Psicothema

Factorial invariance of the Satisfaction with Life Scale in adolescents from Spain and Portugal

Francisco L. Atienza González[1], Isabel Balaguer Solá[1], Nuno Corte-Real[2] and António M. Fonseca[2]
[1] University of Valencia and [2] CIFI2D, Sports Faculty, Porto University (Portugal)

Abstract

Background: The Satisfaction with Life Scale is one of the most widely used scales to measure the global cognitive judgment of satisfaction with one's life. **Method:** This study assesses the equivalence of the SWLS across Spanish and Portuguese adolescents, using multi-sample Confirmatory Factor Analysis. Participants were Spanish (N = 2183) and Portuguese (N = 4082) junior high school. **Results:** The results provide high support for the internal consistency of both the Spanish and Portuguese versions of this scale. The results also showed that factor structure, factor loadings, could be considered invariant across groups. However, the full scalar invariance between Spanish and Portuguese samples was not found, with the intercept for SWLS item 5 varying across countries. **Conclusions:** Similar findings have also been found in other cross-national studies with this scale. Implications of the findings are discussed and we conclude that the Spanish and Portuguese versions of the SWLS can be used for cross-national comparisons with Spanish and Portuguese adolescents.

Keywords: Factorial invariance, multigroup confirmatory factor analysis, adolescents, SWLS.

Resumen

Invarianza factorial de la Escala de Satisfacción con la Vida en adolescentes de España y Portugal. **Antecedentes:** la Escala de Satisfacción con la Vida es una de las escalas más utilizadas para medir el juicio cognitivo global sobre la propia satisfacción con la vida. **Método:** este estudio evalúa la equivalencia de la "SWLS" en adolescentes españoles y portugueses con Análisis Factorial Confirmatorio multi-muestra. Los participantes fueron alumnado español (N = 2.183) y portugués (N = 4.082) de Educación Secundaria. **Resultados:** los resultados proporcionan un elevado apoyo a la consistencia interna de las versiones en español y portugués de esta escala. Los resultados también mostraron que la estructura factorial y pesos factoriales podría considerarse invariable entre los grupos. Sin embargo, no se obtuvo la invariancia escalar completa entre las muestras de España y Portugal, con el intercepto para el ítem 5 variando entre los países. **Conclusiones:** otros estudios internacionales con esta escala han encontrado resultados similares. Se discuten las repercusiones de las conclusiones y se establece que las versiones en español y portugués de la "SWLS" pueden ser utilizadas para las comparaciones entre países con adolescentes españoles y portugueses.

Palabras clave: invarianza factorial, análisis factorial confirmatorio multigrupo, adolescentes, SWLS.

The Satisfaction with Life Scale (SWLS) is a multi-item scale developed in the United States by Diener, Emmons, Larsen, and Griffin (1985) as a measure of the judgmental component of subjective well-being. This scale is one of the most widely used scales to measure global cognitive judgments of satisfaction with one's life and has been validated in numerous countries.

Most of the research with the SWLS has found support for the reliability and the unidimensionality of this scale, as well as its correlates with personality and emotion variables (see Pavot & Diener, 2008). The factorial invariance of this scale has also been analyzed. The establishment of measurement invariance is a prerequisite for meaningful comparisons across groups (Milfont & Fischer, 2010), and failure to provide measurement invariance

can indicate that group comparisons may not be valid. The studies of measurement invariance have examined especially the gender and age factorial invariance of the SWLS. However, the analysis of the cross-national or cross-cultural measurement invariance of the SWLS is more recent (Dimitrova & Domínguez, 2015; Ponizovsky, Dimitrova, Schachner, & Schoot, 2013; Tucker, Ozer, Lyubomirsky, & Boehm, 2006; Whisman & Judd, 2015; Zanon, Bardagi, Layous, & Hutz, 2014).

