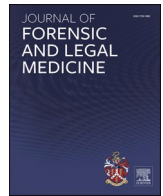


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Research Paper

Forensic Professionals' Stress Inventory (FPSI): Development and psychometric properties

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ABSTRACT

Professionals in the justice system are particularly susceptible to occupational stress and burnout due to factors intrinsic to their profession. The Forensic Professional's Stress Inventory (FPSI) was designed to assess stress and psychological distress specifically in justice system professionals. A preliminary 41-item scale was administered to a sample of 690 forensic professionals (i.e., judges, lawyers, and attorneys). Exploratory factor analysis, exploratory structural equation modeling, and confirmatory factor analysis were conducted to find the most interpretable and parsimonious factor solution for FPSI. The 25-item bifactor model (with four first-order factors) demonstrated the most adequate fit to the data. Overall, FPSI revealed adequate psychometric properties and would be a useful instrument for assessing psychological strain and stress in forensic professionals.

1. Introduction

The well-being of the justice system is dependent on the seamless functioning of its professionals (e.g., judges, lawyers, or public attorneys) because their work plays an important and direct role in other people's lives. It is not incorrect to assume that when these professionals' mental health is affected, the whole system is correspondingly impacted. This feeble balance between the well-being of forensic professionals and the well-being of the whole justice system is challenged when you consider the risk factors associated with the development of occupational stress and burnout in these types of occupations.

Firstly, by itself, the justice system undoubtedly plays an important role in the development of psychological distress. The whole system reinforces attitudes of suspicion, cynicism, hostility, and aggressiveness in their participants, putting all who are involved in a constant state of alertness and anxiety – of feeling constantly “on edge”.¹ It is not surprising that forensic professionals present higher levels of occupational stress, burnout,^{2–4} and psychological distress,^{5,6} when compared to the general population.

These higher levels of psychological distress and strain can be explained by the commonly cited challenges that characterize forensic professions, from extensive schedules, excessive workloads, and too

many responsibilities with sparse rewards, to factors related to the work they do (e.g., violent cases, cases involving children).^{7–11} Many times, forensic professionals must juggle multiple caseloads with limited amounts of information and resources and with a need to maintain confidentiality.¹ The long work hours mean less time for their personal and family lives and, consequently, less social support, leading them to feel isolated and helpless, feelings which are further reinforced by potential conflicts with colleagues and/or clients.^{7,8} Other times, the involvement in violent and dangerous cases leads these professionals to feel unsafe and in an unpredictable environment.¹

Stress, occupational stress, and burnout lead people to make mistakes and judgement errors at work. Thus, the need to assess the psychological functioning of forensic workers, especially stress and occupational stress is clear, considering that these professionals are instrumental to the efficient functioning of the justice system as a whole.

2. Studies regarding psychopathology in the legal professions

The interest in the psychological assessment of forensic professionals has been gaining importance in the last thirty years, mostly focusing on constructs such as depression,^{1,2,6,9,12} vicarious trauma,^{9,10,13–16} substance abuse,^{3–5,9,17–19} stress, anxiety, and burnout.^{2–4,6,9,11,15,18,20}

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Nevertheless, in Portugal, there are sparse studies dedicated to the assessment of these variables.^{7,21–24} In Europe, there are no tools for the evaluation of these dimensions applied to forensic professionals and their idiosyncrasies, and which takes into account the unique characteristics of their workplace and professional tasks.

Most studies concerning these types of professionals mainly resort to one type of forensic occupation, using samples comprised of judges^{13,25} or lawyers,^{3,5,12,14,17,18,26,27} and only few studies assess multiple samples of forensic professionals.^{4,28}

Although burnout and stress in forensic workers have been studied in the past, researchers have a tendency to use general stress measures (e. g., Basic Psychological Need Satisfaction and Frustration at Work Scale²⁹; Kessler 10 Scale³⁰; Depression Anxiety and Stress Scales 21³¹; Job Content Questionnaire),³² meaning they focused on the assessment of general work stressors (e.g., decision authority, job security, social isolation, and others) (e.g., Job Content Questionnaire), instead of taking into account the most common and specific sources of psychological strain in this particular group of professionals. Therefore, a gap remains in assessing stressors specific to forensic work (e.g., stigma associated with the job, need to juggle simultaneous reports, vicarious victimization, among others) and some of the most common coping strategies adopted by these professionals (e.g., alcohol and drug consumption, shortcutting tasks, among others).

