



Research article

Psychometric properties of the Satisfaction with Job Life Scale in Portuguese workers: A systematic study based on the IRT and CFA modeling



Tomás Caycho-Rodríguez^{a,*}, Joana Neto^b, José M. Tomás^c, Pablo D. Valencia^d,
José Ventura-León^a, Félix Neto^b, Mario Reyes-Bossio^e, Lindsey W. Vilca^f

^a Universidad Privada del Norte, Lima, Peru

^b Universidade do Porto, Portugal

^c Universidad de Valencia, Spain

^d Asociación Peruana Contextual-Conductual de Psicología, Peru

^e Universidad Peruana de Ciencias Aplicadas, Peru

^f Universidad Peruana Unión, Peru

ARTICLE INFO

Keywords:

Classical test theory
Job satisfaction
Item response theory
Measurement
Portuguese workers

ABSTRACT

Job satisfaction is related to better physical and mental health, as well as to factors specifically related to work. In this context, the measurement of work satisfaction is important for organizations that profess an interest in engaged and satisfied workers. Therefore, this study aims to examine the psychometric properties of the Satisfaction with Job Life Scale (SWJLS) in Portuguese workers by combining the procedures of the Classical Test Theory (CTT) and the Item Response Theory (IRT). Specifically, internal structure of the scale was studied, its reliability (consistency), correlations with other measures of wellbeing (life satisfaction, loneliness, emotional wellbeing at work, and job satisfaction) were also estimated, and finally, the scale was tested for gender measurement invariance. Participants were 404 workers, 61% women and 39% men, aged between 18 and 64 years ($M = 36.85$; $SD = 14.50$). Confirmatory Factor Analysis indicated that the one-dimensional model of the SWJLS was adequate (Robust $\chi^2(5) = 9.89$, $p = .078$; $CFI = .993$; $RMSEA = .049$, 90% CI [.000 - .094]; $SRMR = .011$.) and had good internal consistency ($\omega = .947$, 95% CI [.936, .956]; $\alpha = .947$, 95% CI [.935, .955]). Subsequent analyses revealed that the scores of the SWJLS were related to other measures of job satisfaction ($r = .742$), job-related emotional well-being ($r = .628$), satisfaction with life ($r = .808$) and loneliness ($r = -.455$). Factorial invariance suggests that the structure of the SWJLS measures the same construct (satisfaction with work-life) in both female and male workers. Moreover, IRT analysis suggests that higher levels of work-life satisfaction are needed to choose the upper response options, while a very low level of work-life satisfaction is required to increase the likelihood of choosing the lower response options. In this sense, the SWJLS is useful and reliable, especially for identifying people with low levels of job satisfaction. These findings support the validity of the SWJLS and indicate that the Portuguese version is a brief instrument with good psychometric characteristics for measuring work-life satisfaction.

1. Introduction

The impact of the global economic recession that occurred at the end of the first decade of the 21st century was felt differently by individual European countries (Chatrakul Na Ayudhya, Prouska and Beauregard, 2019; Zozaya and Vallejo, 2020). For example, Germany and England did not experience major changes in the labor market or higher unemployment rates (Eurofound, 2013; Lallement, 2011), while other countries such as Greece, Portugal or Spain implemented economic austerity

measures that drastically decreased their employment levels (Kokaliari, 2018; Viseu et al., 2018). Economic crises generate an increment in job insecurity, stressful work environments, rest reduction, job benefits, opportunities for formation and career development, as well as job dissatisfaction (Chatrakul Na Ayudhya et al., 2019; De Cuyper, Piccoli, Fontinha and De Witte, 2019; McDonnell and Burgess, 2013).

Likewise, evidence shows a economic crisis is a stressful factor that has a negative impact on physical health, increasing the risk of suffering from cardiovascular and respiratory diseases (Birgisdóttir et al., 2020;

* Corresponding author.

E-mail address: tomas.caycho@upn.pe (T. Caycho-Rodríguez).

Koutsimpou et al., 2019; Moreno-Lostao et al., 2019). Economic crises also relate with mental health problems among workers (Medel-Herrero and Gomez-Beneyto, 2019; Mucci et al., 2016; Shrivastava et al., 2019; Silva et al., 2020; Viseu et al., 2018), due to an increase in anxiety, depression, suicidal rates, excessive alcohol consumption, among other problems (Demirci et al., 2020; De Vogli, De Falco and Mattei, 2019; Frasquilho et al., 2015; Martin-Carrasco et al., 2016).

Although the evidence is inconsistent, some studies have also examined the effects of economic crisis on subjective well-being (Pilipiec et al., 2019). Several investigations have indicated that that economic recessions generate a decrease in the happiness and satisfaction felt by people (Charles et al., 2019; Gonza and Burger, 2017; Habibov and Afandi, 2015; Helliwell et al., 2014). Job satisfaction decreases due to worsened work conditions, reduced opportunities for promotion, and greater demands to sustain productivity (Pilipiec et al., 2019). Nevertheless, some studies have also found positive associations between the economic recession and job satisfaction (Borra and Gómez-García, 2016; Sánchez-Sánchez and Namkee, 2018).

In recent years, there has been considerable interest in studying subjective well-being (SWB) (Diener et al., 2018b). In fact, current scientific investigations on this topic are multi-disciplinary and emanate from different knowledge domains such as psychology, economics, sociology, philosophy, and the health sciences (Diener et al., 2018a). SWB describes how people assess their own lives and includes a set of positive and negative affections as well as a global cognitive assessment of life, i.e., an individual's satisfaction with life (SWL) (Diener et al., 2018b; Diener et al., 2015). The latter is considered the most stable indicator of SWB (Emerson et al., 2017).

SWL has become an important indicator of the quality of life (Diener, 2013) because of its positive associations with health, meaningful social relations, and productivity, among other relevant constructs (Diener, 2013). Consequently, the availability of a valid measure of SWL poses a major challenge for quality of life research (Jovanović, 2016). However, most studies are oriented to satisfaction with life in general rather than satisfaction in different specific domains of life such as work, family, friends, sports, or physical activity (Bardo and Yamashita, 2014; Rojas, 2006). SWL is an important research topic in the context of work and organizations because of its relationships with better job performance, less intentions to quit the job, among others (Abele et al., 2016; Erdogan et al., 2012; Hagmaier et al., 2018).

Job satisfaction is a domain of overall satisfaction that has become one of the most researched topics in human resources management and organizational behavior since the 2000s (Čulibrk et al., 2018; Vigan and Giauque, 2018). Job satisfaction can be defined as the degree to which workers enjoy their labor activities, which is a result of a retrospective evaluation of their work experiences and beliefs (Allan et al., 2018; Hora et al., 2018).

The importance of studying job satisfaction depends on different aspects. First, job satisfaction is a construct of interdisciplinary nature, since it can be addressed from various disciplines such as economics, management, psychology, and health sciences (Vigan and Giauque, 2018). Second, job satisfaction is related to better physical and mental health conditions (Allan et al., 2018; Bowling et al., 2010; Holmberg et al., 2018; Hünefeld et al., 2019; Satuf et al., 2018). Further, job satisfaction is linked to other job-related factors such as increased organizational commitment (Garg et al., 2018; Mathieu et al., 2016), lower work stress, decreased likelihood of the intention to quit (Liu et al., 2019), or improved work performance (Phillips and Masih, 2019; Rahman et al., 2019). Therefore, job satisfaction appropriately reflects the well-being of employees (Bowling et al., 2018).

In this context, the measurement of job satisfaction is pivotal for organizations that desire their employees to be deeply involved, committed, and satisfied (Lepold et al., 2018). In addition, there are two general theoretical approaches that support the measurement of job satisfaction (Dalal and Credé, 2013; Juez, Hulin and Dalal, 2012): first, instruments based on the global satisfaction approach which assess

overall attitude towards work; second, instruments constructed on the basis of satisfaction by facets or dimensions, which evaluate the attitude toward specific aspects of work such as coworkers, salary, supervision, etc. Furthermore, the different evaluation approaches have allowed for global and multidimensional measurements, measures of single- and multiple-items designed and, needless to say, qualitative approaches have also been used (Lepold et al., 2018; Van Saane, Sluiter, Verbeek and Frings-Dresen, 2003). A recent systematic review based on data from Web of Knowledge, Scopus, and Scielo reported the existence of 62 scales to measure job satisfaction being utilized in 42 different countries (Hora et al., 2018).

From a global perspective, the *Scale of Satisfaction with Job Life* (SWJLS) has recently been developed in Portugal (Neto and Fonseca, 2018) based on the original *Satisfaction with Life Scale* (SWLS) (Diener et al., 1985). Corresponding to Diener's (2013) theoretical model of life satisfaction, the SWJLS defines job-life satisfaction as a global cognitive assessment of work-life by an employee (Neto and Fonseca, 2018). To construct the SWJLS, the term "life" was replaced in each of the SWLS items by the words "work-life" (the items of the original Portuguese SWJLS applied to the respondents are presented in Appendix 1). The same procedure was adopted to develop other scales aiming to measure specific domains of SWL such as satisfaction with love life (Neto, 2005), satisfaction with migratory life (Neto and Fonseca, 2016), satisfaction with sex life (Neto, 2012), and satisfaction with family life (Caycho-Rodríguez et al., 2018; da Costa and Neto, 2019; Zabriskie and Ward, 2013).

