randomization procedure to select the participants nor their organizations, so we cannot exclude the possibility of selection biases. Fourth, the mediation analysis

has been based on single-occasion measurements and, although very commonly applied, such a research design does not allow any conclusion on the temporal or causal direction between variables (Jose, 2016). A longitudinal study is, therefore, needed to test the present findings. Lastly, we used an ad hoc questionnaire for measuring health complaints. Future studies should use using already existing validated measures to investigate more thoroughly the association between perceived occupational stress and different physical and psychological issues that may result from this. Indeed, we simply provided normative data based on the obtained distribution; we could not, therefore, determine cut-off scores that would be useful to warn against substantive risk levels of developing different health issues.

Conclusion

In the present research paper, we presented the development and initial validation steps of the Perceived Occupational Scale, a new brief instrument aimed at rating a worker's perception of feeling stressed at work. Occupational stress represents a construct that is currently difficult to directly assess, despite its relevance for both researchers and practitioners. On one hand, indeed, we have risk assessment measures of work-related stress, which evaluate the worker's exposure to occupational stressors, though they do not tell us whether the worker perceives that they are stressed and, if they do, to what degree. On the other hand, we have global measures of stress perception, such as the PSS (Cohen et al., 1983), which reveals how much a person feels they are stressed in her/his life, but without letting us know how much her/his perceived stress is work-related. The POS scale is expected to contribute to diminishing such a gap.

Six studies have demonstrated the reliability, construct and concurrent validity of the POS scale, and provided normative data. Nevertheless, more studies are needed to assess the discriminant validity of the scale and its associations with objective and clinical data (such as sick leave, formal complaints, etc.) and physiological parameters (e.g., levels of cortisol and blood pressure), as well as putting it to the test through repeated-measure designs.

References

Andrisano-Ruggieri, R., Capunzo, M., Crescenzo, P., Savastano, R., Truda, G., De Caro, F., Pennisi, M., & Boccia, G. (2016). Inconsistency of sentinel events and no gender difference in the measurement of work-related stress. *SAGE Open*, 6(1), 1–13. <https://doi.org/10.1177/2158244016629527>