Although there is a scale specifically designed to assess the stress in forensic professionals (*Inventário de Fontes Stressoras na Atividade Profissional do Juiz do Trabalho* [Inventory of Stressful Sources in the Professional Activity of the Labor Judge] – IFSJ),¹¹ it is restricted to judges and it does not use a Likert-type scale, which can difficult the interpretation of results and the drawing of conclusions.

Our study endeavors to present a new scale for the assessment of occupational stress in forensic professionals. This scale was developed to evaluate specific aspects of the judicial work that may lead to distress (e. g., feeling that, no matter how much work they do, justice is not served in court), as well as potential harmful coping strategies that may have been used by forensic professionals to mediate stress (e.g., when dealing with expert's reports, only reading the conclusions, because there is no time for more).

3. The present study

The main objective of the present study was to develop and validate the Forensic Professionals' Stress Inventory (*Inventário de Stress para Profissionais Forenses*; FPSI), a new scale designed to identify signs of psychological strain and stress in people working for the justice system. It is a self-report tool that assesses the most common sources of stress in these occupations (e.g., autonomy, social support, workload), and potential harmful coping strategies adopted by forensic workers to manage perceived stress.

The development of the FPSI followed several steps, namely: (i) a literature review concerning the study of occupational stress and burnout in legal professions; (ii) a review of existing stress, judicial stress scales, and solely judicial scales (e.g., Inventory of Stressful Sources in the Professional Activity of the Labor Judge¹¹ and other generic stress scales (e.g., Stress Vulnerability Questionnaire [*Questionário de Vulnerabilidade ao Stress*; 23 QVS])³³; (iii) the development of the 41 items of the FPSI for the assessment of the most common sources of stress in forensic occupations; (iv) the analysis of the feedback provided by a focus group comprised of some forensic professionals and other experts (e.g., forensic psychiatrists, lawyers, attorneys, and judges) on the preliminary version of the FPSI, which encompassed 41 items measured in a five-point response scale and which included a small instruction script for participants. Higher scores indicate greater stress by forensic professionals.

4. Method

4.1. Participants

A sample of 690 forensic professionals (i.e., judges, lawyers, and attorneys) was contacted to complete our protocol. The judge sample was comprised of 342 participants (105 men and 237 women) who were contacted via e-mail with support given by the High Judicial Council of Portugal and by the Association of Portuguese Women Judges, an association focused on the defense and promotion of the rights of female judges. Two hundred and eighty-two lawyers (73 men and 209 women) were contacted via social media (e.g., Facebook) and e-mail, while also benefitting from the support of two Regional Councils of the Portuguese Bar Association (i.e., Regional Council of Madeira and Regional Council of Faro), who aided us in the dissemination of our protocol. Finally, 66 attorneys (22 men and 44 women) completed our protocol thanks to the contribution of the Portuguese Public Prosecution Service, who made our assessment protocol available to every Portuguese attorney, via their online platform.

Overall, the 41-item version of FPSI was completed by 690 forensic professionals, of which 71.0% were female ($n = 490$), with a mean age of 45.83 ($SD = 9.95$). Fifty-four participants (7.8%) reported having been physically assaulted while working, of which 39 were judges, 12 were lawyers, and three were attorneys. Regarding psychiatric and psychological treatments, 14.9% ($n = 103$) reported benefitting from psychiatric intervention, while 12.3% ($n = 85$) reported having benefitted from this type of intervention in the past. On the other hand, 11.9% ($n = 82$) currently benefit from psychological treatment and 15.4% ($n = 106$) benefitted from it in the past. In addition, 30.3% ($n = 209$) of the participants reported the use of anxiolytics, 30.1% ($n = 208$) antidepressants, 5.5% ($n = 38$) antipsychotics, and 0.3% ($n = 2$) antiepileptics medication.

