

## Polish adaptation of three self-report measures of job stressors: the Interpersonal Conflict at Work Scale, the Quantitative Workload Inventory and the Organizational Constraints Scale

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**Aim.** The objective of the present study was to test the psychometric properties, reliability and validity of three job stressor measures, namely, the Interpersonal Conflict at Work Scale, the Organizational Constraints Scale and the Quantitative Workload Inventory. **Method.** The study was conducted on two samples ( $N = 382$  and  $3368$ ) representing a wide range of occupations. The estimation of internal consistency with Cronbach's  $\alpha$  and the test–retest method as well as both exploratory and confirmatory factor analyses were the main statistical methods. **Results.** The internal consistency of the scales proved satisfactory, ranging from 0.80 to 0.90 for Cronbach's  $\alpha$  test and from 0.72 to 0.86 for the test–retest method. The one-dimensional structure of the three measurements was confirmed. The three scales have acceptable fit to the data. The one-factor structures and other psychometric properties of the Polish version of the scales seem to be similar to those found in the US version of the scales. It was also proved that the three job stressors are positively related to all the job strain measures. **Conclusions.** The Polish versions of the three analysed scales can be used to measure the job stressors in Polish conditions.

**Keywords:** interpersonal conflict at work; organizational constraints; workload; Polish adaptation

### 1. Introduction

The interest in job stress has stayed persistently with us for over 60 years. This is probably caused to a large extent by the results of research showing that job stress is the key job risk factor. Analyses of job conditions in European Union (EU) countries conducted by the European Foundation for the Improvement of Living and Working Conditions indicated that 28% of employees suffer from stress in the work environment and observe its destructive effects.[1] Job stress is the second most important (after back pain) health problem among active workers. Scholars emphasize that the trend is growing.[2] The negative outcomes of job stress can be low job effectiveness, low work engagement, high job burnout, high work absence [3–5] and high counterproductive work behaviour.[6] Psychosocial job conditions have been recognized as a priority in nine EU countries.[1] All this accounts for the continuous research into the methods of stress measurement as well as the development of new elaborate measurement tools.

In accordance with the European Framework for Psychosocial Risk Management (PRIMA-EF),[7] the sources of occupational hazards apply to 10 fields: (a) job content (e.g., work underuse of skills), (b) workload and work pace (e.g., work overload), (c) work schedule (e.g., shift working), (d) control (e.g., low autonomy), (e)

environment and equipment (e.g., inadequate equipment), (f) organizational culture (e.g., poor communication), (g) interpersonal relationships at work (e.g., conflicts with co-workers), (h) role in organization (e.g., role ambiguity), (i) career development (job insecurity) and (j) home–work interface (e.g., work–family conflict). Some of these stressors have been examined in Polish conditions, both by means of questionnaires developed by some Polish authors, e.g., role and ambiguity stress,[8] emotional demands,[9] psychosocial working conditions, which measures job demands (as well as job control, social support and well-being),[10] and questionnaires adapted from other countries, e.g., mobbing,[11] job demands and job insecurity (as well as job control, social support and well-being),[12] work–family and family–work conflicts.[13,14] Another group of stressors, such as interpersonal conflicts at work, quantitative workload and organizational constraints, have been rarely analysed in Polish studies, probably due to a shortage of reliable measurement tools.

The aim of the present study is to validate three short self-report measures of job stressors in Polish conditions. Developed by North American psychologists – Paul Spector and Steve Jex [15] – these measures were designed to assess three types of general job stressors

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that occur in the work environment. The Interpersonal Conflict at Work Scale (ICAWS) was intended to measure conflicts and arguments with other people at work, the Quantitative Workload Inventory (QWI) was intended to assess the amount of work and work pace, and the Organizational Constraints Scale (OCS) was intended to measure constraints on performance at work. These instruments have been used in numerous studies on stress outcome, but mainly in the USA.[6] Two of these scales – the ICAWS and the OCS – have been used in Poland in earlier studies [14,16] as well as within the project of Cooperative International Study on Managerial Stress (CISMS-2), initiated by Spector et al.[17] However, to the best of our knowledge, fully psychometric properties of the scales have never been presented in the Polish literature. The present paper aims to fill the resulting gap.