With respect to the psychometric evidence gathered so far for the SWJLS, the original study (Neto and Fonseca, 2018) suggested the presence of a single factor that explains 81.46% of the total variance. Subsequently, the Confirmatory Factor Analysis (CFA) indicated that a single-factor model demonstrated an adequate fit to the data (GFI = .94, CFI = .97 and SRMR = .02). These results provide empirical evidence of validity based on the factor structure. In terms of the evidence of validity related to other variables, the SWJLS showed significant correlations (r) with life satisfaction ($r = .79$), loneliness ($r = -.51$), self-esteem ($r = .43$), migratory life satisfaction ($r = .82$), job-related emotional well-being ($r = .77$) and another measure of job satisfaction ($r = .63$). To provide evidence of convergent validity, job-life satisfaction was demonstrated to significantly contribute to life satisfaction and migratory life satisfaction. Finally, Cronbach's alpha was very high ($\alpha = .96$). It is worth mentioning that no other studies have yet reported psychometric results of this scale.

These preliminary results suggest that the SWJLS may provide consistent measurements and valid interpretations. Despite these findings, additional studies are needed to examine the psychometric properties of the SWJLS in participants with different characteristics from those possessed by migrants, and combining procedures from Classical Test Theory (CTT) and Item Response Theory (IRT). Accordingly, this study has the following objectives:

- 1) To examine the internal structure of the SWJLS based on CFA results. The scores of the five elements are expected to fit into a single underlying dimension (Neto and Fonseca, 2018).
- 2) To estimate the internal consistency of the SWJLS with coefficient omega. In accordance with the original study a high internal consistency is expected (Neto and Fonseca, 2018).
- 3) To correlate the SWJLS score with other well-being measures (life satisfaction, loneliness, job-related emotional well-being and job satisfaction) with the purpose of evaluating the evidence of validity based on the relationship with other variables. In particular, we seek to provide evidence of validity based on the relationships with other convergent-divergent variables, by correlating SWJLS with other measures that evaluate similar (satisfaction with life, job-related emotional well-being and job satisfaction) and different, but related, constructs (loneliness). According to the empirical evidence, positive correlations are expected between SWJLS and satisfaction with life, job-related emotional well-being and job satisfaction, while negative associations should be observed with loneliness (Bakir and

Aslan, 2017; Neto and Fonseca, 2018; Neto et al., 2019; Tabançali, 2016).

- 4) To evaluate the factorial invariance of SWJLS across gender. The factorial invariance provides enough empirical evidence to consider the SWJLS scores to be psychometrically comparable between groups (countries, ages, genders, etc.). Indeed, the absence of invariance does not allow for determination of whether the difference in the observed scores between groups reflects the true difference in the underlying latent structure (Brown, 2006). In this sense, factorial invariance is considered as a prerequisite for group comparisons. The important presence of women in workplaces requires that the assessment of job satisfaction be carried out with instruments that have not been challenged for their lack of invariance between sexes (Collins et al., 2014; Karin Andreassi, Lawter, Brockerhoff and Rutigliano, 2014). Moreover, as revealed by previous studies, the structure of the SWLS seems invariant with respect to gender (Emerson et al., 2017). Thus, it is interesting to have evidence of the invariance of the SWJLS, since it is derived from the aforementioned scale. Note that previous studies have not reported the SWJLS invariance structure as a function of gender.
- 5) To analyze the characteristics and item performance of SWJLS, based on IRT analysis. This is the first study that combines CTT and IRT modeling for the psychometric analysis of the SWJLS.

2. Method

2.1. Participants

Data were gathered from 404 Caucasian adults working full-time, whose ages ranged from 18 to 64 years ($M = 36.85$; $SD = 14.50$). Women made up 61% of the sample and men 39%. Most of the participants were married or with a partner (59%). To participate in the study, individuals were required to be employed in full-time positions at the time of the completion of the survey. Most of the participants worked in the education sector (35.9%), followed by the commercial (18.6%), construction (12.6%), industrial (10.9%) and health (7.7%) sectors. 5.9% indicated working in other labor sectors and 8.4% did not report the sector where they work.

Participants were selected through convenience sampling. All workers present in their working centers during the time the survey was made were invited to participate, and they entered the sample if they met the inclusion criteria and were willing to participate (Hill and Hill, 2012).

2.2. Measures

2.2.1. Demographic information

Respondents were asked to indicate their age, gender, place of birth, marital status, educational level, and type of work.

Additionally, five scales were used in this study, described below. All of them have been already validated in the Portuguese cultural context and are presented in Appendix 1.

2.2.2. Satisfaction with Job Life Scale (SWJLS)

This measure was developed to assess overall quality of life at work (Neto and Fonseca, 2018). It is composed of 5 items. For instance, one item states: "The conditions of my work life are excellent". Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). The greater the score, the greater the level of satisfaction with job life.

2.2.3. Satisfaction with Life Scale (SWLS)

This measure is employed to assess global life satisfaction (Diener et al., 1985). It includes 5 items. For example, one item states: "So far I have gotten the important things I want in my life". Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). The greater the score, the greater the life satisfaction. Previous research has shown reliable and valid results of this measure in Portuguese cultural contexts

(Neto, 1993, 1995; Munoz-Sastre et al., 2003). On this sample, the internal consistency was high (coefficient alpha = .94).

2.2.4. Loneliness (ULS-6)

Loneliness was assessed by means of the brief Portuguese version of the Revised UCLA Loneliness Scale (Russell et al., 1980; Neto, 1992, 2014). It is composed of 6 items. For instance, one item states: "I am unhappy being so withdrawn". The response options ranged from 1 (*never*) to 4 (*often*). The greater the score, the higher the loneliness. On this sample, the internal consistency was high (coefficient alpha = .85).

2.2.5. Job-related affective well-being (JAWS)

This scale includes twelve mood items devised by Warr (1990; Wilks and Neto, 2013), 6 being positive mood items, such as enthusiastic and contented, and the other 6 being negative mood items, such as tense and anxious. The response format ranged from 1 (*nothing*) to 5 (*very much*). Negative mood items were reversed. The higher the score, the higher the level of job-related affective well-being. On this sample, the internal consistency was high (coefficient alpha = .85).

2.2.6. Job satisfaction (JSS)

This instrument is composed of 16 items (Warr et al., 1979). The scale is viewed as cognitive in nature (Kaplan et al., 2009; Wilks and Neto, 2013). It contains both intrinsic (e.g., method of work) and extrinsic (e.g., physical work conditions) aspects. One of the items in this measure, for instance, states: "How satisfied I am with my work schedule". The response format ranged from 1 (*very unsatisfied*) to 5 (*extremely satisfied*). The greater the score, the greater the job satisfaction. On this sample, the internal consistency was high (coefficient alpha = .94).

2.3. Procedure

Participants were recruited by two research assistants in public places (e.g., railway stations and coffee bars) in the Porto area. To best protect the participants, the study was conducted in accordance with the current legal and ethical norms of the country and it conformed to the principles of the Helsinki Declaration. In addition, the research protocol was approved by the Ethics Committee of the University of Porto and by the Universidad Privada del Norte. With respect to the confidentiality and privacy of the data, the study's researchers followed the protocols mandated by their research centers to deal with private data of the participants, and the anonymity of the respondents was guaranteed. Finally, all participants gave their informed consent to participate in the study. The survey was applied individually and in groups, according to the availability of the workers, and took approximately 15 min to complete. Respondents were unpaid volunteers.

2.4. Data analysis

Statistical analyses were performed with the Mplus 8.3 program. Item-level analyses were carried out first. Mean, standard deviation, skewness and kurtosis of each item were examined. Values of skewness and kurtosis between -1 and 1 were considered sufficient evidence of univariate normality (Ferrando and Anguiano-Carrasco, 2010). The presence of multivariate kurtosis was also examined by the use of *Mardia's coefficient* (1970).

The one-dimensional model was then tested with a Confirmatory Factor Analysis (CFA). Because all items had five response options, it was considered convenient to treat them as continuous variables and use a maximum likelihood estimator (Rhemtulla et al., 2012). Specifically, we used a robust maximum likelihood method (MLR; Yuan and Bentler, 2000). Model fit was evaluated with the Comparative Fit Index (CFI >.95), the Root Mean Square Error of Approximation (RMSEA <.06) and the Standardized Root Mean Square Residual (SRMR <.08) (Hu and Bentler, 1999). In addition, the χ^2 statistic was calculated, which indicates perfect fit if its *p*-value is not significant ($p > .05$).