Tucker et al. (2006) found equivalence in the SWLS between student samples from the USA and Russia, but not between community groups from these countries. Ponizovsky et al. (2013) found evidence for measurement invariance of the SWLS across three immigrant groups (immigrants from the Former Soviet Union (FSU) in Israel, Turkish-Bulgarians, and Turkish-Germans. Zanon et al. (2014) found nonequivalence in the SWLS between undergraduates from the United States and Brazil. Whisman and Judd (2015) found evidence of measurement invariance of the SWLS for configural and metric invariance, but not for scalar invariance between samples from the United States, England, and Japan. Finally, Dimitrova and Domínguez (2015) also found

partial support for the measurement invariance of the SWLS in Argentinean, Mexican, and Nicaraguan samples.

The results obtained about the cross-national and cross-cultural measurement invariance of the SWLS show that the scale exhibits some cultural sensitivity, suggesting that further research is necessary to analyze its cross-cultural equivalence.

The purpose of this research is to examine the extent to which the SWLS is invariant across two similar cultures, specifically across Spanish and Portuguese adolescents. The potential contribution of this article is to introduce the first study that assesses the factorial invariance in Spanish and Portuguese samples. We chose to compare Spanish and Portuguese adolescents because there are some similarities (e.g., in values, educational systems, etc.) between Spain and Portugal due to the fact that both countries have experienced comparable political and historical processes. Thus, it was analyzed whether that the one dimension of the SWLS was equivalent across both countries.

Method

Participants

The Spanish sample. Responses to the SWLS were obtained from 2183 adolescents (48.5% males, 51.5% females). Ages ranged from 13 to 18 years ($M = 15.4$ years; $SD = 1.5$). The age distribution was as follows: 13 years old (19.3%), 14 years old (3.2%), 15 years old (26%), 16 years old (25.2%), 17 years old (20.4%), and 18 years old (5.9%).

The Portuguese sample. Responses to the SWLS were obtained from 4082 high school students (45.6% males, 54.4% females). Ages ranged from 13 to 18 ($M = 15.4$ years; $SD = 1.5$). The age distribution was similar to the one obtained in the Spanish sample: 13 years old (18.8%), 14 years old (3.4%), 15 years old (26.5%), 16 years old (25.8%), 17 years old (18.6%), and 18 years old (6.9%).

Instruments

The SWLS (Diener et al., 1985) assesses respondents' current satisfaction with their life in general. The scale consists of five items, and respondents indicate the extent to which they agree with each item on a five-point Likert scale rated from 1 (*strongly disagree*) to 5 (*strongly agree*). The Spanish sample completed the Spanish version of the SWLS (Atienza, Pons, Balaguer, & García-Merita, 2000) and Portuguese sample completed the Portuguese version of the SWLS (Alves et al., 2004; Figueiras et al., 2010). The Spanish and Portuguese versions of the source English version were made following the back-translation procedure widely described in the literature (e.g., Hambleton & Kanjee, 1995).

Procedure

The Portuguese sample was specifically selected so that it matched the Spanish sample as closely as possible in terms of demographic variables such as gender and age. Following the procedure used in Zanon et al. (2014), the Portuguese sample was randomly split (Cohort 1 and Cohort 2), and both cohorts were compared to the Spanish sample to test for invariance.

In both samples of adolescents, questionnaires were administered by trained research assistants to classroom groups during school hours.

Data analysis

A series of multi-sample Confirmatory Factor Analysis (CFAs) were conducted with LISREL 8.80 (Jöreskog & Sörbom, 2006). An asymptotic covariance matrix was derived from all data sets, and each model was estimated with the diagonally weighted least squares method. The univariate distributions of the items indicated that both the Portuguese and the Spanish scores were non-normally distributed (see Table 1). Results showed negative skewness and high kurtosis in some items. Kolmogorov-Smirnov test results also showed that scores were not normally distributed for both Spanish and Portuguese samples. Since the scores were non-normally distributed, the diagonally weighted least squares method for model estimation was appropriate in our study. Because $\chi2$ is overly sensitive to sample size, other additional fit measures were also used as it is explained later on in the Goodness-of-fit criteria section.

Analyses were based on 6159 respondents (2164 Spanish adolescents and 3995 Portuguese adolescents) who had complete data for the SWLS items.

