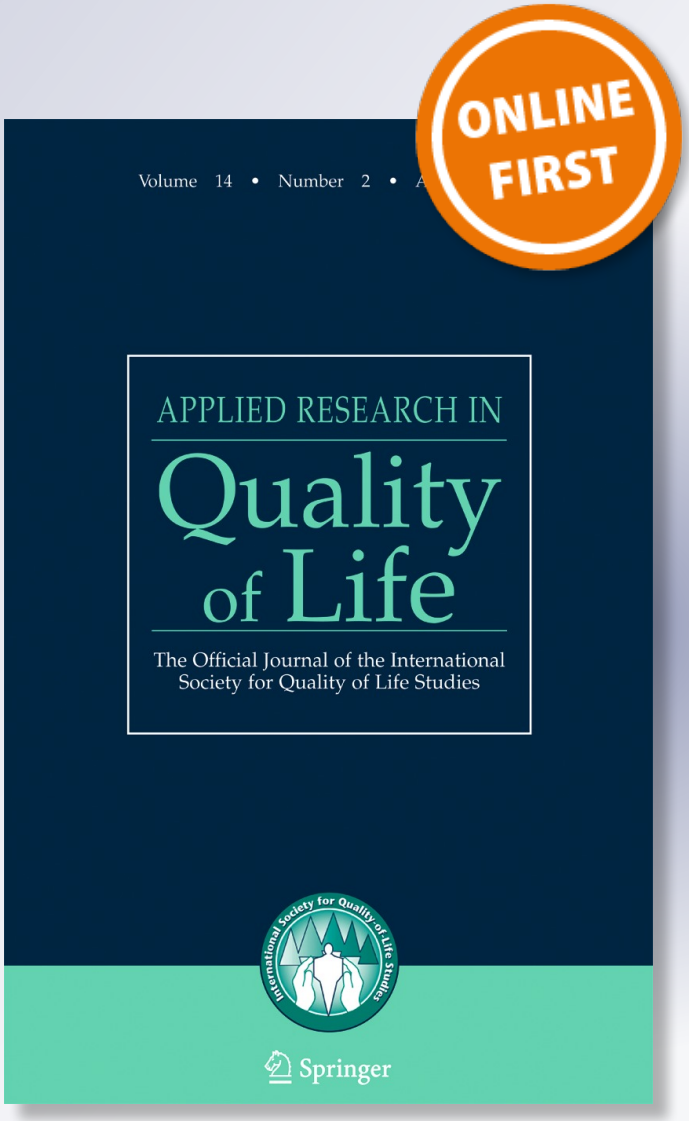
The Quality of Work Life Scale: Validity Evidence from Brazil and Portugal

Jorge Sinval, M. Joseph Sirgy, Dong-Jin Lee & João Marôco

Applied Research in Quality of Life
The Official Journal of the International Society for Quality-of-Life Studies

ISSN 1871-2584

Applied Research Quality Life
DOI 10.1007/s11482-019-09730-3



Springer

Applied Research in Quality of Life
https://doi.org/10.1007/s11482-019-09730-3

The Quality of Work Life Scale: Validity Evidence from Brazil and Portugal

Jorge Sinval[1,2] · M. Joseph Sirgy[3] · Dong-Jin Lee[4] · João Marôco[1]

Received: 7 September 2018 / Accepted: 17 April 2019/Published online: 01 June 2019

Abstract

Quality of work life (QWL) is an important construct, based on satisfaction of worker's needs. It is strongly related to higher work engagement and lower burnout. To properly establish comparisons between countries' QWL with a psychometric instrument, the measure must show validity evidence, namely in terms of measurement invariance. This study aims to assess the validity evidence of the Quality of Work Life Scale (QWLS) by examining the internal structure of the measure (i.e., dimensionality, reliability, and measurement invariance) and its relations with other variables such as burnout and work engagement. The measure was tested using a total sample of 1163 workers, 566 workers from Portugal, and 597 from Brazil. The data had a good fit to the QWLS second-order model and good reliability estimates for the two countries. Full-uniqueness measurement invariance was achieved for data for Portugal and Brazil and for gender too. The measure also demonstrated good nomological validity evidence by successfully predicting burnout and work engagement.

Keywords Quality of work life · Quality of work life scale · Brazil · Portugal · Measurement invariance

There are several definitions of quality of work life (QWL; Martel and Dupuis 2006). Quality of work life (QWL), or "quality of work" as others prefer to call it (Lau and

✉ João Marôco
jpmaroco@ispa.pt

[1] William James Center for Research, ISPA - Instituto Universitário, Rua Jardim do Tabaco, 34, 1149-041 Lisbon, Portugal

[2] Business Research Unit (BRU-IUL), Instituto Universitário de Lisboa (ISCTE-IUL), Avenida das Forças Armadas, 1649-026 Lisbon, Portugal

[3] Pamplin College of Business, Virginia Polytechnic Institute & State University, 880 West Campus Drive (Office: 2025 Pamplin Hall), Blacksburg, Virginia 24061-0236, USA

[4] Department of Marketing, Yonsei University, Yonsei-ro 59, Seodaemun-gu, 03722 Seoul, Republic of Korea

May 1998; Louis 1998), refers to satisfaction of various needs at work (Efraty and Sirgy 1990; Sirgy et al. 2001). That is, QWL is high when the worker perceives that his various basic and growth needs are met through the employing organization. Sirgy et al. (2001) theorized that QWL involves workers' satisfaction of basic and growth needs (i.e., lower-order and higher-order needs based on Maslow framework). The lower-order needs include health and safety needs (i.e., protection from injury at work and outside of work, as well as job-related health benefits), and economic and family needs (i.e., adequate wages, job security, having time from work to attend family needs). Higher-order needs include social needs (i.e., leisure time off work and social interactions at work), esteem needs (i.e., recognition of job performance within the organization itself and recognition of one's job performance outside of the organization), actualization needs (i.e., realization of one's potential within the organization, and/or as a professional in the worker's field), knowledge needs (i.e., learning to enhance professional skills and/or job skills), and aesthetic needs (i.e., personal creativity and general aesthetics, creativity at work). As such, QWL involves the satisfaction of basic and growth needs through worker's participation in organizational life. Organizational rules or standards that govern the conduct of workers (i.e., corporate culture, incentive systems, valued behaviors, promotion policies, and management behavior) can be viewed as antecedents to QWL (Koonmee et al. 2010).

QWL is viewed to impact a variety of behavioral outcomes such as job satisfaction (e.g. Chan and Wyatt 2007; Danna and Griffin 1999; Knox and Irving 1997), job performance, organizational identification, intention to quit, personal alienation, and work engagement (e.g. Kanten and Sadullah 2012; Sirgy et al. 2001), lower turnover and health perceptions (e.g. Chan and Wyatt 2007; de Jong et al. 2015; Easton et al. 2013; Van Laar et al. 2007).

There are several published instruments designed to measure QWL. These include the Quality of Work Life Scale (QWLS) (Sirgy et al. 2001), the Work-Related Quality of Life Scale (Easton and Van Laar 2018), Zin's (2004) Quality of Work Life Measure, Nurses' Quality of Working Life Questionnaire (Hsu 2016), Quality of Work Life Questionnaire (Elizur and Shye 1990), and the Quality of Working Life Systemic Inventory (Martel and Dupuis 2006). Although the conceptual definition of QWL may somewhat differ across studies and measures, it is generally accepted that QWL is related to employee happiness, employee well-being, and job satisfaction.

The QWLS (Lee et al. 2007; Sirgy et al. 2001) provides managers and policy makers with information about the satisfaction of specific needs at work. It also provides managers and policy makers with specific guidelines on effective ways to improve the QWL of workers. The QWLS measure has advantages over other QWL measures in that it is short and easily applicable to various work groups for comparison.

The QWLS has been employed in several studies in the USA and adapted to other countries (see Table 1). The table also summarizes the different QWLS versions used with different samples found on a search on Embase, Scopus, PubMed, Web of Science and Scholar Google. The table documents validity evidence based on the internal structure findings. In addition to the original study (Sirgy et al. 2001), two studies tested the original version of the QWLS through a second-order factor: one with the maintaining all the items (Afsar and Burcu 2014) and other with 13 items (Marta et al. 2013). However, most studies failed to report satisfactory results—given the fact that some studies reported only exploratory factor analysis results instead of the desired

confirmatory factor analysis (Marôco 2014). No studies were identified testing measurement invariance of the QWLS for any group. However, the reliability evidence in terms of internal consistency is considered acceptable in the majority of the studies (Abdollahzade et al. 2016; Koonmee et al. 2010; Singhapakdi et al. 2014).[1]

The present study is designed to assess the validity of QWLS by examining the internal structure of the measure (i.e., dimensionality, reliability, and measurement invariance) and its relations with other variables such as burnout and work engagement. Brazil and Portugal were selected for cross-cultural adaptation of the QWLS because they have cultural and historical commonalities. They share the same language, have close economic ties, and exchange an increasingly large number of migrants (Serviço de Estrangeiros e Fronteiras 2018).

Due to the workforce migration between the two countries, it is important to consider and compare the economic and social context of both countries (Horst et al. 2016). With 20.3% of the total foreign residents, the Brazilian community is the largest foreign resident community in Portugal (Serviço de Estrangeiros e Fronteiras 2018). In 2016, Brazil's migrants represented the top inflows nationality of total inflows of foreigners entries to Portugal: 15% (OECD 2018). Brazil's migrants represented 1.1% of the total OECD countries inflows in 2016, with 18% more than in 2015, is the 25th country of origin with more migrants (OECD 2018). In turn, Portugal was one of the countries that sent more migrants to Brazil, ranked second in terms of investments (Cavalcanti et al. 2017). In fact, from 2010 to 2016, Portugal was the 8th country having more migrants entering in Brazil, and it was the 5th country with more work visa grants (Cavalcanti et al. 2017). Brazil was one of the top desired destination countries of potential migrants between 2010 and 2015 (International Organization for Migration 2017). These two countries share more than just the same language, they share human capital and cultural exchange programs. Several studies compared psychometric instruments between Portugal and Brazil (Dias et al. 2010; Souza et al. 2008). Several other studies have focused on the adaptation of psychometric instruments to Brazil-Portugal unique versions (Marôco et al. 2014; Sinval et al. 2018). There are significant advantages to have two equivalent versions, one per country (Jorge 1998). As such, it is important to evaluate the QWL in these countries, allowing policy makers to provide culturally valid and comparable QWL information for workers in the two countries. It is expected that QWL in Portuguese companies, *Triste Fado* ("sad fate") as some call it (Costa and Costa 2017), is poor. This may be mainly due to the economic crisis, from which the country is recovering, that have affected deeply the Portuguese economy. The same authors referred to the Brazilian situation as *El Dorado* ("country of fabulous riches"), which, despite some political and social instability, is somehow representative of the Brazilian economic situation at the date of the data collection. Both *El Dorado* and *Triste Fado* seem to be good metaphors of the economic situation, work environment, cultural and history context of both countries.

Following the *Standards for Educational and Psychological Testing* (American Educational Research Association et al. 2014) recommendations for assessing instruments validity evidence, two different sources of validity evidence will be used to

[1] Although only the study by Afsar and Burcu (2014) reported individual estimates for each of the first-order factors.

