Adaptation and validation of the Spanish version of the Perceived Occupational Stress Scale: Evidence from Factor Structure, validity, and nomological network

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Abstract

Work is a double-edged sword. It fosters well-being but it is also linked to stress and burnout. Recognizing that stress is ubiquitous and best understood encompassing both the objective and subjective perspective, this study focuses on evaluating the psychometric properties of the Spanish adaptation of the Perceived Occupational Stress Scale (POSS). In Study 1, we translated and back-translated the POSS and administered it to 675 Spanish individuals. The Spanish POSS showed strong internal reliability ($\alpha = 0.903$) and a good fit with the proposed factor structure (CFI = 0.946, RMSEA = 0.206, SRMR = 0.031). Study 2 explores the impact of faking on participants' responses using an experimental design. Our findings underscore the significance of work-related factors, such as mistreatment and lack of appreciation, in predicting faking behavior. In Study 3, we delved into the nomological network of the POSS by examining correlations with related psychological variables. Notably, we only found positive correlations between perceived occupational stress and measures of work engagement and psychosocial factors.

Overall, the Spanish POSS demonstrates strong validity and reliability, closely mirroring the original scale. As an EU-compliant tool, it effectively assesses perceived occupational stress, enhancing organizational support evaluations and deepening our understanding of occupational well-being.

Introduction

Work is a double-edged sword, it can have both positive and negative effects on people's health. While employment can indeed nurture individual well-being through purpose and financial stability, it is imperative not to overlook well-documented risks such as work-induced stress and burnout, as emphasized by prominent global institutions.The World Health Organization (WHO) and the International Labor Organization (ILO) collaboratively published a report addressing the negative impact of job stress on health and well-being. The report urges governments and employers to implement specific interventions to prevent, protect, and support mental health in the workplace, with a focus on building programs to detect and eliminate occupational stress (World Health Organization, 2022).

According to the World Health Organization (2004), *Mental Health* is a state of well-being in which people are aware of their own abilities, can cope with the normal stresses of life, are productive, and contribute to their communities. Mental health, therefore, implies not only the absence of a disorder but also a certain level of psychological well-being (Seow et al., 2016). When managing and enhancing mental health, it is critical to include both components, even when individuals have not received a formal diagnosis of a mental health disorder (Leka and Jain, 2017). Workplace stress, in particular, is considered a key state of sub-optimal mental health that is a precursor to more serious mental health problems (OECD, 2012).

Among the mental health problems prevalent in the workplace, common mental disorders (CMD) such as depression, anxiety, and burnout are of significant concern (Steel et al., 2014). The ICD-11 classification of burnout as a workplace-related illness indicates that it originated in the workplace, emphasizing the recognition of psychosocial concerns. Several international and national organizations, such as the European Parliament and the Spanish National Institute for Safety and Health at Work, acknowledge it (Guseva Canu et al., 2019).

Identifying and addressing the harmful effects of work-related factors, especially psychosocial risks such as workplace stress, is crucial for business sustainability. The WHO (2022) estimates that 12 billion work days are lost yearly due to depression and anxiety, costing the global economy one trillion dollars annually. Nevertheless, only 35% of countries have national-level initiatives to safeguard and advanced workers' mental health. This is partly because current national policies promoting a healthy workforce lack a shared perspective on mental health in the workplace (Volpe et al., 2015).

The impact of mental health on workplace productivity is substantial. *Presenteeism*, a situation in which personnel are present but their performance is hampered by mental health difficulties, has resulted in decreased productivity. According to the most recent report on Mental Health in the Workplace (Evans-Lacko & Knapp, 2016; Mind Share et al., 2021), 77% of full-time American workers have had an impact on their employment due to mental health concerns. Furthermore, 95% of individuals who needed a break due to stress presented alternate justifications, demonstrating the stigma associated with mental health. Addressing mental health in the workplace is becoming a growing expectation among employees, and businesses are under increasing pressure to embrace comprehensive employee well-being (Mind Share Partners, 2021). Given the significant impact of mental health on productivity, creating a safe and healthy work environment is critical. Many nations, including Spain, have developed legislation to safeguard employee well-being, mandating validated approaches based on scientific evidence to manage psychological hazards. As defined by Leka et al. (2008), these risks include "aspects of work design and organization, and their social and organizational contexts, that can cause psychological or physical harm".

While assessing psychosocial elements is critical for occupational risk prevention, it is also critical to comprehend their impact on persons' well-being. Occupational stress is frequently approached from isolated angles, making it difficult to have a holistic understanding of the phenomena (Beauregard et al., 2011; Sørensen et al., 2021). Stress can be conceptualized in three ways: as a response, as a stimulus, and as a transaction (Martín Hernández et al.,

2003; Salanova, 2009). The stress as a response model, proposed by Selye, views stress as a psychophysiological reaction to external dangers, resulting in the General Adaptation Syndrome. This method, however, ignores individual differences, scenario perception, and differential impacts (Martín Hernández et al., 2003). The stress as a stimulus model defines stress as threatening stimuli or situations, particularly psychosocial factors in the workplace. Finally, the transactional model of stress focuses on the cognitive evaluation and emotional responses to stress, emphasizing the importance of psychological processes as mediators (Martín Hernández et al., 2003). The central aspect of this approach is that the stressor can lead to different emotional responses depending on the cognitive evaluation that the person makes of the situation and their available resources, considering "the psychological processes that mediate the effects of stressors on well-being". To estimate the influence of stress on health, it is necessary to examine both individual and organizational characteristics.

While stress is often associated with negative outcomes, it is essential to recognize the positive response known as Eustress, which arises from challenging demands (European Commission et al., 2000). Distinguishing between positive and negative stress and understanding their effects on health is central to preventing workplace stress and promoting well-being. Psychosocial risks, as opposed to psychosocial factors, are occurrences or states that have a high likelihood of negatively impacting workers' health (Moreno Jiménez & Báez León, 2010). Assessing the felt level of stress in people who have been exposed to these circumstances supplements the examination of psychosocial factors and aids in the identification of stressors (Peiró Silla, 2001). This involves the use of brief scales to quantify stress perception in workplace contexts, hence improving psychosocial risk assessment.

Psychosocial factors (stressors) alone do not provide a comprehensive understading of occupational stress (Beauregard et al., 2011). Individuals' cognitive appraisals of situations and their available resources are critical in influencing their emotional responses to

pressures (Martín Hernández et al., 2003). Workplace stress cannot be assessed only on the basis of its causes; it must be evaluated directly using appropriate indicators (Moreno Jiménez & Báez León, 2010). Individuals' perception of stressful circumstances is a significant factor in their stress experience, leading to a variety of consequences and results (Peiró Silla, 2001). A comprehensive assessment requires methods to measure individuals' perceived stress levels must be used in addition to the evaluation of psychosocial aspects. This comprehensive diagnosis aids in the identification of stressors and thus planning of preventive measures to improve and protect employees' health (Marcatto et al., 2022; Ministerio de Trabajo y Economía Social, 2021). A comprehensive understanding of stress requires investigating both the cognitive and emotional dimensions, as well as individual and organizational characteristics (Martín Hernández et al., 2003). By incorporating these measures, we can successfully address the effects of workplace stress on employees' health and well-being.

To summarize, understanding the negative impacts of work-related stress, including psychosocial risks is critical for promoting workplace mental health. To create a favorable atmosphere, governments and employers must take proactive measures. We may design comprehensive techniques to effectively treat workplace stress by acknowledging the impact of both psychosocial factors and individual views. This approach benefits both individuals and organizations by increasing productivity and general well-being.

Perception of occupational stress, related variables, and faking

The evaluation of perceived occupational stress should not be conducted in a theoretical void. Growing knowledge in the research literature provides more and more evidence that all psychological phenomena occur in a network of relationships (Sijtsma, 2006). Thus, the evaluation of the perception of occupational stress should be paired with the assessment of stable psychological characteristics and the physiological functioning of the organism.

Furthermore, it is important to consider the individual's coping mechanisms and support systems to fully understand the impact of occupational stress on their overall well-being (Gaudioso et al., 2017; Koeske et al., 1993).

Mood and affect are vital in shaping stress perception and resposne. Luong et al. (2016) argue that distress is part of what they call negative affect as a category that groups together a whole range of negative moods, emotions, and subjective experiences such as anxiety, depression, sadness, worry, guilt, shame, anger, and envy. These negative moods contributed to occupational stress in a South African sample (Botha & Pienaar, 2006).

On a more psychometric note, Keogh and Reidy (2000) found that negative affectivity may be a higher-order variable associated with different forms of negative emotions and distress, which would partially explain the expression of specific problems such as anxiety and depression. Barlow (2002) explains how negative affectivity may be a mediating factor that interacts with other psychological or environmental factors, such as stress, which then constitute a health risk factor.

Besides considering mood or affect in stress perception, stable psychological elements like personality must be considered. In this sense, Bolger and Zuckerman (1995) proposed four possibilities that explain the effect of personality on either exposure and reactivity to stressful events. The first possibility suggests that personality has no impact on either exposure or reactivity to stressors. The second possibility, called The Differential Exposure Model, suggests that personality affects exposure but not reactivity to stressors, which helps to explain the effects of personality on health and other psychological responses. The third possibility, The Differential Reactivity Model, suggests that personality differences affect reactivity to stressors, and personality moderates the effects of stressful events on health and well-being. The final possibility, The Differential Exposure-Reactivity Model, suggests

that personality acts as a mediating variable in the exposure stages and plays a moderating role in the reactivity stages of stress.

More recently, the Big Five personality model has shown evidence of how specific facets relate to situational stress. For instance, Bartley and Roesch (2011) examined how specific coping strategies mediate the relationship between conscientiousness and positive affect in a multiethnic sample of 366 participants. The results show that individuals with higher conscientiousness used more problem-focused coping, leading to greater positive affect (i. e., less distress). In the same vein, Garbarino et al. (2014) concluded that personality factors can reduce or exacerbate the strain caused by environmental stressors. The study found that neuroticism was strongly associated with job strain and effort/reward imbalance and was associated with most of the stress variables, whereas high agreeableness was associated with low effort/reward imbalance.