Reliability was estimated with coefficient omega, along with its 95% confidence intervals obtained through bootstrapping (Dunn et al., 2014; Ventura-León, 2017). We have used omega instead of alpha because it is already well-known that Cronbach's alpha is a flawed estimate of reliability. The problems with Cronbach's alpha are easily solved by computing readily available alternatives, such as omega (see, for example, Peters, 2014). Nevertheless, Cronbach's alpha estimate for the reliability has also been estimated and presented in the results section. Then, the tau-equivalence assumption was examined to calculate coefficient alpha. This was done by forcing all factor loadings to be equal and by comparing this model to the congeneric model. A significant worsening of model fit would suggest the absence of tau-equivalence and, therefore, coefficient alpha would indicate a lower limit of reliability (Raykov, 2012). Coefficient alpha was calculated along with its bootstrapped 95% confidence interval (Caycho-Rodríguez, 2017; Domínguez-Lara and Merino-Soto, 2015).

Measurement invariance between men and women was examined with several multigroup CFAs, which applied a number of increasing constraints to a base model (configural): equal factorial loadings (metric invariance), equal factor loadings and intercepts (scalar invariance) and equal factor loadings, intercepts and residual variances (strict invariance). Each model was compared to the preceding one via $\Delta\chi^2$ (Muthén et al., 1997) and ΔCFI (Cheung and Rensvold, 2002) methods. A value of $p < .05$ for $\Delta\chi^2$ or $\Delta CFI > .01$ suggests a lack of invariance.

In order to obtain convergent evidence of validity, the correlations between SWJLS and other associated variables were examined: life satisfaction, loneliness, job-related emotional well-being and job satisfaction. Correlations were calculated in SPSS 23.

Additional to these Classical Test Theory-based analyses, the scale was analyzed via Item Response Theory (IRT) models. In particular, the Graded Response Model (GRM) was used (Samejima, 1997). This model is an extension of the 2-Parameter Logistic Model (2-PLM) to ordered polytomous items (Hambleton, van der Linden and Wells, 2010). It describes the behavior of each item with two types of parameters: discrimination (a) and difficulty (b). The discrimination parameter (a) determines the slope on which responses to the items change as a function of the level in the latent variable being measured. Item difficulty (b) parameters determine how challenging each item is. As the SWJLS has a 5-point scale, there are 4 response thresholds for each item. These thresholds indicate the level of the latent variable at which an individual has a 50% chance of scoring at or above a particular response category. Additionally, Item and Test Information Functions were calculated, in order to obtain information on the accuracy (reliability) of the scale across the range of values in the scale. These two approaches, IRT and CFA, have been employed because this way results are reinforced. CFA has the advantage of being confirmatory in nature, being able to test for theoretical plausible models, whereas IRT models produce sample-independent estimates of the parameters.

3. Results

3.1. Item-level analyses

Table 1 shows descriptive statistics of the items in the SWJLS. Means and standard deviations showed very similar results for all items. Likewise, evidence of univariate normality was observed in all cases, except

for item 5, which showed a slight negative kurtosis. On the other hand, the Mardia's statistic indicated that, as a whole, the data presented multivariate kurtosis, $b_{2,p} = 52.62$, $z = .21.16$, $p < .001$. Inter-item correlations are also presented in Table 1.

3.2. Confirmatory Factor Analysis

A one-factor model, the one theoretically sound for the scale, was specified and tested in the whole sample. This unidimensional model had a very good fit to the data. Robust $\chi^2(5) = 9.89$, $p = .078$; CFI = .993; RMSEA = .049, 90% CI [.000 - .094]; SRMR = .011. As can be seen in last column of Table 1, factor loadings are all large, and range from a minimum of .848 (item 5) to a maximum of .929 (item 3). Factor loadings averaged .885.

3.3. Reliability estimation

From the established factorial solution, coefficient omega was calculated, indicating high reliability ($\omega = .947$, 95% CI [.936, .956]). To examine the possibility of calculating coefficient alpha, the tau-equivalent model was compared to the congeneric model. This constrained model had worse fit than the one-factor CFA model without these constraints, both statistically ($\Delta\chi^2(4) = 18.27$, $p = .001$) and practically ($\Delta CFI = .011$). However, when computing coefficient alpha, this provided a punctual estimator identical to that of coefficient omega ($\alpha = .947$, 95% CI [.935, .955]).

3.4. Measurement invariance

A measurement invariance routine allowed to test for metric and scalar invariance in the SWJLS. Before starting with the invariance routine, the one-factor model was separately tested in men and women. For the sample of men ($n = 156$), fit may be considered excellent: Robust $\chi^2(5) = 8.38$, $p = .136$; CFI = .991; RMSEA = .066 CI [.000 - .141]; SRMR = .011. Similarly, for women ($n = 248$) fit was extremely similar: Robust $\chi^2(5) = 7.62$, $p = .178$; CFI = .996; RMSEA = .043 CI [.000 - .107]; SRMR = .013. Given that a one-factor solution was tenable for both samples, to test for measurement invariance is adequate. Therefore, a standard measurement invariance routine was used to test the equivalence of the scale across groups.

Model fit results for the sequence of models in the invariance routine are presented in Table 2. The configural model tests for the same one-factor structure in both samples simultaneously. This model fit is used as a baseline to be used for comparison against other, more constrained, models. The second model in the invariance routine is the metric invariance model. In this model, factor loadings are constrained to equality in both samples. Table 2 shows that there were statistically significant chi-square differences between this model and the configural at $p < .05$ but not at $p < .01$. Differences in practical fit were, nevertheless, negligible. Then, scalar invariance, in which both factor loadings and intercepts are constrained to equality in the two groups, was tested. In this case, both practical fit and chi-square differences showed that the new constraints on the intercepts were correctly imposed since the metric and scalar models fit the data equally well and without differences. Finally, strict invariance was tested. For strict invariance, residuals are also constrained to equality and model fit compared to the scalar model.

Table 1. Means (M), Standard Deviations (SD), skewness (g_1), kurtosis (g_2), inter-item correlations, and factor loadings of the items of the SWJLS.

Item	M	SD	g_1	g_2	1	2	3	4	5	λ
1	3.53	1.15	-.40	-.77	1					.861
2	3.27	1.20	-.17	-.92	.787	1				.906
3	3.49	1.21	-.39	-.80	.795	.855	1			.929
4	3.40	1.20	-.28	-.90	.761	.780	.813	1		.881
5	3.14	1.33	-.03	-1.22	.724	.753	.779	.787	1	.848

Table 2. Set of nested models to test for the measurement invariance of the SWJLS.

Model	χ^2	df	p	$\Delta\chi^2$	Δ df	p	CFI	Δ CFI	SRMR	RMSEA	90% CI
Configural	16.01	10	.099				.994		.013	.055	.000–.102
Metric	24.72	14	.037	10.37	4	.035	.989	.005	.048	.062	.015–.101
Scalar	29.29	18	.044	3.24	4	.518	.988	.001	.054	.056	.009–.091
Strict	40.16	23	.013	10.31	5	.067	.982	.006	.039	.061	.028–.092

Note: df = degrees of freedom; Δ = differences.

Fit results in Table 2 make clear that there were no significant differences between scalar and strict invariance models, and therefore we may conclude that the SWJLS is strictly invariant by gender.

3.5. Item Response Theory model

The 2-Parameter Logistic Model or graded response model was fitted to the data. A graded response model with two parameters was chosen because the scale has been found to be unidimensional, and the assumption of equal discrimination parameters (a 1 Parameter Logistic or Rasch Model) was not tenable. Given that discrimination parameters (a) in the IRT models are analytically similar to factor loadings in the CFA (Ferrando, 1996; Widaman and Reise, 1997), in order to test the plausibility of the 1PLM, we tested a one-factor CFA with all factor loadings in the five items constrained to the same value. Model fit was: Robust $\chi^2(9) = 23.90, p = .004; CFI = .984; RMSEA = .064$ CI [.033 - .096]; SRMR = .066. This constrained model worsens the fit of the one-factor CFA model without these constraints both statistically ($\Delta\chi^2(4) = 14.60, p = .006$) and practically ($\Delta CFI = .011$). Therefore, the 2PLM seems to be a more plausible IRT model for the SWJLS.

Discrimination and difficulties parameter estimates and their standard errors are presented in Table 3. Regarding the difficulties, a first important result is that estimates of the ordered thresholds monotonically increased, as expected. Item 3 is an example of one of the less “difficult” items, and item 5 an example of one of the more “difficult” items. b parameters associated to thresholds of every item were not close to each other, supporting the suitability of the alternatives. With respect to the discrimination parameters, all of them were extremely high, well above the value of 1 usually considered as good discrimination (Hambleton, van der Linden and Wells, 2010), and their magnitudes ordered the same as the factor loadings in the CFA, as expected.

Information Functions (IF) were calculated for both individual items and for the total of the scale. Figure 1 shows the Item IF (IIF) for the five items of the SWJLS. It is apparent in this figure that the most informative (reliable) item was item 3, whereas the less reliable was item 5. This is again in line with the results of the CFA. These IIFs, added up, form the test's Total Information Function (TIF), presented in Figure 2. It can be seen that the most information (reliability) of the scale is in the range -1.5 to 1, indicating that the instrument is especially useful for people with relatively low levels of satisfaction with their job.