Table 1 QWLS versions: validity evidence based on the internal structure

Country (Authors)	Occupational group	*N*	Items (factors)	Dimensionality	Reliability: Internal consistency						
					Total	HS	EF	S	E	A	K
India (Rastogi et al. 2018)	Various (middle-level employees)	380	16 (two)	EFA	α = .92	–	–	–	–	–	–
			16 (one)	CFA							
			16 (two)	CFA							
			16 (seven)	CFA							
India (Saha and Kumar 2016)	Managers	150	12 (three)	EFA	–	–	–	–	–	–	–
		562	12 (three)	CFA	α = .73	α = .62	–	–	–	–	–
Iran (Abdollahzade et al. 2016)	Nurses	147	16 (seven)		α = .85	–	–	–	–	–	–
Australia (Arndt et al. 2015)	Engineers	112	3(one)^{H}	–	α = .875	–	–	–	–	–	–
Malaysia	University teachers	160	16 (seven)	–	α = .92	–	–	–	–	–	–
Thailand		165		–	α = .90	–	–	–	–	–	–
(Mohan and Suppareakchaisakul 2014)		(325)		–	–	–	–	–	–	–	–
Thailand	Managers	152	16 (two)$^{L\text{-}H}$	–	–	–	–	–	–	–	–
USA		230		–	–	–	–	–	–	–	–
(Singhapakdi et al. 2014)		(382)		–	α = .723 *CR* = .734	–	–	–	–	–	–
Turkey (Afsar and Burcu 2014)	Academics	254	16 (seven)	CFA	α = .84	α = .40	α = .62	α = .33	α = .73	α = .83	α = .78
			16 (seven)^{2L}	CFA							
Bangladesh (Taher 2013)	Academic professionals	202	15 (three)	EFA	α = .78	–	–	–	–	–	–
Thailand	Managers	152	13 (seven)^{2L}	–	–	–	–	–	–	–	–
USA		230		–	–	–	–	–	–	–	–
(Marta et al. 2013)		(382)		CFA	–	–	–	–	–	–	–
			5 (one)^{L}	–	α = .644	–	–	–	–	–	–

Table 1 (continued)

Country (Authors)	Occupational group	*N*	Items (factors)	Dimensionality	Reliability: Internal consistency						
					Total	HS	EF	S	E	A	K
					ρ = .703						
			8 (one)[H]	–	α = .832 ρ = .840	–	–	–	–	–	–
Bangladesh (Nimalathasan and Ather 2010)	Academic professionals	133	13 (three)	EFA	α = .887	–	–	–	–	–	–
Thailand (Koonmee et al. 2010)	Human resource managers	164	16 (two)[L-H]	–	α = .800 ρ = .787	–	–	–	–	–	–
China (Chan and Wyatt 2007)	Various	319	14 (six)	–	α_s = .90	–	–	–	–	–	–
USA (Lee et al. 2007)	Marketing practitioners	230	6 (one)[L]	–	*CR* = .700 α = .580	–	–	–	–	–	–
			10 (one)[H]	–	*CR* = .843 α = .826	–	–	–	–	–	–
USA (Sirgy et al. 2001)	Faculty and staff	173	–	–	–	–	–	–	–	–	–
	Faculty and staff	310	–	–	–	–	–	–	–	–	–
	Accountants	73	–	–	–	–	–	–	–	–	–
	(total)	(556)	7 (one)	CFA	α_s = .78	–	–	–	–	–	–
			16 (seven)[2L]	CFA							

Country (Authors)	Reliability: Internal consistency	Measurement invariance	χ^2/df	*TLI*	*GFI*	*NFI*	*CFI*	*RMSEA*	*SRMR*
	Ae								
India (Rastogi et al. 2018)	–	–	–	–	–	–	–	–	–
		–	7.59	.856	–	.900	.911	.132	–

Table 1 (continued)

Country (Authors)	Reliability: Internal consistency	Measurement invariance	χ^2/df	*TLI*	*GFI*	*NFI*	*CFI*	*RMSEA*	*SRMR*
	Ae								
		–	1.16	.997	–	.983	.998	.021	–
		–	12.62	.746	–	.783	.796	.175	–
India (Saha and Kumar 2016)	–	–	–	–	–	–	–	–	–
	–	–	2.67	.96	.97	.96	.97	.05	–
Iran (Abdollahzade et al. 2016)	–	–	–	–	–	–	–	–	–
Australia (Arndt et al. 2015)	–	–	–	–	–	–	–	–	–
Malaysia	–	–	–	–	–	–	–	–	–
Thailand	–	–	–	–	–	–	–	–	–
(Mohan and Suppareakchaisakul 2014)	–	–	–	–	–	–	–	–	–
Thailand	–	–	–	–	–	–	–	–	–
USA	–	–	–	–	–	–	–	–	–
(Singhapakdi et al. 2014)	–	–	–	–	–	–	–	–	–
Turkey (Afsar and Burcu 2014)	$\alpha = .77$	–	2.96	–	–	–	.96	.064	.049
		–	3.00	–	–	–	.94	.079	.066
Bangladesh (Taher 2013)	–	–	–	–	–	–	–	–	–
Thailand	–	–	–	–	–	–	–	–	–
USA	–	–	–	–	–	–	–	–	–
(Marta et al. 2013)	–	–	4.14	–	.909	.912	.931	.093	.055
	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	–
Bangladesh (Nimalathasan and Ather 2010)	–	–	–	–	–	–	–	–	–
Thailand (Koonmee et al. 2010)	–	–	–	–	–	–	–	–	–

Table 1 (continued)

Country (Authors)	Reliability: Internal consistency	Measurement invariance	χ^2/df	*TLI*	*GFI*	*NFI*	*CFI*	*RMSEA*	*SRMR*
	Ae								
China (Chan and Wyatt 2007)	–	–	–	–	–	–	–	–	–
USA (Lee et al. 2007)	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	–
USA (Sirgy et al. 2001)	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	–
	–	–	4.58	–	.97	–	.96	.08	–
		–	3.78	–	.92	.86	.89	.07	–

^{2L} second-order factor, *HS* Health and safety needs items, *EF* Economic and family needs items, *S* Social needs items, *E* Esteem needs items, *A* Actualization needs items, *K* Knowledge needs items, *Ae* Aesthetics needs, $^{L\text{-}H}$ Lower- and higher-order needs, ^{L} lower-order needs, ^{H} - higher-order needs

The extracted results for the goodness-of-fit indices are presented with two or three decimal places depending on the original author's report. α_s standardized alpha, *CFA* Confirmatory Factor Analysis, *EFA* Exploratory Factor Analysis, *GFI* goodness-of-fit index, *RMSEA* Root Mean Square Error of Approximation, *NFI* Normed Fit Index, *TLI* Tucker Lewis Index, CFI Comparative Fit Index, *SRMR* Standardized Root Mean Square Residual

assess QWLS. One source is based on the internal structure of the instrument, which is related to the dimensionality, reliability of the scores and measurement invariance. The second source of validity evidence is based on relationships with other variables. The first source of validity involves three hypotheses. The first hypothesis (H1) assumes that the QWLS has a satisfactory fit based on its original second-order structure. This assumption is based on the findings of previous studies that tested the second-order structure of the instrument obtaining an acceptable or a good fit (Afsar and Burcu 2014; Marta et al. 2013; Sirgy et al. 2001). Past research has shown that the reliability evidence in terms internal consistency estimates is considered acceptable in regard to all items of the original version (Koonmee et al. 2010; Mohan and Suppareakchaisakul 2014; Rastogi et al. 2018) as with short versions of the instrument (Chan and Wyatt 2007; Marta et al. 2013; Nimalathasan and Ather 2010; Taher 2013). No study tested properly the second-order internal consistency, and only one study presented the individual seven first-order internal consistency estimates, which turned out to be acceptable (Afsar and Burcu 2014). Thus, the second hypothesis (H2) assumes that the QWLS has good reliability estimates both at first- and second-order factors levels.

No research that has used the QWLS tested the measurement invariance in relation to gender and country. There is evidence that invariance can be obtained between Portugal and Brazil with other psychometric instruments (Campos et al. 2012; Sinval et al. 2018) and in relation to gender in these countries (Sinval et al. 2019). Given that both countries share a common culture, it is more likely to find measurement invariance between the two samples (Vargas et al. 2017). To make valid comparisons of quality of work life between male and female workers (Bureau of Labor Statistics 2017; Eurofound 2017), measurement invariance between the genders must be established. We expect both male and female workers understand and respond to the measurement items in a similar way even though they may experience different levels of need satisfaction. As such, we hypothesize that the QWLS is characterized by measurement invariance between Brazil and Portugal and between male and female workers (H3).

The second source of validity focuses on predictive validity by testing the relationship between QWL and other behavioral constructs such as burnout and work engagement. QWL has been shown to have an impact on burnout (Cetrano et al. 2017; Tuuli and Karisalmi 1999). Furthermore, work engagement has been found to be positively predicted by QWL (Jenaro et al. 2011). As such, we hypothesize that QWLS can significantly explain variation in work engagement (positively) and burnout (negatively). Thus, our fourth hypothesis (H4) states that QWLS should demonstrate discriminant predictive validity evidence with burnout and convergent predictive validity evidence with work engagement.

Specifically, for work engagement, we hypothesize that the satisfaction of lower-order needs is positively related to work engagement (H4a). This is because satisfaction of lower-order needs (e.g., satisfying pay, healthy and safe working conditions) should motivate employees to be more engaged on the job. We also hypothesize that the satisfaction of higher-order needs is positively related to work engagement (H4b). This is because self-actualization and progress towards individual goals at work should also motivate employees to be more engaged on the job.

In relation to employee burnout, we hypothesize that the satisfaction of lower-order needs is negatively related to employee burnout (H4c). This is because satisfaction of lower-order needs reflects financial stress and work-family conflict, protection from

overwork and safety-related stress. In addition, we hypothesize that satisfaction of higher-order needs is negatively related to employee burnout (H4d). This is because employees with the satisfaction of higher-order needs at work are likely to have emotional and social support from the organization; as such, they are likely to be shielded from work-related stress.

Past research has shown differences between males and females workers in terms of lower-order QWL, which can change depending on the country (Singhapakdi et al. 2014), which again highlights the importance of the country factor (Greenan et al. 2014). As such, H5 states that different QWL dimensions' and overall mean levels should be observed between male and female workers and between workers in Brazil and Portugal. Specifically, we hypothesize that male workers are likely to experience higher QWL levels than female workers (Cardoso et al. 2016; Connerley and Wu 2016; Santos and Garibaldi de Hilal 2018) (H5a). Gender disparity is likely to be evident in lower-order need satisfaction (satisfaction of economic and family needs as well as health and safety needs). Women workers in masculine countries are likely to receive lower pay and experience greater role conflict and stress (Lewis 2009; Ollier-Malaterre and Foucreault 2017). Research has shown that work-family conflict has a greater negative impact on job satisfaction, especially for women (Ernst Kossek and Ozeki 1998). We hypothesize that there is no gender differences in satisfaction of higher-order needs such as social need, knowledge need, aesthetics need, and self-actualization needs (H5b). This is because the satisfaction of higher-order needs is likely to be influenced by individual factors rather than cultural norms related to gender. This observation is also consistent with past research–gender differences in relation to lower-order need satisfaction (Singhapakdi et al. 2014).

Method

Sampling and Data Collection

The sample for this study was collected in 2015–2017 in both countries involving 1163 workers. This overall sample was composed of two samples, the first sample comprised multi-occupational workers in Brazil ($n = 597$), the second multi-occupational workers in Portugal ($n = 566$).

In regard to the Brazilian sample, the average age was 35.11 ($SD = 10.13$), the average working years in current job sector was 9.73 ($SD = 8.61$), the average number of years working in the current organization was 5.84 ($SD = 6.80$), the average working years in current job position was 4.97 ($SD = 6.29$), average working years in past jobs was 3.38 ($SD = 3.89$), average number of job promotions in their actual job was 1.85 ($SD = 2.06$), and 67.23% were females. Furthermore, 60.50% of study participants were identified as working in private firms, 32.77% working in public firms, and 6.73% in other firms. With respect to the work schedule, 65.83% reported working on a regular schedule (65.83%), 28.35% on a rotation schedule, and 5.82% on an irregular schedule. With respect to compensation, 86.41% reported receiving a salary and 13.59% an hourly wage.