Fornés-Vives et al. (2019) demonstrated that neuroticism and emotional coping style predict professional burnout among nurses during their transition period from training to their first three years of professional practice. Similarly, Kong et al. (2020) found that occupational stress and job satisfaction partly mediated the relationship between neuroticism and quality of life among Chinese civil servants. Additionally, Parent-Lamarche et al. (2021) assessed the role of personality as a moderating variable between organizational conditions and psychological distress. Their study revealed that higher levels of psychological distress were associated with psychological demands, job insecurity, number of hours worked, neuroticism, and high agreeableness.

On a related note, faking constitutes a pervasive influence on responding in psychological measurement and, to a certain extent, on measures of perceived occupational stress. Although not directly associated with our variable of interest, the Honesty-Humility dimension of the HEXACO personality model (Lee & Ashton, 2004) seems to be related to some work

variables such as performance and Employee Engagement (Johnson et al., 2011). However, in a hierarchical linear regression analysis, the relationship between engagement and H-H only appears after controlling for self-regulation (Chernauskas-Beecher, 2018).

There is no clear direct relationship between H-H and the perception of stress, however, there is evidence of the mediating role that low scores in H-H play in the relationship between counterproductive work behavior and a situational stressor, such as organizational politics (Zettler & Hilbig, 2010), implying that the lowest a score in trait H-H is, the more likely one is to display counterproductive work behavior in front of a stressful situation.

More established methods of assessing the impact of faking on work-related outcomes is to include the use of measures of social desirability (Ones et al., 1996) and to compare data from actual personnel selection contexts and from research settings (within-subjects design) (Griffith et al., 2007). A study combining both approaches found that faking has a negative effect on the relationship between personality traits and counterproductive work behavior and was related to other self-reported counterproductive work behaviors, indicating that the act of faking on the personnel selection process is related to future counterproductive work behaviors (Peterson et al., 2011).

In health research, the reliability of self-reported scales is paramount, however, the potential for faking responses remains underexplored. Seminal studies, such as Davis' (1978) examination of the Beck Depression Inventory, highlighted the effects of both faking good and bad. This vulnerability was further emphasized by Furnham & Henderson (1983), who noted biases in self-reported data for both general and mental health. While strategies to mitigate this "fakeability" have been proposed, notably by George & Skinner (1990), there's a pressing need for more experimental evidence to validate these approaches and ensure the integrity of self-reported health data.

This study aims to validate a measure of perceived occupational stress (POSS) on a Spanish population and explore the interactions between theoretically related variables mentioned in this introduction. In addition, it determines the best variable predictors of honest and fake answering.

As we explore workplace stress and its impact on employees' well-being, a comprehensive approach to assessing and mitigating stressors is needed. One tool available in Italian and English is the Perceived Occupational Stress Scale (Marcatto et al., 2022), The POSS overcomes many limitations existing in the assessment of stress, namely, the fact that many current golden standards in the measurement of work stress do not consider the subjectivity of experiencing stress and also do not distinguish between stress at work and stress from other sources, such as the case of the Perceived Stress Scale (PSS; Cohen et al., 1983).

A comprehensive assessment of occupational stress necessitates measuring both psychosocial risk factors and a measure of the perception of occupational stress (Marcatto et al., 2022). This is in theoretical alignment with the transactional model of stress, which posits that the effects of any stressor are relevant only when people appraise them as threatening, feel overwhelmed with the situation and with not enough resources to face them (Goh et al., 2010; Lazarus & Folkman, 1984).

Given that most of the stress scales used are focused on evaluating psychosocial risk factors (Karasek et al., 1998) and that the few scales that do measure occupational stress are normally single-item questionnaires and measure its specific antecedents (Siegrist et al., 2004), Marcatto et al., (2022) developed the multi-item Perceived Occupational Stress Scale to provide an easy, short, and useful measure of perceived occupational stress along with the psychosocial risk factors assessments.

Therefore, the addition of the POSS to the toolkit of occupational health professionals will fill a gap in the current status quo. A correct evaluation of stress has to be informed by both objective and subjective indicators of it. However, the existing measures focus more on the former, and thus are incomplete. By using the POSS, along with other instruments, the assessment of stress will be more comprehensive and valid.

Overview of the paper

The present study examines the psychometric properties of the Spanish version of the Perceived Occupational Stress Scale (POSS). Three main research questions are addressed in this study:

1. Validity of the Spanish version of the POSS: The first research question investigates the validity of the Spanish version of the POSS in terms of its internal structure. Confirmatory factor analysis will be conducted to assess the fit of the data to the proposed factor structure. The results of this analysis will provide information on the reliability and validity of the Spanish version of the POSS. In addition, continuous norming regression will be applied to derive norms in order to improve the accuracy and precision of the norm scores.
2. Effects of faking on POSS scores: The second research question focuses on the effects of faking on POSS scores. A logistic regression analysis will be conducted to examine whether it is possible to predict the likelihood of an individual being a faker based on demographics, personality, work-related variables, and occupational health variables. This analysis will provide information about the robustness of the POSS to faking and the potential utility of demographic and personality variables in detecting faking.
3. Nomological network of the POSS: The third research question focuses on the nomological network of the POSS. A correlational analysis will be conducted to

examine the relationship between the scores on the POSS and a range of outcomes, including personality, honesty-humility, psychological capital, occupational health, and work-related variables. The results of this analysis will provide information about the external validity of the Spanish version of the POSS and its place within the nomological network of organizational support.

In summary, this study provides a comprehensive examination of the psychometric properties of the Spanish version of the POSS. The results of this study will contribute to our understanding of the validity and reliability of the Spanish version of the POSS and its potential utility in the assessment of organizational support.

Study 1: Adaptation and validation of the Spanish version of the Perceived Occupational Stress Scale

Study 1 psychometrically validates the Perceived Occupational Stress Scale in a Spanish population.

Method

Participants and Procedure. The sample includes different categories of workers from different regions of Spain. Sample 1 was a convenience sample of 602 workers (60.8% female, 38.7% male, 0.5% others, aged 18–65 years) from different sectors. The sample was obtained by distributing the Qualtrics survey link in the social media channels of the authors and in massive communication groups from the institutions involved, such as the Asociación Española de Especialistas en Medicina del Trabajo (AEEMT). The main demographic descriptive statistics of the sample are presented in Table 1.

Measures. The data presented in this study were collected as part of a larger research project and consisted of self-reported questionnaire responses from participants, which included the assessment of the Perceived Occupational Stress Scale (POSS) and

demographic information. The rest of the measures employed will be presented in the following studies.

The Perceived Occupational Stress Scale contains only four items: “my work is stressful”, “thinking about my work makes me feel tense”, “at work I feel under pressure”, and “my work has negative effects on my health”, scored following a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The items collect information about the last 6 months. These scores are then averaged to compute the final score.

Data Analysis. To answer the research question, several analyses were applied using RStudio (RStudio Team, 2021). Confirmatory factor analysis to determine the factor structure, and regression-based norming for age and sex. Confirmatory factor analysis (CFA) was conducted to assess the validity of the POSS measurement model. CFA is a statistical method used to examine the fit between the observed data and a hypothesized underlying factor structure. In this study, the maximum likelihood (ML) method was used to estimate the parameters of the CFA model. The fit of the CFA model was evaluated using several fit indices, including the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), root mean square error of approximation (RMSEA), and comparative fit index (CFI). The commonly accepted cutoffs for these fit indices were used to determine the overall goodness-of-fit of the model, with values greater than 0.90 for the GFI, AGFI, and CFI, and values less than 0.08 for the RMSEA indicating a good fit (Chen, 2007; Hu & Bentler, 1999; Jöreskog & Sörbom, 1984).

Regression-based norms (Lenhard et al., 2018; Oosterhuis et al., 2016) were computed in this study to establish a reference point for interpreting POSS scores. The regression-based norm approach uses regression analysis to model the relationship between the scores on the POSS and a predictor variable. In this study, two regression models were estimated using demographics (sex & age) as predictor variables and the POSS as the criterion variable. The regression coefficients obtained from the analysis were then used to compute

the regression-based norms, which provide a benchmark for interpreting the scores on the POSS in terms of demographics. This approach allows for creating context-specific norms because the regression-based norms are derived from the specific sample and criterion variable used in the analysis. This approach provides a more meaningful interpretation of the scores on the POSS than using generic norms, which may not be representative of the specific population or context under investigation. Here, we used the semi-parametric approach to continuous norming (SPCN, Lenhard et al., 2018) given that it has been shown to be the most accurate approach in combinations of small item numbers and is particularly useful when working with skewed data that have ceiling or floor effects (Gary & Lenhard, 2021). To favor the interpretability of the results, we set the width parameter (the width of each age interval that determines the observed norm scores of location) to 1 (i.e. the age intervals are 1-year-wide).

CFA and regression-based norm computation were performed using the *lavaan* (Rosseel, 2012) and *cNORM* (Lenhard et al., 2022) packages in R, respectively.

Results

The mean score for the POSS was 12.52 with a standard deviation of 4.16. The median score was 13, suggesting a relatively symmetrical distribution, with a longer tail to the left due to a small skewness of -0.22. In addition, the distribution is slightly flatter than a normal distribution with a kurtosis of -0.73. These statistics suggest that our participants experienced, on average, moderate levels of stress.

Beyond descriptive statistics, confirmatory factor analysis was conducted to assess the underlying structure of the four POSS items. Preliminarily, we checked the data for sampling adequacy: the Kaiser–Meyer–Olkin (KMO) value was .78, that is, higher than the conventional value of .70, which indicates that the sampling was adequate (Hair et al., 2006). In addition, Bartlett's test of sphericity ($w2\ (6) = 699.07$, $p < .001$) indicated that the

inter-item correlations were sufficiently large; therefore, it was deemed appropriate to conduct factor analysis. The eigenvalues suggested a general factor that accounted for 65% of the total variance. Parallel analysis (Turner, 1998) supported a single-factor solution since only the first observed eigenvalue was greater than those generated by parallel analysis. Table 3 reports item-factor loadings, item-total, and inter-item correlations. The model fit indices of this solution were as follows: CFI = .95, SRMR = .03, and RMSEA = .23 (LO90= .19, HI90 = .28). Cronbach's α coefficient of the POSS was .82, and McDonald's ω coefficient was .89.