3.6. Evidence of convergent validity

Table 4 shows the associations among the SWJLS and other measures of interest. As expected, we may see that the largest correlation is with

the SWLS, the instrument the SWJLS is derived from. On the other hand, the lowest correlation is with loneliness, which indicates that loneliness is related to job satisfaction, but it is clearly distinguishable. Finally, correlations with JAWS and JS are large, but also not as large as not being distinguishable.

4. Discussion

This research aimed to provide evidence about the psychometric properties of the SWJLS in a sample of Portuguese workers. To this end, procedures that are part of two psychometric models, CCT and IRT, were adopted. Specifically, the underlying factorial structure of SWJLS, its internal consistency, its relationship to other theoretically associated variables, measurement invariance with respect to gender, and the characteristics and performance of items were examined.

According to the CFA, the one-dimensional model of the SWJLS presents adequate fit, with factor loadings that vary from a minimum of .848 to a maximum of .929. These estimates are similar to those found in the original study (Neto and Fonseca, 2018) and are consistent with the underlying theoretical model in the construction of the scale, which is also one-dimensional (Diener et al., 1985). As indicated both by omega and alpha coefficient values, the internal consistency of the SWJLS was satisfactory. This result is similar to what was reported in the original SWJLS validation study conducted on immigrant workers in Portugal (Neto and Fonseca, 2018). In contrast to the original study, the current investigation estimated the internal consistency with the coefficient omega that indicates the proportion of variance attributed to the entire common variance (McDonald, 1999). Since this calculation is based on factor loadings, the omega coefficient reduces the risk of overestimating reliability (Waller, 2008). Getting good indicators of internal consistency is important since it allows for more precise interpretations of the relationship between one construct and another. In addition, it favors the diagnostic usefulness of the instrument, since a lack of consistency in the reported scores would provide inaccurate information about the psychological characteristics of those evaluated, in this case in their satisfaction with work life (John and Soto, 2007). Overall, the results of the CFA and the internal consistency show that the items of SWJLS measured satisfaction with work life consistently.

On the other hand, the correlations of the SWJLS with measures of satisfaction with life (SWLS), job-related emotional well-being (JAWS), job satisfaction (JSS) and loneliness (UCLA-6), were as expected. The positive association between the scores of the SWJLS and SWLS is consistent with previous research that showed a substantial relationship between satisfaction with overall life and its different domains (Bardo

Table 3. Parameter estimates of the two Parameter Logistic Model.

Item	a	SE	b ₁	SE	b ₂	SE	b ₃	SE	b ₄	SE
I1	3.78	.35	-7.04	.58	-3.13	.32	-.60	.25	3.07	.34
I2	5.15	.61	-7.51	.86	-3.10	.43	.56	.33	4.70	.56
I3	6.65	.94	-9.98	1.32	-5.03	.75	-.43	.41	4.37	.71
I4	4.32	.42	-6.81	.61	-2.99	.37	-.08	.28	3.55	.38
I5	3.47	.31	-4.44	.39	-1.32	.25	.61	.23	3.07	0.30

Note: a = discrimination parameters; b = difficulty parameters; SE = Standard Errors.

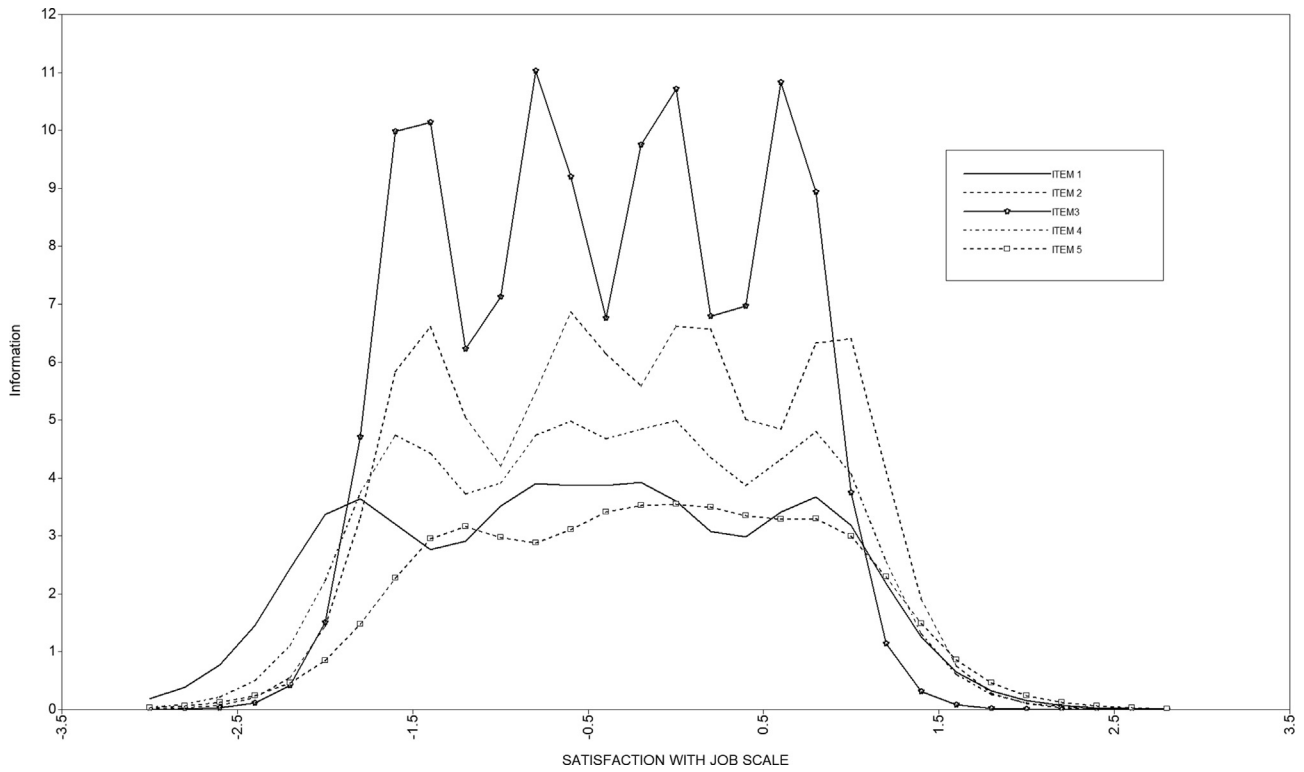


Figure 1. Item Information Functions for the five items of the SWJLS.

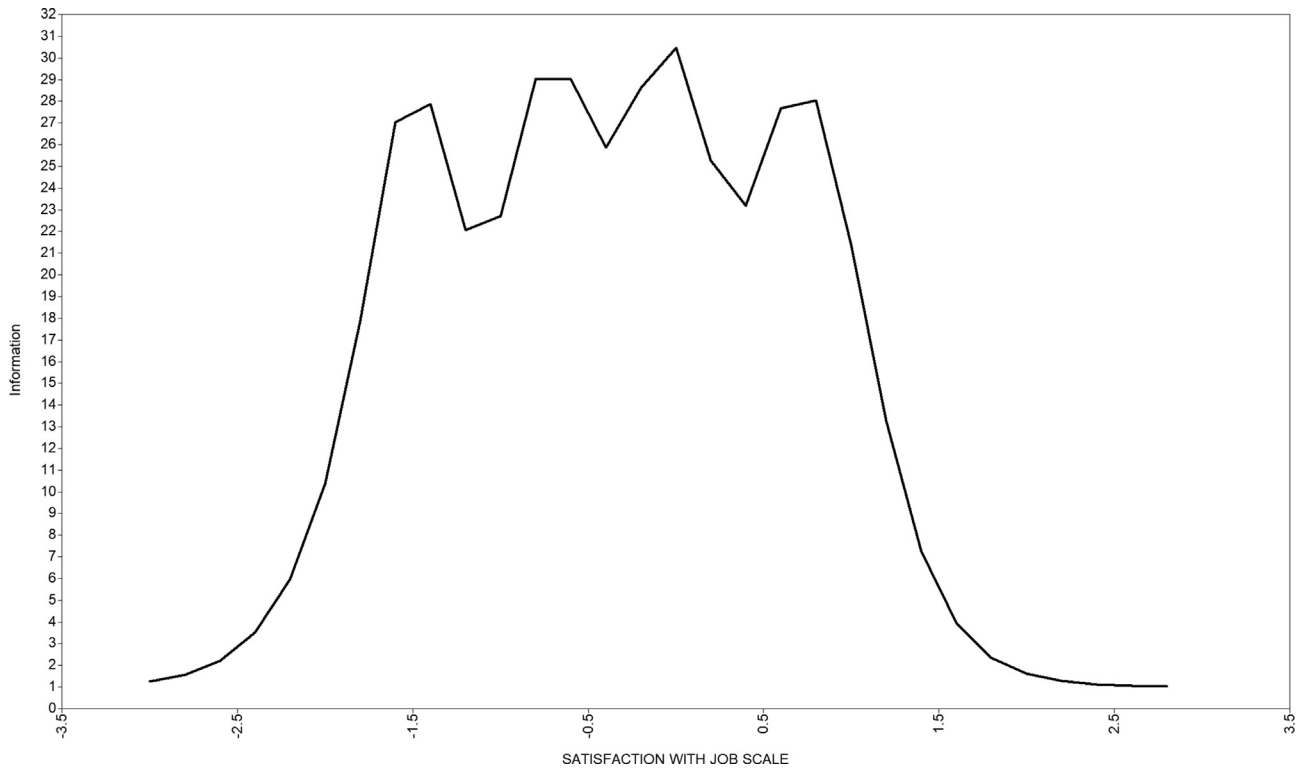


Figure 2. Test information function for the SWJLS.

and Yamashita, 2014; Caycho-Rodríguez et al., 2018; Neto, 2012; Neto and Fonseca, 2016, 2018; Ruiz, Neto, Munoz Sastre, Salvatore, Riviere and Mullet, 2009). This relationship indicates that while satisfaction with work-life and SWL in general share a common variation, they cannot be considered equivalent constructs (Diener et al., 1985).