With respect to the Portuguese sample, the average age was 35.83 ($SD = 9.76$), the average working years in the current job sector was 11.23 ($SD = 9.69$), the average

number of years working in the current organization was 8.11 (*SD* = 8.92), the average working years in current job position was 6.14 (*SD* = 7.05), average working years in past jobs was 2.34 (*SD* = 3.03), average number of job promotions in the actual job was 1.34 (*SD* = 1.90), and 62.84% were females. Furthermore, 49.50% reported working in private firms, 40.04% in public firms, and 10.46% in others. With respect to the work schedule, 55.24% reported that they work on a regular schedule, 37.10% on a rotation schedule, and 7.66% on an irregular schedule. With respect to compensation, 90.52% reported receiving salary and 9.48% an hourly wage.

With respect to the worker's occupation, according to the *International Standard Classification of Occupations ISCO-08* (International Labour Office 2012), the sample from Brazil and Portugal involved mostly professionals[2] (see Table 2). With respect to education, 74.39% of the Brazilian sample and 83.07% of the Portuguese sample were college graduates.

The two samples at large were based on non-probabilistic, convenience sampling, with certain inclusion criteria: all participants had to be workers, were able to read, and had easy access to a PC/smartphone/tablet to access the online platform of the survey questionnaire.

Constructs and Measures

The Quality of Work Life Scale (QWLS) The QWLS measure was originally developed by Sirgy et al. (2001). The measure is a self-report instrument involving 16 items scored on Likert-type scales. Subjects are asked to respond to each item by checking a seven-point scale ranging from "1 - Very Untrue" to "7 - Very True" (see Table 3). The measure was designed to capture the extent to which the work environment, job requirements, supervisor behavior, and support programs in an organization are perceived to meet workers' needs. Specifically, the measure assesses seven major needs: (1) health and safety needs (i.e., job related benefits, safety at work, preventive measures of health care); (2) economic and family needs (i.e., pay, job security and other family needs); (3) social needs (i.e., collegiality at work and leisure time off work); (4) esteem needs (i.e., recognition and appreciation of work within and outside the organization); (5) actualization needs (i.e., realization of one's potential within the organization and as a professional); (6) knowledge needs (i.e., learning to enhance job and professional skills); and (7) aesthetic needs (i.e., creativity at work as well as personal creativity and general aesthetics).

The first two needs are treated as lower-order needs, while the others are treated as higher-order needs. To develop the Portuguese version (see Table 3), the permission of the original author to adapt the original version was requested (Sirgy et al. 2001). The process of adaptation followed The ITC Guidelines for Translating and Adapting Tests (International Test Commission 2018), adapting the items to the Portuguese language per the Orthographic Agreement signed by both Portugal and Brazil in 2009. The instrument's items were discussed with several Brazilian and Portuguese research methodologists to ensure cultural, semantic, and idiomatic equivalence in Brazil and

[2] According ISCO-08 (International Labour Office 2012) this group includes science, engineering, health, teaching, business and administration, or information and communication technology professionals.

Table 2 Sociodemographic, occupational group and academic level across the two countries

	Brazil ($n = 597$)	Portugal ($n = 566$)
Sociodemographic		
Age *M*(*SD*)	35.11 (10.13)	35.83 (9.76)
Gender (females) %	67.23	62.84
Working years in the current organization *M*(*SD*)	5.84 (6.80)	8.11 (8.92)
Working years in the current job *M*(*SD*)	4.97 (6.29)	6.14 (7.05)
Working years in the current job sector *M*(*SD*)	9.73 (8.61)	11.23 (9.69)
Occupational groups %		
Armed Forces Occupations	1.55	4.44
Managers	27.38	8.87
Professionals	36.12	53.63
Technicians and Associate Professionals	8.74	12.90
Clerical Support Workers	27.38	9.48
Services and Sales Workers	6.21	6.05
Skilled Agricultural, Forestry and Fishery Workers	–	–
Craft and Related Trades Workers	2.14	2.22
Plant and Machine Operators and Assemblers	0.78	0.60
Elementary Occupations	1.55	1.81
Academic level %		
PhD	5.12	5.64
Master	9.49	38.52
Post-graduation (not master neither PhD)	25.62	9.34
Graduation	34.16	29.57
Unfinished graduation	13.09	4.67
High school, vocational education or less	12.52	12.26

Portugal. A pilot study was conducted using 15 workers from each country. This version had the same items' wording for both countries.

The Oldenburg Burnout Inventory (OLBI) To assess burnout, the Oldenburg Burnout Inventory Portuguese version for Brazil and Portugal was used (OLBI; Sinval et al. 2019). The burnout construct is this case was treated as a second-order latent factor. Burnout is considered a syndrome involving feelings of chronic exhaustion and a negative attitude towards one's job due to occupational stress (Bakker et al. 2014). The OLBI measure includes 15 self-report items scored on a five-point Likert-type scale (1 = Strongly disagree; 5 = Strongly agree). Examples of items in the measure include: "It happens more and more often that I talk about my work in a negative way" (disengagement), and "There are days when I feel tired before I arrive at work" (exhaustion). That is, the measure involves two dimensions: (1) disengagement dimension with seven items, and (2) exhaustion dimension with eight items. The disengagement dimension refers to distancing from work both in terms of object and content, and to the development of cynical and negative attitude towards one's job and acting

Table 3 QWLS Original and Portuguese versions

Item Original QWLS (Sirgy et al. 2001)	Portuguese (Brazil and Portugal) version of QWLS
Very Untrue ... Very True	Totalmente Falso ... Totalmente Verdadeiro
1 2 3 4 5 6 7	1 2 3 4 5 6 7
Health and safety needs	Necessidades de saúde e segurança
1. I feel physically safe at work.	1. Sinto-me fisicamente seguro no trabalho.
2. My job provides good health benefits.	2. O meu emprego oferece-me um bom plano de saúde.
3. I do my best to stay healthy and fit.	3. Faço o meu melhor para me manter saudável e em forma.
Economic and family needs	Necessidades económicas e familiares
4. I am satisfied with I'm getting paid for my work.	4. Estou satisfeito com o salário que recebo pelo meu trabalho.
5. I feel that my job at this organization is a secure life.	5. Sinto que o meu emprego nesta organização é estável.
6. My job does well for my family.	6. O meu emprego beneficia a minha família.
Social needs	Necessidades sociais
7. I have good friends at work.	7. Tenho bons amigos no trabalho.
8. I have enough time away from work to enjoy other things in life.	8. Tenho tempo suficiente, fora do trabalho, para desfrutar de outras coisas importantes na vida.
Esteem needs	Necessidades de reconhecimento
9. I feel appreciated at work at this organization.	9. Sinto-me reconhecido pelo meu trabalho nesta organização.
10. People at this organization and/or within my profession respect me as a professional and expert in my field of work.	10. Tanto os colegas desta organização, como as pessoas da mesma profissão respeitam-me como profissional e especialista na minha área de trabalho.
Actualization needs	Necessidades de atualização
11. I feel that my job allows me to realize my full potential.	11. Sinto que o meu emprego possibilita a realização de todo o meu potencial.
12. I feel that I am realizing my potential as an expert in my line of work.	12. Sinto que estou a concretizar o meu potencial como especialista na minha área de trabalho.
Knowledge needs	Necessidades de conhecimento
13. I feel that I'm always learning new things that help do my job better.	13. Sinto que estou sempre a aprender coisas novas que aprimoram o meu trabalho.
14. This job allows me to sharpen my professional skills.	14. Este emprego permite aperfeiçoar as minhas competências profissionais.
Aesthetics needs	Necessidades de criatividade
15. There is a lot of creativity involved in my job.	15. O meu emprego envolve imensa criatividade.
16. My job helps me develop my creativity outside of work.	16. O meu emprego permite-me desenvolver a minha criatividade fora do trabalho.

unfavorably in work situations (Demerouti and Bakker 2008). Exhaustion refers to feelings of physical fatigue, the need to rest, and feelings of being overtaxed and emptiness at work (Bakker et al. 2004). The OLBI's Portuguese (Brazil and Portugal) study (Sinval et al. 2019) provided good criterion validity evidence in relation to other measures (i.e. work engagement, $r_{burnout*work\ engagement}(1102) = -.85,\ p < .001$). The measure also showed measurement invariance between Portugal and Brazil, and

between male and female workers for the proposed second-order factor dimensionality and good values of the reliability estimates.

Utrecht Work Engagement Scale (UWES) The Portuguese language version for Brazil and Portugal of the Utrecht Work Engagement Scale (UWES-9; Sinval et al. 2018) was used to assess work engagement through a second-order latent factor. Work engagement has been defined as energetic involvement with work (Schaufeli and Bakker 2010) and it is characterized by three dimensions: vigor, dedication, and absorption (Schaufeli et al. 2002). Vigor reflects mental resilience and high energy in the workplace (Bakker and Demerouti 2008). The dedication dimension reflects deep involvement with work, feelings of significance, challenge, enthusiasm and pride (Schaufeli and Bakker 2004). Absorption refers to being happily engrossed and fully concentrated at work, whereby the worker perceives time to fly and feeling difficulty to disconnect from work (Bakker and Demerouti 2008). As such, UWES-9 involves nine items, three items for each dimension. Responses were captured on a seven-point frequency scale (0 = never; 6 = always). Examples of items for this construct include: "I feel happy when I am working intensely" (absorption), "I am enthusiastic about my job" (dedication), and "At my work, I feel bursting with energy" (vigor). The Portuguese version (Sinval et al. 2018) is supported by good validity evidence based on the internal structure, namely full-uniqueness second-order measurement invariance between countries, good reliability estimates values and evidence that suggest a second-order latent construct, work engagement. Work engagement was also found to successfully predicted by the QWL (Jenaro et al. 2011).

Procedure

Respondents from both samples completed the QWLS, OLBI and UWES-9 questionnaire. They also answered questions pertaining to demographics and career (i.e. age, gender, working years in the current organization, working years in the current job, working years in the current job sector). The data were collected through an online software *LimeSurvey* (LimeSurvey GmbH 2017). The respondents were contacted individually or through the organization where they were working. Those organizations which accepted to disseminate the study to their employees were not provided access to the worker's survey information. Both samples used a country's major university (Brazil and Portugal) institutional website to provide study participants access to the survey. Sample 1's response rate was 58.0% and 63.3% for Sample 2. Before completing the survey, participants were informed about the study, assuring them that this study was a research study and the employing organization would not have access to the responses of individual employees. Informed consent was obtained before survey completion. The study and the survey instrument were approved by the Ethics Committee of the respective universities where the study was made accessible to the study participants.

Data Analysis

The statistical program *R* (R Core Team 2018) via the integrated development environment, *RStudio* (RStudio Team 2018) was used for all statistical analyses. A Confirmatory Factor Analysis (CFA) tested the factor structure of the QWLS as a second-order factor with seven

first-order factors with a total of 16 items. The following indices were used to assess goodness of fit: TLI (Tucker Lewis Index), NFI (Normed Fit Index), χ^2/df (ratio Chi-Square and Degrees of Freedom), CFI (Comparative Fit Index), SRMR (Standardized Root Mean Square Residual), and the RMSEA (Root Mean Square Error of Approximation). Estimates smaller than 5 are considered good for χ^2/df, whereas estimates above .95 are also considered good for CFI, NFI and TLI (Hu and Bentler 1999). Estimates below .08 are considered good for RMSEA and SRMR (Byrne 2010). The CFA analysis was conducted using the Weighted Least Squares Means and Variances (WLSMV) estimator proposed by Muthén (1983) through the package *lavaan* (Rosseel 2012). Descriptive statistics were obtained using the *skimr* package (McNamara et al. 2018). The Mardia's multivariate kurtosis (Mardia 1970) was assessed to evaluate multivariate normality, and it was generated using the *psych* package (Revelle 2018). To test for convergent validity evidence, Average Variance Extracted (AVE) was estimated as described in Fornell and Larcker (1981) and Marôco (2014). Values of AVE ≥ .5 are considered indicative of convergent validity (Hair et al. 2014).