### 1.1. Interpersonal conflict at work

Many researchers emphasize that any investigations into the sources of occupational stress should to a greater extent take into account the social factors,[18–20] which represent ‘aspects of the work environment having to do with interactions with other people’.[19] Earlier studies indicated that destructive interpersonal relationships in the workplace can lead to similar health problems as physical stressors (e.g., noise, poor working conditions) or organizational ones (e.g., workload).[21]

Interpersonal conflict at work refers to how well an individual gets along with others at work (e.g., how often others are rude, nasty to or shout at them) and is one of the social stressors.[15] It is defined as a negative interpersonal encounter characterized by a contentious exchange, hostility or aggression. This may be an isolated incident or repeated and prolonged acts which can be manifestations of bullying. Interpersonal conflict at work may range from minor disagreements between co-workers to physical violence.[15] The conflict may be overt (e.g., being rude to co-workers) or covert (e.g., spreading rumours about co-workers).

The Stress Incident Report (SIR), an open-ended method used by Keenan and Newton [22] to collect cases of stressful incidents that occurred at work, shows that 74% of the reported incidents were caused by social interactions with superiors, subordinates or colleagues. Some earlier investigations showed that interpersonal conflicts at work are positively related to employees’ frustration, anxiety, anger, emotional exhaustion, job burnout and depression. The consequences of conflicts with one’s co-workers differ a little from those with one’s supervisors.[23] The former usually lead to personal problems (e.g., depressed mood, decrease in self-esteem), the latter can result in organizational outcomes (e.g., decrease in motivation and organizational commitment).

There is some cross-cultural evidence for the prevalence of interpersonal conflict at work as a significant source of stress. In one study,[24] North American and Indian clerical workers considered 11 possible stressor categories. Interpersonal conflict was the third most cited source of stress in a US sample and the fourth most cited source of stress in an Indian sample.

### 1.2. Quantitative workload

Workload is listed as one of the most common sources of stress.[25] It can be measured by the number of working hours, the level of production or even the mental demands of the work being performed. In the current study, quantitative workload is provided, which is measured by the volume of work that employees are required to perform in a given time period.[15] Some tools, developed by Polish researchers, measure a similar theoretical construct – e.g., the Psychosocial Working Conditions [10] and the Job Content Questionnaire.[12] However, the QWI has a shorter formula so can be used with other elaborate tools simultaneously. The direct positive effects of quantitative workload on job burnout, job strain, depression, physical problems and low job satisfaction found support in numerous studies.[26,27]

### 1.3. Organizational constraints

Organizational constraints are situations or things that prevent employees from translating ability and effort into high levels of job performance.[15] Organizational constraints can be divided into interpersonal constraints (e.g., conflicting commands of one’s superiors) and job context constraints (e.g., inadequate training).[28] Peters and O’Connor [29] defined 11 sources of organizational constraints: job-related information, budgetary support, required support, materials and supplies, required services and help from others, task preparation, time availability, work environment, scheduling of activities, transportation and job-relevant authority. Performance may be inhibited due to the unavailability, poor quality or inadequacy (or some combination thereof) of a constraint source.[20] Some cross-cultural studies showed that various organizational constraints are perceived as an important source of stress by North American, Indian and Chinese employees.[24,28] It was found that US employees experienced significantly more interpersonal constraints than Chinese ones. As for job context constraints, there were no significant differences between North American and Chinese employees. Organizational constraints are associated with negative emotions (e.g., anxiety, hostility and frustration), low job satisfaction, low organizational commitment and organizational deviance.[6]

The aims of the present research were threefold: (a) validation of the factor structure of the Polish version of the

ICAWS, the QWI and the OCS; (b) determination of reliability of the ICAWS, the QWI and the OCS; (c) test of convergent validity of the scales. In line with the original research, we expected to replicate the factor structure and good psychometric properties of the scales. In terms of convergent validity, we predicted that the Polish versions of the ICAWS, the QWI and the OCS would show positive correlations with the measures relating to job strain: (a) work–family and family–work conflicts; (b) perceived stress; and (c) job burnout. Similar theoretical criteria of convergent validity were used by Spector and Jex [15] in the original study, which confirmed convergent validity of the job stressor scales by correlation with such measures as state and trait anxiety, depression, frustration, negative affect, absenteeism and low job satisfaction.