Similarly, work-life satisfaction was positively correlated with job-related emotional well-being. While the link between both variables is significant, the literature suggests that these can express different aspects on how employees feel about their job (Rafaeli et al., 2009; Wright and Cropanzano, 2000; Wright and Bonett, 2007). Thus, both job-related

Table 4. Associations between the SWJLS and other variables of interest.

	SWLS	ULS-6	JAWS	JSS	SWJLS
SWLS	1				
ULS-6	-.402	1			
JAWS	.551	-.497	1		
JSS	.618	-.509	.663	1	
SWJLS	.808	-.455	.628	.742	1

Note: SWLS = Satisfaction with Life Scale; UCL-6 = UCLA Loneliness Scale, Short Form; JAWS = Job related Affective Well-being Scale; JSS = Job Satisfaction; SWJLS = Satisfaction with Job Life Scale.

emotional well-being and work-life satisfaction appear necessary for the improved understanding of the SWB of employees (Wilks and Neto, 2013). On the other hand, a lower perception of loneliness was related to a higher SWJLS score, a result that is consistent with previous studies (Aytac, 2015; Doğan, Çetin and Sungur, 2009; Neto and Fonseca, 2018; Wright et al., 2006). In this sense, more evidence is provided to consider loneliness as a factor of occupational risk that can physically, socially and psychologically affect employees of an organization and reduce their productivity (Aytac, 2015). This outcome may result from the fact that the individuals perceiving more intense loneliness are less self-confident and tend to lose their belief in their ability to succeed. This sensing of imminent failure would then be associated with greater dissatisfaction with their work and would, in turn, generate a significant loss of efficiency in their workplace (Tabançali, 2016; Yilmaz, 2011). This situation, along with higher levels of stress, would make the employee insecure, aggressive and introverted, worsening relations with their colleagues and deepening his/her loneliness. Overall, these findings contribute to the extensive and increasing literature that considers job satisfaction to be a measure of worker's well-being (Warr, 2002).

The measurement invariance analysis offers evidence that allows us to consider that one instrument can measure the same construct in different groups (Cheung and Rensvold, 2002). Specifically, the configural invariance established that the factorial structure of SWJLS remained invariant across gender, indicating that Portuguese workers of both sexes conceptualized satisfaction with work-life in the same one-dimensional structure. The metric invariance demonstrated that the relationships between the SWJLS items and the latent construct were invariable between groups, implying that the workers responded in the same way to the items, regardless of their gender. In addition, the scalar invariance test established that the relationship between the observed and latent scores of SWJLS is invariant, suggesting that a change in latent scores would cause the same modification in the observed SWJLS scores of men and women. Finally, the strict invariance showed that the error variations in the SWJLS remained invariant between the compared groups, i.e. the measurement error for each item was constant across gender. Therefore, the SWJLS measures the same construct in Portuguese workers of both sexes. A direct implication of this finding is that the SWJLS can be used to effect comparisons between the two groups of Portuguese workers. In addition, the result of the factorial invariance can be considered as further evidence of the validity and reliability of the SWJLS. To the best of our knowledge, this is the first study that has tested and found factorial invariance of the SWJLS between men and women.

As mentioned, this study also used the IRT approach that is useful for one-dimensional models and allows for more realistic information about the measurement error and estimating sample-independent parameters (Embretson and Reise, 2000; Zickar and Broadfoot, 2009). The results showed that the difficulty parameter was adequate and that the SWJLS has highly difficult items (item 5: "If I could live my work life over, I would change almost nothing") and less difficult (item 3: "I am satisfied with my work life"). That is, higher levels of job-life satisfaction are required to choose the higher response options (high satisfaction). Similarly, it is noted that item 3 requires a very low level of satisfaction with work-life to increase the likelihood of choosing the lower response options. Moreover, all items were highly discriminatory, especially item

3, indicating that it may be easier to respond to more general questions because of the difficulty associated with the self-reporting of specific states (Smallwood et al., 2007). In addition, the reliability decreased at the highest levels of this trait, where items 5 and 3 were the least and most reliable respectively. The range where most information on the scale is located (-1.5 to 1) indicates that SWJLS is useful and reliable, especially in identifying people with low levels of job satisfaction.

4.1. Limitations

The study presented some limitations that must be mentioned. First, the data come from self-reporting measures that can generate socially desirable responses. Extant scholarly literature suggests that people report higher levels of SWL when they interact directly with others and report lower levels when they do so through anonymous interviews (Schwarz et al., 1991). This also causes an uncontrolled source of error of common variance.

Second, the study was predominantly conducted with middle class Caucasian workers who were selected through a non-probabilistic sampling. Thus, caution should be exerted when generalizing the findings for Portuguese workers from other cultural contexts. In recent years, varied studies have reported the direct relationship between culture and job satisfaction (Onyemah et al., 2018). Satisfaction levels may vary in different cultural contexts within a country and also among different nations (Pepe et al., 2017; Rozkwitalska, 2017). Additionally, evidence reports positive relations among cultural collectivism, and job satisfaction (Gurbuz et al., 2018) and that interactions among different cultural groups within an organization may satisfy individuals needs for growing, thus generating a positive impact on satisfaction (Stahl et al., 2010). On the other hand, several studies consider interactions among culturally different groups to be problematic and to cause negative consequences on job satisfaction (Lauring and Klitmöller, 2015). Therefore, it is necessary to carry out additional studies with more heterogeneous cultural samples to generate more evidence of external validity.

Thirdly, our data are cross-sectional, which prevents analyzing the dynamic nature of job satisfaction over time. Within the context of individual experiences at work, time is an important, but poorly studied, factor that is related to variations in job satisfaction (Dobrow Riza, Ganzach and Liu, 2018). Therefore, to further investigate this problem, the most effective methodology is longitudinal, which simultaneously considers variables such as age, salary, development opportunities and others in relation to job satisfaction over a period of time (Cavanagh et al., 2019; Dobrow Riza et al., 2018).

Fourth, it was only demonstrated that factor invariance was maintained when comparing groups of male and female workers. Therefore, future studies should compare other groups, such as age, service time, among others. For example, although most research concludes that satisfaction with working life increases with age (Ng and Feldman, 2010), other findings indicate that these changes may follow non-linear patterns (Dobrow Riza et al., 2018). To be certain that the results are the product of real variations in the construct satisfaction with working life and not the measuring instrument, it should be contrasted that different groups (of ages or service time, etc.) conceptualize the construct, measured by the SWJLS, in the same way. Therefore, the invariance

would demonstrate the ability of the SWJLS to assess satisfaction with working life in the same way and with equal precision, not only in men and women, but also among other groups.

5. Conclusion

Despite its limitations, this research concludes that the SWJLS shows internal consistency, adequate one-dimensional structure, an empirical relationship with other theoretically associated constructs, and an invariant factorial structure between workers of both genders. Thus, the results support the use of SWJLS as an appropriate tool to measure, globally, the satisfaction with work life of female and male workers, especially those with low levels of job satisfaction.

This study has made some contributions. It is the first to perform a factorial invariance analysis of the SWJLS. The combination of IRT and CTT (SEM, and particularly CFA) models also allows for a better understanding of the psychometric properties of SWJLS. In addition, due to its short five-item format, SWJLS offers a quick and optimal way to measure a person's overall satisfaction regarding his/her work-life. From an applied perspective the findings could serve to expand research on job satisfaction within the Portuguese context. In this sense, the SWJLS would identify those workers with lower levels of job satisfaction in order to develop practical interventions that seek to improve their attitudes at work.

Declarations

Author contribution statement

T. Caycho-Rodríguez: Conceived and designed the experiments; Wrote the paper.

J. Neto, F. Neto, J. Ventura-León, M. Reyes-Bossio: Contributed reagents, materials, analysis tools or data; Wrote the paper.