Reliability of the various dimensions was assessed through estimates of internal consistency. Specifically, the $\alpha_{ordinal}$ and $\omega_{ordinal}$ were computed (Jorgensen et al. 2018). Values of $\alpha_{ordinal} \geq .7$ and $\omega_{ordinal} \geq .7$ are considered indicative of acceptable reliability. The second-order factor reliability was also assessed using the various ω coefficients with the *semTools* package (Jorgensen et al. 2018): the proportion of observed variance explained by the second-order factor after controlling for the uniqueness of the first-order factor $\omega_{partial\ L1}$, the proportion of the second-order factor explaining the variance of the first-order factor levels ω_{L2} and the proportion of the second-order factor explaining the total score ω_{L1}.Measurement invariance was evaluated with the *lavaan* package (Rosseel 2012) using theta-parameterization for categorical items to compare a group of seven different models (Millsap and Yun-Tein 2004) and the second-order models' invariance specifications (Rudnev et al. 2018): (a) configural invariance, (b) first-order factor loadings, (c) second-order structural loadings, (d) thresholds of measured variables (depending of the estimator and assumptions), (e) intercepts of first-order factors, (f) disturbances of first-order factors, and (g) residual variances of observed variables. The causal SEM models were tested using *lavaan* to test validity based on relationships with other constructs. The significance of the differences between model parameters in both groups was assessed using the Wald test (Buse 1982) through the *lavaan* package (Rosseel 2012) for comparisons 2 by 2 (Marôco 2014).The mean scores for latent variables were compared using an ANOVA test, using the ω^2 as effect size measure and π as a statistical power indicator (Hays 1963) followed by Tukey's HSD post-hoc test using the *stats* package (R Core Team 2018). The composite scores percentiles were computed using the *doBy* package (Højsgaard and Halekoh 2018).

Results

Validity Evidence Based on the Internal Structure

Dimensionality We tested the dimensionality of the QWLS by examining the items' distributional properties and factor-related validity evidence. With respect to the items'

distributional properties, Table 4 provides summary measures, skewness (Sk), kurtosis (Ku) and a histogram for each of the sixteen items of QWLS. The distributional properties and psychometric sensitivity were analyzed based on these results. Absolute values of Sk smaller than 3, and of Ku smaller than 7 were considered as an indication that there are no severe violations in the normal distribution assumption (Finney and DiStefano 2013). And indeed no severe univariate normality violations were observed in both samples. The values of the Mardia's multivariate kurtosis suggested that there was no multivariate normality for both samples (38.58, $p < .001$; 37.76, $p < .001$, for Brazil and Portugal respectively). All the items in both samples had all possible values, and no outliers were deleted. These distributional properties indicate psychometric sensitivity, and that an estimator that does not assume multivariate normal distribution should be used. Thus, WLSMV estimator was selected suitably to ordinal scales.

With respect to factor-related validity evidence, the original proposed second-order latent factor with seven first-order latent factors data fit was acceptable for both samples (H1; Fig. 1): Sample 1 (Brazil) ($\chi^2(97) = 479.314$; $\chi^2/df = 4.94$, $p < .001$; $n = 597$; $CFI = .992$; $NFI = .990$; $TLI = .990$; $SRMR = .063$; $RMSEA = .081$; $P(\text{rmsea}) \leq .05) < .001$, 90% CI].074; .089[), and Sample 2 (Portugal) ($\chi^2(97) = 673.253$; $\chi^2/df = 6.94$, $p < .001$; $n = 566$; $CFI = .989$; $NFI = .987$; $TLI = .987$; $SRMR = .077$; $RMSEA = .103$; $P(\text{rmsea}) \leq .05) < .001$, 90% CI].095; .110[). All the λ and γ were statistically significant. There were no items removed, however there were items with loadings below .45: two items for Sample 1 ($\lambda_{item\ 2} = .40$; and $\lambda_{item\ 2} = .44$), and two items for Sample 2 ($\lambda_{item\ 2} = .39$; $\lambda_{item\ 2} = .44$). The obtained γ from the second-order factor to the first-order factors were high, being the lowest $\gamma_{EF} = 0.76$ for Sample 1,

Table 4 Sample 1, and Sample 2 Descriptive statistics

	Brazil								Portugal							
QWLS - 16 items	*M*	*SD*	*Min*	*Mdn*	*Max*	Histogram	*Sk*	*Ku*	*M*	*SD*	*Min*	*Mdn*	*Max*	Histogram	*Sk*	*Ku*
QWLS1[HS]	5.05	1.78	1	5	7		-0.70	-0.06	5.55	1.49	1	6	7		-1.01	0.42
QWLS2[HS]	3.16	2.30	1	2	7		0.50	-1.41	3.50	2.17	1	3	7		0.20	-1.44
QWLS3[HS]	4.77	1.76	1	5	7		-0.35	-0.71	4.93	1.47	1	5	7		-0.39	-0.52
QWLS4[EF]	3.81	1.99	1	4	7		0.03	-1.17	3.54	1.78	1	4	7		0.17	-1.14
QWLS5[EF]	4.35	2.06	1	5	7		-0.27	-1.06	4.52	1.85	1	5	7		-0.44	-0.89
QWLS6[EF]	4.98	2.02	1	6	7		-0.67	-0.87	4.55	1.82	1	5	7		-0.46	-0.84
QWLS7[S]	5.20	1.68	1	6	7		-0.72	-0.48	4.93	1.65	1	5	7		-0.57	-0.54
QWLS8[S]	4.23	2.00	1	4	7		-0.14	-1.13	4.35	1.79	1	5	7		-0.24	-1.01
QWLS9[E]	4.19	1.96	1	4	7		-0.18	-1.07	4.18	1.80	1	4	7		-0.25	-0.97
QWLS10[E]	5.06	1.66	1	5	7		-0.69	-0.12	5.19	1.41	1	6	7		-0.81	0.11
QWLS11[A]	4.15	1.93	1	4	7		-0.12	-1.04	4.14	1.72	1	4	7		-0.29	-0.93
QWLS12[A]	4.20	1.94	1	4	7		-0.20	-1.04	4.18	1.76	1	4	7		-0.27	-0.95
QWLS13[K]	5.14	1.81	1	6	7		-0.70	-0.71	4.72	1.76	1	5	7		-0.53	-0.71
QWLS14[K]	4.83	1.94	1	5	7		-0.55	-0.69	4.80	1.72	1	5	7		-0.66	-0.42
QWLS15[Ae]	4.56	2.01	1	5	7		-0.34	-1.05	4.31	1.77	1	5	7		-0.27	-0.89
QWLS16[Ae]	4.25	2.04	1	4	7		-0.15	-1.15	3.92	1.77	1	4	7		-0.02	-1.03

[HS] Health and safety needs, [EF] Economic and family needs, [S] Social needs, [E] Esteem needs, [A] Actualization needs, [K] Knowledge needs, [Ae] Aesthetics needs

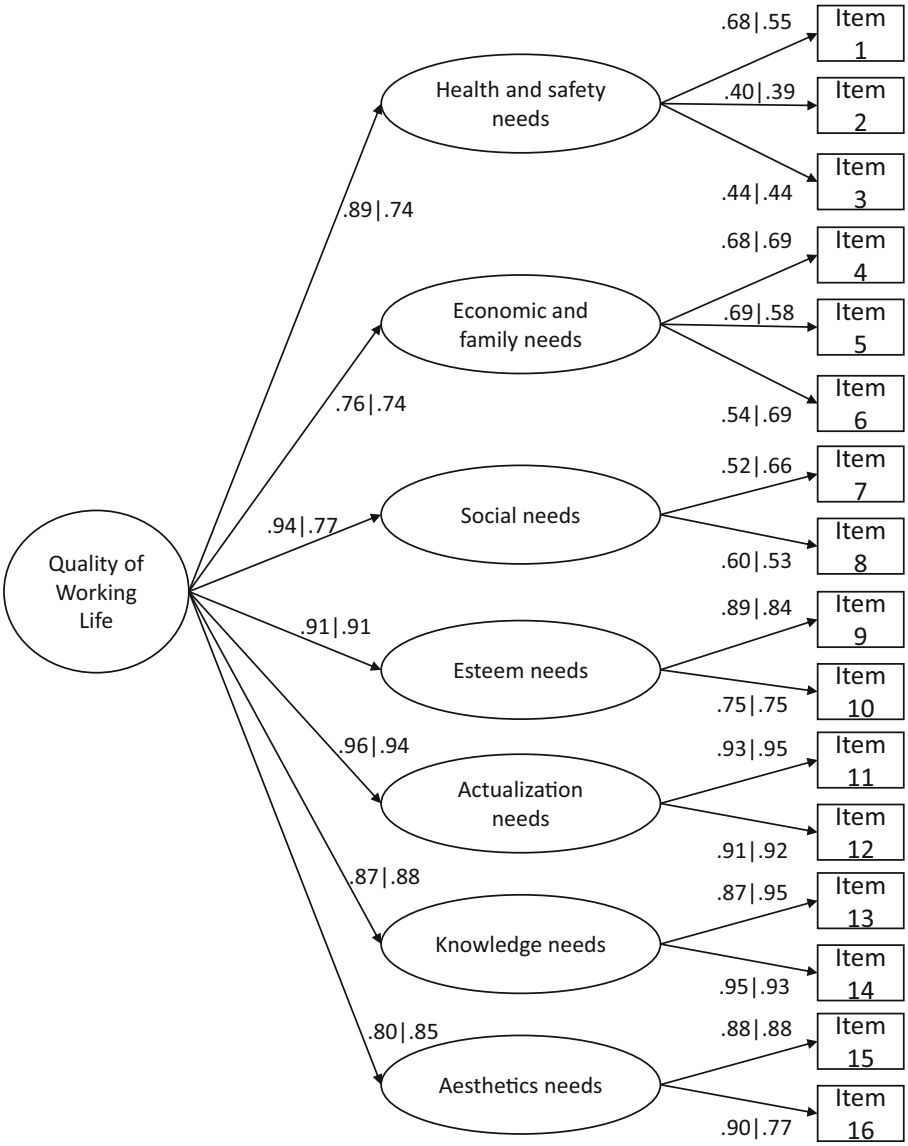


Fig. 1 QWLS second-order latent structure (16 items) separate fit to Brazil's ($n = 597$), and Portugal's ($n = 566$) workers. Latent loadings for each factor; and factor loadings for each item are shown (Brazil | Portugal)

$\gamma_{EF} = 0.74$ and $\gamma_{HS} = 0.74$ for Sample 2. These values show that the second-order latent factor clearly captures the different first-order dimensions for both countries (H1).

To assess convergent validity, AVE was estimated for each first-order factor. Regarding Sample 1 (Brazil), the results indicate low values of AVE for three dimensions ($AVE_{HS} = .27$; $AVE_{EF} = .41$; $AVE_S = .32$) and four factors with acceptable to high AVE values ($AVE_E = .67$; $AVE_A = .85$; $AVE_K = .76$; $AVE_{Ae} = .79$). For Sample 2 (Portugal), four dimensions showed satisfactory AVE values ($AVE_E = .64$; $AVE_A = .88$; $AVE_K = .90$; $AVE_{Ae} = .69$),

and three dimensions were unsatisfactory (AVE_{HS} = .22; AVE_{EF} = .43; AVE_{S} = .36). In sum, these results provide acceptable convergent validity evidence for QWLS (H1).