- Barbaranelli, C., Ghezzi, V., Di Tecco, C., Ronchetti, M., Fida, R., & Ghelli, M. (2018). Assessing objective and verifiable indicators associated with work-related stress: Validation of a Structured Checklist for the Assessment and Management of Work-Related Stress. *Frontiers in Psychology*, 9, Article 2424. <https://doi.org/10.3389/fpsyg.2018.02424>
- Caplan, R. O., Cobb, S., French, J. R. P., Van Harrison, R., & Pinneau, S. R. (1975). *Job demands and worker health: Main effects and occupational differences*. US Government Printing Office.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4), 385–396. <https://doi.org/10.2307/2136404>
- Colligan, T. W., & Higgins, E. M. (2006). Workplace stress: Etiology and consequences. *Journal of Workplace Behavioral Health*, 21(2), 89–97. https://doi.org/10.1300/J490v21n02_07
- Cousins, R., Mackay, C. J., Clarke, S. D., Kelly, C., Kelly, P. J., & McCaig, R. H. (2004). “Management standards” work-related stress in the UK: Practical development. *Work & Stress*, 18(2), 113–136. <https://doi.org/10.1080/02678370410001734322>
- Cox, T. (1998). Work related stress: From environmental exposure to ill health. In R. H. McCaig & M. Harrington (Eds.), *The changing nature of occupational health* (pp. 137–159). HSE Books.
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, 86(3), 499–512. <https://doi.org/10.1037/0021-9010.86.3.499>
- DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.). Sage.
- Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: A predictive validity perspective. *Journal of the Academy of Marketing Science*, 40(3), 434–449. <https://doi.org/10.1007/s11747-011-0300-3>
- Durán, M. A., Extremera, N., Rey, L., Fernández-Berrocal, P., & Montalbán, F. M. (2006). Predicting academic burnout and engagement in educational settings: Assessing the incremental validity of perceived emotional intelligence beyond perceived stress and general self-efficacy. *Psicothema*, 18, 158–164. <https://reunido.uniovi.es/index.php/PST/article/view/8436>
- Eriksen, H. R., Ihlebæk, C., & Ursin, H. (1999). A scoring system for Subjective Health Complaints (SHC). *Scandinavian Journal of Public Health*, 27(1), 63–72. <https://doi.org/10.1177/14034948990270010401>
- EU-OSHA. (2014). *Calculating the cost of work-related stress and psychosocial risks*. Publications Office of the European Union. <https://doi.org/10.2802/20493>
- Fuchs, C., & Diamantopoulos, A. (2009). Using single-item measures for construct measurement in management research: Conceptual issues and application guidelines. *Die Betriebswirtschaft*, 69(2), 195–210. <https://pdfs.semanticscholar.org/9bc8/ecd511fcb0bbf7300945c675eeca7000ac81.pdf>
- Galanakis, M., Stalikas, A., Kallia, H., Karagianni, C., & Karela, C. (2009). Gender differences in experiencing occupational stress: The role of age, education and marital status. *Stress and Health*, 25(5), 397–404. <https://doi.org/10.1002/smi.1248>
- Garrido, L. E., Abad, F. J., & Ponsoda, V. (2013). A new look at Horn’s parallel analysis with ordinal variables. *Psychological Methods*, 18(4), 454–474. <https://doi.org/10.1037/a0030005>
- George, D., & Mallery, M. (2010). *SPSS for Windows step by step: A simple study guide and reference*, 17.0 update (10th ed.). Allyn & Bacon.
- Goh, Y. W., Sawang, S., & Oei, T. P. (2010). The Revised Transactional Model (RTM) of occupational stress and coping: An improved process approach. *Australian and New Zealand Journal of Organisational Psychology*, 3(1), 13–20. <https://doi.org/10.1375/ajop.3.1.13>
- Grandey, A. A., & Cropanzano, R. (1999). The conservation of resources model applied to work–family conflict and strain. *Journal of Vocational Behavior*, 54(2), 350–370. <https://doi.org/10.1006/jvbe.1998.1666>
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. (2006). *Multivariate data analysis*. Pearson Prentice Hall.
- Health and Safety Executive (HSE). (2012, February 26). *Psychosocial working conditions in Britain in 2010*. <http://www.hse.gov.uk/statistics/pdf/pwc2010.pdf>
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, 30(2), 179–185. <https://doi.org/10.1007/BF02289447>
- Houdmont, J., Cox, T., & Griffiths, A. (2010). Work-related stress case definitions and prevalence rates in national surveys. *Occupational Medicine*, 60(8), 658–661. <https://doi.org/10.1093/occmed/kqq138>
- Houdmont, J., Jachens, L., Randall, R., Hopson, S., Nuttall, S., & Pamia, S. (2019). What does a single-item measure of job stressfulness assess? *International Journal of Environmental Research and Public Health*, 16(9), Article 1480. <https://doi.org/10.3390/ijerph16091480>
- Houdmont, J., Kerr, R., & Randall, R. (2012). Organizational psychosocial hazard exposures in UK policing: Management Standards Indicator Tool reference values. *Policing: An International Journal of Police Strategies and Management*, 35, 182–197. <https://doi.org/10.1108/13639511211215522>
- Jiménez-Ortiz, J. L., Islas-Valle, R. M., Jiménez-Ortiz, J. D., Pérez-Lizárraga, E., Hernández-García, M. E., & González-Salazar, F. (2019). Emotional exhaustion, burnout, and perceived stress in dental students. *Journal of International Medical Research*, 47(9), 4251–4259. <https://doi.org/10.1177/0300060519859145>
- Johnson, S., Cooper, C., Cartwright, S., Donald, I., Taylor, P., & Millet, C. (2005). The experience of work-related stress across occupations. *Journal of Managerial Psychology*, 20(2), 178–187. <https://doi.org/10.1108/02683940510579803>
- Jose, P. E. (2016). The merits of using longitudinal mediation. *Educational Psychologist*, 51(3–4), 331–341. <https://doi.org/10.1080/00461520.2016.1207175>
- Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., & Amick, B. (1998). The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational Health Psychology*, 3(4), 322–355. <https://doi.org/10.1037/1076-8998.3.4.322>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.
- Lee, R. T., & Ashforth, B. E. (1996). A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology*, 81(2), 123–133. <https://doi.org/10.1037/0021-9010.81.2.123>
- Lee, J. S., Joo, E. J., & Choi, K. S. (2013). Perceived stress and self-esteem mediate the effects of work-related stress on depression. *Stress and Health*, 29(1), 75–81. <https://doi.org/10.1002/smi.2428>
- Leka, S., Griffiths, A., & Cox, T. (2003). *Work organisation and stress: Systematic problem approaches for employers, managers and trade union representatives*. World Health Organization.
- Loo, R. (2002). A caveat on using single-item versus multiple-item scales. *Journal of Managerial Psychology*, 17(1), 68–75. <https://doi.org/10.1108/02683940210415933>
- Mackay, C. J., Cousins, R., Kelly, P. J., Lee, S., & McCaig, R. H. (2004). “Management standards” and work-related stress in the UK: Policy background and science. *Work & Stress*, 18(2), 91–112. <https://doi.org/10.1080/02678370410001727474>