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INSERT TABLE 3 AROUND HERE

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The effects of age and sex on test scores were investigated and a significant correlation was found. Statistical analysis showed that the POSS score was negatively correlated with age; r = -.154, p <.001. Sex was neither significantly correlated with POSS scores (r = .058, p = .15) nor produced sex differences as testes with a t-test (t=1.435, df=508.8, p = .15). Therefore, we examined the POSS score norms only with age as a continuous variable via multiple regression. Five predictors were deemed necessary to model the norm sample data almost perfectly with an adjusted R^2 = .87, with the resulting regression equation being:

$POSS = 8.64 - 0.66*L + 0.02*L^2 - 1x10^{-4}*L^3 - 7.09x10^{-7}*L*A^3 + 6.64x10-^{7}*L^2A^2$

where A is Age and L is the observed location (e.g. observed T score within an age interval). Figure 1 shows the predicted progression of POSS scores with age. The figure illustrates a smooth progression of the predicted percentiles throughout the entire age range, aligning well with the original dataset. Any minor variances among individual age interval groups are effectively smoothed out. Crucially, it is necessary to prevent the intersection of percentile lines, as this would signify the assignment of diverse latent person variable values to a single raw score. Table SM1 shows the corresponding normed score and percentile for each age group and raw score from 18 to 70 years.

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INSERT FIGURE 1 AROUND HERE

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Discussion

The purpose of this study was to examine the factor structure and establish norms for the POSS in a sample of Spanish workers from different economic sectors and regions. We conducted a confirmatory factor analysis to test the unidimensionality of the POSS, as reported by Marcatto et al. (2022). The model fit indices of this solution indicated good performance. The internal consistency of the POSS was high, as indicated by both Cronbach's and McDonald's coefficients. These results support the validity and reliability of the Spanish version of the POSS. However, some differences were observed between our sample and the original Italian study, especially in terms of the RMSEA value and the mean scores of the POSS. These discrepancies could be attributed to variations in sample size and characteristics. Further data collection and analysis are needed to confirm these assumptions and to explore the generalizability of the POSS across different populations.

Study 2: Effects of Faking on the validity of the Spanish Version of the Perceived Occupational Stress Scale

Study 2 examines how faking influences POSS scores and the variables involved in such behavior.

Participants and Procedure

A group of students (n = 155, 78.1% female, 20.6% male, and 1.3% other) from the University of Barcelona were asked to complete the POSS. The second study employed an experimental design with a convenience sample to examine the impact of faking on POSS scores. The sample's age range was between 18 and 52 years, with a mean age of 21.83 years and a standard deviation of 6.28. The participants were randomly assigned to two conditions: non-fakers (n = 86) and fakers (n = 69). The latter group was instructed to simulate a profile of someone who would take leave at work, whereas the other group was

instructed to be as honest as possible. This experimental design allowed for a direct comparison of the POSS scores for individuals who were instructed to fake and those who were instructed to be honest. Table 2 shows more details on the participants' data, such as their job category, education level, and size of their companies. Importantly, job categories only show the most frequent categories and include the rest under the “Other” label.

Measures

In the second study, a comprehensive battery of measures was used to examine the impact of faking on the POSS scores. In addition to the POSS, a brief sociodemographic questionnaire, and several psychological measures were administered. These were: the Brief Symptom Inventory 18 (BSI-18), which was designed to measure three psychological symptomatology: anxiety, depression, and somatization (Calderon et al., 2020; Derogatis & Melisaratos, 1983); the Work Ability Score (WAS) —not to be confused with the Work Ability Index (WAI)— designed to self-assess the workers’ current ability as compared to their lifetime best (El Fassi et al., 2013); the Utrecht Work Engagement Scale (UWES) designed to measure work engagement with three subscales: vigor, dedication, and absorption (Schaufeli et al., 2002), the Big Five Inventory 2, Spanish adaptation, extra short version (BFI-2 XS) designed to measure the Big Five trait domains: Extraversion, Agreeableness, Conscientiousness, Negative Emotionality, and Open-Mindedness (Gallardo-Pujol et al., 2022), the PRIMA-EF, which is the current european framework for the measurement of psychosocial hazards in areas such as job content, workload and work pace, degree of control in work activities, environment, organisational culture, interpersonal relationships at work, role played in the organisation, possibilities for career development, and home-work balance (Leka et al., 2008); the SF 12, a reduced version of the SF 36, aimed at measuring quality of life related to health (Vilagut et al., 2008); and, finally, the HEXACO, used only for the items that measure the trait Honesty/Humility (Ashton & Lee, 2009).

Data Analysis

In the second study, a logistic regression analysis was conducted to predict group membership (fakers versus non-fakers) as a function of demographics as well as scores on the other administered measures: Perceived Occupational Stress Scale, (POSS), Brief Symptom Inventory 18 (BSI-18), Work Ability Score (WAS), Utrecht Work Engagement Scale (UWES), Big Five Inventory 2, Spanish adaptation, extra short version (BFI-2 XS), PRIMA-EF, Health Survey SF 12, and HEXACO (honesty-humility scale only). The sample was partitioned into a training and a test dataset, and the logistic regression model was trained on the training data and evaluated on the test data using a 10-fold cross validation procedure. The performance of the model was assessed using sensitivity, specificity, the Receiver Operating Characteristic (ROC), and Area Under curve (AUC). The AUC is presented to visualise the trade-off between sensitivity and specificity and to evaluate the overall performance of the model. Furthermore, backward stepwise variable selection and LASSO were performed on the full model to determine the best predictors to keep in the final model. The results of this analysis provide important insights into the ability of demographic and psychological variables to predict faking behaviour and inform the development of methods for detecting faking in organisational research and practice.

Results

The mean score for the POSS was 14.87 with a standard deviation of 4. The distribution of scores showed a slight negative skewness (-0.63); which was higher than the previous study. Specifically, participants in the “Faker" experimental condition obtained a mean of 17.24, whereas those from the “Honest” condition obtained a mean of 12.96. The difference between the two was significant, as indicated by a Cohen’s D effect size of 1.25 (See Figure 2).

This study examined the factors that influence honesty in individuals using a Generalized Linear Model (GLM) under a binomial umbrella. A logistic regression with 27 predictors was applied, including variables such as age, company size, and all the psychological measures

scores mentioned in the Measures section. The lack of a clear structure in the 10 items of the PRIMA EF led us to treat them as individual variables. As per the rest, particularly in the case of personality, they were employed as factors or domains.

Of all the 27 predictors, the ones that obtained a significant coefficient were the fifth, eighth, and tenth questions of the PRIMA EF, as well as the Physical and Mental dimensions of the SF 12 and the UWES. A residual deviance of 52.476, an AIC of 116.476, and a Nagelkerke R squared of 0.86 demonstrate the model's good fit (See Table 4 and Figure 3). Hence, the function that we fitted in this study is

$$Faking = \frac{1}{1 + e^{-22.214 - 1.562 * PEF5 + 0.965 * PEF8 + 1.751 * PEF10 + 0.241 * PhysSF12 + 0.197 * MentSF12 - 0.10 * UWES}}$$

where PEF stands for PRIMA-EF, PhysSF12 for Physical SF-12, and MentSF12 for Mental Sf-12.

(INSERT TABLE 4 HERE).

The model achieved an accuracy of 0.66, and a kappa of 0.34, indicating a fair agreement between the predictions and actual data. The sensitivity was 0.56 and the specificity was 0.78, indicating a better performance of the model at detecting honest participants than fakers. The AUC was 0.975 (See Table 10).

Next, we performed a stepwise backward elimination procedure to identify the most parsimonious regression model. This technique included the following as significant variables for the model: the fourth, fifth, and tenth questions of the PRIMA EF, the Physical and Mental dimensions of the SF 12, the UWES, and the WAS. The model shows a residual deviance of 62.58, an AIC of 96.58, and a Nagelkerke R squared of 0.83, showing

improvement in the AIC compared with the previous model, and a slight drop in the other indices (See Table 5 and Figure 4).

(INSERT TABLE 5 HERE).

The 10-fold cross-validation showed an accuracy equal to 0.77 and a kappa of 0.54, which were better indicators than the previous model. The sensitivity was 0.7, and the specificity was 0.86. The AUC was equal to 0.969 (See Table 10).

As a final step, we conducted a LASSO regression analysis to identify the most important predictors of honesty while striking a compromise between model fit and simplicity, which the earlier steps partially failed to achieve. The lambda value that minimized the cross-validated error was employed because it obtained the best accuracy among the three models: full model, minimal lambda, and best lambda.

The final LASSO regression model included only three significant variables, the fourth question of the PRIMA EF, and the Physical and Mental dimensions of the SF 12. This model obtains a residual deviance of 83.28, an AIC of 111.28, and a Nagelkerke R squared of 0.75 (See Table 6 and Figure 5).

(INSERT TABLE 6 HERE).

The model obtained similar scores as the previous model in terms of accuracy (0.77), kappa (0.54), sensitivity (0.7), and specificity (0.86). Only the AUC was slightly smaller (0.941). Tables 7 to 9 show the confusion matrices for each model.

Discussion

This study tested the susceptibility of the POSS to be influenced by faking and the predictors of faking among 155 Spanish workers using three logistic regression models. The POSS scores were negatively skewed, suggesting that some participants faked their responses as instructed. This implies that the POSS may be sensitive to response distortion.

The first logistic model included all 27 predictors and had a good fit; however, it may have been overfitted and most of the variables were irrelevant. The second model used a stepwise procedure to select a parsimonious model, which had a slightly lower fit and performance but better cross-validation accuracy and kappa. This model performed the best among the three. The third model was a LASSO regression model, which had the worst fit and performance, but a similar cross-validation accuracy and kappa to the second model. This model avoided overfitting and multicollinearity, but it may not be the most robust.