Reliability of the Scores To test for reliability, we conducted two tests, namely a test for internal consistency of the first-order factors and an internal consistency test of the second-order factors. With respect to the internal consistency of the first-order factors, various internal consistency estimates were generated to assess the evidence of the reliability of the various dimensions. The $\alpha_{ordinal}$ and $\omega_{ordinal}$ values for both samples first-order dimensions ranged from acceptable to high (see Table 5). For Sample 1 (Brazil), two $\alpha_{ordinal}$ and three $\omega_{ordinal}$ values of the first-order dimensions had reliability internal consistency values bellow .7, and for Sample 2 (Portugal) two $\alpha_{ordinal}$ and two $\omega_{ordinal}$ first-order dimensions' values were below .7. The values of the internal consistency of the first-order dimensions were satisfactory for the two samples. These results suggest an acceptable reliability of the dimensions (H2).

With respect to the internal consistency of the second-order factors, the estimated values were high for the two samples. For Sample 1 (Brazil), the proportion of the variance of the first-order factors explained by the second-order factor (ω_{L2}) was .96, the proportion of the second-order factor explaining the total score (ω_{L1}) was .90, and the proportion of observed variance explained by the second-order factor after controlling the uniqueness of the first-order factor ($\omega_{partial\,L1}$) was .94. Sample 2 (Portugal) had a ω_{L2} = .95 of the proportion of the variance of the first-order factors explained by the second-order factor. The ω_{L1} = .88 for the proportion of the second-order factor explaining the total score (ω_{L1}) and $\omega_{partial\ L1}$ = .93 for the proportion of observed variance explained by the second-order factor after controlling the uniqueness of the first-order factor. As such, these results suggest that the observed values of internal consistency for the second-order latent factor were acceptable (H2).

Measurement Invariance To test if the same second-order latent model holds in each country, and gender, a group of seven nested models with indications of

Table 5 Internal consistency estimates for the both samples

Internal consistency estimates				
QWLS seven-factor dimensions	Brazil $\omega_{ordinal}$	Portugal	Brazil $\alpha_{ordinal}$	Portugal
Health and Safety needs	.48	.41	.50	.45
Economic and family needs	.64	.66	.68	.68
Social needs	.45	.50	.48	.52
Esteem needs	.77	.75	.80	.77
Actualization needs	.90	.91	.92	.93
Knowledge needs	.87	.92	.91	.94
Aesthetics needs	.86	.79	.88	.91
Total	.93	.93	.92	.90

equivalence was needed. The ΔCFI criterion (Cheung and Rensvold 2002) was selected over the $\Delta\chi^2$ criterion (Satorra and Bentler 2001) given the fact that the latter is too restrictive (Marôco 2014). To test measurement invariance between the two countries, Multi-group Confirmatory Factor Analysis (MGCFA) was conducted for the merged samples. Full-uniqueness second-order measurement invariance was obtained among the samples from Brazil and Portugal (H3). The ΔCFI < .01 was achieved in for all constrained models, contrary to the $\Delta\chi^2$. Regarding the measurement invariance for each gender group in two countries, full-uniqueness second-order measurement invariance was observed (H3; Table 6). The $\Delta CFI \leq .010$ criterion was achieved for all the comparisons between the established models for invariance between male and female workers in each country.

Table 6 Measurement invariance between countries and genders

Model	χ^2	*df*	χ^2/df	*CFI* scaled	$\Delta\chi^2$	Δ *CFI* scaled
Brazil ($n = 597$) and Portugal ($n = 566$)						
Configural	1152.566	187	6.163	.960	–	–
First-order loadings invariance	1218.670	196	6.218	.959	52.048***	.001
Second-order loadings invariance	1227.589	202	6.077	.959	8.179^{ns}	.000
Thresholds of measured variables	1472.796	275	5.356	.958	216.439***	.001
Intercepts of first-order factors invariance	1728.609	281	6.152	.953	67.951***	.005
Disturbances of first-order factors invariance	1793.782	288	6.228	.952	52.358***	.001
Residual variances of observed variables invariance	2114.748	304	6.956	.950	97.993***	.002
Brazilian Females ($n = 355$) and Brazilian Males ($n = 173$)						
Configural	553.286	188	2.943	.957	–	–
First-order loadings invariance	560.991	197	2.848	.958	8.571^{ns}	.001
Second-order loadings invariance	564.256	203	2.780	.959	4.393^{ns}	.001
Thresholds of measured variables	652.908	276	2.366	.961	96.980*	.002
Intercepts of first-order factors invariance	659.492	282	2.339	.965	3.634^{ns}	.004
Disturbances of first-order factors invariance	825.263	296	2.788	.967	32.779**	.002
Residual variances of observed variables invariance	892.972	312	2.862	.969	29.914*	.002
Portuguese Females ($n = 323$) and Portuguese Males ($n = 191$)						
Configural	671.696	187	3.592	.961	–	–
First-order loadings invariance	684.963	196	3.495	.963	11.720^{ns}	.002
Second-order loadings invariance	694.488	202	3.438	.963	9.726^{ns}	.000
Thresholds of measured variables	839.477	275	3.053	.964	128.300***	.001
Intercepts of first-order factors invariance	909.601	281	3.237	.963	24.088***	.001
Disturbances of first-order factors invariance	940.599	296	3.178	.971	15.956^{ns}	.008
Residual variances of observed variables invariance	1054.590	312	3.380	.971	54.597***	.000

^{ns} $p > .05$; ** $p < .01$; *** $p < .001$

Validity Evidence Based on Relationships with Other Constructs

The OLBI second-order factor model showed acceptable fit ($\chi^2(85) = 974.653$; $\chi^2/df = 11.47$; $p < .001$; $n = 1103$; $CFI = .986$; $NFI = .984$; $TLI = .982$; $SRMR = .064$; $RMSEA = .097$; $P(\text{rmsea}) \leq .05) < .001$; 90% CI].092; .103[). The UWES-9 second-order model also obtained acceptable fit ($\chi^2(25) = 434.518$; $\chi^2/df = 17.38$; $p < .001$; $n = 1092$; $CFI = .998$; $NFI = .998$; $TLI = .997$; $SRMR = .041$; $RMSEA = .123$; $P(\text{rmsea}) \leq .05) < .001$; 90% CI].113; .133[). Both in terms of first- and second-order latent factors the reliability of the scores in terms of internal consistency for UWES-9 ($\omega_{vigor} = .94$; $\omega_{dedication} = .92$; $\omega_{absorption} = .88$; $\omega_{partial\ L1} = .97$; $\omega_{L1} = .93$; $\omega_{L2} = .96$) and OLBI ($\omega_{disengagement} = .87$; $\omega_{exhaustion} = .89$; $\omega_{partial\ L1} = .94$; $\omega_{L1} = .86$; $\omega_{L2} = .91$) were considered good evidence.

The causal model of QWL's lower-needs satisfaction predicting work engagement (H4a) had a good fit ($\chi^2(86) = 593.937$; $\chi^2/df = 6.91$, $p < .001$; $n = 1092$; $CFI = .998$; $NFI = .987$; $TLI = .997$; $SRMR = .041$; $RMSEA = .074$; $P(\text{rmsea}) \leq .05) < .001$, 90% CI].068; .079[), indicating a large and positive effect ($\beta_{QWL\ L\text{-}N\ -\ >\ WE} = 0.55$; $p < .001$). No statistically significant differences were found between the Brazilian and the Portuguese samples for this relationship ($\Delta\chi^2 = 0.33$; $\Delta df = 1$; $p = .564$; $\beta_{Brazil} = .61$; $\beta_{Portugal} = 0.46$).

The causal model of work engagement being predicted by QWL's higher-needs (H4b) had a good fit ($\chi^2(288) = 917.721$; $\chi^2/df = 6.37$, $p < .001$; $n = 1092$; $CFI = .998$; $NFI = .997$; $TLI = .997$; $SRMR = .040$; $RMSEA = .070$; $P(\text{rmsea}) \leq .05) < .001$, 90% CI].066; .075[) indicating a positive and large effect ($\beta_{QWL\ H\text{-}N\ -\ >\ WE} = 0.79$; $p < .001$). No statistically significant differences were found between the Brazilian and the Portuguese samples for this relationship ($\Delta\chi^2 = 0.31$; $\Delta df = 1$; $p = .580$; $\beta_{Brazil} = 0.80$; $\beta_{Portugal} = 0.77$).

The causal model of QWL's lower-needs predicting burnout (H4c) had a good fit ($\chi^2(181) = 1340.125$; $\chi^2/df = 7.40$, $p < .001$; $n = 1103$; $CFI = .983$; $NFI = .981$; $TLI = .981$; $SRMR = .058$; $RMSEA = .076$; $P(\text{rmsea}) \leq .05) < .001$, 90% CI].072; .080[) indicating a large and negative effect ($\beta_{QWL\ L\text{-}N\ -\ >\ B} = -0.63$; $p < .001$). No statistically significant differences were found between the Brazilian and the Portuguese samples for this relationship ($\Delta\chi^2 = 0.40$; $\Delta df = 1$; $p = .527$; $\beta_{Brazil} = -0.66$; $\beta_{Portugal} = -0.57$).

The causal model of burnout being predicted by QWL's higher-needs (H4d) had an acceptable fit ($\chi^2(264) = 2716.279$; $\chi^2/df = 10.29$, $p < .001$; $n = 1103$; $CFI = .987$; $NFI = .986$; $TLI = .986$; $SRMR = .066$; $RMSEA = .092$; $P(\text{rmsea}) \leq .05) < .001$, 90% CI].089; .095[) indicating a negative and large effect ($\beta_{QWL\ H\text{-}N\ -\ >\ B} = -0.83$; $p < .001$). No statistically significant differences were found between the Brazilian and the Portuguese samples for this relationship ($\Delta\chi^2 = 2.29$; $\Delta df = 1$; $p = .130$; $\beta_{Brazil} = -0.82$; $\beta_{Portugal} = -0.85$).

QWL Comparisons among Gender and Country Categories

Comparisons of the means of the QWLS' dimensions and overall mean score between the groups that obtained measurement invariance were performed (see Table 7). The results of two-way ANOVA (gender and country) indicate that the country-gender interaction effect was significant only for actualization needs (H5). The results also

Table 7 QWLS dimensions comparisons among countries, gender and interaction between countries and gender

QWLS dimension	Brazil-Portugal											
	Gender				Country				Gender* Country			
	F (df_F; df_r)	p	ω^2	π	F (df_F; df_r)	p	ω^2	π	F (df_F; df_r)	p	ω^2	π
Health and Safety needs	13.554 (1; 1038)	<.001	.012	.957	19.997 (1; 1038)	<.001	.011	.950	1.487 (1; 1038)	.335	<.001	.161
Economic and Family needs	15.026 (1; 1038)	<.001	.013	.972	6.211 (1; 1038)	.013	.005	.703	0.812 (1; 1038)	.537	−.001	.095
Social needs	9.057 (1; 1038)	.003	.008	.853	0.421 (1; 1038)	<.001	−.001	.099	0.822 (1; 1038)	.529	−.001	.097
Esteem needs	2.502 (1; 1038)	.114	.001	.353	0.068 (1; 1038)	.795	−.001	.058	1.265 (1; 1038)	.261	<.001	.203
Actualization needs	3.186 (1; 1038)	.075	.002	.431	0.516 (1; 1038)	.473	<.001	.111	4.765 (1; 1038)	.029*	.004	.588
Knowledge needs	1.514 (1; 1038)	.219	<.001	.234	6.443 (1; 1038)	.011	.005	.718	1.638 (1; 1038)	.201	.001	.249
Aesthetics needs	1.028 (1; 1038)	.311	<.001	.174	8.615 (1; 1038)	.003	.007	.835	1.652 (1; 1038)	.199	.001	.251
Overall needs (QWL)	10.010 (1; 1038)	.002	.009	.886	1.159 (1; 1038)	.282	<.001	.190	0.706 (1; 1038)	.401	<.001	.134
Gender - Country	*Actualization needs pairwise comparisons (Tukey HSD) M diff (p-values)											
	Male – Brazil			Female – Brazil			Male – Portugal			Female – Portugal		
Male – Brazil	–			–			–			–		
Female – Brazil	0.463 (.025)			–			–			–		
Male – Portugal	−0.405 (.128)			0.058 (.983)			–			–		
Female – Portugal	−0.367 (.123)			0.096 (.893)			−0.038 (.995)			–		

show that there are significant gender differences between three QWLS dimensions and the overall mean score and that there are significant country differences in five QWLS dimensions (see Table 7). In terms of satisfaction of the lower-order needs statistically significant differences were found, being higher in males ($\Delta\chi^2_{scaled} = 14.464$, $\Delta df = 1$, $p < .001$, $d = -0.358$). Regarding the satisfaction of higher-order needs, no differences were found among genders ($\Delta\chi^2_{scaled} = 3.326$, $\Delta df = 1$, $p = .068$, $d = -0.136$). Although not hypothesized, we tested whether there are country differences in satisfactions of higher-order needs and satisfaction of lower-order needs. The results indicate that there is no significant difference in the satisfaction of lower-order needs ($\Delta\chi^2_{scaled} = 1.039$, $\Delta df = 1$, $p = .308$, $d = 0.089$) or satisfaction of higher-order needs ($\Delta\chi^2_{scaled} = 2.443$, $\Delta df = 1$, $p = .118$, $d = -0.101$). For comparative proposes with other studies using the QWLS, the correspondent means and quartiles of each QWLS' dimensions and QWLS' overall composite mean score for gender and country are shown in Table 8.