P. D. Valencia, J. M. Tomás, L. W. Vilca: Analyzed and interpreted the data; Wrote the paper.

Funding statement

This study has been partially funded by the aid program Challenges of the Ministry of Science, Innovation and Universities, Spain [RTI2018-093321-B-I00], the aid program for Special Actions of the Vice-Rectorate for Research of the University of Valencia, Spain [AE18-777619] and fund 20194003 of the Universidad Privada del Norte.

Competing interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

Appendix 1

Satisfaction with Job Life Scale (SWJLS)

1. Em muitos aspectos a minha vida de trabalho aproxima-se dos meus ideais
2. As condições da minha vida de trabalho são excelentes
3. Estou satisfeito(a) com a minha vida de trabalho.
4. Até agora consegui obter aquilo que era importante na vida de trabalho
5. Se pudesse viver a minha vida de trabalho de novo, não mudaria quase nada.

Satisfaction with Life Scale (SWLS)

1. Em muitos aspetos a minha vida aproxima-se dos meus ideais
2. As condições da minha vida são excelentes
3. Estou satisfeito(a) com a minha vida
4. Até agora consegui obter aquilo que era importante na vida
5. Se pudesse viver a minha vida de novo, não mudaria quase nada.

Revised UCLA Loneliness Scale (ULS-6)

1. Sinto falta de camaradagem
2. Sinto que faço parte de um grupo de amigos
3. Sinto-me excluído(a)
4. Sinto-me isolado(a) dos outros
5. Sou infeliz por ser tão retraído(a)
6. As pessoas estão à minha volta, mas não estão comigo

Job-Related Affective Well-being Scale (JAWS)

7. Entusiasmado
8. Satisfeito
9. Ansioso
10. Melancólico
11. Otimista
12. Confortável
13. Tenso
14. Deprimido
15. Interessado
16. Relaxado
17. Preocupado
18. Infeliz

Job Satisfaction Scale (JSS)

1. Condições físicas de trabalho.
2. Liberdade para escolher o modo como trabalho.
3. Os colegas de trabalho.
4. Reconhecimento pelo trabalho que faço
5. O superior hierárquico imediato.
6. A responsabilidade que me é atribuída.
7. O vencimento e outras remunerações recebidas.
8. Oportunidades para usar os meus conhecimentos e competências.
9. Relações das chefias com os empregados da organização.
10. Possibilidades de ser promovido e de ter uma carreira na organização.
11. O modo como a organização é gerida.
12. A atenção dada às sugestões que faço.
13. Horário de trabalho.
14. Variedade de tarefas que fazem parte da minha função.
15. Segurança de emprego.
16. Stress no trabalho.

References

- Abele, A.E., Hagmaier, T., Spurk, D., 2016. Does career success make you happy? The mediating role of multiple subjective success evaluations. *J. Happiness Stud.* 17 (4), 1615–1633.
- Allan, B.A., Dexter, C., Kinsey, R., Parker, S., 2018. Meaningful work and mental health: job satisfaction as a moderator. *J. Ment. Health* 27 (1), 38–44.
- Aytac, S., 2015. Loneliness as mediator between job satisfaction and intention to leave: a study on prison staff in Turkey. *Arabian J. Bus. Manag. Rev. (AJBMR)* 5 (6), 1–4.
- Bakır, A.A., Aslan, M., 2017. Examining the relationship between principals' organizational loneliness and job satisfaction levels. *J. Stud. Int. Educ.* 3 (6), 50–71.
- Bardo, A.R., Yamashita, T., 2014. Validity of domain satisfaction across cohorts in the US. *Soc. Indic. Res.* 117 (2), 367–385.