Testing for SWLS equivalence encompassed a series of hierarchically ordered steps addressed to test the invariance of the factor structure and the invariance of item parameters of the SWLS across the Spanish sample and the two cohorts of the Portuguese samples. First, the a priori factor structure was fitted separately for each sample to determine the extent to which the baseline model fitted the data for each group individually. Thus, we tested the baseline model for the Spanish sample and we tested the baseline model for the Portuguese sample. Then, a set of three nested models using multi-sample CFAs tested for increasingly stringent levels of constrained equivalence across the groups. Configural model addressed the equality of number and pattern of factor loadings across groups. Thus, the configural model tested whether a single factor model held in the two samples, but no invariance constraints were imposed. This model was used as a baseline for fit comparisons against the later models. The metric model addressed the invariance of factor loadings across groups. And in the scalar model, factor loadings and intercepts were constrained to be invariant across groups. We followed the recommendations of Vandenberg and Lance (2000) for testing partial measurement invariance. They argue that we need to establish first the support for configural invariance and at least partial metric invariance before testing further partial invariance model. Hence, after establishing this invariance, we then tested for partial measurement invariance, if obtained results did not support metric or scalar model, by successive removal of constraints on factor loadings (for metric model) or item intercepts (for scalar model) based on an examination of modification indices until the revised model did not differ from the configural model.

In all the models, for identification purposes and to establish the scale of measurement, Item 1 was selected to be a reference indicator, and its factor loading was fixed to 1. This item was not chosen arbitrarily. In accordance with other studies (Atienza et al., 2000; Atienza, Balaguer, & García-Merita, 2003; Pons, Atienza, Balaguer, & García-Merita, 2000; Whisman et al., 2015; Zanon et al., 2014), the models were identified by fixing the first factor loading to the unit.

Model fit was assessed using different criteria. The χ^2 statistic assesses whether the model holds exactly in the population. A significant χ^2 indicates a relevant deviation of the data from the model, but this might be an effect of the large sample size.

Therefore, the use of other fit measures is strongly recommended. Following Marsh, Hau, and Grayson (2005), we considered the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMSR), the non-normed fit index (NNFI), and the comparative fit index (CFI) to evaluate the goodness of fit as well as an evaluation of parameter estimates. In order to test invariance using CFA, a modeling rationale was used (Little, 2000; Marsh et al., 2005). With a modeling rationale, practical fit indices are used to assess the difference in goodness of fit between nested models. Even though there are no generally accepted standards, some criteria have been proposed in the literature to interpret differences in practical fit indices. Thus, for example, Widaman (1985) considered differences not larger than .01 between NNFI values (ΔNNFI) as an indication of negligible practical differences. Regarding differences between CFI values (ΔCFI), which are based on the results of a simulation work, Cheung and Rensvold (2002) suggested that decreases in fit greater than .01 might be important. From a modeling rationale, in the present study we will consider that a tested invariance is tenable if: (a) the model has an acceptable practical fit, and (b) the difference in the NNFI and CFI values provided by this model and a model without constraints can be considered as negligible (equal to or less than .01).

The goodness-of-fit indices for the models used to test item parameter invariance are also presented in Table 3. With regard to the multi-sample baseline model, support for configural invariance between the Spanish and the Portuguese cohort 1 samples were found. Results showed that the fit was acceptable (RMSEA = .018; SRMSR = .029; NNFI = 1.00; CFI = 1.00). Adequate values for configural invariance were also found between the Spanish and the Portuguese cohort 2 samples. Results also showed that the fit was acceptable (RMSEA = .042; SRMSR = .022, NNFI = .995; CFI = .997).

These results support the presence of a single-factor model across groups. Thus, it could be concluded that the same factor model was able to fit the data from each group. Consequently, the freely estimated single-factor model (Configural) was used as the baseline against which all remaining models were compared in the process of determining evidence of invariance.