4.2. Procedures

The assessment protocol was available online through Google Forms for approximately three months (from March 2021 to June 2021), to ensure the maximum response rate from participants. In addition to the 41-item version of the FPSI, our protocol also included the Oldenburg Burnout Inventory (OLBI)^{34,35} and the Personality Assessment Inventory (PAI).^{36,37} Overall, the protocol took approximately an hour to complete.

4.3. Measures

Oldenburg Burnout Inventory. The OLBI^{34,35} is a four-point Likert-type scale for the assessment of burnout. This instrument is comprised of 16 items that assess two core dimensions of burnout: exhaustion and disengagement. Additionally, it covers the affective, physical, and cognitive aspects of burnout. The *Exhaustion* subscale is comprised of eight items and the *Disengagement* subscale is comprised of the remaining eight items. Total and sub-total scores can be reached by summing the raw scores. The higher the score, the greater the level of burnout.

Personality Assessment Inventory. The PAI^{36,37} is a self-report test of personality, psychopathology, and psychosocial environment, comprising 344 items organized into 22 scales: four validity scales, 11 clinical scales, five treatment scales, and two interpersonal scales.³⁸ For our study's purpose, we used the *Stress*, *Anxiety*, *Dominance*, and *Grandiosity* domains. The *Stress* subscale is composed of eight items, the *Anxiety* subscale is comprised of 24 items, the *Dominance* subscale is comprised of 12 items, and the *Grandiosity* subscale is composed of eight items. Raw scores are obtained by summing the total item scores for each scale or subscale. To guarantee response validity in the completion of the protocol, PAI's validity scales were taken into account for the present study. No participants were excluded from the study due to invalid profiles.

4.4. Statistical analyses

Exploratory structural equation modeling (ESEM) and confirmatory factor analysis (CFA) were conducted using Mplus 8. All the other statistical analyses were performed using IBM SPSS Statistics 26.

ESEM integrates both CFA and exploratory factor analysis (EFA) into a single structural equation modeling model. Consequently, not only does it permit the existence of relationships between factors, but it also estimates complex error variance structures and produces bifactor models, allowing for cross-loadings.³⁹ The maximum likelihood parameter estimates with mean-adjusted chi-square test statistic (MLM) were used in the ESEM and CFA because of the deviation from the normality of some items (MLM is robust to non-normality). The goodness-of-fit indices used to consider the adequacy of the factor models were: chi-square/degree of freedom ratio (χ^2/df) ≤ 5 ,⁴⁰ Comparative Fit Index (CFI) ≥ 0.90 , Standardized Root Mean Square Residual (SRMR) ≤ 0.08 , and Root Mean Square Error of Approximation (RMSEA) ≤ 0.08 .^{41–43}

5. Results

5.1. Preliminary analysis

Skewness and kurtosis values were examined to determine the normality of the data distribution. From the original 41 items, 11 items had skewness values > 1 , and 13 items had kurtosis values > 1 .

We performed an EFA (principal components analysis with direct oblimin rotation) for the 41 items of FPSI. The EFA suggested the presence of four factors (eigenvalues > 1 and scree plot) that explain 46.08% of the variance. Some items revealed loadings below 0.30, low communalities, and cross-loadings. Subsequently, we performed a series of ESEMs to explore the most interpretable and parsimonious factor solution (e.g., goodness-of-fit indices for the 41 items and 4 factors: CFI = 0.843, SRMR = 0.054, RMSEA = 0.085). The findings from the EFA and ESEM suggested the elimination of 16 items (e.g., loadings < 0.30 and low communalities), which lead us to a factor solution of 25 items and four factors: (i) *Vulnerability to Professional Stress* (VS) with nine items; (ii) *Coping Strategies* (CS) with five items; (iii) *Overwork* (OW) with seven items; and (iv) *Social Support/Autonomy* (SSA) with four items.

5.2. Confirmatory factor analysis (CFA)

The findings from EFA and ESEM showed some cross-loadings, suggesting the presence of a general factor. Thus, we tested three factor structures: (i) a four-correlated-factor model with 25 items; (ii) a bifactor model where each item loads onto its respective first-order factor and simultaneously onto a general factor; and (iii) a hierarchical four-factor model with the general factor (second-order factor), the four factors (first-order factor), and the 25 items.