The results showed that only three items of the PRIMA EF, the physical and mental dimension of the SF 12, work engagement, and the WAS were significant predictors of faking. These results indicate that perceived occupational stress is influenced by individual and organisational factors, as well as mental health and quality of life. Other variables, such as personality traits and psychological capital, were not significant predictors of faking. Our study is the first to investigate health faking within organizational contexts. Our findings align with earlier research, notably Furnham & Henderson (1983) study, confirming that health data can be manipulated, regardless of the setting. While we have made strides in understanding this issue, there is more work ahead. Strategies to combat faking, like those suggested by George & Skinner (1990), need further exploration. Future studies should focus on refining these strategies to ensure trustworthy self-reported health data.

The study had some limitations, such as a small and unbalanced sample size, faking manipulation that may not reflect realistic scenarios, and some measures that lacked clear structures or reliability. Future research should use diverse samples across different

contexts, more realistic faking scenarios, and more valid and reliable measures of occupational health variables.

Study 3: Nomological network of the Spanish version of the Perceived Occupational Stress Scale

The aim of Study 3 was to explore the convergent and divergent validity of the Spanish version of the Perceived Occupational Stress Scale (POSS) by studying its nomological network.

Participants and Procedure

The sample consisted of 606 workers (60.6% female, 38.9% male, 0.5% others), from different regions of Spain, with ages ranging from 18 to 65 years. Data collection was conducted through social media channels and massive communication groups. The main demographic descriptive statistics of the sample are presented in Table 1.

Measures

To explore the nomological network of the POSS, we used the same measures as in Study 2. Besides the POSS, we administered the BSI-18 (psychological symptomatology), the BFI-2 XS (personality traits), the HEXACO (honesty/humility), the PCQ 12 (psychological capital), the PRIMA-EF (psychosocial hazards), the SF 12 (health-related quality of life), the UWES (work engagement), and the WAS (work-ability score).

Data Analysis

We performed correlations between the POSS and each of the previously mentioned questionnaires to examine their convergent and discriminant validity. In addition, we conducted a multiple regression analysis to test which variables predicted the POSS total score. The dependent variable was the POSS score, and the independent variables were the scores of the BSI 18, each of the five personality traits, the psychological capital, each of the items of the PRIMA EF, the two dimensions of the SF 12, the UWES score, and the

WAS score. We did not include the HEXACO (honesty/humility) score in the regression model, because it did not show significant correlations with the POSS score, and its inclusion would have resulted in a significant reduction in the sample size.

We hypothesized the following:

- Convergent correlations between the BSI 18 total score and the POSS.
- Divergent correlations between personality, as a set of stable dispositions of affect, cognition, and behavior, and the POSS. This also includes honesty/humility. The regression coefficients will not be relevant.
- Negative correlations between the psychological capital score and the POSS scores.
- Convergent correlations between excessive workload and work pace, poor job content, bad interpersonal relationships at work, and mistreatment at work (PRIMA EF items 1 to 4) with the POSS scores. Negative correlations for the rest of the PRIMA EF items and the POSS.
- Negative correlations between the Mental dimensions of the SF 12 with the POSS.
- Negative correlations between the UWES and the POSS scores.
- Negative correlations between the WAS and the POSS scores.

Results

The Perceived Occupational Stress score was positively correlated with somatization ($r = 0.40$, $p < .001$), anxiety ($r = 0.52$, $p < .001$), depression ($r = 0.43$, $p < .001$), and the total score of the BSI 18 ($r = 0.49$, $p < .001$). (Table 11).

The correlation coefficients among the POSS questions and its total with Conscientiousness, and Open Mindedness were negligible in two ways, their effect sizes were really small and their p value was not significant. Agreeableness (-0.10, $p = .01$), Negative Emotionality (0.23, $p < .001$), and Extraversion (0.08, $p = .04$) stand out as evidence for convergent correlations, in the case of Negative Emotionality, and divergent correlations, in the other two traits (see table 12).

There were no significant or high correlations between the Honesty-Humility trait and the POSS. (Table 13)

The correlations between the POSS and the dimensions from the PCQ-12 (Table 14) were all in accordance with our hypothesis. The total score, psychological capital, was negative ($r = -0.47$, $p < .001$) as well as the scores of each of the dimensions of the test: self-efficacy ($r = -0.25$, $p < .001$), hope ($r = -0.4$, $p < .001$), resilience ($r = -0.45$, $p < .001$), and optimism ($r = -0.52$, $p < .001$).

Our findings showed informative relationships between all PRIMA EF items and the POSS (Table 15). In particular, there was a positive correlation between perceived occupational stress and excessive workload and work pace (PRIMA-EF 1, $r = 0.50$, $p < .001$), poor job content (PRIMA-EF 2, $r = 0.28$, $p < .001$), poor work relationships (PRIMA-EF 3, $r = 0.38$, $p < .001$), and abuse at work (PRIMA-EF 4, $r = 0.41$, $p < .001$). In contrast, there were negative correlations between the POSS and employee recognition of their talents (PRIMA-EF 5, $r = -0.28$, $p < .001$), valued viewpoints (PRIMA-EF 6, $r = -0.27$, $p < .001$), the possibility for career development (PRIMA-EF 7, $r = -0.2$, $p < .001$), internal communications (PRIMA-EF 8, $r = -0.18$, $p < .001$), personal life and work balance (PRIMA-EF 9, $r = -0.38$, $p < .001$), and overall job satisfaction (PRIMA-EF 10, $r = -0.54$, $p < .001$). The first group of negative correlations constitutes all the risk factors for a heightened perception of stress at the workplace, whereas the second group of positive correlations constitutes the protective factors against it.

Of the two dimensions of the SF 12, only the Mental dimension obtained a negative correlation with the POSS ($r = -0.47$, $p < .01$) (See Table 16).

The correlation coefficients for the Utrecht Work Engagement Scale (UWES) were all negative, with Dedication having the largest effect size ($r = -0.32$, $p < .001$), followed by Vigor ($r = -0.31$, $p < .001$), Engagement ($r = -0.29$, $p < .001$), and Absorption ($r = -0.19$, $p < .001$) (see Table 17).

Finally, the correlation coefficient between WAS and POSS was negative ($r = -0.33$, $p < .001$), as expected by theory (see Table 18).

The regression analysis yielded informative findings regarding the predictive factors of the POSS. The BSI 18 total score showed no association with the POSS, the same as all the personality traits.

The Psychological Capital (PCQ 12) exhibited a negative association ($\beta = -0.573$, $p = 0.03$), indicating that higher levels of psychological capital were associated with lower levels of perceived stress.

Concerning the PRIMA EF, it was shown that six items of the questionnaire —excessive workload and work pace, poor job content, bad interpersonal relationships, mistreatment at work, appreciation of worker's skills, and within-company communications— have a positive association with the POSS ($\beta = 1.313$, $p < .001$, $\beta = 0.066$, $p = 0.6$, $\beta = 0.302$, $p = 0.06$; $\beta = 0.273$, $p = 0.1$, $\beta = 0.296$, $p = 0.1$, $\beta = 0.295$, $p = 0.04$, respectively), whereas the other four items: valued opinions ($\beta = -0.033$, $p = 0.8$), potential for career development ($\beta = -0.109$, $p = 0.3$), personal and work-life balance ($\beta = -0.185$, $p = 0.2$), and overall satisfaction with work ($\beta = -1.172$, $p < .001$), have negative associations with the POSS.

As per the SF 12, the Mental dimension shows a negative and significant association with the POSS ($\beta = -0.054$, $p = 0.005$), whereas the Physical dimension shows no association whatsoever.

Regarding the UWES, the total score did not exhibit a significant association with the POSS and, similarly, the WAS score did not show any significant association with the POSS.

Overall, the regression analysis confirmed some associations shown by the previous correlations. These results contribute to the understanding of the factors that influence perceived occupational stress (Table 19).

Discussion

This study examined the nomological network through an analysis of its convergent and divergent validity of the Spanish version of the Perceived Occupational Stress Scale (POSS) with 606 workers from Spain. The POSS was correlated with several measures of mental

health, personality, psychological capital, occupational well-being, and psychosocial risks. The results showed that the POSS had positive relationships with mental health outcomes, negative emotionality, and negative aspects of the workplace, and negative relationships with psychological capital, engagement, work ability, and positive aspects of the work environment. The POSS had weak but significant relationships with some personality traits and physical health quality of life. The regression analysis identified psychological capital, three items of the PRIMA EF, and the mental dimension of the SF 12 as significant predictors of the POSS. These findings suggest that perceived occupational stress is influenced by individual and organisational factors, as well as by mental health quality of life. This study was limited by its cross-sectional design and sample characteristics. Future studies should use longitudinal or experimental methods to explore the causal effects of occupational stress on workers' well-being and health, and consider potential moderators and mediators of these effects.

General Discussion

The main objective of this research was to validate the Spanish version of the Perceived Occupational Stress Scale (POSS) and to examine its nomological network and susceptibility to faking. The results of the three studies provided evidence for the reliability and validity of the POSS, as well as some insights into the factors that influence perceived occupational stress and its effects on workers’ well-being and health.

The first study confirmed the one-factor structure of the POSS using confirmatory factor analysis. The POSS showed good internal consistency and reliability, as well as adequate norms based on continuous covariates such as age. These findings support the use of the POSS as a valid and reliable measure of perceived occupational stress in Spanish workers with a similar performance to that of the original Italian study (Marcatto et al., 2022). The POSS is a brief and easy-to-use instrument that can assess the level of stress experienced by workers in different contexts and occupations, as well as monitor changes over time or

interventions aimed at reducing stress. The POSS has several advantages over other measures of occupational stress, such as its simplicity, applicability, and sensitivity. Furthermore, the POSS bridges the gap in the current assessment of stress in Spain by adding a short and reliable measure of perceived stress.