Discussion

The QWL is an important construct in organizational settings given that it is related to life and job satisfaction, general well-being, organizational and affective commitment, turnover intention, and team spirit (Arndt et al. 2015; Chan and Wyatt 2007; Koonmee and Virakul 2007; Lee et al. 2007). To measure QWL effectively, it is necessary to ensure that the measure is valid across settings, countries, and gender groups. The measurement instrument of QWL is QWLS. Our study findings provide good validity evidence based on the internal structure and based on relationships with other variables (American Educational Research Association et al. 2014). With respect to the H1, the study findings show acceptable goodness-of-fit to the original structure of the QWLS using two samples (Portugal and Brazil), thus supporting H1.

Three previous studies conducted a confirmatory factor analysis on the seven-factor version of QWLS (Afsar and Burcu 2014; Marta et al. 2013; Rastogi et al. 2018). Unlike the second-order structure in this study, Rastogi et al. (2018) tested a seven-factor first-order model. Afsar and Burcu (2014) tested the first- and second-order models with a minimum $\gamma = 0.56$, which is lower than the minimum obtained in our study ($\gamma_{HS\ Portugal} = 0.74$; and $\gamma_{EF\ Portugal} = 0.74$). Marta et al. (2013) tested the QWLS as a second-order model with the lowest γ being 0.46 (social needs dimension). That measure used a single item to capture social needs and esteem needs. Overall, the second-order structure of the QWLS measure used in this study provided a good fit to the data.

The results indicate that the QWLS measure in this study has good reliability for both samples, supporting H2. The QWLS had high second-order internal consistency estimates for samples 1 and 2, the first-order dimensions had estimates that varied from unsatisfactory to very good. The study of Afsar and Burcu (2014) was the only one that reported internal consistency estimates for the seven first-order factors separately, however the reliability internal consistency values that were published were only based on Cronbach's α tests, instead of the more appropriate ω coefficients, which were used in our study. However, none of the studies provided second-order latent variable estimates (Jorgensen et al. 2018) as was done in our study.

Table 8 Quartiles, Means, and Standard Deviations for Countries and Genders

QWLS dimensions	Gender														
	Brazil ($n = 597$)														
	Female ($n = 355$)					Male ($n = 173$)					Total ($n = 597$)*				
	M	*SD*	25	50	75	*M*	*SD*	25	50	75	*M*	*SD*	25	50	75
Health and Safety needs	4.30	1.30	3.33	4.33	5.33	4.51	1.46	3.33	4.67	5.67	4.33	1.36	3.33	4.33	5.33
Economic and Family needs	4.34	1.51	3.17	4.33	5.33	4.66	1.55	3.67	4.67	6.00	4.38	1.54	3.33	4.33	5.67
Social needs	4.61	1.48	3.50	5.00	6.00	4.96	1.49	4.00	5.00	6.00	4.72	1.48	4.00	5.00	6.00
Esteem needs	4.57	1.65	3.50	4.50	6.00	4.84	1.57	4.00	5.00	6.00	4.63	1.43	3.50	5.00	6.00
Actualization needs	4.08	1.85	2.50	4.00	5.50	4.55	1.76	3.00	4.50	6.00	4.18	1.84	3.00	4.00	6.00
Knowledge needs	4.94	1.80	3.50	5.50	6.50	5.24	1.66	4.00	5.50	7.00	4.98	1.77	3.50	5.00	6.50
Aesthetics needs	4.34	1.88	3.00	4.50	6.00	4.62	1.87	3.00	5.00	6.00	4.41	1.89	3.00	4.50	6.00
Overall needs (QWL)	4.44	1.22	3.56	4.56	5.38	4.75	1.24	3.94	4.81	5.75	4.50	1.23	3.63	4.63	5.44
	Portugal ($n = 566$)														
	Female ($n = 323$)					Male ($n = 191$)					Total ($n = 566$)*				
Health and Safety needs	4.53	1.17	3.67	4.67	5.33	4.90	1.14	4.00	5.00	5.67	4.66	1.18	3.67	4.67	5.67
Economic and Family needs	4.07	1.40	3.00	4.00	5.00	4.51	1.37	3.50	4.67	5.67	4.20	1.40	3.33	4.33	5.33
Social needs	4.57	1.34	3.50	4.50	5.50	4.82	1.47	4.00	5.00	6.00	4.64	1.40	3.63	4.50	6.00
Esteem needs	4.68	1.42	3.50	5.00	6.00	4.72	1.45	3.75	5.00	6.00	4.68	1.63	3.50	5.00	6.00
Actualization needs	4.18	1.72	3.00	4.50	5.75	4.14	1.67	3.00	4.50	5.50	4.16	1.67	3.00	4.50	5.50
Knowledge needs	4.77	1.68	3.50	5.00	6.00	4.78	1.74	3.50	5.00	6.00	4.76	1.68	3.50	5.00	6.00
Aesthetics needs	4.12	1.67	3.00	4.00	5.50	4.11	1.54	3.00	4.00	5.00	4.12	1.61	3.00	4.00	5.50
Overall needs (QWL)	4.41	1.07	3.56	4.44	5.25	4.59	1.10	3.81	4.81	5.38	4.46	1.08	3.69	4.50	5.25

Note. * - Some subjects didn't inform their gender

H3 deals with measurement invariance. The results indicate that measurement invariance was achieved across the country and gender. This is the first study that tested measurement invariance across gender and country. The findings confirm the cultural similarities between Portugal and Brazil (Vargas et al. 2017).

H4 deals with the nomological validity of the measure. The results indicate that two dimensions of QWLS are positively related to work engagement and are negative to burnout. These results provide support for H4. The effect size was large in all cases suggesting that the QWLS measure has predictive validity, and that predictive validity is consistent across country samples. The QWLS predictive paths in relation to work engagement and burnout suggested that QWL's higher-needs play a stronger impact than QWL's lower-order needs. Energetic involvement in work seems to be associated with need satisfaction of Brazilian and Portuguese workers. Specifically, we compared the mean of QWLS need satisfaction between the two country samples. The results indicate that the Portuguese sample had a higher mean score for health and safety need satisfaction, whereas the Brazilian sample had a higher mean score for economic and family need satisfaction, knowledge needs satisfaction, aesthetics need satisfaction and social need satisfaction. This is consistent with the importance of creativity and social roles of Brazilian workers as documented by Garibaldi de Hilal (2009). In the Brazilian culture, personal and friendly treatment of workers is the cultural norm; this social phenomenon is known as *jeitinho brasileiro* ("the Brazilian way") (Hofstede et al. 2010).

The importance of social roles is fundamental in Brazilian organizations. Social roles among Brazilian workers are used to help deal with work demand, providing the desired flexibility and adaptability. This is the reflex of the *Cordial Man*, which moves the worker by the *ethos of emotion*, seeking to suppress "distance" imposed by the hierarchy (de Holanda 2012), *looking* to overcome formalism that marks social relations and applying to them a more personal form (Rosa et al. 2006) where they look for proximity within society's hierarchy (de Freitas 2007; Motta 2007). As such, having the workers' social needs and aesthetic needs met should be an important priority for Brazilian firms. In contrast, in Portugal, the formality in work relations seem to be more grounded (Dias et al. 2010).

We compared the mean of QWLS need satisfaction dimensions between gender groups. The results indicate that male workers had higher mean satisfaction scores on lower-order needs, higher-order needs, and overall QWL. These findings show that male workers may feel more satisfied at work than female workers. However, this need satisfaction is limited mainly to lower-order needs (familial and economic needs; health and security needs) for both Brazilian and Portuguese samples. This finding is similar to the study involving Thai and USA workers, where gender disparities were found between males and females in the sample from Thailand with respect to lower-order needs (Mohan and Suppareakchaisakul 2014). Gender differences observed in the present study can be related to gender-role norms in regard to work and family life. Namely, female workers, when assuming the role of housewife, do not always receive the expected support from organizations to sustain their performance in dual roles — work and family roles (Donnelly et al. 2016). Gender disparities are reported to exist in both countries (Cardoso et al. 2016; Lyonette et al. 2007; Santos and Garibaldi de Hilal 2018).

With respect to the interaction effect between country (Brazil and Portugal) and gender, the study findings show a significant interaction in relation to only one dimension, namely, actualization needs among Brazilian males and females. In Portugal, the actualization

dimension did not differ significantly between male and female workers. In contrast, Brazilian female workers do not feel that their potential is realized compared to Brazilian males. This was suggested by a study with Brazilian females which reported that companies give preference to male workers with respect to promotion and opportunities for supervisor roles (Santos and Garibaldi de Hilal 2018). In fact, this study's findings reveal that QWL differences between male and female workers can change depending on the country. Additionally, Brazilian workers did not score higher on all QWLS' dimensions. We found that Brazilian workers have higher satisfaction ratings on three specific higher-order needs (i.e., social needs, knowledge needs, aesthetics needs), whereas Portuguese workers have higher satisfaction ratings on a specific lower-order need (i.e., health and safety needs). Although not hypothesized, we found that there is no latent mean difference in higher- and lower-order needs between the two countries. It should be noted that QWL differences between the countries are influenced by a host of country characteristics (economic conditions, political conditions, immigration policy, etc.), organizational characteristics (company policy, supervisory support, working environment, etc.), as well as employee demographics (age, education, work experience, type of occupation, etc.). As such, it is difficult to reach a firm conclusion at this stage about what causes the QWL difference between the two countries. Future research should be conducted to compare QWL differences with matching samples from the two countries while controlling organizational and individual characteristics. One way of doing so is to compare the QWL of employees working in subsidiaries of the same global company operating in the two countries. In this study Portugal and Brazil were in different moments of socioeconomical transition. Portugal was recovering from the crisis, with the economy growing faster than the European Union average for the first time in 15 years, and the unemployment felling sharply (Reis 2015). While Brazil was entering on a deep political crisis, marked with big scandals of corruption and the President's impeachment causing bi instability (Green et al. 2019). An extended crisis in parallel to socioeconomic problems (i.e., growing inflation) associated with other Brazil's historic problems (e.g., corruption and violence/crime) (Alban 2018).

Future research can formally test antecedents to QWLS in a nomological network in the two countries. For example, one can argue that higher-order needs of QWL are influenced by cultural values (e.g., creativity, flexibility), whereas lower-order needs of QWL is influenced by the level of economic development (e.g., per capita GDP).