As shown in Table 1, the bifactor model showed a better model fit than the other two competing models. In general, the 25 items revealed adequate factor loadings with their first-order factor and/or with the

Table 1
Goodness-of-fit indices for the estimated models.

Factor models	$\chi^2(df)$	χ^2/df	CFI	RMSEA (90% CI)	SRMR
4-correlated-factor	1138.454 (269)	4.232	0.860	0.068 (0.064–0.073)	0.082
Bifactor (4 factors)	747.560 (250)	2.990	0.920	0.054 (0.049–0.058)	0.066
Hierarchical (4 factors)	1207.660 (271)	4.456	0.849	0.071 (0.067–0.075)	0.097

Note. CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual.

general factor (see Fig. 1).

5.3. Reliability

The Cronbach alpha value for the general factor was 0.90, indicating excellent internal consistency.⁴⁴ Likewise, each of the four factors presented good internal consistency (VS = 0.85; CS = 0.77; OW = 0.86; and SSA = 0.74).

The correlations among the four FPSI subscales' scores were moderate to strong⁴⁵ (small $r = 0.100$, medium $r = 0.300$, and large $r = 0.500$), with the highest correlation coefficients being between CS and SSA and between VS and OW ($r = 0.522$), whilst the lowest correlation coefficient was between CS and OW ($r = 0.295$). Likewise, correlations between each of the four factors and the general factor were strong ($r > 0.60$), giving support for a bifactor model of FPSI (see Table 2).

5.4. Convergent, divergent, and discriminant validity

To examine convergent validity, we analyzed the correlation coefficients between FPSI and two other instruments that the literature refers to measure similar constructs, such as burnout, anxiety, and stress (see Table 3). The correlation coefficient between the general factor scores of the FPSI and OLBI was strong ($r = 0.801$; $p < 0.001$). Considering the two dimensions of OLBI, both correlated strongly with the general factor score of the FPSI (*Disengagement*: $r = 0.673$, $p < 0.001$; and *Exhaustion*: $r = 0.812$, $p < 0.001$). The correlation coefficients between the general factor score of the FPSI and the two subscales of PAI were also adequate (*Anxiety*: $r = 0.716$, $p < 0.001$; and *Stress*: $r = 0.571$, $p < 0.001$).

For the divergent validity (see Table 3), we performed a correlation analysis between FPSI and two measures that literature refers to as different and non-related to psychological stress and strain, such as a sense of dominance (*Dominance* subscale of PAI) and grandiosity (*Grandiosity* subscale of PAI). The correlation coefficients between the general factor score of FPSI and the Dominance ($r = -0.114$, $p < 0.001$), and the Grandiosity ($r = -0.150$, $p < 0.001$) were small.

To examine the discriminant validity of the FPSI, we analyzed the presence of significant group differences between the scores obtained by forensic professionals who benefit from psychological/psychiatric/psychopharmacological treatment ($n = 276$) and forensic professionals who do not ($n = 414$). As shown in Table 4, statistically significant group differences (treatment group $>$ no-treatment group) were found in the global factor ($t(688) = 7.77$, $p < 0.001$), as well as in VS ($t(688) = 7.94$, $p < 0.001$), CS ($t(688) = 8.57$, $p < 0.001$), OW ($t(688) = 6.95$, $p < 0.001$), and SSA ($t(688) = 8.74$, $p < 0.001$). The effect sizes were medium to large (Cohen's $d > 0.50$).