The second study investigated the effects of faking on the POSS scores through a between-subject experimental design. The results showed that participants who were instructed to fake obtained significantly higher scores on the POSS than those who responded honestly. This suggests that the POSS may be sensitive to response distortion and that its scores may not reflect the true level of perceived occupational stress. The study also examined the predictors of faking using three different logistic regression models. The results showed that work-related variables, such as mistreatment at work, lack of appreciation for workers' skills, and overall satisfaction with work, were the most important predictors, followed by work ability, the physical and mental health quality of life, and engagement. Neither the Big Five nor the Honesty - Humility domain were significant predictors of faking. These results indicate that some workers may distort their responses to the POSS in order to appear more stressed than they are or to obtain some benefits or avoid some costs. This calls for more effective strategies to improve our detection of faking in psychological measurement (Geiger et al., 2018; Grieve & de Groot, 2011).

The third study explores the nomological network of the POSS using correlational and regression analyses. The results showed that the POSS had positive relationships with mental health symptoms, negative emotionality, and negative aspects of the workplace, and negative relationships with psychological capital, positive aspects of the work environment, mental health quality of life, engagement and work ability. It also had divergent correlations with some traits of the BFI 2 XS and Honesty - Humility. The regression analysis identified psychological capital, three aspects of the PRIMA EF, and the mental dimensions of the SF 12 as significant predictors of the POSS. These results indicate that perceived occupational

stress is influenced by both individual and organizational factors, as well as by mental health quality of life.

These findings agree with extant literature on the relationships between stress and mental health issues (Charles et al., 2013; Kocalevent et al., 2014); personality traits (Liu et al., 2021; Strizhitskaya et al., 2019); workers' well-being and health (Landells & Albrecht, 2019; Schaufeli & Bakker, 2004); and psychological capital (Jin et al., 2020; Mensah & Amponsah-Tawiah, 2016; Min et al., 2015; Wang & Wang, 2019).

The findings of this study have several theoretical and practical implications. First, they contribute to the literature on occupational stress by validating a brief and easy-to-use measure of perceived occupational stress in Spanish workers. The POSS can be used to assess the level of stress experienced by workers in different contexts and occupations, as well as to monitor changes over time or interventions aimed at reducing stress (Marcatto et al., 2022). The validation of the POSS also provides a basis for cross-cultural comparisons of occupational stress.

Second, they provide information about the variables that affect perceived occupational stress and its consequences for workers' well-being and health. The results suggest that psychological capital, which encompasses self-efficaccy, hope, resilience, and optimism, may act as a buffer against the negative effects of stress and enhance well-being and performance at work, similar to engagement and work ability. Psychological capital is a positive psychological state that can be developed through training or coaching programs (Luthans et al., 2007). Moreover, they indicate that some aspects of the work environment, such as those reflected in the PRIMA EF, play a role in shaping workers' perceptions of stress and their outcomes. These aspects can be modified or improved through organizational interventions or policies (Leka et al., 2008), as is the case in Spain (*BOE-A-1995-24292 Ley 31/1995, de 8 de Noviembre, de Prevención de Riesgos Laborales.*, n.d.).

Third, they highlight the potential impact of faking on the scores of the POSS and its validity. The results show that some workers may distort their responses to the POSS to appear more stressed than they are or to obtain some benefits or avoid some costs. This may undermine the accuracy and usefulness of the POSS as a measure of perceived occupational stress. Therefore, it is important to detect and prevent faking in occupational settings, especially when the POSS is used for high-stakes purposes, such as selection, promotion, or compensation. Some strategies to reduce faking include using warning instructions, verification tests, or social desirability scales (Bing et al., 2011; Law et al., 2016).

These studies also have some limitations. First, the sample size was relatively small and unbalanced between fakers and honest responders in Study 2, which may limit the statistical power and generalizability of the results. Comparatively, a larger sample size was used in study 1 and 3, although their size was not ideal either. Second, the experimental manipulation of faking used in Study 2 may not reflect realistic scenarios of response distortion in applied settings. However, and specifically about the POSS, it should be acknowledged that stress is a highly stigmatized mental health issue and, for that reason, many people who suffer from it do not reveal it to anyone, influencing the responses of the test takers. Third, some of the measures used in this study lacked clear factorial structures or adequate reliability coefficients (i.e., PRIMA EF, BSI 18), which may affect their validity. Fourth, the cross-sectional nature of our study precludes temporal changes and casual inferences of our findings.

Future research should address these limitations by using larger and more diverse samples of workers across different contexts and occupations, incorporating more realistic faking scenarios to induce response distortion, and using more valid and reliable measures of some occupational health variables. Furthermore, future research should explore other

potential predictors and moderators of perceived occupational stress, such as coping strategies, social support, or organisational interventions. Longitudinal or experimental designs are encouraged for future research to determine the casual impacts of occupational stress on workers' well-being and health outcomes. Future research should also examine the cross-cultural validity of the POSS and compare its cores and correlates with other measures of occupational stress.

Conclusion

In conclusion, this study provides evidence for the validity and reliability of the Spanish version of the POSS, as well as some insights into its nomological network and susceptibility to faking. The findings suggest that perceived occupational stress is influenced by both individual and organizational factors, as well as mental health quality of life. The findings also imply that psychological capital may buffer against stress and enhance well-being and performance at work. All in all, this study presents a new psychometrically strong measure for occupational health professionals to use. Our study follows an integrative framework introducing perceptional elements in the assessment of occupational stress, a necessary addition to the assessment of occupational stress in Spain.

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Table 1

Demographics sutdy 1

Variable		*Frequency*	*Proportion*	*M*	*SD*
Age				42.95	14.62
POSS				12.53	4.16
Sex					
	Female	366	60,6%		
	Male	233	38,7%		
	Other	3	0,5%		
Job					
	Directors and managers	50	8,3%		
	Scientific and intellectual technicians and professionals	308	51,2%		
	Technicians; support professionals	63	10,5%		
	Accountancy, administrative and other office employees	106	17,3%		

Workers in catering, personal, and protection services and salespersons	61	10,1%
Craftsperson and skilled workers in manufacturing and construction	3	0,5%
Elementary occupations	8	1,3%
Other	5	0,8%
Health workers		
Yes	158	26,2%
No	444	73,8%
Education level		
Primary education	6	1%
Secondary education	21	3,5%
Higher education	482	80,1%
Vocational training	46	7,6%
Other	47	7,8%
Company size		

Small	53	8,8%
Microenterprises	51	8,5%
Medium	60	10%
Large	438	72,8%
Currently studying		
Yes	105	17,4%
No	497	82,6%

Table 2

Demographics study 2

Variable		Frequency	Proportion
Sex			
	Female	121	78,1%
	Male	32	20,6%
	Other	2	1,3%
Fakers			
	Yes	69	44,5%
	No	86	55,5%
Job			
	Scientific and intellectual technicians and professionals	65	41,9%
	Accountancy, administrative and other office employees	6	3,9%
	Workers in catering, personal, and protection services and salespersons	77	49,7%

Other	7	4,5%
Education level		
Secondary education	19	12,3%
Higher education	89	57,4%
Vocational training	20	12,9%
Other	27	17,4%
Company size		
Small	30	19,4%
Microenterprises	28	18,1%
Medium	23	14,8%
Large	74	47,7%
Currently studying		
Yes	112	72,3%
No	43	27,7%

Table 3

Factor loadings, item-total, and inter-item correlations of the Perceived Occupational Stress Scale items

POS item	Factor loadings	Item total correlations	Item 2	Item 3	Item 4
1	0.81	0.85	0.61	0.74	0.65
2	0.82	0.88	-	0.69	0.73
3	0.85	0.88	-	-	0.65
4	0.82	0.87	-	-	-

Note. POS = Perceived Occupational Stress.

Table 4

Logistic Regression Results for experimental conditions: all variables

	Estimate	Std. Error	t value	p value
(Intercept)	-22.214*	13.178	-1.686	0.092
POSS total	0.206	0.198	1.039	0.299
Sex: male	-1.653	1.561	-1.059	0.29
Age	-0.025	0.124	-0.203	0.84
Job: Scientific and intellectual technicians and professionals	2.562	2.875	0.891	0.373
Job: Workers in catering, personal, and protection services and salespersons	1.587	2.452	0.647	0.518
Job: other	-1.357	4.012	-0.338	0.736
Company size: microenterprises	4.308	2.63	1.638	0.102
Company size: small	-0.293	1.768	-0.166	0.869
Company size: medium	-1.961	1.852	-1.059	0.29
BSI 18 total	-0.01	0.051	-0.198	0.843
O	0.133	0.242	0.548	0.584
C	0.119	0.237	0.502	0.616
E	0.265	0.248	1.067	0.286

A	-0.659	0.401	-1.643	0.101
N	0.101	0.175	0.577	0.564
HEXACO (honesty/humility)	0.212*	0.118	1.808	0.071
Psychological capital	0.138*	0.074	1.878	0.061
PRIMA-EF 1	-0.87	0.664	-1.31	0.191
PRIMA-EF 2	0.14	0.635	0.22	0.826
PRIMA-EF 3	-0.643	0.631	-1.02	0.308
PRIMA-EF 4	-0.737	0.637	-1.157	0.248
PRIMA-EF 5	-1.562**	0.619	-2.525	0.012
PRIMA-EF 6	-0.466	0.655	-0.711	0.478
PRIMA-EF 7	-0.048	0.559	-0.085	0.933
PRIMA-EF 8	0.965**	0.441	2.189	0.029
PRIMA-EF 9	-0.841	0.632	-1.332	0.183
PRIMA-EF 10	1.751**	0.89	1.968	0.05
Physical (SF 12)	0.241***	0.088	2.729	0.007
Mental (SF 12)	0.197**	0.096	2.054	0.041
UWES total	-0.101**	0.043	-2.346	0.019
WAS	0.498*	0.268	1.856	0.064

Observations	153
Log Likelihood	-26.238
Akaike Inf. Crit.	116.476
Nagelkerke R squared	0.86
Residual Deviance	52.476 (df = 121)
Null Deviance	210.210 (df = 152)

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

PRIMA-EF 1: excessive workload & work pace; 2: poor job content; 3: bad interpersonal relationships at work; 4: mistreatment at work; 5: appreciation of worker's skills; 6: valued opinions; 7: potential for career development; 8: within-company communications; 9: personal life & work balance; 10: overall satisfaction with work.