- Birgisdóttir, K.H., Hauksdóttir, A., Ruhm, C., Valdimarsdóttir, U.A., Ásgeirsdóttir, T.L., 2020. The effect of the economic collapse in Iceland on the probability of cardiovascular events. *Econ. Hum. Biol. In Press*.
- Borra, C., Gómez-García, F., 2016. Wellbeing at work and the great recession: the effect of others' unemployment. *J. Happiness Stud.* 17 (5), 1939–1962.
- Bowling, N.A., Eschleman, K.J., Wang, Q., 2010. A meta-analytic examination of the relationship between job satisfaction and subjective well-being. *J. Occup. Organ. Psychol.* 83 (4), 915–934.
- Bowling, N.A., Wagner, S.H., Beehr, T.A., 2018. The facet satisfaction scale: an effective affective measure of job satisfaction facets. *J. Bus. Psychol.* 33 (3), 383–403.
- Cavanagh, T.M., Kraiger, K., L. Henry, K., 2019. Age-related changes on the effects of job characteristics on job satisfaction: a longitudinal analysis. *Int. J. Aging Hum. Dev.* Article first published online.
- Caycho-Rodríguez, T., 2017. Intervalos de Confianza para el coeficiente alfa de Cronbach: aportes a la investigación pediátrica. *Acta pediatri.* Méx. 38 (4), 291.
- Caycho-Rodríguez, T., Ventura-León, J., Barboza-Palomino, M., Reyes-Bossio, M., Gallegos, W.L.A., Cadena, C.H.G., Cahua, J.C.H., 2018. Validez e invarianza factorial de una medida breve de Satisfacción con la Vida Familiar. *Universitas Psychologica* 17 (5), 1–17.
- Chatrakul Na Ayudhya, U., Prouska, R., Beauregard, T.A., 2019. The impact of global economic crisis and austerity on quality of working life and work-life balance: a capabilities perspective. *Eur. Manag. Rev.* 16 (4), 847–862.
- Charles, A., Wu, D., Wu, Z., 2019. Economic shocks on subjective well-being: Re-assessing the determinants of life-satisfaction after the 2008 financial crisis. *J. Happiness Stud.* 20 (4), 1041–1055.
- Cheung, G.W., Rensvold, R.B., 2002. Evaluating goodness-of-fit indexes for testing measurement invariance. *Struct. Equ. Model.* 9 (2), 233–255.
- Collins, B.J., Burrus, C.J., Meyer, R.D., 2014. Gender differences in the impact of leadership styles on subordinate embeddedness and job satisfaction. *Leader. Q.* 25 (4), 660–671.
- Ćulibrk, J., Delić, M., Mitrović, S., Ćulibrk, D., 2018. Job satisfaction, organizational commitment and job involvement: the mediating role of job involvement. *Front. Psychol.* 9, 132.
- da Costa, M.P., Neto, F., 2019. Psychometric evaluation of the Portuguese satisfaction with family life scale. *Meas. Instrum. Soc. Sci.* 1 (1), 2.
- De Cuyper, N., Piccoli, B., Fontinha, R., De Witte, H., 2019. Job insecurity, employability and satisfaction among temporary and permanent employees in post-crisis Europe. *Econ. Ind. Democr.* 40 (2), 173–192.
- Dalal, R.S., Credé, M., 2013. Job satisfaction. In: Geisinger, K.F. (Ed.), *American Psychological Association Handbook of Testing and Assessment in Psychology: Vol. 1: Test Theory and Testing and Assessment in Industrial and Organizational Psychology*. American Psychological Association, Washington DC, USA, pp. 675–691.
- Demirci, Ş., Konca, M., Yetim, B., İlgin, G., 2020. Effect of economic crisis on suicide cases: an ARDL bounds testing approach. *Int. J. Soc. Psychiatr.* 66 (1), 34–40.
- De Vogli, R., De Falco, R., Mattei, G., 2019. Excess suicides due to the global economic crisis in Italy: an update. *Epidemiol. Prev.* 43 (2-3), 111.
- Diener, E.D., Emmons, R.A., Larsen, R.J., Griffin, S., 1985. The satisfaction with life scale. *J. Pers. Assess.* 49 (1), 71–75.
- Diener, E., Lucas, R.E., Oishi, S., 2018a. Advances and open questions in the science of subjective well-being. *Collabra Psychol.* 4 (1), 15.
- Diener, E., Oishi, S., Lucas, R.E., 2015. National accounts of subjective well-being. *Am. Psychol.* 70 (3), 234–242.
- Diener, E., Oishi, S., Ryan, K.L., 2013. Universals and cultural differences in the causes and structure of happiness: a multilevel review. In: Keyes, C. (Ed.), *Mental Well-Being*. Springer, Dordrecht, Netherlands, pp. 153–176.
- Diener, E., Oishi, S., Tay, L., 2018b. Advances in subjective well-being research. *Nat. Hum. Behav.* 2 (4), 253–260.
- Dobrow Riza, S., Ganzach, Y., Liu, Y., 2018. Time and job satisfaction: a longitudinal study of the differential roles of age and tenure. *J. Manag.* 44 (7), 2558–2579.
- Dogan, T., Çetin, B., Sungur, M.Z., 2009. Is Yasaminda Yalnzlik Ölçeği Türkçe formunun geçerlilik ve güvenilirlik çalışması [reliability and validity of the Turkish version of loneliness at work scale]. *Anadolu Psikiyatri Dergisi* 10 (4), 271–277.
- Domínguez-Lara, S.A., Merino-Soto, C., 2015. ¿Por qué es importante reportar los intervalos de confianza del coeficiente alfa de Cronbach? *Rev. Latinoam. Cienc Soc. Niñez Juventud.* 13 (2), 1326–1328.
- Dunn, T.J., Baguley, T., Brunsden, V., 2014. From alpha to omega: a practical solution to the pervasive problem of internal consistency estimation. *Br. J. Psychol.* 105 (3), 399–412.
- Embretson, S.E., Reise, S.P., 2000. *Item Response Theory for Psychologists*. Lawrence Erlbaum, Mahwah, NJ.
- Emerson, S.D., Guhn, M., Gadermann, A.M., 2017. Measurement invariance of the Satisfaction with Life Scale: reviewing three decades of research. *Qual. Life Res.* 26 (9), 2251–2264.
- Erdogan, B., Bauer, T.N., Truxillo, D.M., Mansfield, L.R., 2012. Whistle while you work: a review of the life satisfaction literature. *J. Manag.* 38 (4), 1038–1083.
- Eurofound, 2013. *Tackling Undeclared Work in 27 European Union Member States and Norway: Approaches and Measures since 2008*. Eurofound, Dublin.
- Ferrando, P.J., 1996. Calibration of invariant item parameter in a continuous item response model using the extended LISREL measurement submodel. *Multivariate Behav. Res.* 31, 419–439.
- Ferrando, P.J., Anguiano-Carrasco, C., 2010. El análisis factorial como técnica de investigación en psicología [Factor analysis as a research technique in psychology]. *Papeles del Psicólogo* 31 (1), 18–33.
- Frasquilho, D., Matos, M.G., Salonna, F., Guerreiro, D., Storti, C.C., Gaspar, T., Caldas-de-Almeida, J.M., 2015. Mental health outcomes in times of economic recession: a systematic literature review. *BMC Publ. Health* 16 (1), 115.
- Garg, K., Dar, I.A., Mishra, M., 2018. Job satisfaction and work engagement: a study using private sector bank managers. *Adv. Develop. Hum. Resour.* 20 (1), 58–71.
- Gonza, G., Burger, A., 2017. Subjective well-being during the 2008 economic crisis: identification of mediating and moderating factors. *J. Happiness Stud.* 18 (6), 1763–1797.
- Gurbuz, S., Costigan, R., Teke, K., 2018. Does being positive work in a mediterranean collectivist culture? Relationship of core self-evaluations to job satisfaction, life satisfaction, and commitment. *Curr. Psychol.* 1–16. In press.
- Hagmaier, T., Abele, A.E., Goebel, K., 2018. How do career satisfaction and life satisfaction associate? *J. Manag. Psychol.* 33 (2), 142–160.
- Hambleton, R.K., van der Linden, W.J., Wells, C.S., 2010. IRT models for the analysis of polytomously scored data: brief and selected history of model building advances. In: Nering, M.L., Ostini, R. (Eds.), *Handbook of Polytomous Item Response Models*. Routledge, New York, NY, pp. 21–42.
- Habibov, N., Afandi, E., 2015. Pre-and post-crisis life-satisfaction and social trust in transitional countries: an initial assessment. *Soc. Indic. Res.* 121 (2), 503–524.
- Helliwell, J.F., Huang, H., Wang, S., 2014. Social capital and well-being in times of crisis. *J. Happiness Stud.* 15 (1), 145–162.
- Hill, M.M., Hill, A., 2012. *Investigação por questionário*. Editora Sílabo, Lisboa.
- Holmberg, C., Caro, J., Sobis, I., 2018. Job satisfaction among Swedish mental health nursing personnel: revisiting the two-factor theory. *Int. J. Ment. Health Nurs.* 27 (2), 581–592.
- Hora, G.P.R., Júnior, R.R., de Souza, M.A., 2018. State of the art of job satisfaction measures: a systematic review. *Trends Psychol.* 26 (2), 987–1002.
- Hu, L., Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct. Equ. Model.* 6 (1), 1–55.
- Hünefeld, L., Gerstenberg, S., Hüfmeier, J., 2019. Job satisfaction and mental health of temporary agency workers in Europe: a systematic review and research agenda. *Work. Stress* 1–29. In press.
- John, O.P., Soto, C.J., 2007. The importance of being valid: reliability and the process of construct validation. In: Robins, R.W., Fraley, R.C., Kruger, F. (Eds.), *Handbook of Research Methods in Personality Psychology*. Guilford Press, New York, NY, pp. 461–494.
- Jovanović, V., 2016. The validity of the Satisfaction with Life Scale in adolescents and a comparison with single-item life satisfaction measures: a preliminary study. *Qual. Life Res.* 25 (12), 3173–3180.
- Kaplan, S.A., Warren, C.R., Barsky, A.P., Thoresen, C.J., 2009. A note on the relationship between affect(ivity) and differing conceptualizations of job satisfaction: some unexpected meta-analytic findings. *Eur. J. Work. Organ. Psychol.* 18 (1), 29–54.
- Karin Andreassi, J., Lawter, L., Brockerhoff, M., J. Rutigliano, P., 2014. Cultural impact of human resource practices on job satisfaction: a global study across 48 countries. *Cross Cult. Manag.* 21 (1), 55–77.
- Kokaliari, E., 2018. Quality of life, anxiety, depression, and stress among adults in Greece following the global financial crisis. *Int. Soc. Work* 61 (3), 410–424.
- Koutsimpou, P., Gourgoulis, K., Economou, A., Raftopoulos, V., 2019. Health status of patients who suffer from acute and chronic respiratory diseases in Greece in the era of economic crisis. *Adv. Respir. Med.* 87 (3), 167–174.
- Lallement, M., 2011. Europe and the economic crisis: forms of labour market adjustment and varieties of capitalism. *Work. Employ. Soc.* 25 (4), 627–641.
- Lauring, J., Klitmöller, A., 2015. Corporate language-based communication avoidance in MNCs: a multi-site ethnography approach. *J. World Bus.* 50 (1), 46–55.
- Lepold, A., Tanzer, N., Bregenzner, A., Jiménez, P., 2018. The efficient measurement of job satisfaction: facet-items versus facet scales. *Int. J. Environ. Res. Publ. Health* 15 (7), 1362.
- Liu, J., Zhu, B., Wu, J., Mao, Y., 2019. Job satisfaction, work stress, and turnover intentions among rural health workers: a cross-sectional study in 11 western provinces of China. *BMC Fam. Pract.* 20 (1), In press.
- McDonnell, A., Burgess, J., 2013. The impact of the global financial crisis on managing employees. *Int. J. Manpow.* 34 (3), 84–197.
- Mardia, K.V., 1970. Measures of multivariate skewness and kurtosis with applications. *Biometrika* 57 (3), 519–530.
- Mathieu, C., Fabi, B., Lacoursière, R., Raymond, L., 2016. The role of supervisory behavior, job satisfaction and organizational commitment on employee turnover. *J. Manag. Organ.* 22 (1), 113–129.
- Martin-Carrasco, M., Evans-Lacko, S., Dom, G., Christodoulou, N.G., Samochowiec, J., González-Fraile, E., Wasserman, D., 2016. EPA guidance on mental health and economic crises in Europe. *Eur. Arch. Psychiatr. Clin. Neurosci.* 266 (2), 89–124.
- Medel-Herrero, Á., Gómez-Beneyto, M., 2019. Impacto de la crisis económica del 2008 en el número de jóvenes hospitalizados por patología psiquiátrica. *Rev. Psiquiatría Salud Ment.* 12 (1), 28–36.
- McDonald, R.P., 1999. *Test Theory: A Unified Treatment*. Lawrence Erlbaum Associates, Inc, Mahwah.
- Moreno-Lostao, A., Guerras, J.M., Lostao, L., de la Fuente, L., Martínez, D., Rodríguez-Artalejo, F., Regidor, E., 2019. Cardiovascular mortality and risk behaviours by degree of urbanization before, during and after the economic crisis in Spain. *BMC Publ. Health* 19 (1), 1–9.
- Mucci, N., Giorgi, G., Roncaioli, M., Perez, J.F., Arcangeli, G., 2016. The correlation between stress and economic crisis: a systematic review. *Neuropsychiatric Dis. Treat.* 12, 983–993.
- Munoz Sastre, M.T., Vainsonneau, G., Neto, F., Girard, M., Mullet, E., 2003. Forgiveness and satisfaction with life. *J. Happiness Stud.* 4, 323–335.
- Muthén, B., du Toit, S.H.C., Spisic, D., 1997. *Robust Inference Using Weighted Least Squares and Quadratic Estimating Equations in Latent Variable Modeling with Categorical and Continuous Outcomes*. Retrieved from: https://www.statmodel.com/download/Article_075.pdf.
- Neto, F., 1992. Loneliness among Portuguese adolescents. *Soc. Behav. Pers.* 20 (1), 15–22.