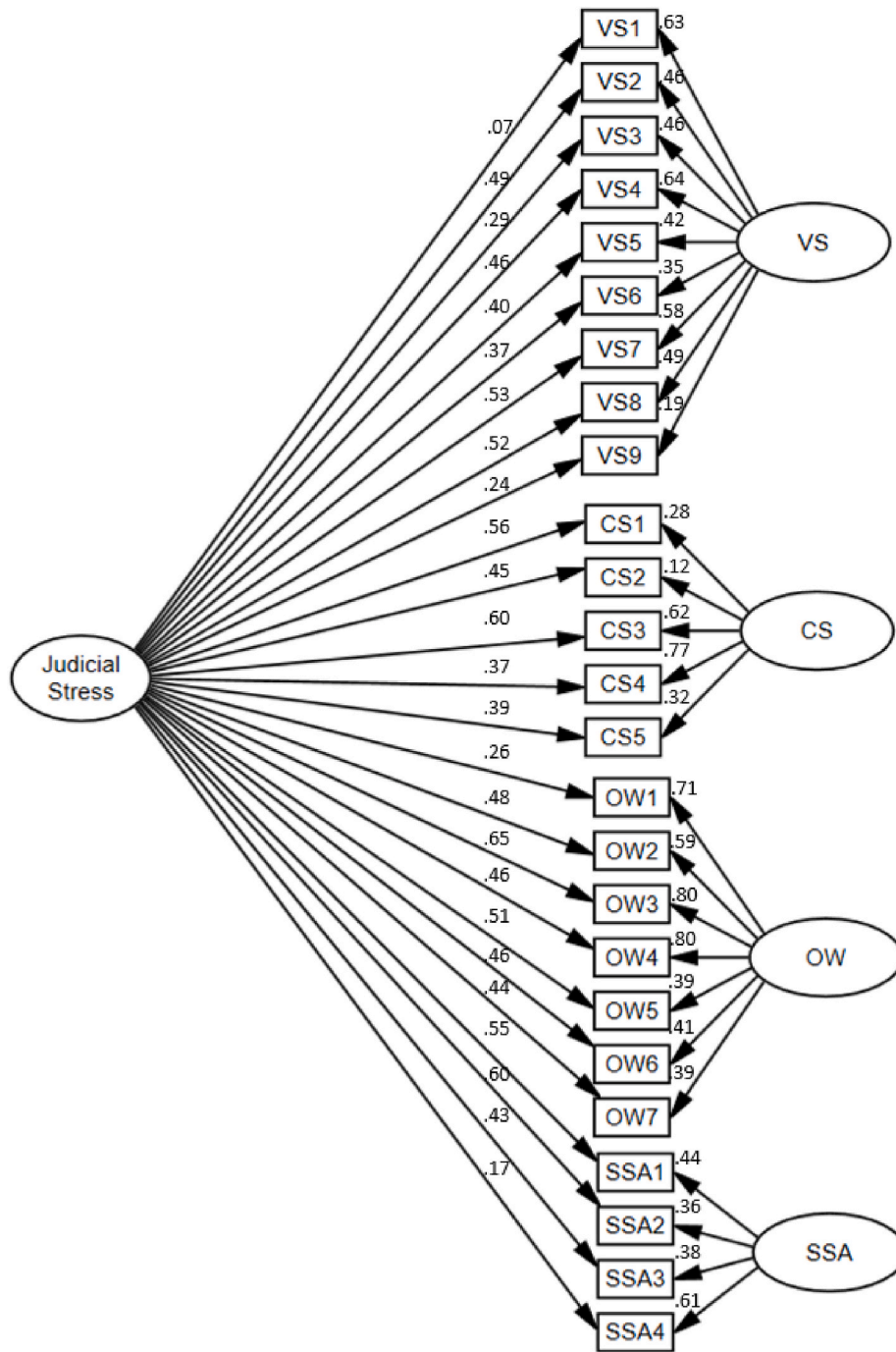
5.5. Standardization of the FPSI raw scores

To better help clinicians to interpret and quantify the stress observed in forensic professionals, we standardized the global score and the four-factor scores of the FPSI. Table 5 shows the raw scores, the respective percentile ranks, and the classification of the level of occupational stress.

6. Discussion

This study aimed to develop and validate a new self-report that measures symptoms of psychological strain and stress in professionals working for the justice system.

Although stress and occupational stress have been the focus of numerous studies throughout the last 30 years, the stress in forensic professions has not been as heavily scrutinized, and in Europe, there is still a lack of understanding about which factors lead to stress and, eventually, burnout in professionals such as lawyers, judges, and attorneys. In truth, occupational stress can be developed as a consequence of factors such as perceived overwork, extensive schedules, and lack of



Note. VS = Vulnerability to professional stress; CS = Coping strategies; OW = Overwork; SSA = Social support/autonomy

Fig. 1. CFA - standardized solution of the bifactor model.