Table 5

Logistic Regression Results for experimental condition: backward stepwise

	Estimate	Std. Error	t value	p value
(Intercept)	-8.36**	4.07	-2.05	0.05
Company size: microenterprises	0.95	1.13	0.84	0.41
Company size: small	-1.75	1.1	-1.59	0.12
Company size: medium	-2.17*	1.25	-1.74	0.09
O	0.26	0.18	1.44	0.15
A	-0.48*	0.28	-1.71	0.09
HEXACO (honesty/humility)	0.13*	0.07	1.84	0.07
PRIMA-EF 1	-0.82*	0.44	-1.88	0.06
PRIMA-EF 4	-0.87**	0.37	-2.38	0.02
PRIMA-EF 5	-1.16**	0.47	-2.48	0.02
PRIMA-EF 8	0.66*	0.36	1.82	0.07
PRIMA-EF 9	-0.61	0.4	-1.51	0.14
PRIMA-EF 10	1.35**	0.64	2.11	0.04
Physical (SF 12)	0.20***	0.05	4.08	0.0001
Mental (SF 12)	0.11**	0.04	2.57	0.02

UWES total	-0.07**	0.03	-2.48	0.02
WAS	0.57**	0.22	2.56	0.02
Observations	153			
Log Likelihood	-31.29			
Akaike Inf. Crit.	96.58			
Nagelkerke R squared	0.83			
Residual Deviance	62.58 (df = 136)			
Null Deviance	210.21 (df = 152)			

Note: *p<0.1; **p<0.05; ***p<0.01

PRIMA-EF 1: excessive workload & work pace; 2: poor job content; 3: bad interpersonal relationships at work; 4: mistreatment at work; 5: appreciation of worker's skills; 6: valued opinions; 7: potential for career development; 8: within-company communications; 9: personal life & work balance; 10: overall satisfaction with work.

Table 6

Logistic Regression Results for experimental conditions: LASSO regression

	Estimate	Std. Error	t value	p value
(Intercept)	-5.24	4.13	-1.27	0.21
Age	-0.1	0.08	-1.26	0.21
Company size: microenterprises	1.20	0.86	1.4	0.17
Company size: small	-0.69	0.8	-0.86	0.39
Company size: medium	-0.67	1	-0.67	0.51
BSI 18 total	-0.01	0.02	-0.31	0.76
PRIMA-EF 4	-0.94**	0.33	-2.83	0.005
PRIMA-EF 6	-0.39	0.33	-1.19	0.24
PRIMA-EF 7	-0.02	0.29	-0.06	0.95
PRIMA-EF 9	-0.35	0.34	-1.06	0.3
PRIMA-EF 10	0.41	0.45	0.91	0.37
Physical (SF 12)	0.14***	0.04	3.29	0.001
Mental (SF 12)	0.07**	0.03	3.29	0.04
WAS	0.3*	0.15	1.94	0.06
Observations		153		
Log Likelihood		-41.64		

Akaike Inf. Crit.	111.28
Nagelkerke R squared	0.75
Residual Deviance	83.28 (df = 139)
Null Deviance	210.21 (df = 152)

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

PRIMA-EF 1: excessive workload & work pace; 2: poor job content; 3: bad interpersonal relationships at work; 4: mistreatment at work; 5: appreciation of worker's skills; 6: valued opinions; 7: potential for career development; 8: within-company communications; 9: personal life & work balance; 10: overall satisfaction with work.

Table 7

Confusion matrix and statistics: the all variables model

	Predicted positive	Predicted negative	Total
Actual Positive	9	3	12
Actual Negative	7	11	18
Total	16	14	30

Table 8

Confusion matrix and statistics: a stepwise backward model

	Predicted positive	Predicted negative	Total
Actual Positive	11	2	13
Actual Negative	5	12	17
Total	16	14	30

Table 9

Confusion matrix and statistics: the Lasso model

	Predicted positive	Predicted negative	Total
Actual Positive	11	2	13

Actual Negative	5	12	18
Total	16	14	30

Table 10

Regression performance indexes

	All variables model	Stepwise backward model	Lasso model
Accuracy	0.66	0.77	0.77
Kappa	0.34	0.54	0.54
Sensitivity	0.56	0.7	0.7
Specificity	0.78	0.86	0.86
AUC	0.975	0.969	0.941

Table 11

Descriptive Statistics and Correlations between BSI 18 and POSS

Variable	*M*	*SD*	Stress	Tension	Pressure	Health	Total
Somatization	9.48	4.04	.27**	.40**	.31**	.42**	.40**
			[.18, .35]	[.31, .47]	[.22, .39]	[.34, .49]	[.32, .47]
Anxiety	9.86	4.07	.39**	.53**	.41**	.52**	.52**
			[.30, .46]	[.46, .59]	[.33, .48]	[.45, .59]	[.45, .59]
Depression	10.31	4.90	.28**	.45**	.32**	.44**	.43**
			[.19, .36]	[.37, .52]	[.23, .40]	[.37, .52]	[.35, .50]
BSI 18 total	29.64	11.90	.34**	.50**	.37**	.50**	.49**
			[.25, .42]	[.43, .56]	[.29, .45]	[.43, .57]	[.42, .56]

Note. M and *SD* are used to represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Table 12

Descriptive Statistics and Correlations between BFI-2 and POSS

Variable	*M*	*SD*	Stress	Tension	Pressure	Health	Total
Agreeableness	38.43	20.96	-.08	-.11**	-.11**	-.06	-.10*
			[-.16, .00]	[-.19, -.03]	[-.19, -.03]	[-.14, .02]	[-.18, -.02]
Negative Emotionality	7.87	2.17	.15**	.26**	.15**	.22**	.23**
			[.07, .23]	[.18, .33]	[.08, .23]	[.14, .29]	[.15, .30]
Conscientiousness	11.09	2.06	.05	-.09*	-.00	-.02	-.02
			[-.03, .13]	[-.17, -.01]	[-.08, .08]	[-.10, .06]	[-.10, .06]
Open Mindedness	8.24	2.56	-.02	-.08	-.04	-.03	-.05
			[-.10, .06]	[-.15, .00]	[-.12, .04]	[-.11, .05]	[-.13, .03]
Extraversion	9.26	2.18	.06	.07	.07	.09*	.08*
			[-.02, .14]	[-.01, .15]	[-.01, .15]	[.01, .17]	[.00, .16]

Note. M and *SD* are used to represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Table 13

Descriptive Statistics and Correlations between HEXACO and POSS

Variable	*M*	*SD*	Stress	Tension	Pressure	Health	Total
Sincerity	9.76	2.75	.08	-.11	.01	-.02	-.02
			[-.10, .26]	[-.28, .07]	[-.17, .18]	[-.20, .15]	[-.19, .16]
Fairness	10.13	2.94	-.00	-.06	-.07	-.08	-.06
			[-.18, .18]	[-.23, .12]	[-.24, .11]	[-.25, .10]	[-.24, .11]
Greed Avoidance	6.21	1.60	.02	.05	.04	.03	.04
			[-.16, .19]	[-.12, .23]	[-.13, .22]	[-.15, .20]	[-.13, .22]
Modesty	8.18	1.64	.08	.08	.06	.02	.07
			[-.10, .25]	[-.10, .25]	[-.12, .23]	[-.15, .20]	[-.10, .25]
Honesty-Humility	34.27	6.41	.06	-.04	-.00	-.03	-.01
			[-.12, .23]	[-.21, .14]	[-.18, .18]	[-.21, .14]	[-.18, .17]

Note. M and *SD* are used to represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Table 14

Descriptive Statistics and Correlations between PCQ 12 and POSS

Variable	*M*	*SD*	Stress	Tension	Pressure	Health	Total
Self Efficacy	14.48	3.73	-.14**	-.30**	-.18**	-.24**	-.25**
			[-.22, -.06]	[-.37, -.23]	[-.26, -.10]	[-.31, -.16]	[-.32, -.17]
Hope	17.30	3.80	-.26**	-.44**	-.32**	-.38**	-.40**
			[-.33, -.18]	[-.50, -.37]	[-.39, -.24]	[-.44, -.31]	[-.47, -.33]
Resilience	12.94	2.97	-.33**	-.46**	-.38**	-.37**	-.45**
			[-.40, -.26]	[-.52, -.40]	[-.45, -.31]	[-.44, -.30]	[-.51, -.38]
Optimism	8.31	2.30	-.37**	-.53**	-.42**	-.49**	-.52**
			[-.44, -.30]	[-.58, -.47]	[-.49, -.35]	[-.55, -.43]	[-.58, -.46]
Psychological capital	8.31	2.30	-.31**	-.51**	-.38**	-.43**	-.47**
			[-.38, -.24]	[-.57, -.45]	[-.44, -.31]	[-.49, -.36]	[-.53, -.40]

Note. M and *SD* are used to represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Table 15