Support for the metric invariance between the Spanish and the Portuguese cohort samples were found too. The practical fit index values obtained between the Spanish and the Portuguese cohort 1samples for the model that posits factor loading invariance (Metric) showed that this model had an acceptable fit (see Table 3, RMSEA = .015, SRMSR = .035, NNFI = 1.00, CFI = 1.00). The practical fit index values obtained between the Spanish and the

	Table 1											
	Descriptive statistics to the Spanish and Portuguese sample											
	Spanish adolescents[a] (n = 2164)						**Portuguese adolescents[b] (n = 3995)**					
Item	Loadings	M	SD	Skewness	Kurtosis	Z_{K-S}	Loadings	M	SD	Skewness	Kurtosis	Z_{K-S}
1	.76	3.62	.97	-.90	.32	.34**	.91	3.35	1.02	-.42	-.14	21**
2	.77	3.64	.95	-.73	.04	.32**	.88	3.52	.99	-.36	-.19	.21**
3	.92	3.82	.92	-.96	.78	.33**	.96	3.66	1.02	-.59	-.04	.24**
4	.68	3.37	1.11	-.35	-.76	.34**	.86	3.57	1.02	-.43	-.27	.22**
5	.66	3.65	.99	-.89	.41	.32**	.72	3.15	1.31	-.18	-1.08	.18**

[a] α coefficient = .83
[b] α coefficient = .81
** = p<.01

Results

Preliminary analyses

The descriptive statistics and coefficient alpha are presented in Table 1. In addition, item covariances for samples are shown in the Table 2. The estimate of internal consistency for the score gathered with the single-factor solution was satisfactory in the Spanish and the Portuguese samples.

Before carrying out the multi-sample CFAs, the single-factor structure for the SWLS was fitted separately in both samples. The loadings presented in Table 1 are standardized. As can be seen in Table 3 (Models Baseline Model Spain and Baseline Model Portugal), the proposed factorial structure adequately fitted the data for the Spanish (RMSEA = .004; SRMSR = .012; NNFI = 1.00; CFI = 1.00) and for the Portuguese (RMSEA = .035; SRMSR = .020; NNFI = .996; CFI = .998) samples considered separately. For these models, all parameter estimates were statistically significant.

	Table 2			
	Item covariances for samples			
Item 1	**Item 2**	**Item 3**	**Item 4**	**Item 5**
Spanish and Portuguese samples				
Item 1	.60	.68	.50	.52
Item 2	.54	.71	.51	.50
Item 3	.60	.63	.64	.60
Item 4	.47	.44	.61	.47
Item 5	.46	.14	.59	.54
Portuguese cohort samples				
Item 1	.55	.61	.46	.47
Item 2	.54	.66	.47	.43
Item 3	.60	.61	.63	.59
Item 4	.48	.42	.59	.55
Item 5	.44	.41	.58	.53

Note: Upper diagonal contains item covariances for Spanish and Portuguese cohort 1 samples. Lower diagonal contains item covariances for Portuguese and Portuguese cohort 2 samples

Table 3
Tested models, and fit indexes between the Spanish and Portuguese cohort samples

Models	df	SBχ2	RMSEA	(90% CI)	SRMSR	NNFI	CFI	ΔNNFI	ΔCFI
Baseline Spain	5	5.205	.004	(.000 – .030)	.012	1.00	1.00		
Baseline Portugal	5	29.739**	.035	(.023 – .048)	.020	.996	.998		
Spanish and cohort 1									
Configural	10	17.000	.018	(.000 – .033)	.029	1.00	1.00		
Metric	14	20.740	.015	(.000 – .028)	.035	1.00	1.00	.000	.000
Scalar	18	394.110**	.100	(.920 – .110)	.036	.970	.970	-.030	-.030
Scalar[a]	17	108.860**	.051	(.042 – .060)	.032	.990	.990	-.010	-.010
Spanish and cohort 2									
Configural	10	45.855**	.042	(.030 – .054)	.022	.995	.997		
Metric	14	20.960	.015	(.000 – .028)	.037	1.00	1.00	.005	.003
Scalar	18	359.840**	.096	(.087 – .100)	.039	.970	.980	-.025	-.017
Scalar[a]	17	77.550**	.041	(.032 – .051)	.035	.990	1.00	-.005	.003

Note: df = degrees of freedom; SBχ2= Satorra-Bentler Scaled Chi-Square; RMSEA = root mean square error of approximation; 90% CI = 90% confidence interval for the RMSEA; SRMSR = standardized root mean square residual; NNFI = non-normed fit index; CFI = comparative fit index. All the Δ index comparisons are made with respect to the configural model
** = p<.01
[a] Item intercepts for Item 5 were not constrained

Portuguese cohort 2 samples for the metric model showed too an acceptable fit (see Table 3, RMSEA = .015, SRMSR = .037, NNFI = 1.00, CFI = 1.00).