Note. VS = Vulnerability to professional stress; CS = Coping strategies; OW = Overwork; SSA = Social support/autonomy.

social support, all of which forensic professionals must manage during their occupation, and which we assess with our scale.

A preliminary analysis through an EFA and ESEM showed that 16 items have low communalities and were dropped out from the final version of the FPSI. The findings from EFA and ESEM suggested the presence of a general factor (some cross-loadings), thus we examined three competing factor models. The bifactor model (25 items, four first-order factors, and one general factor) was the most interpretable and parsimonious factor solution. The 25 items of the FPSI showed adequate

factor loadings with their first-order factor and/or with the general factor.

Contrary to other occupational stress or burnout scales (e.g., Schaufeli's Maslach Burnout Inventory or Demerouti and Bakker's Oldenburg Burnout Inventory), the factor structure of FPSI is not solely focused on the assessment of symptoms but is also searching for the main stressors of a profession and the coping strategies used by workers. Consequently, although items measuring emotional exhaustion and cynicism can be found (e.g., item 22 "I feel that no matter how much I

Table 2
Pearson's correlation – 4 factors and 1 general factor.

Measure	VS	CS	OW	SSA
GF	0.834**	0.677**	0.767**	0.650**
VS	–	0.396**	0.522**	0.346**
CS	–	–	0.295**	0.522**
OW	–	–	–	0.310**
SSA	–	–	–	–

Note. GF = General Factor (Judicial Stress); OW = Overwork; CS = Coping strategies; VS = Vulnerability to professional stress; SSA = Social support/autonomy.

p* < 0.05, *p* < 0.01.

work, justice is not made in courts”), we will also find items representing autonomy, social support, and coping strategies (e.g., item 11 “When I need to make a decision, I feel that I can ponder and discuss it with a colleague”; item 19 “I need to resort to alcohol to help me deal with my job’s demands”). On the other hand, it shares some similarities to the Occupational Stress Indicator questionnaire (OSI),⁴⁶ in that the latter also includes scales measuring sources of pressure and coping strategies. The existing tools assessing occupational stress in forensic professionals (e.g., Lipp and Tanganelli’s Inventory of Stressful Sources in the Professional Activity of the Labor Judge), lack a defined factorial structure that would allow for a comparison between our scale and theirs.

We found adequate internal consistency (e.g., general factor with a $\alpha = 0.90$). The reliability found for the FPSI was higher than the one obtained in the validity studies of the Maslach Burnout Inventory ($\alpha = 0.69$ to 0.87)⁴⁷ and the Oldenburg Burnout Inventory ($\alpha = 0.85$).³⁴ The absence of a validated and statistically strong measure for forensic stress in literature prevents us from comparing the internal consistency of the FPSI with other similar scales.

FPSI also showed evidence of convergent and divergent validity. Consistent with predictions, the FPSI was significantly correlated with burnout (OLBI), stress, and anxiety (PAI). Inversely, FPSI was weakly correlated with non-related constructs, such as dominance and grandiosity (PAI). These findings are similar to the ones found in a study analyzing the divergent and convergent validity of OLBI,³⁴ where it was related to the Ermüdung-Monotonie-Sättigung-Streß (BMS) questionnaire, an instrument measuring short-term effects of strain at work. In this study, the OLBI showed correlation values ranging from 0.46 to 0.60. Similar results were also found in a study with the Job Stress Questionnaire (JSQ),^{48,49} where convergent values ranged from 0.72 to 0.87. No studies were found analyzing convergent and divergent validity of forensic stress measures in literature.

Statistically significant differences were found between forensic professionals who have psychological/psychiatric/psychopharmacological treatment and those that do not have any treatment. These findings suggest that FPSI discriminates efficiently both groups.

The FPSI showed adequate psychometric properties, suggesting that it may be a useful scale to measure the stress and psychological strain in forensic professionals. Notwithstanding, the relevance of the present study had some limitations that should be addressed in future studies. First, the test-retest reliability and the analysis of the skewed/kurtotic items need to be further investigated. Second, the administration of a

Table 3
Pearson's correlation – convergent and divergent validity.