The analysis was performed on two independent samples. Exploratory factor analysis was conducted in sample 1 ( $N = 382$ ), while in sample 2 ( $N = 3368$ ) confirmatory factor analysis (CFA) was performed. Convergent validity was examined in sample 1 but descriptive statistics and reliability coefficients were calculated in both samples.

## 2. Method

### 2.1. Study population

#### 2.1.1. Sample 1

The study on sample 1 was conducted in 2011. The group examined comprised nurses ( $n = 85$ ), teachers ( $n = 136$ ) and police officers ( $n = 161$ ). Some earlier studies had indicated that these professions are particularly vulnerable to job stress.[5,30] Women constituted the majority of the study participants ( $n = 254$ ; 66%). The age of the participants ranged from 20 to 60 ( $M = 35.38$ ;  $SD = 8.46$ ). Their work experience ranged from 1 to 40 years ( $M = 12.64$ ;  $SD = 9.01$ ). The average working time was 39 h per week ( $SD = 16.7$ ).

#### 2.1.2. Sample 2

The study on sample 2 was conducted between January 2012 and April 2014. The participants were medical staff ( $n = 477$ ), teachers ( $n = 545$ ), police officers ( $n = 542$ ), clerical staff ( $n = 475$ ), sales staff ( $n = 602$ ) and representatives of other occupations ( $n = 727$ ), including firefighters, prison staff, lawyers, financial consultants and others. Questionnaires were distributed at randomly selected institutions in four regions of Poland. Potential respondents received a hard copy of the questionnaires along with a letter explaining the purpose of the study. Full confidentiality of data and anonymity were assured. Those who provided informed consent were asked to fill out the questionnaires and seal them in envelopes which were subsequently collected by research assistants (i.e., some undergraduate students). All the participants were treated in accordance with the ethical guidelines of the Helsinki Declaration. Out

of the 5000 questionnaires distributed, 3368 (67.4%) were returned at least 80% complete and subsequently used for data analysis. The group analysed consisted of 1980 (59%) women and 1388 (41%) men, aged between 19 and 70 ( $M = 38.93$ ;  $SD = 9.09$ ). Work experience of the analysed participants ranged from 1 to 45 years ( $M = 14.75$ ;  $SD = 9.29$ ).

### 2.2. Instruments

The three job stressor instruments have been obtained in the authorized process of back translation from English into Polish and again into English. Polish versions of the three scales were prepared by Roman Cieślak with the authors of the original versions' consent.[16] The Interpersonal Conflict at Work Scale (ICAWS) was used to measure interpersonal conflict. The ICAWS includes four items referring to the frequency of arguments or conflicts in the workplace and the rude behaviour of co-workers (e.g., 'How often do other people yell at you at work?'). The Quantitative Workload Inventory (QWI) was used to measure workload. The QWI consists of five items referring to the quantity of job tasks, the effort required to perform them and the time assigned for task completion (e.g., 'How often does your job leave you with little time to get things done?'). This summated rating scale assesses respondents' perceptions of work in terms of volume and pace. The Organizational Constraints Scale (OCS) was used to measure organizational constraints. The OCS includes 11 items referring to a variety of constraints in the workplace, related to poor equipment, organizational rules and procedures, other employees, supervisors, lack of training and incorrect instructions (e.g., 'How often do you find it difficult or impossible to do your job because of poor equipment or supplies?'). This summated rating scale is based on the constraint areas identified by Peters and O'Connor.[29] Participants are asked to indicate how often they find it difficult or impossible to do their job because of each constraint. The three instruments have a 5-point response scale ranging from 1 = *less than once a month or never* to 5 = *several times a day*. High scores represent a high level of job stressors. In the study on the validation of the US version of the scales, the reliability coefficients for the individual scales were:  $\alpha = 0.74$  for the ICAWS,  $\alpha = 0.85$  for the OCS and  $\alpha = 0.81$  for the QWI.[15]

*Work–family and family–work conflicts* were measured with the Work–Family and Family–Work Conflicts questionnaire,[31] in the Polish adaptation by Zalewska.[13] Both conflict types were measured with two separate 7-point scales from 1 = *I do not agree at all* to 7 = *I fully agree*, each one comprising five items. The theoretical validity of the tool was evidenced by the negative relations of work–family and family–work conflicts to job stress, psychological tension, job burnout, low job satisfaction and low organizational commitment.[31,32] In

the present study, the  $\alpha$ -coefficient reliability was 0.89 for work–family conflict and 0.86 for family–work conflict.