- Magnavita, N. (2007). Due strumenti per la sorveglianza sanitaria dello stress da lavoro: il Job Content Questionnaire di Karasek e l'Effort Reward Imbalance di Siegrist [Two tools for health surveillance of job stress: The Karasek Job Content Questionnaire and the Siegrist Effort Reward Imbalance Questionnaire]. *Giornale Italiano di Medicina del Lavoro ed Ergonomia*, 29(3), 667–670.
- Marcatto, F., Colautti, L., Larese Filon, F., Luis, O., Di Blas, L., Cavallero, C., & Ferrante, D. (2016). Work-related stress risk factors and health outcomes in public sector employees. *Safety Science*, 89, 274–278. <https://doi.org/10.1016/j.ssci.2016.07.003>
- Marcatto, F., Colautti, L., Larese Filon, F., Luis, O., & Ferrante, D. (2014). The HSE Management Standards Indicator Tool: Concurrent and construct validity. *Occupational Medicine*, 64(5), 365–371. <https://doi.org/10.1093/occmed/kqu038>
- Marcatto, F., D'Errico, G., Di Blas, L., & Ferrante, D. (2011). La valutazione dello stress lavoro correlato: Adattamento italiano dell'HSE Management Standards Work-Related Stress Indicator Tool [Assessing work-related stress: An Italian adaptation of the HSE Management Standards Work-Related Stress Indicator Tool]. *Giornale Italiano di Medicina del Lavoro ed Ergonomia*, 33, 403–408.
- Marcatto, F., Di Blas, L., Luis, O., Festa, S., & Ferrante, D. (2021). *Dataset for: The Perceived Occupational Stress Scale: A brief tool for measuring workers' perception of stress at work*. <https://doi.org/10.23668/psycharchives.4565>
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Organizational Behavior*, 2(2), 99–113. <https://doi.org/10.1002/job.4030020205>
- McDowell, I. (2006). *Measuring health: A guide to rating scales and questionnaires*. Oxford University Press.
- Mimura, C., & Griffiths, P. (2004). A Japanese version of the Perceived Stress Scale: Translation and preliminary test. *International Journal of Nursing Studies*, 41(4), 379–385. <https://doi.org/10.1016/j.ijnurstu.2003.10.009>
- Mucci, N., Giorgi, G., Cupelli, V., Gioffrè, P. A., Rosati, M. V., Tomei, F., Tomei, G., Bresò-Esteve, E., & Arcangeli, G. (2015). Work-related stress assessment in a population of Italian workers. The Stress Questionnaire. *Science of the Total Environment*, 502, 673–679. <https://doi.org/10.1016/j.scitotenv.2014.09.069>
- NIOSH Working Group. (1999). *Stress at work*. US Department of Health and Human Services.
- Oliver, J., & Brough, P. (2002). Cognitive appraisal, negative affectivity and psychological well-being. *New Zealand Journal of Psychology*, 31(1), Article 2.
- Örücü, M. Ç., & Demir, A. (2009). Psychometric evaluation of perceived stress scale for Turkish university students. *Stress and Health*, 25(1), 103–109. <https://doi.org/10.1002/smi.1218>
- Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health*, 30(4), 459–467. <https://doi.org/10.1002/nur.20199>
- Rhee, K. Y. (2010). Different effects of workers' trust on work stress, perceived stress, stress reaction, and job satisfaction between Korean and Japanese workers. *Safety and Health at Work*, 1(1), 87–97. <https://doi.org/10.5491/SHAW.2010.1.1.87>
- Rick, J., & Briner, R. B. (2000). Psychosocial risk assessment: problems and prospects. *Occupational Medicine*, 50(5), 310–314. <https://doi.org/10.1093/occmed/50.5.310>
- Salminen, S. (2004). Have young workers more injuries than older ones? An international literature review. *Journal of Safety Research*, 35(5), 513–521. <https://doi.org/10.1016/j.jsr.2004.08.005>
- Schaufeli, W. B., & Buunk, B. P. (2002). Burnout: An overview of 25 years of research and theorizing. In M. Schabracq, J. A. K. Winnubst, & C. L. Cooper (Eds.), *The handbook of work and health psychology* (2nd ed., pp. 282–424). Wiley.
- Schaufeli, W., & Enzmann, D. (1998). *The burnout companion to study & practice: A critical analysis*. Taylor & Francis.
- Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology*, 1(1), 27–41. <https://psycnet.apa.org/doi/10.1037/1076-8998.1.1.27>
- Siegrist, J. (2008). Effort-reward imbalance and health in a globalized economy. *Scandinavian Journal of Work, Environment & Health Supplements*, 6, 163–168.
- Siegrist, J., Li, J., & Montano, D. (2014). *Psychometric properties of the Effort-Reward Imbalance Questionnaire*. Duesseldorf University.
- Siegrist, J., Starke, D., Chandola, T., Godin, I., Marmot, M., Niedhammer, I., & Peter, R. (2004). The measurement of effort-reward imbalance at work: European comparisons. *Social Science & Medicine*, 58(8), 1483–1499. [https://doi.org/10.1016/S0277-9536\(03\)00351-4](https://doi.org/10.1016/S0277-9536(03)00351-4)
- Sirigatti, S., & Stefanile, C. (1988). Per una scala di misurazione del burnout. *Bollettino di Psicologia Applicata*, 187(188), 29–32.
- Smith, A. (2000). The scale of Perceived Occupational Stress. *Occupational Medicine*, 50(5), 294–298. <https://doi.org/10.1093/occmed/50.5.294>
- Tait, M., Padgett, M. Y., & Baldwin, T. T. (1989). Job and life satisfaction: A reevaluation of the strength of the relationship and gender effects as a function of the date of the study. *Journal of Applied Psychology*, 74(3), 502–507. <https://doi.org/10.1037/0021-9010.74.3.502>
- Vasunilashorn, S., Lynch, S. M., Gleib, D. A., Weinstein, M., & Goldman, N. (2015). Exposure to stressors and trajectories of perceived stress among older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 70(2), 329–337. <https://doi.org/10.1093/geronb/gbu065>
- Waltz, C. F., Strickland, O. L., & Lenz, E. R. (Eds.). (2010). *Measurement in nursing and health research*. Springer.
- Wanous, J. P., & Reichers, A. E. (1996). Estimating the reliability of a single-item measure. *Psychological Reports*, 78(2), 631–634. <https://doi.org/10.2466/pr0.1996.78.2.631>
- Webster, J. R., Beehr, T. A., & Love, K. (2011). Extending the challenge-hindrance model of occupational stress: The role of appraisal. *Journal of Vocational Behavior*, 79(2), 505–516. <https://doi.org/10.1016/j.jvb.2011.02.001>
- Zhang, Y., Peters, A., & Chen, G. (2018). Perceived stress mediates the associations between sleep quality and symptoms of anxiety and depression among college nursing students. *International Journal of Nursing Education Scholarship*, 15(1), 1–9. <https://doi.org/10.1515/ijnes-2017-0020/html>
- Zurlo, M. C., Pes, D., & Siegrist, J. (2010). Validity and reliability of the effort-reward imbalance questionnaire in a sample of 673 Italian teachers. *International Archives of Occupational and Environmental Health*, 83(6), 665–674. <https://doi.org/10.1007/s00420-010-0512-8>