Descriptive Statistics and Correlations between PRIMA-EF and POSS

Variable	*M*	*SD*	Stress	Tension	Pressure	Health	Total
PRIMA-EF 1	3.24	1.15	.50**	.38**	.45**	.41**	.50**
			[.44, .56]	[.31, .45]	[.38, .51]	[.34, .48]	[.43, .56]
PRIMA-EF 2	2.49	1.16	.13**	.33**	.22**	.28**	.28**
			[.05, .21]	[.26, .40]	[.14, .29]	[.20, .35]	[.20, .35]
PRIMA-EF 3	2.05	1.11	.28**	.36**	.30**	.38**	.38**
			[.21, .35]	[.29, .43]	[.23, .37]	[.31, .44]	[.31, .45]
PRIMA-EF 4	1.71	1.01	.27**	.38**	.34**	.44**	.41**
			[.19, .34]	[.30, .44]	[.27, .41]	[.38, .51]	[.35, .48]
PRIMA-EF 5	3.47	1.12	-.15**	-.29**	-.23**	-.28**	-.28**
			[-.22, -.07]	[-.36, -.22]	[-.31, -.16]	[-.36, -.21]	[-.35, -.20]
PRIMA-EF 6	3.49	1.16	-.15**	-.28**	-.25**	-.26**	-.27**
			[-.23, -.07]	[-.35, -.21]	[-.32, -.17]	[-.33, -.18]	[-.34, -.20]
PRIMA-EF 7	2.52	1.33	-.11**	-.18**	-.18**	-.22**	-.20**
			[-.19, -.04]	[-.26, -.10]	[-.25, -.10]	[-.29, -.14]	[-.28, -.12]
PRIMA-EF 8	3.40	1.27	-.06	-.22**	-.13**	-.20**	-.18**
			[-.14, .02]	[-.29, -.14]	[-.21, -.05]	[-.28, -.12]	[-.25, -.10]
PRIMA-EF 9	3.69	1.20	-.34**	-.34**	-.31**	-.35**	-.38**
			[-.40, -.26]	[-.41, -.27]	[-.38, -.24]	[-.42, -.28]	[-.45, -.31]

PRIMA-EF 10	3.73	1.04	-.37** [-.44, -.30]	-.53** [-.59, -.47]	-.45** [-.51, -.38]	-.54** [-.59, -.48]	-.54** [-.60, -.49]

Note. PRIMA-EF 1: excessive workload & work pace; 2: poor job content; 3: bad interpersonal relationships at work; 4: mistreatment at work; 5: appreciation of worker's skills; 6: valued opinions; 7: potential for career development; 8: within-company communications; 9: personal life & work balance; 10: overall satisfaction with work.

Table 16

Descriptive Statistics and Correlations between SF12 and POSS

Variable	*M*	*SD*	Stress	Tension	Pressure	Health	Total
Physical	53.79	8.04	-.05	-.05	-.01	-.12**	-.06
			[-.13, .03]	[-.13, .03]	[-.09, .07]	[-.19, -.04]	[-.14, .02]
Mental	39.67	12.42	-.33**	-.46**	-.38**	-.45**	-.47**
			[-.40, -.26]	[-.52, -.40]	[-.45, -.31]	[-.51, -.38]	[-.53, -.40]

Note. M and *SD* are used to represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Table 17

Descriptive Statistics and Correlations between UWES and POSS

Variable	*M*	*SD*	Stress	Tension	Pressure	Health	Total
Vigor	30.75	6.90	-.16**	-.38**	-.21**	-.32**	-.31**
			[-.24, -.08]	[-.44, -.31]	[-.28, -.13]	[-.39, -.25]	[-.38, -.24]
Dedication	25.14	7.00	-.14**	-.39**	-.24**	-.34**	-.32**
			[-.22, -.06]	[-.45, -.32]	[-.32, -.17]	[-.41, -.26]	[-.39, -.25]
Absorption	28.75	7.21	-.04	-.28**	-.13**	-.21**	-.19**
			[-.12, .04]	[-.35, -.20]	[-.21, -.05]	[-.28, -.13]	[-.27, -.11]
Engagement	84.64	19.66	-.12**	-.37**	-.21**	-.31**	-.29**
			[-.20, -.04]	[-.44, -.30]	[-.28, -.13]	[-.38, -.23]	[-.36, -.22]

Note. M and *SD* are used to represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Table 18

Descriptive Statistics and Correlations between WAS and POSS

Variable	*M*	*SD*	Stress	Tension	Pressure	Health	Total
WAS	7.62	1.78	-.19**	-.36**	-.22**	-.35**	-.33**
			[-.27, -.11]	[-.43, -.29]	[-.29, -.14]	[-.42, -.28]	[-.39, -.25]

Note. M and *SD* are used to represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Table 19

Regression Results for the POSS nomological network

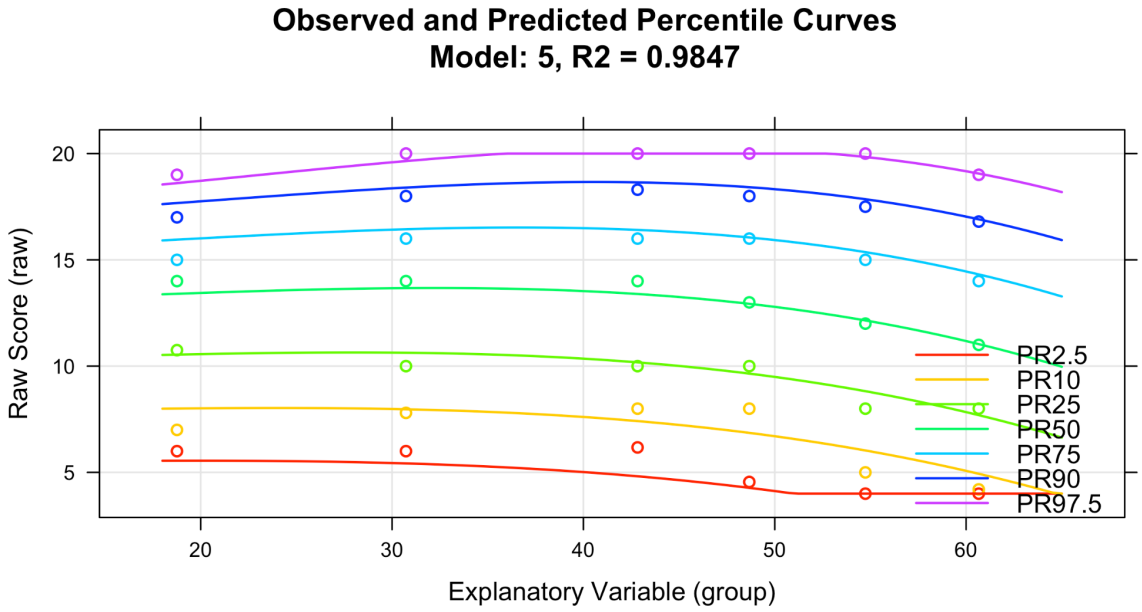
	Estimate	Std. Error	t value	Pr(> | t|)
(Intercept)	15.460***	2.809	5.503	$6.46*10^{-08}$
BSI 18 total	0.027	0.019	1.411	0.159
O	-0.028	0.072	-0.392	0.695
C	-0.049	0.080	-0.609	0.543
E	-0.061	0.065	-0.932	0.352
A	-0.004	0.009	-0.418	0.676
N	-0.042	0.074	-0.568	0.571
Psychological Capital	-0.573**	0.266	-2.158	0.032
PRIMA-EF 1	1.313***	0.137	9.554	$2*10^{-16}$
PRIMA-EF 2	0.066	0.167	0.393	0.694
PRIMA-EF 3	0.302	0.164	1.842	0.066
PRIMA-EF 4	0.273	0.198	1.382	0.168
PRIMA-EF 5	0.296	0.198	1.497	0.135
PRIMA-EF 6	-0.033	0.201	-0.162	0.871
PRIMA-EF 7	-0.109	0.125	-0.868	0.386
PRIMA-EF 8	0.295**	0.143	2.065	0.04

PRIMA-EF 9	-0.185	0.145	-1.275	0.203
PRIMA-EF 10	-1.172***	0.231	-5.068	$6*10^{-07}$
Physical (SF 12)	-0.014	0.021	-0.675	0.5
Mental (SF 12)	-0.054***	0.019	-2.781	0.006
UWES total	0.015	0.012	1.271	0.205
WAS	0.036	0.101	0.359	0.72

Note: *p<0.1; **p<0.05; ***p<0.01

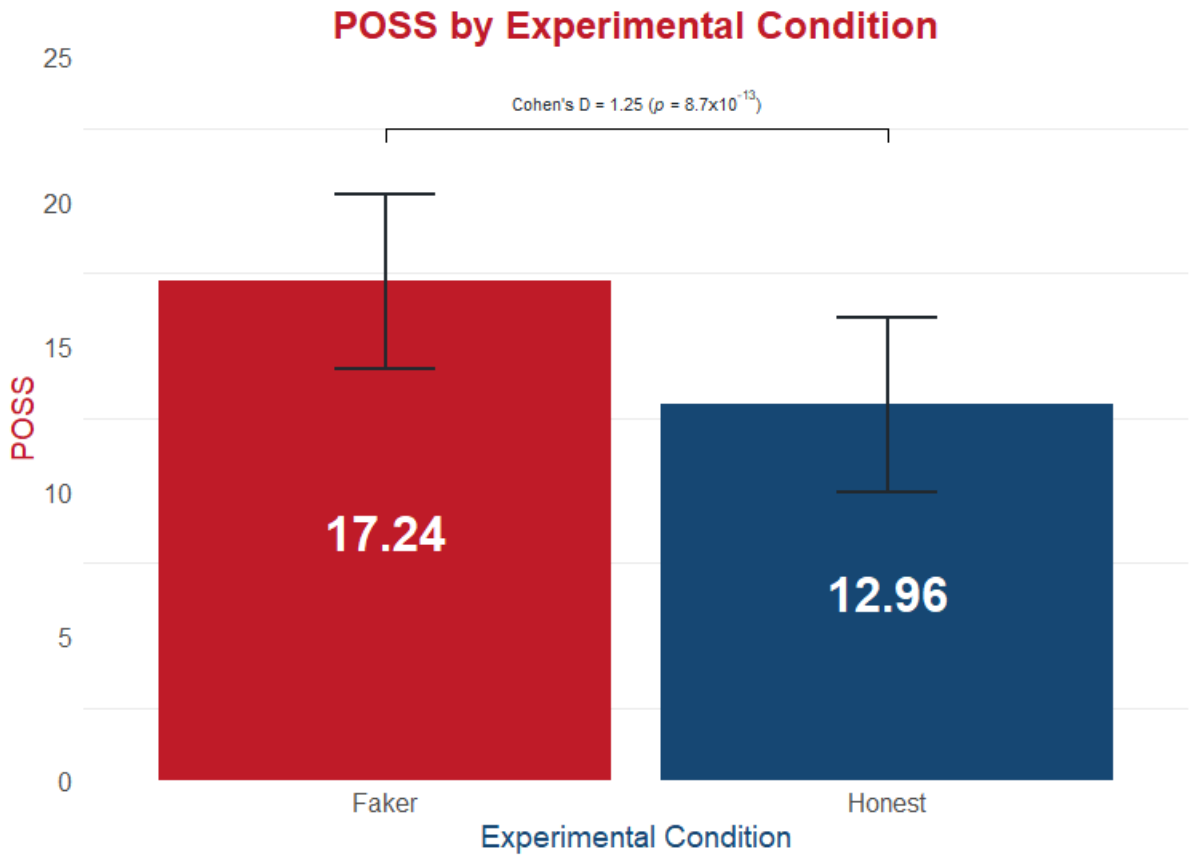
Note. PRIMA-EF 1: excessive workload & work pace; 2: poor job content; 3: bad interpersonal relationships at work; 4: mistreatment at work; 5: appreciation of worker's skills; 6: valued opinions; 7: potential for career development; 8: within-company communications; 9: personal life & work balance; 10: overall satisfaction with work.