*Perceived stress* was measured with the Perceived Stress Scale (PSS-10) developed by Cohen et al.,[33] in the Polish adaptation by Juczyński and Ogińska-Bulik.[34] The instrument measures stress based on the transactional model, focusing on self-assessment of experienced events. It consists of 10 items scored from 0 = *never* to 4 = *very often*. The scale demonstrates satisfactory psychometric properties (Cronbach's  $\alpha = 0.84$ ).

*Job burnout* was measured with the Oldenburg Burnout Inventory,[35] in the Polish version.[16] This 16-item scale consists of two subscales for exhaustion and disengagement at work. A 5-point response scale ranged from 1 = *I completely disagree* to 5 = *I completely agree*. In the current study, only the general coefficient of job burnout was used (Cronbach's  $\alpha = 0.85$ ).

### 2.3. Data analyses

The current research was performed on two independent samples, in which factorial validity of the Polish version of the scales was examined. The fit of the factor structure identified in sample 1 ( $N = 382$ ) was examined in sample 2 ( $N = 3368$ ) by performing CFAs using SPSS Amos version 20.0. The CFAs were conducted because confirmatory procedures offer a more rigorous test than exploratory analyses and because the measurement models for the three scales were hypothesized a priori. Because multivariate normality is assumed for most CFA estimation methods and departures from multivariate normality can have a significant impact on CFA estimations,[36] descriptive analytical measures were calculated prior to conducting the CFAs. Since for the OCS, the ICAWS and the QWI univariate and multivariate kurtosis statistics were found to indicate non-normality (see Table 1), the CFAs were carried out using the asymptotically distribution-free (ADF) method according to guidelines for non-normal data and large samples.[37,38]

Using CFAs, estimations of one-factor models of the ICAWS, the QWI and the OCS were conducted. The models' fit was assessed with: the root mean square error of approximation (RMSEA), the goodness of fit index (GFI) and the comparative fit index (CFI). RMSEA values lower than 0.05 are usually considered good, while values lower than 0.08 are considered acceptable.[39] Finally, GFI and CFI values equal to or higher than 0.90 are considered acceptable, while values equal to or higher than 0.95 are considered good.[36,40] The  $\chi^2$  values are provided for each analysis but are not used to evaluate the overall model fit as the  $\chi^2$  test is inappropriate with large samples.[36,41]

Descriptive statistics and internal consistencies of the scales using Cronbach's  $\alpha$  were investigated in samples 1 and 2. To evaluate the test–retest reliability, 54 participants (30 female) of sample 1, ranging in age from 22 to 27,

completed the Polish version of the ICAWS, the QWI and the OCS a second time, three months after the first administration. Finally, convergent validity of the scales was investigated, using correlation analyses in sample 1 by analysing the correlations between the three job stressors and (a) work–family and family–work conflicts, (b) perceived stress and (c) job burnout.

## 3. Results

### 3.1. Factor structure

#### 3.1.1. Exploratory factor analysis (sample 1)

Three principal component analyses (PCAs) to explore the factorial structures of the Polish ICAWS, QWI and OCS in sample 1 were computed. The results of the analyses showed that the one-factor solution is adequate for these three scales, one factor with eigenvalues  $> 1$  explaining 62.51% of the total variance of the ICAWS, one factor with eigenvalues  $> 1$  explaining 63.73% of the total variance of the QWI and, finally, two factors with eigenvalues  $> 1$  explaining 56.80% of the total variance of the OCS. However, the scree plot suggested one rather than two factors: the first factor with equivalence 5.17 explaining 46.97% of the total variance and the second factor with equivalence 1.14 explaining 12.72% of the total variance of the OCS. Given the results and high factor loadings of the items of the three scales (see Table 1), we assumed that the one-factor solutions can be tested in further analysis according to the one-dimensional structures of the original versions of these scales.