Conclusion

Greater QWL can be achieved if workers' and organizations' goals are matched (Ramawickrama et al. 2017). Improving QWL is a goal of the European Union, given that it fosters workplace innovation and sustainable work (e.g., Greenan et al. 2014). Thus, it is important to keep in mind the observed differences between males and females workers in relation to occupational health and safety (e.g., Stallones 2004), as well as well-being and life satisfaction of workers (e.g., Page and Vella-Brodrick 2012; Sirgy 2001). This study contributes important information about the validity of the QWLS instrument to help researchers use the QWLS measure with greater confidence concerning its internal structure and its relation to other behavioral constructs such as work engagement and burnout.

The present study has its limitations. The study used convenience samples. As such, future research should test the validity of the QWLS using representative samples. Representative samples should be obtained to reflect the dominant profile of workers in each country including the less-developed states and districts within (Henrich et al. 2010). The differences among Portuguese and Brazilian workers should also be analyzed with caution, given the timeframe and the specific economic conditions that were in flux both in Brazil and Portugal during the period of the data collection. We hope that future research would continue this line of investigation to further support the use of the QWLS across a more diverse set of countries, cultures, specific occupations and demographic groups.

Acknowledgements The authors would like to thank: the Portuguese national occupational health program of the Directorate-General of Health (DGS) and the William James Center for Research, Portuguese Science Foundation (FCT UID/PSI/04810/2013). This work was produced with the support of INCD funded by FCT and FEDER under the project 22153-01/SAICT/2016.

References

Abdollahzade, F., Asghari, E., Asghari Jafarabadi, M., Mohammadi, F., Rohan, A., & Mardani-Kivi, M. (2016). Predictive factors of quality of work life among operating room nurses in training hospitals. *Journal of Guilan University of Medical Sciences, 25*(99), 57–68 http://journal.gums.ac.ir/article-1-1285-en.html.

Afsar, S. T., & Burcu, E. (2014). The adaptation and validation of quality of work life scale to Turkish culture. *Applied Research in Quality of Life, 9*(4), 897–910. https://doi.org/10.1007/s11482-013-9276-0.

Alban, M. (2018). The degradation of Brazilian socioeconomics. *Brazilian Journal of Political Economy, 38*(1), 167–183. https://doi.org/10.1590/0101-31572018v38n01a10.

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for Educational and Psychological Testing*. Washington, DC: American Psychological Association.

Arndt, A. D., Singhapakdi, A., & Tam, V. (2015). Consumers as employees: The impact of social responsibility on quality of work life among Australian engineers. *Social Responsibility Journal, 11*(1), 98–108. https://doi.org/10.1108/SRJ-06-2013-0075.

Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International, 13*(3), 209–223. https://doi.org/10.1108/13620430810870476.

Bakker, A. B., Demerouti, E., & Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource Management, 43*(1), 83–104. https://doi.org/10.1002/hrm.20004.

Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. I. (2014). Burnout and work engagement: The JD–R approach. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 389–411. https://doi.org/10.1146/annurev-orgpsych-031413-091235.

Bureau of Labor Statistics. (2017). *Highlights of women's earnings in 2016 (no. 1069)*. Washington, DC: Author https://www.bls.gov/opub/reports/womens-earnings/2016/pdf/home.pdf.

Buse, A. (1982). The likelihood ratio, Wald, and Lagrange multiplier tests: An expository note. *The American Statistician, 36*(3a), 153–157. https://doi.org/10.1080/00031305.1982.10482817.

Byrne, B. M. (2010). *Structural equation modeling with AMOS* (3rd ed.). New York: Routledge. https://doi.org/10.4324/9781410600219.

Campos, J. A. D. B., Carlotto, M. S., & Marôco, J. (2012). Oldenburg burnout inventory - student version: Cultural adaptation and validation into Portuguese. *Psicologia: Reflexão e Crítica, 25*(4), 709–718. https://doi.org/10.1590/S0102-79722012000400010.

Cardoso, A. R., Guimarães, P., & Portugal, P. (2016). What drives the gender wage gap? A look at the role of firm and job-title heterogeneity. *Oxford Economic Papers, 68*(2), 506–524. https://doi.org/10.1093/oep/gpv069.

Cavalcanti, L., Oliveira, A. T. de, Araujo, D., & Tonhati, T. (Eds.). (2017). *A inserção dos imigrantes no mercado de trabalho brasileiro: Relatório anual 2017*. Brasília: OBMigra http://obmigra.mte.gov.br/index.php/relatorio-anual.

Cetrano, G., Tedeschi, F., Rabbi, L., Gosetti, G., Lora, A., Lamonaca, D., Manthorpe, J., & Amaddeo, F. (2017). How are compassion fatigue, burnout, and compassion satisfaction affected by quality of working life? Findings from a survey of mental health staff in Italy. *BMC Health Services Research, 17*(1), 1–11. https://doi.org/10.1186/s12913-017-2726-x.

Chan, K. W., & Wyatt, T. A. (2007). Quality of work life: A study of employees in Shanghai, China. *Asia Pacific Business Review, 13*(4), 501–517. https://doi.org/10.1080/13602380701250681.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5.

Connerley, M. L., & Wu, J. (Eds.). (2016). *Handbook on well-being of working women*. Dordrecht: Springer. https://doi.org/10.1007/978-94-017-9897-6.

Costa, H. A., & Costa, E. S. (2017). Precariousness and call Centre work: Operators' perceptions in Portugal and Brazil. *European Journal of Industrial Relations, 24*, 1–17. https://doi.org/10.1177/0959680117736626.

Danna, K., & Griffin, R. W. (1999). Health and well-being in the workplace: A review and synthesis of the literature. *Journal of Management, 25*(3), 357–384.

de Freitas, A. B. (2007). Traços brasileiros para uma análise organizacional. In F. C. P. Motta & M. P. Caldas (Eds.), *Cultura organizacional e cultura brasileira* (pp. 38–54). São Paulo: Atlas.

de Holanda, S. B. (2012). *O homem cordial*. São Paulo: Penguin & Companhia das Letras.

de Jong, M., de Boer, A. G. E. M., Tamminga, S. J., & Frings-Dresen, M. H. W. (2015). Quality of working life issues of employees with a chronic physical disease: A systematic review. *Journal of Occupational Rehabilitation, 25*(1), 182–196. https://doi.org/10.1007/s10926-014-9517-6.

Demerouti, E., & Bakker, A. B. (2008). The Oldenburg burnout inventory: A good alternative to measure burnout and engagement. In J. R. B. Halbesleben (Ed.), *Handbook of stress and burnout in health care* (pp. 65–78). New York: Nova Science.

Dias, S., Queirós, C., & Carlotto, M. S. (2010). Burnout syndrome and associated factors among health professionals: A comparative study between Brazil and Portugal. *Aletheia, 32*, 4–21.

Donnelly, K., Twenge, J. M., Clark, M. A., Shaikh, S. K., Beiler-May, A., & Carter, N. T. (2016). Attitudes toward women's work and family roles in the United States, 1976–2013. *Psychology of Women Quarterly, 40*(1), 41–54. https://doi.org/10.1177/0361684315590774.

Easton, S. A., & Van Laar, D. L. (2018). *User manual for the Work-Related Quality of Life (WRQoL) scale: A mesure of quality of working life* (2nd ed.). Portsmouth: University of Portsmouth All. https://doi.org/10.17029/EASTON2018.

Easton, S. A., Van Laar, D. L., & Marlow-Vardy, R. (2013). Quality of working life and the police. *Management, 3*(3), 135–141. https://doi.org/10.5923/j.mm.20130303.01.

Efraty, D., & Sirgy, M. J. (1990). The effects of quality of working life (QWL) on employee behavioral responses. *Social Indicators Research, 22*(1), 31–47. https://doi.org/10.1007/BF00286389.

Elizur, D., & Shye, S. (1990). Quality of work life and its relation to quality of life. *Applied Psychology. An International Review, 39*(3), 275–291. https://doi.org/10.1111/j.1464-0597.1990.tb01054.x.

Ernst Kossek, E., & Ozeki, C. (1998). Work-family conflict, policies, and the job-life satisfaction relationship: A review and directions for organizational behavior-human resources research. *Journal of Applied Psychology, 83*(2), 139–149. https://doi.org/10.1037/0021-9010.83.2.139.

Eurofound. (2017). *Sixth European Working Conditions Survey - Overview report (2017 update)*. Luxembourg: Publications Office of the European Union. https://doi.org/10.2806/422172.

Finney, S. J., & DiStefano, C. (2013). Non-normal and categorical data in structural equation modeling. In G. R. Hancock & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (2nd ed., pp. 439–492). Charlotte: Information Age Publishing.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*, 39–50. https://doi.org/10.2307/3151312.

Garibaldi de Hilal, A. V. (2009). In E. H. Kessler & D. J. Wong-MingJi (Eds.), *Cultural mythology and global leadership*. Cheltenham: Edward Elgar.

Green, J. N., Langland, V., & Schwarcz, L. M. (Eds.). (2019). *The Brazil reader: History, culture, politics* (2nd ed.). Durham: Duke University Press.

Greenan, N., Kalugina, E., & Walkowiaky, E. (2014). Has the quality of working life improved in the EU-15 between 1995 and 2005? *Industrial and Corporate Change, 23*(2), 399–428. https://doi.org/10.1093/icc/dtt012.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis: Pearson new international edition* (7th ed.). Harlow: Pearson.

Hays, W. L. (1963). *Statistics for psychologists*. New York: Holt, Rinehart, Winston.

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences, 33*(2–3), 61–83. https://doi.org/10.1017/S0140525X0999152X.

Hofstede, G., Garibaldi de Hilal, A. V., Malvezzi, S., Tanure, B., & Vinken, H. (2010). Comparing regional cultures within a country: Lessons from Brazil. *Journal of Cross-Cultural Psychology, 41*(3), 336–352. https://doi.org/10.1177/0022022109359696.

Højsgaard, S., & Halekoh, U. (2018). doBy: Groupwise statistics, LSmeans, linear contrasts, utilities (R package version 4.6–2) [Computer software]. https://cran.r-project.org/package=doBy.

Horst, C., Pereira, S., & Sheringham, O. (2016). The impact of class on feedback mechanisms: Brazilian migration to Norway, Portugal and the United Kingdom. In O. Bakewell, G. Engbersen, M. L. Fonseca, & C. Horst (Eds.), *Beyond networks: Feedback in international migration* (pp. 90–112). London: Palgrave Macmillan. https://doi.org/10.1057/9781137539212_5.

Hsu, M.-Y. (2016). A quality of working life survey instrument for hospital nurses. *Journal of Nursing Research, 24*(1), 87–99. https://doi.org/10.1097/jnr.0000000000000098.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118.

International Labour Office. (2012). *International standard classification of occupations. Isco-08 (Vol. I)*. Geneva: International Labour Organization. https://doi.org/10.13140/RG.2.1.1419.3126.

International Organization for Migration (Ed.). (2017). *World migration report 2018*. Geneva: Author https://www.iom.int/wmr/world-migration-report-2018.

International Test Commission. (2018). ITC guidelines for translating and adapting tests (second edition). *International Journal of Testing, 18*(2), 101–134. https://doi.org/10.1080/15305058.2017.1398166.

Jenaro, C., Flores, N., Orgaz, M. B., & Cruz, M. (2011). Vigour and dedication in nursing professionals: Towards a better understanding of work engagement. *Journal of Advanced Nursing, 67*(4), 865–875. https://doi.org/10.1111/j.1365-2648.2010.05526.x.

Jorge, M. R. (1998). Adaptação transcultural de instrumentos de pesquisa em saúde mental. *Revista de Psiquiatria Clínica, 25*(5), 233–239.

Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., & Rosseel, Y. (2018). semTools: Useful tools for structural equation modeling (R package version 0.5–1) [Computer software]. https://cran.r-project.org/package=semTools.