Because the metric model constraints equal factor loadings across groups, these results suggest that the SWLS items tap the same latent construct across the groups. Thus, it could be concluded that no important differences were found in the factor loadings across the samples.

The scalar model analyzed the invariance of factor loadings and intercepts. Support for the full scalar invariance between the Spanish and the Portuguese cohort samples was not found. The results suggest that, as function of the additional constraints of item intercepts, there was substantial deterioration in model fit. The practical fit index values obtained between the Spanish and the Portuguese Cohort 1samples for the model that posits factor loading and intercept invariance (Scalar) showed that the fit of this model was not acceptable (see Table 3, RMSEA = .100; SRMSR = .036; NNFI = .970; CFI = .970). In addition, the values obtained on ΔNNFI and ΔCFI, which exceed the criterion value .01, suggest the lack of support for the scalar invariance. The practical fit index values obtained between the Spanish and the Portuguese Cohort 2 samples for the scalar model also showed an unacceptable fit (see Table 3, RMSEA = .096, SRMSR = .039, NNFI = .970, CFI = .980). The values on ΔNNFI and ΔCFI also exceeded the criterion value .01.

Therefore, it could be concluded that important differences in the intercepts across the two samples were found. The maximum modification index obtained for the intercept for Item 5 in the scalar model between Spanish and the Portuguese Cohort 1 and between Spanish and the Portuguese Cohort 2 suggested that the item intercept for this item was not invariant. Thus, we released the constraints on these item intercepts in the Scalar[a] model. Some practical fit index values obtained between the Spanish and the Portuguese Cohort 1samples for this model (Scalar[a]) showed that this model had an acceptable fit (see Table 3, RMSEA = .051, SRMSR = .032, NNFI = .990, CFI = .990) and values on ΔNNFI and ΔCFI, that did not exceed the criterion value .01.

Results obtained between the Spanish and the Portuguese Cohort 2 samples for the model with unconstrained item intercept for Item 5 (Scalar[a]) were similar and also showed an acceptable fit in some indexes (see Table 3, RMSEA = .041, SRMSR = .035, NNFI = .990, CFI = 1.00) and values on ΔNNFI and ΔCFI, that did not exceed the criterion value .01.

Discussion

The goal of the present study was to analyze the measurement equivalence of the SWLS across Spanish and Portuguese adolescents, using multi-sample Confirmatory Factor Analysis. As a prelude to the main analyses, support was provided for the reliability of the scores gathered with the Spanish and Portuguese language versions of the SWLS.

Drawing from the results of the CFA for each sample separately, support for a one-factor structure was found in Spanish and Portuguese samples. Results from the internal consistency and from an examination of multiple fit indexes suggest that the SWLS is a valid and reliable scale for studying satisfaction with life in adolescents from Spain and Portugal.

The multi-sample CFA between the Spanish sample and two cohorts (randomly split) of the Portuguese sample reveals that the one-factor structure of the SWLS is similar across samples. We found evidence of configural invariance, which indicates that Spanish and Portuguese adolescents conceptualize life satisfaction in the same one-dimensional structure. We also found evidence of metric invariance, which indicates that Spanish and Portuguese adolescents conceptualize life satisfaction in the same one dimensional structure and they calibrate the items of the scale equivalently. However, we did not find evidence of full scalar invariance, which indicates that item intercepts were not invariant between Spanish and Portuguese adolescents. Results suggest that item intercept for item 5 ("if I could live my life over, I would change almost nothing") was not invariant. The evidence of noninvariance for Item 5 has also been found in other cross-national studies. Zanon et al., (2014) found that Items 4

and 5 were noninvariant between undergraduates from the United States and Brazil. Whisman and Judd (2015) found that Item 4 was noninvariant between adults from United States, England, and Japan. In addition, Dimitrova and Domínguez (2015) found that Items 2 and 3 were noninvariant between adults from Argentina, Mexico and Nicaragua.