#### 3.1.2. Confirmatory factor analysis (sample 2)

Table 1 presents standardized regression weights (factor loadings) for the common factor on the ICAWS, the QWI and the OCS, respectively. The squared multiple correlation coefficients ( $R^2$ ), describing the amount of variance the common factor accounts for in the observed variables, are also presented in Table 1. The detailed results obtained were as follows.

**3.1.2.1. ICAWS.** The one-factor model showed the good fit index according to the fit index: GFI = 0.985; CFI = 0.961; RMSEA = 0.056 and 90% CI = [0.037, 0.078];  $\chi^2(2) = 23.114$ . The completely standardized item loadings ranged from 0.585 to 0.791 and  $R^2$  for items ranged from 0.444 to 0.625 (see Table 1). All factor loadings are statistically significant at  $p < 0.001$ .

**3.1.2.2. QWI.** All of the indexes for the one-factor model provided a good fit to the data: GFI = 0.993; CFI = 0.979; RMSEA = 0.060 and 90% CI = [0.046, 0.075];  $\chi^2(4) = 52.515$ . The completely standardized item loadings ranged from 0.507 to 0.833, and all factor loadings are statistically significant at  $p < 0.001$ . The  $R^2$  for items ranged from 0.402 to 0.694.

Table 1. Descriptive statistics of the items of the ICAWS, QWI and OCS, results of PCA in sample 1 and CFA in sample 2.

|             | Sample 1 ( <i>N</i> = 382) |           |               |               |       | Sample 2 ( <i>N</i> = 3368) |           |               |               |       |       |
|-------------|----------------------------|-----------|---------------|---------------|-------|-----------------------------|-----------|---------------|---------------|-------|-------|
|             | <i>M</i>                   | <i>SD</i> | Item skewness | Item kurtosis | FA    | <i>M</i>                    | <i>SD</i> | Item skewness | Item kurtosis | SRW   | SMC   |
| ICAWS (1–4) |                            |           |               |               |       |                             |           |               |               |       |       |
| ICAWS1      | 1.42                       | 0.81      | 2.307         | 5.551         | 0.716 | 1.45                        | 0.80      | 2.061         | 4.480         | 0.587 | 0.444 |
| ICAWS2      | 1.44                       | 0.85      | 2.295         | 5.506         | 0.831 | 1.53                        | 0.93      | 2.052         | 3.984         | 0.788 | 0.621 |
| ICAWS3      | 1.81                       | 1.04      | 1.367         | 1.342         | 0.839 | 1.87                        | 1.04      | 1.249         | 1.061         | 0.791 | 0.625 |
| ICAWS4      | 1.34                       | 0.76      | 2.573         | 6.821         | 0.770 | 1.37                        | 0.80      | 2.624         | 7.136         | 0.706 | 0.499 |
| QWI (1–50)  |                            |           |               |               |       |                             |           |               |               |       |       |
| QWI1        | 3.92                       | 1.24      | –0.878        | –0.297        | 0.706 | 3.9                         | 1.15      | –0.750        | –0.383        | 0.507 | 0.457 |
| QWI2        | 3.51                       | 1.20      | –0.410        | –0.700        | 0.809 | 3.55                        | 1.13      | –0.374        | –0.641        | 0.634 | 0.402 |
| QWI3        | 3.05                       | 1.25      | –0.005        | –1.010        | 0.831 | 3.19                        | 1.21      | –0.102        | –0.869        | 0.797 | 0.635 |
| QWI4        | 3.45                       | 1.14      | –0.191        | –0.813        | 0.837 | 3.57                        | 1.12      | –0.292        | –0.758        | 0.833 | 0.694 |
| QWI5        | 2.69                       | 1.39      | 0.329         | –1.128        | 0.801 | 2.78                        | 1.33      | 0.248         | –1.074        | 0.786 | 0.617 |
| OCS (1–5)   |                            |           |               |               |       |                             |           |               |               |       |       |
| OCS1        | 2.06                       | 1.08      | 0.881         | 0.123         | 0.633 | 2.39                        | 1.25      | 0.645         | –0.561        | 0.585 | 0.342 |
| OCS2        | 2.08                       | 1.07      | 0.762         | –0.150        | 0.696 | 2.33                        | 1.17      | 0.642         | –0.377        | 0.709 | 0.502 |
| OCS3        | 1.94                       | 1.02      | 0.918         | 0.189         | 0.779 | 1.95                        | 1.02      | 0.957         | 0.340         | 0.669 | 0.448 |
| OCS4        | 1.63                       | 0.94      | 1.677         | 2.620         | 0.668 | 1.89                        | 1.14      | 1.222         | 0.647         | 0.692 | 0.479 |
| OCS5        | 2.09                       | 1.14      | 0.840         | –0.120        | 0.683 | 2.51                        | 1.31      | 0.528         | –0.815        | 0.618 | 0.382 |
| OCS6        | 1.48                       | 0.78      | 1.700         | 2.499         | 0.584 | 1.83                        | 1.06      | 1.206         | 0.666         | 0.642 | 0.412 |
| OCS7        | 2.00                       | 1.10      | 0.976         | 0.196         | 0.623 | 2.14                        | 1.21      | 0.813         | –0.357        | 0.612 | 0.375 |
| OCS8        | 1.46                       | 0.81      | 2.045         | 4.313         | 0.565 | 1.63                        | 0.90      | 1.515         | 1.983         | 0.555 | 0.308 |
| OCS9        | 1.95                       | 1.06      | 1.016         | 0.402         | 0.770 | 2.16                        | 1.16      | 0.820         | –0.157        | 0.796 | 0.633 |
| OCS10       | 1.80                       | 0.94      | 1.052         | 0.334         | 0.781 | 1.92                        | 1.04      | 1.017         | 0.351         | 0.712 | 0.507 |
| OCS11       | 1.62                       | 0.85      | 1.414         | 1.767         | 0.715 | 1.82                        | 1.00      | 1.237         | 1.058         | 0.729 | 0.531 |

