



VALIDITY AND RELIABILITY OF THE GREEK VERSION OF THE SATISFACTION WITH LIFE SCALE (SWLS)

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ABSTRACT

The current study examined the validity and reliability of the Greek version of the Satisfaction with Life Scale (SWLS). An exploratory factor analysis was performed in a sample of 360 students ( $M \pm SD = 23.54 \pm 5.96$  years). In addition, a confirmatory factor analysis was applied in a second sample of 726 adults ( $M \pm SD = 38.80 \pm 13.64$  years). Further, associations were examined among the SWLS and physical activity and various socio-demographic variables. Results indicated a one-factor solution for the SWLS and satisfactory validity and reliability coefficients.

KEYWORDS : life satisfaction, factor structure, reliability.

INTRODUCTION

During the last years there has been an increasing research interest on theoretical models that examined various factors affecting quality of life and life satisfaction (Awick, et al., 2017). Specifically, these factors are usually examined through the theory of subjective well-being that reflects a cognitive and an emotional dimension of well-being (Diener, 1984). The cognitive component of well-being highlights a cognitive judgment of satisfaction with one's life (Diener, 1984). For this reason, Diener et al., (1985) developed the Satisfaction with Life Scale (SWLS) in order to assess a global level of life satisfaction. The SWLS is probably one of the most widely used instruments (Awick, et al., 2017; Pavot & Diener, 1993) and therefore, it has been translated and validated in various countries (Hultell & Gustavsson, 2008; Vasquez, Duque, & Hervas, 2013).

However, no validity or reliability data of the SWLS have been available in the Greek language, hence prompting the present study. Therefore, the purpose of the current study was to examine the validity and reliability of the Greek version of the SWLS.

METHOD

Participants

Two independent not randomly selected samples were used. The first sample consisted of 360 University students, 191 men (53.06%) and 169 women (46.94%) with a mean age of 23.54 years old ( $SD = 5.96$  years) (Figure 1).

The second sample consisted of 752 participants ( $n_{men} = 212$  and  $n_{women} = 540$ ), ranging in age from 18 to 65 years, who participated in various exercise programs. However, 26 of the participants were excluded due to incomplete information. The remaining 726 participants consisting of 209 men (28.79%) and 517 women (71.21%) with a mean age of 38.80 years old ( $SD = 13.64$  years) were used for the analyses (Figure 1).

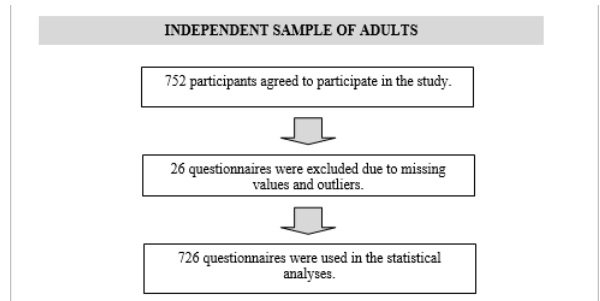


Figure 1. Sampling diagram

Measures

Satisfaction with Life Scale

The SWLS consists of the following five items: "in most ways my life is close to my ideal", "the conditions of my life are excellent", "I am satisfied with my life", "so far I have gotten the important things I want in my life", "if I could live my life over, I would change almost nothing" (Pavot & Diener, 1993). Each item was rated on a 7-point scale ranging from 1, "strongly disagree" to 7, "strongly agree". All items constituted one factor. Satisfactory validity, internal consistency ( $\alpha = 0.80-0.89$ ) and test-retest reliability ( $r = 0.64-0.84$ ) of the SWLS have been reported (Pavot & Diener, 1993).

International Physical Activity Questionnaire (IPAQ)

Physical activity (PA) levels were estimated with the International Physical Activity Questionnaire (IPAQ, Craig, et al., 2003). The IPAQ-short form had seven days recall period and consisted of six items measuring exercise frequency and duration and one item about sedentary life. The six items assessed four PA indexes such as walking PA, moderate PA, vigorous PA and total PA (Craig, et al., 2003).