Measure	OLBI	DIS	EXH	ANX	STR	DOM	MAN-G
FPSI	0.801**	0.673**	0.812**	0.716**	0.571**	–0.114**	–0.150**
OW	0.531**	0.371**	0.611**	0.388**	0.242**	–0.019*	–0.083*
CS	0.571**	0.580**	0.483**	0.602**	0.667**	–0.006*	–0.062*
VS	0.672**	0.531**	0.713**	0.610**	0.379**	–0.179**	–0.122**
SSA	0.614**	0.588**	0.553*	0.571**	0.561**	–0.104**	–0.197**

Note. OW = Overwork; CS = Coping strategies; VS = Vulnerability to professional stress; SSA = Social support/autonomy; OLBI = Oldenburg Burnout Inventory; DIS = Disengagement; EXH = Exhaustion; ANX = Anxiety; STR = Stress; DOM = Dominance; MANG-G = Grandiosity.

p* < 0.05, *p* < 0.01.

social desirability scale in addition to the FPSI is fundamental to guarantee the validity of the responses given, especially regarding more sensitive topics (e.g., narcotics and alcohol use). Third, a measurement invariance (i.e., multiple-group analysis) would be helpful to evaluate whether the factor structure of the FPSI would be equivalent across forensic professionals (judges, lawyers, and attorneys). Lastly, it would be interesting to analyze how the factor structure of the FPSI operates in

Table 4
T-test for psychological/psychiatric/psychopharmacological treatment groups.

	Treatment	M	SD	t (688)	Cohen's d
GF	Yes _a	85.46	13.55	7.77***	0.87
	No _b	74.29	11.91		
VS	Yes _a	34.96	5.62	7.94***	0.64
	No _b	31.34	6.25		
CS	Yes _a	10.55	4.60	8.57***	0.71
	No _b	7.99	2.25		
OW	Yes _a	28.18	4.75	6.95***	0.53
	No _b	25.49	5.33		
SSA	Yes _a	11.77	3.91	8.74***	0.71
	No _b	9.47	2.43		

Note. GF = General Factor (Judicial Stress); OW = Overwork; CS = Coping strategies; VS = Vulnerability to professional stress; SSA = Social support/autonomy; a: n = 276; b: n = 414.

****p* < 0.001.

Table 5
Percentiles and descriptive statistics for FPSI raw scores.

Percentiles	Raw scores					Level of occupational stress
	GF	VS	CS	OW	SSA	
1	50	17	5	13	5	Very low
5	58	23	5	17	6	Low
10	61	24	6	19	7	Low
15	64	26	6	20	7	Low
20	67	27	6	22	8	Moderate
25	68	28	7	23	8	Moderate
30	71	30	7	24	8	Moderate
35	73	30	7	25	9	Moderate
40	75	31	7	26	9	Moderate
45	77	32	8	27	9	Moderate
50	78	33	8	27	10	Moderate
55	80	34	9	28	10	Moderate
60	81	35	9	28	11	Moderate
65	83	36	10	29	11	Moderate
70	85	36	10	30	12	Moderate
75	87	37	11	30	12	Moderate
80	90	38	11	31	13	Moderate
85	92	39	12	32	14	High
90	96	40	12	33	15	High
95	102	42	17	35	17	High
99	121	45	25	35	20	Very high
M	78.52	32.53	9.02	26.57	10.39	
SD	13.80	6.18	3.62	5.27	3.31	

Note. GF = General Factor (Judicial Stress); OW = Overwork; CS = Coping strategies; VS = Vulnerability to professional stress; SSA = Social support/autonomy.

other cultures and with other forensic professionals (e.g., solicitors, officers of justice, and professionals working under the National Institutes of Legal Medicine and Forensic Sciences).

In conclusion, the FPSI is an adequate measure of psychological strain and stress in forensic professionals. The assessment of the factors responsible for forensic stress and the development of further studies using this scale may be particularly useful to understand the mental health state of these professionals, their main stressors, and the most common coping strategies utilized by them to manage psychological distress. Furthermore, the assessment, regulation, and monitoring of mental health in forensic workers using FPSI may assist them in avoiding the development of bleaker and more grievous psychopathological disorders.

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Declaration of competing interest

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jflm.2024.102677>.

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