Therefore, the lack of full scalar invariance obtained in our study is in line with previous results obtained in cross-national studies. The lack of full scalar invariance has also been obtained in some studies that have tested the gender and age measurement equivalence of the SWLS. Hultell and Gustavson (2008) found a lack of scalar invariance for the SWLS between age groups of Swedish university students. Clench-Aas, Nes, Dalgard, and Aarø, (2011) failed to find scalar invariance between age groups in a sample of Norwegian adults. More recently, Moksnes, Løhre, Byrn, and Haugan, (2014) did not find support for scalar invariance between genders in Norwegian adolescents.

Some authors have deemed that Items 4 and 5 of the SWLS are problematic. Hultell and Gustavson (2008) have pointed that the age of the respondent might affect the answers given to these items, and Item 4 appears to be positively related to age whereas Item 5 appears to be negatively related to age. Casas et al., (2012) consider that Item 5 is problematic with adolescents because many adolescents do not like to repeat the same experiences, as they think that new experiences will be more desirable. Other authors such as McDonald (1999) and Wishman et al. (2015) have pointed that Items 4 and 5 refer primarily to the past in comparison with the other items of the SWLS that focus on the present.

While we did not find evidence of full scalar invariance of the SWLS between Spanish and Portuguese adolescents, cross-national comparisons can be made. The full measurement invariance is unlikely to hold in practice, and appropriate cross-group comparisons can be made with partial measurement invariance (Milfont & Fischer, 2010). In light of our findings regarding partial measurement invariance, we feel confident that the SWLS can be considered to operate equivalently across Spanish and Portuguese adolescents. Given the known psychometric soundness of the SWLS with strong theoretical and empirical bases, those results have the potential to add evidence to the construct validity of this scale with respect to its Spanish and Portuguese adaptations.

It is important to note some strengths and limitations of our reported results. Strengths include the sample size of Spanish and Portuguese adolescents of our study, considerably larger than found in previous cross-national or cross cultural measurement invariance studies of the SWLS; and testing measurement invariance between Spanish and Portuguese adolescents using two cohorts of Portuguese adolescents with the same sample size and very similar results. Limitations include that, although the samples were matched in terms of age, education, and gender breakdown, they cannot be considered totally representative of the populations of the two countries compared, and the results of our study should be taken with caution as they are not directly comparable with the ones of the previous studies. All previous cross-cultural studies used adult samples and our study used adolescent samples. Thus, there may be some risk that we have over-generalized our findings, and more research is needed to evaluate the generalizability of findings about partial scalar invariance obtained in our and other cross-national studies.

In conclusion, the results of this study suggest that the factorial structure of the SWLS represents a valid and reliable theoretical construct for studying global cognitive judgments of satisfaction with one's life among adolescents in Spain and Portugal, with appropriate cross-national comparisons, taking into account that the SWLS seems to lack full scalar invariance, that is, intercepts of Item 5 are not identical across groups.

References

Alves, J. R., Corte-Real, N. J., Corredeira, R., Brustad, R., Balaguer, I., & Fonseca, A. M. (2004). Psychometrics properties and factorial invariance across gender of the Portuguese version of the Satisfaction with Life Scale (SWLSp). In The British Psychological Society (Eds.), *Abstract book of the annual conference of British Psychological Society: Health psychology - a positive perspective* (pp. 52-53). Edinburgh: Queen Margaret University College.

Atienza, F. L., Balaguer, I., & García-Merita, M. L. (2003). Satisfaction with life scale: Analysis of factorial invariance across sexes. *Personality and Individual Differences, 35*, 1255-1260.

Atienza, F. L., Pons, D., Balaguer, I., & García-Merita, M. (2000). Propiedades psicométricas de la Escala de Satisfacción con la Vida en adolescentes [Psychometric properties of the satisfaction with life scale in adolescents]. *Psicothema*, *12*(2), 314-319.

Casas, F., Sarriera, J. C., Abs, D., Coenders, G., Alfaro, J., Saforcada, E., & Tonon, G. (2012). Subjective indicators of personal well-being among adolescents. Performance and results for different scales in Latin-language speaking countries: A contribution to the international debate. *Child Indicators Research*, *5*(1), 1-28.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indices for testing measurement invariance. *Structural Equation Modeling, 9*, 233-255.