- Neto, F., 1993. The satisfaction with life scale: psychometrics properties in an adolescent sample. *J. Youth Adolesc.* 22 (2), 125–134.
- Neto, F., 1995. Predictors of satisfaction with life among second generation migrants. *Soc. Indic. Res.* 35 (1), 93–116.
- Neto, F., 2005. The satisfaction with love life scale. *Meas. Eval. Counsel. Dev.* 38 (1), 2–13.
- Neto, F., 2012. The satisfaction with sex life scale. *Meas. Eval. Counsel. Dev.* 45 (1), 18–31.
- Neto, F., 2014. Psychometric analysis of the short-form UCLA Loneliness Scale (ULS-6) in older adults. *Eur. J. Ageing* 11 (4), 313–319.
- Neto, F., Fonseca, A.C.M., 2016. The satisfaction with migration life scale. *Int. J. Intercult. Relat.* 54, 47–54.
- Neto, F., Fonseca, A.C.M., 2018. The satisfaction with job life scale Among immigrants. *Psychol. Stud.* 63 (3), 209–218.
- Neto, F., Wilks, D.C., Fonseca, A.C.M., 2019. Job-related well-being of immigrants. *Soc. Indic. Res.* 141 (1), 463–475.
- Ng, T.W., Feldman, D.C., 2010. The relationships of age with job attitudes: a meta-analysis. *Person. Psychol.* 63 (3), 677–718.
- Onyemah, V., Rouziès, D., Iacobucci, D., 2018. Impact of religiosity and culture on salesperson job satisfaction and performance. *Int. J. Cross Cult. Manag.* 18 (2), 191–219.
- Pepe, A., Addimando, L., Veronese, G., 2017. Measuring teacher job satisfaction: assessing invariance in the teacher job satisfaction scale (TJSS) across six countries. *Eur. J. Psychol.* 13 (3), 396–416.
- Peters, G.Y., 2014. The alpha and the omega of scale reliability and validity: why and how to abandon Cronbach's alpha and the route towards more comprehensive assessment of scale quality. *Eur. Health Psychol.* 16, 56–69.
- Phillips, S.G., Masih, E., 2019. Impact of job satisfaction on performance of women employee of banking industry-A study in Kanpur city. *Asian J. Manag.* 10 (4), 394–399.
- Pilipiec, P., Groot, W., Pavlova, M., 2019. A longitudinal analysis of job satisfaction during a recession in The Netherlands. *Soc. Indic. Res.* In press 1–31.
- Rafaeli, A., Semmer, N., Tschan, F., 2009. Emotion in work settings. In: Sanders, D., Scherer, K. (Eds.), *Oxford Companion to Affective Sciences*. RJ, Oxford, pp. 414–416.
- Rahman, M.H., Fatema, M.R., Ali, M.H., 2019. Impact of motivation and job satisfaction on employee's performance: an empirical study. *Asian J. Econ. Bus. Account.* 10 (4), 1–10.
- Raykov, T., 2012. Scale construction and development using structural equation modeling. In: Hoyle, R.H. (Ed.), *Handbook of Structural Equation Modeling*. Guilford Press, Nueva York, pp. 472–492.
- Rhemtulla, M., Brosseau-Liard, P.É., Savalei, V., 2012. When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychol. Methods* 17 (3), 354–373.
- Rojas, M., 2006. Life satisfaction and satisfaction in domains of life: ¿Is it a simple relationship? *J. Happiness Stud.* 7 (4), 467–497.
- Rozkwitalska, M., 2017. Job satisfaction and subjective well-being in the multicultural workplace. In: Rozkwitalska, M., Sulkowski, L., Magala, S. (Eds.), *Intercultural Interactions in the Multicultural Workplace*. Springer, Cham, pp. 123–135.
- Russell, D., Peplau, L.A., Cutrona, C.E., 1980. The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. *J. Pers. Soc. Psychol.* 39 (3), 472–480.
- Samejima, F., 1997. Graded response model. In: Van der Linden, W.J., Hambleton, R.K. (Eds.), *Handbook of Modern Item Response Theory*. Springer, New York, NY, pp. 85–100.
- Sánchez-Sánchez, N., Namkee, A., 2018. Is job satisfaction of high-level managers and self-employed more pro-cyclical than normal employees? *Int. J. Manpow.* 39 (6), 800–819.
- Satuf, C., Monteiro, S., Pereira, H., Esgalhado, G., Marina Afonso, R., Loureiro, M., 2018. The protective effect of job satisfaction in health, happiness, well-being and self-esteem. *Int. J. Occup. Saf. Ergon.* 24 (2), 181–189.
- Schwarz, N., Strack, F., Hippler, H.J., Bishop, G., 1991. The impact of administration mode on response effects in survey measurement. *Appl. Cognit. Psychol.* 5 (3), 193–212.
- Shrivastava, A., Lodha, P., De Sousa, A., Singh, N., 2019. Economic recession and mental health: an analysis. In: Javed, A., Fountoulakis, K.N. (Eds.), *Advances in Psychiatry*. Springer, Cham, pp. 679–695.
- Silva, M., Resurrección, D.M., Antunes, A., Frasilho, D., Cardoso, G., 2020. Impact of economic crises on mental health care: a systematic review. *Epidemiol. Psychiatr. Sci.* 29, e7.
- Smallwood, J., McSpadden, M., Schooler, J.W., 2007. The lights are on but no one's home: meta-awareness and the decoupling of attention when the mind wanders. *Psychon. Bull. Rev.* 14 (3), 527–533.
- Stahl, G.K., Mäkelä, K., Zander, L., Maznevski, M.L., 2010. A look at the bright side of multicultural team diversity. *Scand. J. Manag.* 26 (4), 439–447.
- Tabanali, E., 2016. The relationship between teachers' job satisfaction and loneliness at the workplace. *Eurasian J. Educ. Res.* 16 (66), 263–280.
- Van Saane, N., Sluiter, J.K., Verbeek, J.H.A.M., Frings-Dresen, M.H.W., 2003. Reliability and validity of instruments measuring job satisfaction—a systematic review. *Occup. Med.* 53 (3), 191–200.
- Ventura-León, J.L., 2017. Intervalos de confianza para coeficiente Omega: propuesta para el cálculo [Confidence intervals for Omega coefficient: proposal for calculus]. *Adicciones* 30 (1), 77.
- Vigan, F.A., Giauque, D., 2018. Job satisfaction in African public administrations: a systematic review. *Int. Rev. Adm. Sci.* 84 (3), 596–610.
- Viseu, J., Leal, R., de Jesus, S.N., Pinto, P., Pechorro, P., Greenglass, E., 2018. Relationship between economic stress factors and stress, anxiety, and depression: moderating role of social support. *Psychiatr. Res.* 268, 102–107.
- Waller, N.G., 2008. Commingled samples: a neglected source of bias in reliability analysis. *Appl. Psychol. Meas.* 32, 211–223.
- Warr, P., 1990. The measurement of well-being and other aspects of mental health. *J. Occup. Psychol.* 63 (3), 193–210.
- Warr, P., 2002. The study of well-being, behaviour and attitudes. In: Warr, P. (Ed.), *Psychology at Work*. Penguin Books, London, pp. 1–25.
- Warr, P.B., Cook, J., Wall, T.D., 1979. Scales for the measurement of work attitudes and aspects of psychological well-being. *J. Occup. Psychol.* 52 (2), 129–148.
- Widaman, K.F., Reise, S.P., 1997. Exploring the measurement invariance of psychological instruments: applications in the substance use domain. In: Bryant, K.J., Windle, M., West, S.G. (Eds.), *The Science of Prevention*. American Psychological Association, Washington, DC, pp. 281–324.
- Wilks, D.C., Neto, F., 2013. Workplace well-being, gender and age: examining the 'double jeopardy' effect. *Soc. Indic. Res.* 114 (3), 875–890.
- Wright, S.L., Burt, C.D.B., Strongman, K.T., 2006. Loneliness in the workplace: construct definition and scale development. *N. Z. J. Psychol.* 35 (2), 59–68.
- Wright, T.A., Bonett, D.G., 2007. Job satisfaction and psychological well-being as nonadditive predictors of workplace turnover. *J. Manag.* 33 (2), 141–160.
- Wright, T.A., Cropanzano, R., 2000. Psychological well-being and job satisfaction as predictors of job performance. *J. Occup. Health Psychol.* 5 (1), 84–94.
- Yilmaz, E., 2011. An investigation of teachers' loneliness in the workplace in terms of human values they possess. *Afr. J. Bus. Manag.* 5 (13), 5070–5075.
- Yuan, K.-H., Bentler, P.M., 2000. Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. *Socio. Methodol.* 30 (1), 165–200.
- Zabriske, R.B., Ward, P., 2013. Satisfaction with family life scale. *Marriage Fam. Rev.* 49, 446–463.
- Zickar, M., Broadfoot, A., 2009. The partial revival of a dead horse? Comparing classical test theory and item response theory. In: Lance, C.E., Vandenberg, R.J. (Eds.), *Statistical and Methodological Myths and Urban Legends: Doctrine, Verity and Fable in the Organizational and Social Sciences*. Routledge, New York, NY, pp. 37–59.
- Zozaya, N., Vallejo, L., 2020. The effect of the economic crisis on adolescents' perceived health and risk behaviors: a multilevel analysis. *Int. J. Environ. Res. Publ. Health* 17 (2), 643.