Note: ICAWS = Interpersonal Conflict at Work Scale; QWI = Quantitative Workload Inventory; OCS = Organizational Constraints Scale; FA = factor loading; SRW = standardized regression weight; SMC = squared multiple correlation.

3.1.2.3. *OCS*. The one-factor model provided acceptable fit index according to: GFI = 0.901; RMSEA = 0.065 and 90% CI = [0.060, 0.069]; but CFI = 0.800 ( $< 0.90$ ) showed that this model did not fit well. In addition,  $\chi^2(41) = 614.70$  was significant:  $p < 0.001$  but was not used to evaluate the model fit due to its inappropriateness for our large sample.[36,40] However, when one takes into account that the completely standardized item loadings are statistically significant at  $p < 0.001$  and ranged from 0.555 to 0.796 (see Table 1), it can be considered as an acceptable one-factor model of the OCS.

### 3.2. Descriptive statistics and reliability (samples 1 and 2)

Table 2 includes the means, standard deviations and Cronbach's  $\alpha$  coefficients of the three scales for samples 1 and 2. The values of the means and standard deviations are adequate and comparable to Spector and Jex's [15] results. The values amounted, respectively, to  $M = 7.1$ ,  $SD = 2.4$  for the ICAWS;  $M = 16.5$ ,  $SD = 3.4$  for the QWI and  $M = 21.3$ ,  $SD = 7.4$  for the OCS in the US validation study.

The reliability of the Polish versions of the scales was assessed with the internal consistency method using

Table 2. Mean, standard deviations and Cronbach's  $\alpha$  reliability coefficients in samples 1 and 2.

| Analysed stressor          | Sample 1 |           |          | Sample 2 |           |          |
|----------------------------|----------|-----------|----------|----------|-----------|----------|
|                            | <i>M</i> | <i>SD</i> | $\alpha$ | <i>M</i> | <i>SD</i> | $\alpha$ |
| Interpersonal conflicts    | 6.01     | 2.75      | 0.80     | 6.23     | 2.84      | 0.80     |
| Workload                   | 16.62    | 4.94      | 0.86     | 16.99    | 4.64      | 0.84     |
| Organizational constraints | 20.13    | 7.4       | 0.88     | 22.59    | 8.76      | 0.90     |