Kanten, S., & Sadullah, O. (2012). An empirical research on relationship quality of work life and work engagement. *Procedia - Social and Behavioral Sciences, 62*, 360–366. https://doi.org/10.1016/j.sbspro.2012.09.057.

Knox, S., & Irving, J. A. (1997). An interactive quality of work life model applied to organizational transition. *The Journal of Nursing Administration, 27*(1), 39–47. https://doi.org/10.1097/00005110-199701000-00009.

Koonmee, K., & Virakul, B. (2007). Ethics, quality of work life, and employee job-related outcomes: A survey of HR and marketing managers in Thai business. *NIDA Development Journal, 47*(4), 67–97. https://doi.org/10.14456/ndj.2007.3.

Koonmee, K., Singhapakdi, A., Virakul, B., & Lee, D.-J. (2010). Ethics institutionalization, quality of work life, and employee job-related outcomes: A survey of human resource managers in Thailand. *Journal of Business Research, 63*(1), 20–26. https://doi.org/10.1016/j.jbusres.2009.01.006.

Lau, R. S. M., & May, B. E. (1998). A win-win paradigm for quality of work life and business performance. *Human Resource Development Quarterly, 9*(3), 211–226. https://doi.org/10.1002/hrdq.3920090302.

Lee, D.-J., Singhapakdi, A., & Sirgy, M. J. (2007). Further validation of a need-based quality-of-work-life (QWL) measure: Evidence from marketing practitioners. *Applied Research in Quality of Life, 2*(4), 273–287. https://doi.org/10.1007/s11482-008-9042-x.

Lewis, J. (2009). *Work–family balance, gender and policy*. Northampton: Edward Elgar. https://doi.org/10.4337/9781848447400.

LimeSurvey GmbH. (2017). *LimeSurvey: An open source survey tool [computer software]*. Hamburg: Author http://www.limesurvey.org.

Louis, K. S. (1998). Effects of teacher quality of work life in secondary schools on commitment and sense of efficacy. *School Effectiveness and School Improvement, 9*(1), 1–27. https://doi.org/10.1080/0924345980090101.

Lyonette, C., Crompton, R., & Wall, K. (2007). Gender, occupational class and work-life conflict: A comparison of Britain and Portugal. *Community, Work & Family, 10*(3), 283–308. https://doi.org/10.1080/13668800701456245.

Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrika, 57*(3), 519–530. https://doi.org/10.1093/biomet/57.3.519.

Marôco, J. (2014). *Análise de equações estruturais: Fundamentos teóricos, software & aplicações* (2nd ed.). Pêro Pinheiro: ReportNumber.

Marôco, J., Campos, J. A. D. B., Vinagre, M. d. G., & Pais-Ribeiro, J. L. (2014). Adaptação transcultural Brasil-Portugal da Escala de Satisfação com o Suporte Social para estudantes do ensino superior. *Psicologia: Reflexão e Crítica, 27*(2), 247–256. https://doi.org/10.1590/1678-7153.201427205.

Marta, J. K. M., Singhapakdi, A., Lee, D.-J., Sirgy, M. J., Koonmee, K., & Virakul, B. (2013). Perceptions about ethics institutionalization and quality of work life: Thai versus American marketing managers. *Journal of Business Research, 66*(3), 381–389. https://doi.org/10.1016/j.jbusres.2011.08.019.

Martel, J.-P., & Dupuis, G. (2006). Quality of work life: Theoretical and methodological problems, and resentation of a new model and measuring instrument. *Social Indicators Research, 77*(2), 333–368. https://doi.org/10.1007/s11205-004-5368-4.

McNamara, A., Arino de la Rubia, E., Zhu, H., Ellis, S., & Quinn, M. (2018). Skimr: Compact and flexible summaries of data (R package version 1.0.3) [Computer software]. https://cran.r-project.org/package=skimr.

Millsap, R. E., & Yun-Tein, J. (2004). Assessing factorial invariance in ordered-categorical measures. *Multivariate Behavioral Research, 39*(3), 479–515. https://doi.org/10.1207/S15327906MBR3903_4.

Mohan, K. P., & Suppareakchaisakul, N. (2014). Psychosocial correlates of the quality of work life among university teachers in Thailand and Malaysia. *International Journal of Behavioral science, 9*(2), 1–16 https://www.tci-thaijo.org/index.php/IJBS/article/view/20099/pdf.

Motta, F. C. P. (2007). Cultura e organizações no Brasil. In F. C. P. Motta & M. P. Caldas (Eds.), *Cultura organizacional e cultura brasileira* (pp. 25–37). São Paulo: Atlas.

Muthén, B. O. (1983). Latent variable structural equation modeling with categorical data. *Journal of Econometrics, 22*(1–2), 43–65. https://doi.org/10.1016/0304-4076(83)90093-3.

Nimalathasan, B., & Ather, S. M. (2010). Quality of work life (QoWL) and job satisfaction (JS): A study of academic professionals of private universities in Bangladesh. In *Annual Research Conference (ARC)*-2010. Jaffna, Sri Lanka: University of Jaffna.

OECD. (2018). *International migration outlook 2018*. Paris: Author. https://doi.org/10.1787/migr_outlook-2018-en.

Ollier-Malaterre, A., & Foucreault, A. (2017). Cross-national work-life research: Cultural and structural impacts for individuals and organizations. *Journal of Management, 43*(1), 111–136. https://doi.org/10.1177/0149206316655873.

Page, K. M., & Vella-Brodrick, D. A. (2012). From nonmalfeasance to beneficence: Key criteria, approaches, and ethical issues relating to positive employee health and well-being. In N. P. Reilly, M. J. Sirgy, & C. A. Gorman (Eds.), *Work and quality of life: Ethical practices in organizations* (pp. 463–489). Dordrecht: Springer. https://doi.org/10.1007/978-94-007-4059-4_25.

R Core Team. (2018). *R: A language and environment for statistical computing (version 3.5.1) [computer software]*. Vienna: R Foundation for Statistical Computing https://www.r-project.org/.

Ramawickrama, J., Opatha, H. H. D. N. P., & Pushpakumari, M. D. (2017). Quality of work life, job satisfaction, and the facets of the relationship between the two constructs. *International Business Research, 10*(4), 167–182. https://doi.org/10.5539/ibr.v10n4p167.

Rastogi, M., Rangnekar, S., & Rastogi, R. (2018). Psychometric evaluation of need-based quality of work life scale in an Indian sample. *Industrial and Commercial Training, 50*(1), 10–19. https://doi.org/10.1108/ICT-06-2017-0041.

Reis, R. (2015). Looking for a success in the euro crisis adjustment programs: The case of Portugal. *Brookings Papers on Economic Activity, 458*, 433–458. https://doi.org/10.1353/eca.2015.0010.

Revelle, W. (2018). *psych: Procedures for psychological, psychometric, and personality research (R package version 1.8.12) [Computer software]*. Evanston: Northwestern University https://cran.r-project.org/package=psych.

Rosa, A. R., Tureta, C., & Brito, M. J. d. (2006). Cultura organizacional e cultura brasileira revisitadas: Uma atualização hermenêutica do dilema brasileiro. *Revista Eletrônica de Gestão Organizacional, 4*(3), 3–17 https://periodicos.ufpe.br/revistas/gestaoorg/article/view/21482.

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1–21. https://doi.org/10.18637/jss.v048.i02.

RStudio Team. (2018). *RStudio: Integrated development for R (version 1.1.463) [Computer software]*. Boston: RStudio, Inc http://www.rstudio.com/.

Rudnev, M., Lytkina, E., Davidov, E., Schmidt, P., & Zick, A. (2018). Testing measurement invariance for a second-order factor. A cross-national test of the alienation scale. *Methods, Data, Analyses, 12*(1), 47–76. https://doi.org/10.12758/mda.2017.11.

Saha, S., & Kumar, S. P. (2016). Empirical validation of dimensionality of quality of work life in India. *International Journal of Applied Business and Economic Research, 14*(6), 4253–4266 http://www.serialsjournals.com/serialjournalmanager/pdf/1499751958.pdf.

Santos, C., & Garibaldi de Hilal, A. V. (2018). Same, same but different? Women's experiences with gender inequality in Brazil. *Employee Relations, 40*(3), 486–499. https://doi.org/10.1108/ER-04-2017-0094.

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*(4), 507–514. https://doi.org/10.1007/BF02296192.

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior, 25*(3), 293–315. https://doi.org/10.1002/job.248.

Schaufeli, W. B., & Bakker, A. B. (2010). Defining and measuring work engagement: Bringing clarity to the concept. In A. B. Bakker & M. P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research* (pp. 10–24). New York: Psychology Press.

Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Vocational Behavior, 3*(1), 71–92. https://doi.org/10.1023/A:1015630930326.

Serviço de Estrangeiros e Fronteiras. (2018). *Relatório de imigração, fronteiras e asilo 2017*. Lisbon: Author http://sefstat.sef.pt/Docs/Rifa_2014.pdf.

Singhapakdi, A., Sirgy, M. J., Lee, D.-J., Senasu, K., Yu, G. B., & Nisius, A. M. (2014). Gender disparity in job satisfaction of Western versus Asian managers. *Journal of Business Research, 67*(6), 1257–1266. https://doi.org/10.1016/j.jbusres.2013.04.004.

Sinval, J., Pasian, S. R., Queirós, C., & Marôco, J. (2018). Brazil-Portugal transcultural adaptation of the UWES-9: Internal consistency, dimensionality, and measurement invariance. *Frontiers in Psychology, 9*. https://doi.org/10.3389/fpsyg.2018.00353.

Sinval, J., Queirós, C., Pasian, S. R., & Marôco, J. (2019). Transcultural adaptation of the Oldenburg burnout inventory (OLBI) for Brazil and Portugal. *Frontiers in Psychology, 10*, 1–28. https://doi.org/10.3389/fpsyg.2019.00338.

Sirgy, M. J. (2001). *Handbook of quality-of-life research: An ethical marketing perspective*. Dordrecht: Springer. https://doi.org/10.1007/978-94-015-9837-8.

Sirgy, M. J., Efraty, D., Siegel, P., & Lee, D.-J. (2001). A new measure of quality of work life (QWL) based on need satisfaction and spillover theories. *Social Indicators Research, 55*(3), 241–302. https://doi.org/10.1023/A:1010986923468.

Souza, J. C., Paiva, T., & Reimão, R. (2008). Sleep, quality of life and accidents in the lives of Brazilian and Portuguese truck drivers. *Psicologia em Estudo, 13*(3), 429–436. https://doi.org/10.1590/S1413-73722008000300003.

Stallones, L. (2004). Women in the workforce. In S. Loue & M. Sajatovic (Eds.), *Encyclopedia of Women's Health* (pp. 32–40). Boston: Springer. https://doi.org/10.1007/978-0-306-48113-0_4.

Taher, A. (2013). Variations of quality of work life of academic professionals in Bangladesh: A discriminant analysis. *European Journal of Training and Development, 37*(6), 580–595. https://doi.org/10.1108/EJTD-05-2013-0060.

Tuuli, P., & Karisalmi, S. (1999). Impact of working life quality on burnout. *Experimental Aging Research, 25*(4), 441–449. https://doi.org/10.1080/036107399243922.

Van Laar, D. L., Edwards, J. A., & Easton, S. A. (2007). The work-related quality of life scale for healthcare workers. *Journal of Advanced Nursing, 60*(3), 325–333. https://doi.org/10.1111/j.1365-2648.2007.04409.x.

Vargas, C., Sarmento, C., & Oliveira, P. (2017). Cultural networks between Portugal and Brazil: A postcolonial review. *International Journal of Cultural Policy, 23*(3), 300–311. https://doi.org/10.1080/10286632.2015.1056175.

Zin, R. M. (2004). Perception of professional engineers toward quality of worklife and organizational commitment. *Gadjah Mada International Journal of Business, 6*(3), 323–334 https://journal.ugm.ac.id/gamaijb/article/view/5553/4524.