Socio-demographic variables

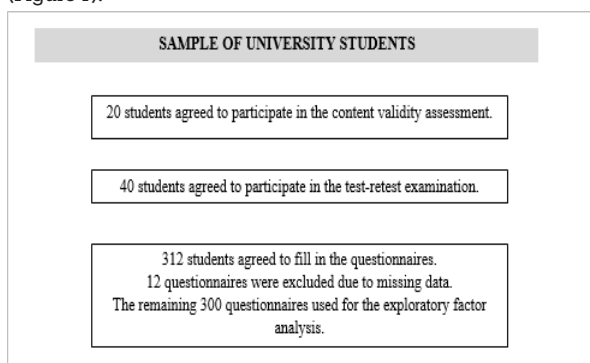
Age, gender, educational level, marital status, number of children, type of job and income were recorded.

Design And Procedure

Participants filled in a consent form. Institutional ethical approval for this cross-sectional study was obtained through the University. As Figure 1 presents, 20 students completed the scale for the content validity examination. Then, to assess the factor structure and reliability of the scale 340 students filled in the questionnaires. Further, to test the validity of the scale in a second independent sample, 752 participants filled in the questionnaires (Figure 1).

Data Analyses

Phase 1: Content validity, factor structure and reliability testing



To examine the relevance and clarity of the questions, as well as, the significance and completeness of responses in the scale, 20 students filled in it. Then, to assess the factor structure and internal consistency of the scale 300 students completed it. To examine the factor structure of the scale, an exploratory factor analysis (EFA) was performed. The extraction method employed was principal axis factoring (PAF) followed by promax rotation (Russell, 2002). The Bartlett's test of sphericity ( $p < 0.05$ ) and the Kaiser-Meyer-Olkin test ( $> 0.50$ ) were the criteria to test the sampling adequacy and suitability of the scale's items. Extraction of factors was based on the Kaiser's criterion with eigenvalues greater than 1.0 and the Cattell's scree test. Factor loadings that exceeded the criterion of 0.40 were regarded as significant. The internal consistency of the scale was assessed using the Cronbach's  $\alpha$  coefficient. The SPSS 25.0 statistical software (SPSS Inc., Chicago, IL, USA) was used. Finally, to examine the test-retest reliability of the SWLS, 40 students filled in it twice with an interval of 15 days between the two assessments. The absolute agreement between the two assessments was conducted using the intraclass correlation coefficient (ICC). To describe the variety / difference in the ICC, a 95% confidence interval (CI) was used.

**Phase 2: Factorial and construct validity in the second sample**  
 This phase aimed to verify the factor structure of the scale and investigate its construct validity using a second independent sample of 726 physically active adults. To confirm the factor structure of the scale found in students, a CFA was performed employing maximum likelihood method (Kline, 2005). Factor loadings that exceeded the criterion of 0.40 were regarded as significant. Analysis was conducted by using the AMOS 26.0 statistical software (IBM Corporation, Armonk, NY, USA).

Assessment of model fit was based on the following indexes: (a) the chi-square test ( $\chi^2$ ), (b) the Satorra-Bentler  $\chi^2/df$  ratio, (c) the root mean square error of approximation (RMSEA) and (d) standardized root mean square residual (SRMR) (Steiger, 1990). Non-significant values of  $\chi^2$  and values of  $\chi^2/df$  ratio smaller than 3.0 indicate acceptable fit of model (Kline, 2005). RMSEA values lower than 0.05 represent close fit, between 0.05 and 0.08 indicate acceptable fit, whereas RMSEA values greater than 0.08 represent poor model fit (Steiger, 1990). SRMR values equal to zero indicate perfect model fit. In addition, assessment of model fit was based on the following comparative / incremental fit indexes: (a) Comparative Fit Index (CFI), (b) Goodness of Fit Index (GFI), (c) Incremental Fit Index (IFI) and (d) Tucker and Lewis Index (TLI) (Bentler, 1990). CFI, GFI, IFI and TLI values approximating 1.0 indicate perfect fit, whereas values above 0.90 represent acceptable fit of model.