Cronbach's  $\alpha$  and the test-retest correlation. It was suggested that  $\alpha$  should be within the range of 0.60–0.90 to consider a measure to be reasonably consistent.[42] In the current study, Cronbach's  $\alpha$  coefficients ranged from 0.80 (for the ICAWS, samples 1 and 2) to 0.90 (for the OCS, sample 2) and were slightly higher than in the original study. The item-total correlation ranged from  $r = 0.38$  to 0.61 for the ICAWS; from  $r = 0.38$  to 0.65 for the QWI; and from  $r = 0.23$  to 0.76 for the OCS. The test-retest reliability over three months ( $N = 54$ ) was  $r = 0.86$  ( $p < 0.001$ ) for the ICAWS;  $r = 0.72$  ( $p < 0.001$ ) for the QWI; and  $r = 0.78$  ( $p < 0.001$ ) for the OCS. The obtained values of internal consistency can be considered satisfactory.

Table 3. Correlation matrix of variables.

| Variable                       | 1       | 2        | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      |
|--------------------------------|---------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. Age                         |         |          |         |         |         |         |         |         |         |         |
| 2. Gender                      | -0.14** |          |         |         |         |         |         |         |         |         |
| 3. Seniority                   | 0.93*** | -0.21*** |         |         |         |         |         |         |         |         |
| 4. Work hours weekly           | -0.15** | 0.08     | -0.07   |         |         |         |         |         |         |         |
| 5. Work-family conflict        | 0.22*** | -0.05    | 0.25*** | 0.15*** |         |         |         |         |         |         |
| 6. Family-work conflict        | 0.13*   | -0.03    | 0.12*   | -0.02   | 0.53*** |         |         |         |         |         |
| 7. Perceived stress            | 0.14**  | -0.19*** | 0.17**  | -0.03   | 0.42*** | 0.37*** |         |         |         |         |
| 8. Job burnout                 | 0.10*   | 0.02     | 0.13**  | 0.08    | 0.49*** | 0.34*** | 0.57*** |         |         |         |
| 9. Interpersonal conflict      | -0.04   | 0.13*    | -0.01   | 0.11*   | 0.21*** | 0.19*** | 0.35*** | 0.32*** |         |         |
| 10. Quantitative workload      | 0.06    | -0.06    | 0.10    | 0.13*   | 0.42*** | 0.20*** | 0.32*** | 0.29*** | 0.38*** |         |
| 11. Organizational constraints | 0.001   | 0.14**   | -0.01   | 0.07    | 0.27*** | 0.29*** | 0.41*** | 0.33*** | 0.55*** | 0.41*** |

Note: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

### 3.3. Convergent validity (sample 2)

Convergent validity was examined by analysing the correlations between the three job stressors and some work factors which, in the psychological literature, are considered to be measures relating to job strain.[4] These are: (a) work-family and family-work conflicts, (b) perceived stress and (c) job burnout. Similar theoretical criteria of convergent validity were used by Spector and Jex [15] in the original study. The authors confirmed convergent validity of the job stressor scales by correlation with such factors as state and trait anxiety, depression, frustration, negative affect, absenteeism and low job satisfaction.

Table 3 presents the correlation coefficients obtained in sample 1 of the current study. All the job stressors are strongly positively connected with all the variables related to job strain ( $p = 0.001$ ). The highest correlations were found for organizational constraints and perceived stress ( $r = 0.41$ ), the lowest for interpersonal conflict at work and family-work conflict. The findings obtained confirm the convergent pattern of correlations between the three job stressors and job strain measures.

Table 3 shows also the correlation coefficients for the correlations between the job stressors and demographic factors. None of the job stressors is connected with age or seniority.<sup>1</sup> Interpersonal conflicts at work and organizational conflict are positively related to gender. In addition to this, a larger number of working hours is accompanied by more frequent interpersonal conflicts and a higher level of quantitative workload.