Figure 1.



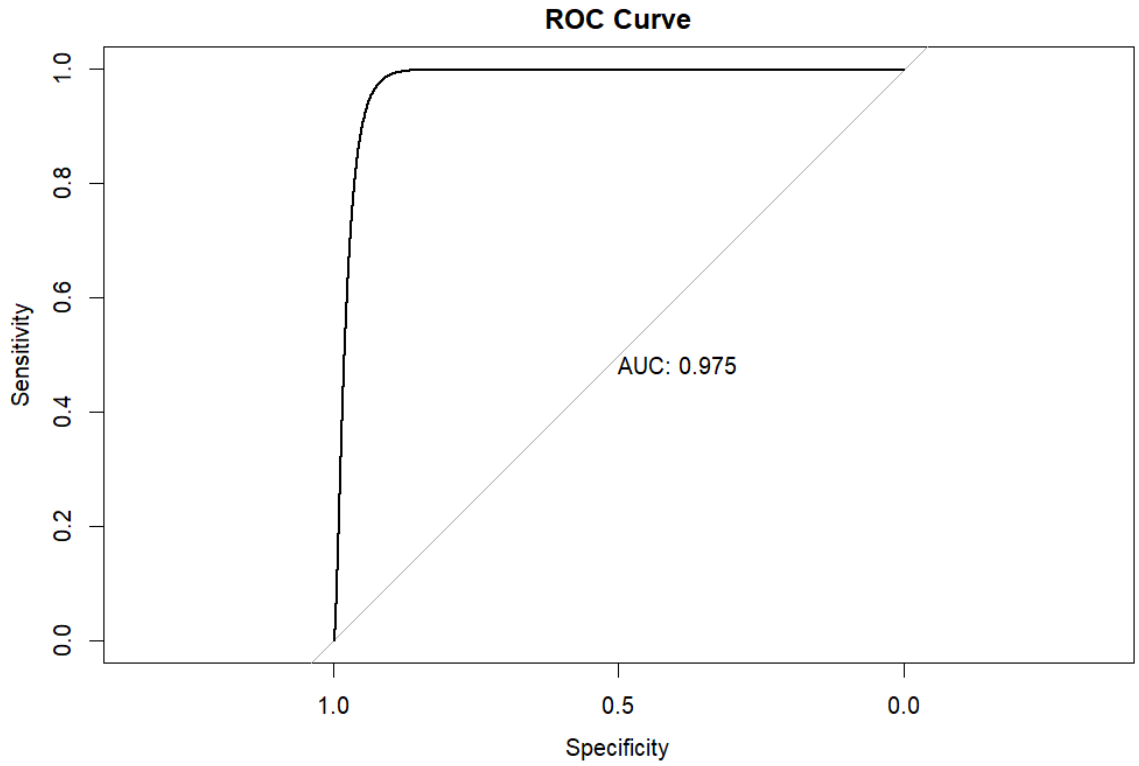
Observed and predicted percentile curves for the POSS scores.

Figure 2.



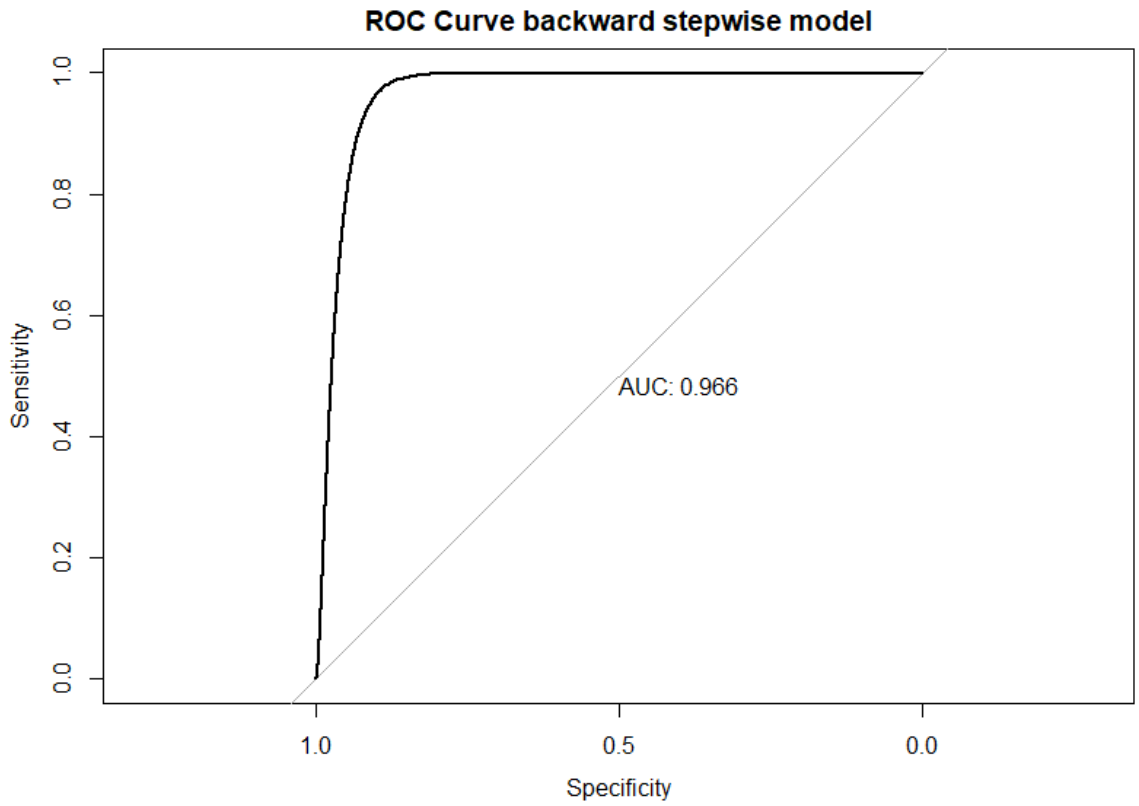
Mean comparison for each experimental condition

Figure 3.



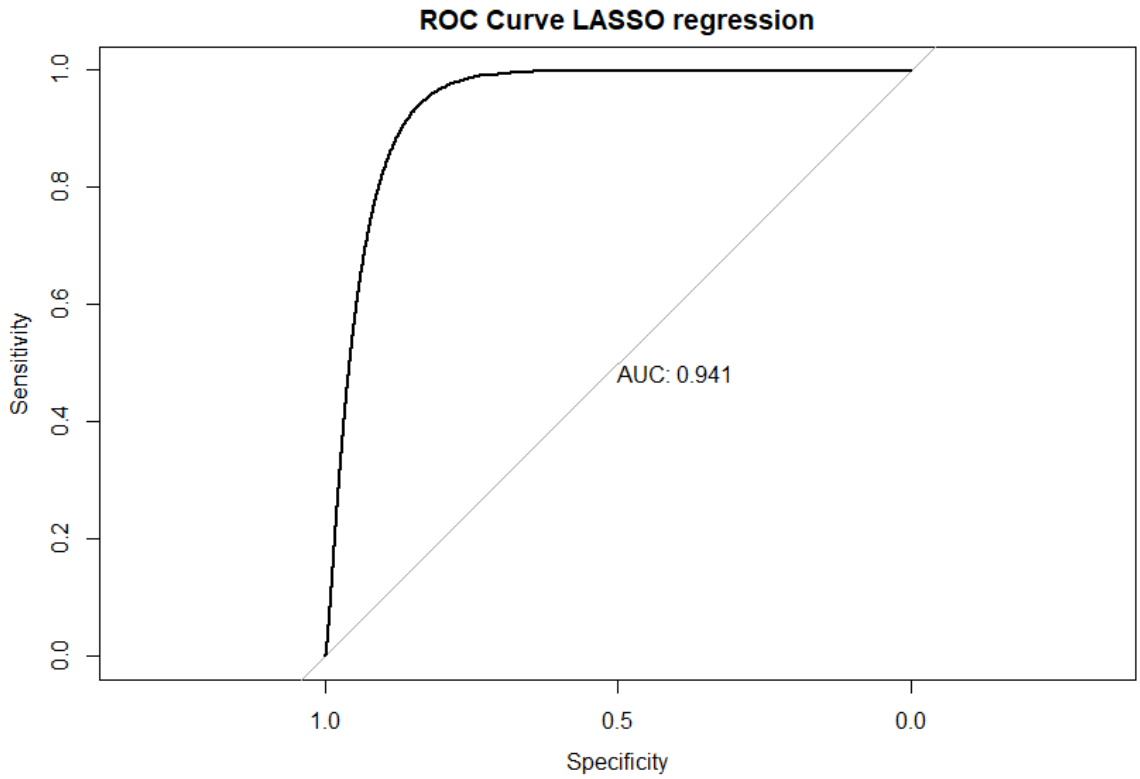
AUC from the logistic regression model: all variables

Figure 4.



AUC from the logistic regression model: backward stepwise model

Figure 5



AUC from the logistic regression model: LASSO regression