Finally, the construct validity of the scale was examined applying correlation coefficients among the SWLS and IPAQ and socio-demographic variables.

**RESULTS**

**Factor Structure And Reliability Testing**

Skewness (-1.12 to -0.29) and kurtosis (-0.92 to 0.31) values were acceptable. The EFA extracted one factor accounted for 75.14% of the variability among the items, whereas the factor loadings ranged from 0.73 to 0.91 (Table 1). The items' correlations coefficients ranged from 0.59 to 0.81. The Cronbach's  $\alpha$  coefficient was 0.92 and the ICC coefficient was 0.77 (0.61-0.87 95% CI).

**Table 1. Exploratory Factor Analysis Of The Satisfaction With Life Scale: Factor Loadings And Communalities (n1 = 300)**

Items	LOADINGS	COMMUNALITIES
1	0.85	0.67
2	0.86	0.71

3	0.91	0.75
4	0.80	0.60
5	0.73	0.51
Eigenvalue	3.76	
% Explained variance	75.14	
Kaiser-Meyer-Olkin test = 0.877		
Bartlett's test of Sphericity: $\chi^2 = 1064.76$ , $df = 10$ , $p = 0.000$		

**Factorial and construct validity testing in the second sample**

The skewness (-1.11 to -0.29) and kurtosis (-1.07 to 0.16) values and the Mardia's coefficient (5.65) were acceptable. The one-factor model found in EFA provided an acceptable fit to the data ( $\chi^2 = 43.282$ ,  $p = 0.000$ ,  $df = 5$ ,  $\chi^2/df = 8.656$ ,  $CFI = 0.978$ ,  $GFI = 0.974$ ,  $IFI = 0.978$ ,  $TLI = 0.956$ ,  $RMSEA = 0.106$ ,  $SRMR = 0.028$ ). Due to the high value of RMSEA, an alternative one-factor solution was examined setting a pair of correlated errors between items 2 and 3, based on theoretical rationale (Kline, 2005). The alternative model provided a better fit to the data ( $\chi^2 = 21.320$ ,  $p = 0.000$ ,  $df = 4$ ,  $\chi^2/df$  ratio = 5.330,  $CFI = 0.990$ ,  $GFI = 0.987$ ,  $IFI = 0.990$ ,  $TLI = 0.975$ ,  $RMSEA = 0.071$ ,  $SRMR = 0.019$ ). The factor loadings ranged from 0.73 to 0.82, whereas the items' correlations coefficients ranged from 0.53 to 0.67. The Cronbach's  $\alpha$  coefficient was 0.88.

To assess construct validity, Spearman's correlation coefficients were performed due to the non-normally distributed variables. Specifically, the SWLS was positively associated with family income ( $r = 0.33$ ,  $p < 0.01$ ) and total PA ( $r = 0.31$ ,  $p < 0.01$ ).

**DISCUSSION**

The current study examined the psychometric properties of the Greek version of the SWLS in two independent samples. Specifically, the results indicated that a one-factor solution for the scale represented an appropriate fit to the data in the first sample. This factor structure of the scale was verified by applying CFA in the second sample. In addition, the current study demonstrated satisfactory internal consistency and test-retest reliability of the SWLS, which is in accordance with the findings of similar studies in other populations (Hultell & Gustavsson, 2008; Vasquez, et al., 2013).

However, this study had several limitations that need to be reported. First, measures were self-reported and there are problems associated with common method variance. Second, the samples were not randomly selected. Third, other validity types were not examined. Despite the aforementioned limitations, this study had some advantages that should be considered. In particular, a key feature of this study was the investigation of validity, internal consistency and test-retest reliability of the Greek version of the SWLS in two independent and large samples that has not been examined until now. Future studies should be carried out to further investigate the scale's validity in older or younger individuals.

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