Clench-Aas, J., Nes, R. B., Dalgard, O. S., & Aarø, L. E. (2011). Dimensionality and measurement invariance in the Satisfaction with Life Scale in Norway. *Quality of Life Research, 20*, 1307-1317.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*, 71-75.

Dimitrova, R., & Domínguez, A. (2015). Measurement invariance of the Satisfaction with Life Scale in Argentina, Mexico and Nicaragua. *Social Inquiry into Well-being, 1*, 32-39.

Figueiras, T., Santana, P., Corte-Real, N., Dias, C., Brustad, R., & Fonseca, A. M. (2010). Análise da estrutura factorial e da invariância da versão portuguesa da Satisfaction with Life Scale (SWLSp) quando aplicada a adultos de ambos os sexos [Analysis of the factor structure and the invariance of the Portuguese version of the satisfaction with life scale (SWLSp) when applied to adults of both sexes]. *Revista Portuguesa de Ciências do Desporto, 10*(3), 11-30.

Hambleton, R. K., & Kanjee, A. (1995). Increasing the validity of cross-cultural assessments: Use of improved methods for test adaptations. *European Journal of Psychological Assessment, 11*, 147-157.

Hultell, D., & Gustavsson, J. P. (2008). A psychometric evaluation of the Satisfaction with Life Scale in a Swedish nationwide sample of university students. *Personality and Individual Differences, 44*, 1070-1079.

Jöresbog, K. G., & Sörbom, D. (2006). *LISREL 8.80: A guide to the program and applications*. Chicago, IL: SPSS, Inc.

Little, T. D. (2000). On the comparability of constructs in cross-cultural research. A critique of Cheung and Rensvold. *Journal of Cross-Cultural Psychology, 31*, 213-219.

Marsh, H. W., Hau, K.T., & Grayson, D. (2005). Goodness of fit evaluation in structural equation modeling. In A. Maydeu-Olivares & J. McCardle (Eds.), *Contemporary psychometrics. A festschrift to Roderick P. McDonald* (pp. 275-340). Mahwah NJ: Erlbaum.

McDonald, R. P. (1999). *Test theory: A unified treatment*. Mahwah, NJ: Lawrence Erlbaum.

Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research, 3*(1), 111-121.

Moksnes, U. K., Løhre, A., Byrn, D. G., & Haugan, G. (2014). Satisfaction with life scale in adolescents: Evaluation of factor structure and gender invariance in a Norwegian sample. *Social Indicators Research, 118*, 657-671.

Pavot, W., & Diener, E. (2008). The Satisfaction with Life Scale and the emerging construct of life satisfaction. *The Journal of Positive Psychology, 3*, 137-152.

Ponizovsky, Y., Dimitrova, R., Schachner, M. K., & van de Schoot, R. (2013). The Satisfaction with Life Scale: Measurement invariance across immigrant groups. *European Journal of Developmental Psychology, 10*(4), 526-532.

Pons, D., Atienza, F. L., Balaguer, I., & García-Merita, M. L. (2000). Satisfaction with Life Scale: Analysis of factorial invariance for adolescents and elderly persons. *Perceptual and Motor Skills, 91*, 62-68.

Tucker, K. I., Ozer, D. J., Lyubomirsky, S., & Boehm, J. K. (2006). Testing for measurement invariance in the Satisfaction with Life Scale: A comparison of Russians and North Americans. *Social Indicators Research, 78*, 341-360.

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods, 3*, 4-70.

Whisman, M. A., & Judd, C. M. (2016). A cross-national analysis of measurement invariance of the Satisfaction with Life Scale. *Psychological Assessment, 28*(2), 239-244.

Widaman, K. F. (1985). Hierarchically nested covariance structure models for multitrait-multimethod data. *Applied Psychological Measurement, 9*, 1-26.

Zanon, C., Bardagi, M. P., Layous, K., & Hutz, C. S. (2014). Validation of the Satisfaction with Life Scale to Brazilians: Evidences of measurement noninvariance across Brazil and U.S. *Social Indicators Research, 119*, 443-453.