Publication Ethics

The research conformed to the provisions of the Declaration of Helsinki and all ethical guidelines were followed as required when conducting human research, including adherence to the legal requirements in Italy.

Open Science

We report how we determined our sample size, all data exclusions (if any), all data inclusion/exclusion criteria, whether inclusion/exclusion criteria were established prior to data analysis, all measures in the study, and all analyses including all tested models. If we use inferential tests, we report exact *p* values, effect sizes, and 95% confidence or credible intervals.

Open Data: We confirm that there is sufficient information for an independent researcher to reproduce all of the reported results, including codebook if relevant (Marcatto et al., 2021).

Open Materials: The information needed to reproduce all of the reported methodology is not openly accessible. The material is available on request from the authors.

Preregistration of Studies and Analysis Plans: This study was not preregistered.

ORCID

Francesco Marcatto
 <https://orcid.org/0000-0003-0675-0876>

Francesco Marcatto
Department of Life Sciences
University of Trieste
Via Weiss 21
34127 Trieste (TS)
Italy
fmarcatto@units.it

Appendix

Health Complaints Questionnaire

Table A1. Means (*M*), standard deviations (*SD*), skewness, and kurtosis values of the Health Complaints Questionnaire items

Items	<i>M</i> (<i>SD</i>)	Skewness	Kurtosis
Sleep disorders (e.g., insomnia, disturbed sleep, excessive daytime sleepiness etc.)	2.12 (0.95)	−.06	−.62
Backpain (e.g., lumbago, sciatica)	1.83 (1.14)	.13	−.70
Headache	1.62 (1.00)	.02	−.52
Neck or shoulder muscle tension	2.36 (1.10)	−.47	−.21
Gastrointestinal disorders (e.g., abdominal pain and/or cramps, gastric reflux)	1.47 (1.12)	.33	−.75
Lacking energy just after having started to work	1.52 (1.11)	.31	−.68
Feeling physically exhausted	1.68 (0.96)	.12	−.41
Feeling emotionally exhausted	1.89 (1.08)	−.01	−.68
Breathing difficulties	0.96 (1.11)	.83	−.40