## 4. Discussion

The paper aimed to validate three short self-report job stressor measures (the ICAWS, the QWI and the OCS) in Polish conditions. The analyses of the Polish version of the measures confirmed their adequate factor structure, internal consistency, reliability and validity. The one-factor structure of the three scales obtained in sample 1 was supported in an independent large sample 2. Each item of the

ICAWS (5 items), the QWI (5 items) and the OCS (11 items) formed a single latent factor with high significant factor loadings both in the PCAs and the CFAs. As hypothesized, the PCA and CFA results were consistent with the one-factor models of the three scales. The ICAWS and the QWI have good fit to the data, the OCS have acceptable fit in the CFA. Given these results, it can be assumed that the three scales have one-dimensional structures and contain all the items from their original versions. Moreover, the one-factor structures and other psychometric properties of the Polish version of these scales seem to be similar to those found in the original version of the scales.[15] The mean values for the Polish version of the scales were similar to the US ones. Both Cronbach's  $\alpha$  coefficients and the test-retest method with three months' follow-up confirmed the reliability of the questionnaires.

Our analysis of convergent validity showed that, as expected, the three job stressors correlated significantly with other job-related stressors such as work-family and family-work conflicts as well as with job strain measured with perceived stress and job burnout. The patterns of correlation for the job stressors were similar. The correlation was the strongest for perceived stress and the weakest for work-family conflict. The strength of correlations between workload and job strain indicators was a little lower than for the other two stressors. Similar results were obtained in the original study.[15] Both the organizational constraints and interpersonal conflict are, to a large extent, psychosocial stressors, arising wholly or partly from interpersonal interactions. Workload, on the other hand, concerns tasks more than people. Furthermore, just having a large amount of work does not necessarily lead to distress in the same way as constraints or interpersonal conflict might. Many individuals might enjoy work and might not find having a lot to do unpleasant. Therefore, it is expected that the relationship between workload and job strain will be weaker than in the case of the other two job stressors. The three job stressors turned out to be correlated with one another, from  $r = 0.29$  for interpersonal conflict and quantitative

workload to  $r = 0.55$  for interpersonal conflict and organizational constraints. Spector and Jex [15] obtained quite similar correlation coefficients from  $r = 0.20$  for interpersonal conflict and quantitative workload to  $r = 0.44$  for interpersonal conflict and organizational constraints.

It has also been shown that job stressors are not related to age or job seniority. Spector and Jex [15] did not observe any associations between the job stressors and age either. As in the original study, the QWI had a stronger link with the weekly working hours than the other job stressors. The relation between the QWI and the working hours can be considered indicative of convergent validity because working hours are expected to relate to perceived workload. Gender had little connection with interpersonal conflict at work and organizational constraints (but not with workload), but, in contrast to the original study, more with men obtaining higher means. Taken together, our results provide evidence that the Polish versions of the three analysed job stressors show reliability and validity for evaluating interpersonal conflict at work, organizational constraints and quantitative workload. These findings allow the scales to be used reliably with Polish samples in studies of vocational stress.

The present study seems to have several limitations. Although our samples included different kinds of occupations, they did not comprise some other stressful jobs, like managers or industrial workers. Thus, any future investigations should include more diverse occupational groups. Moreover, the result may be affected by the dominance of women in both samples. The data received may apply to men only to some extent. Another thing is the method of stress measurement, which is one of the most frequently discussed issues in stress research. The three analysed scales are self-report measures. The items of the scales are related to the frequency of stressful events in daily work, so they can be used mainly in investigations of chronic stressors, repeated cyclically and somehow inscribed in job roles. The advantage of self-report measures is that the strength of a stressor is assessed by the person directly affected. Their disadvantage lies in the fact that the assessment is highly influenced by currently induced emotions and cognitive patterns. Furthermore, during the measurement of subjective feelings related to the stressful factor, the difference between the stressor and the response to it are blurred because these elements are treated as inseparable.[43] To the best of our knowledge, no study has investigated the link between the three job stressor measures and the objective parameters of stress measured by physiological indicators (e.g., systolic and diastolic blood pressure and the heart rate) or by competent judges (e.g., co-workers) who have had the opportunity to observe a worker in one or more work-related situations. This type of study would be especially recommended in the course of further investigations of the self-report job stressor instruments.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Note

1. Very similar correlation coefficients were obtained in sample 2.

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