



## Psychometric analysis of the life-satisfaction scale in university students

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**José Calizaya-López**

<https://orcid.org/0000-0001-6221-0909>

[jcalizayal@unsa.edu.pe](mailto:jcalizayal@unsa.edu.pe)

Universidad Nacional de San Agustín de Arequipa, Perú.

**Merly Clariza Lazo-Manrique**

<https://orcid.org/0000-0002-9451-8710>

[mlazom@unsa.edu.pe](mailto:mlazom@unsa.edu.pe)

Universidad Nacional de San Agustín de Arequipa, Perú.

**Ferdinand Eddington Ceballos-Bejarano**

<https://orcid.org/0000-0003-2867-2397>

[fceballos@unsa.edu.pe](mailto:fceballos@unsa.edu.pe)

Universidad Nacional de San Agustín de Arequipa, Perú

**Segundo Ortiz-Cansaya**

<https://orcid.org/0000-0003-7922-1716>

[sortizca@unsa.edu.pe](mailto:sortizca@unsa.edu.pe)

Universidad Nacional de San Agustín de Arequipa, Perú.

**Lolo Juan Mamani-Daza**

<https://orcid.org/0000-0002-7922-1716>

[lmamanid@unsa.edu.pe](mailto:lmamanid@unsa.edu.pe)

Universidad Nacional de San Agustín de Arequipa, Perú

**Luis Fernando Ramos-Vargas**

<https://orcid.org/0000-0001-9216-7040>

[lramosv@ucsm.edu.pe](mailto:lramosv@ucsm.edu.pe)

Universidad Católica Santa María, Arequipa, Perú.

### Abstract

**Introduction:** Life satisfaction defines the liking or disliking that people experience about their life processes. It is based on psychological and subjective well-being approaches from positive psychology in the fields of mental health, well-being and quality of life. The life satisfaction scale is an instrument widely used for its measurement, but scarcely validated in university students in the United States Arequipa, Perú. **Objective:** To analyze the psychometric properties of the life satisfaction scale in university students in Arequipa-Peru. **Method:** A total of 1,211 people between 17 and 60 years of age participated, it was decided to remove those older than 28 years of age because they had small frequencies ( $< 20$ ), resulting in a sample of 970 students. **Results:** The evaluation was made through the CFA, showing that the structure is unidimensional and the fit indices obtained indicate a good fit ( $\chi^2(4) = 16.60, p < .05$ ;  $CFI = .999$ ;  $TLI = .997$ ;  $RMSEA = .057$ ;  $SRMR = .011$ ). The internal consistency showed values higher than .87. Finally, when evaluating the equivalence of the measurement according to sex, the instrument showed



measurement invariance. **Conclusion:** The instrument is valid and reliable for use in measuring life satisfaction.

**Keywords:** Satisfaction with life; Psychometrics; Validation; Reliability; Measurement invariance.

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## Resumen

**Introducción:** La satisfacción con la vida define el agrado o no que experimentan las personas en relación con sus procesos de vida. Se fundamenta en los enfoques de bienestar psicológico y subjetivo desde la psicología positiva en los campos de la salud mental, el bienestar y la calidad de vida. La escala de satisfacción con la vida es un instrumento bastante utilizado para su medición, pero escasamente validado en estudiantes universitarios en Arequipa, Perú.

**Objetivo:** Analizar las propiedades psicométricas de la escala satisfacción con la vida en estudiantes universitarios en Arequipa-Perú.

**Método:** Participaron 1,211 personas desde los 17 hasta los 60 años, se decide retirar a los mayores de 28 años por tener frecuencias pequeñas ( $< 20$ ), quedando una muestra de 970 estudiantes. **Resultados:** Se hizo la evaluación a través del AFC, demostrando que la estructura es unidimensional y los índices de ajuste obtenidos señalan un buen ajuste ( $\chi^2(4) = 16.60, p < .05; CFI = .999; TLI = .997; RMSEA = .057; SRMR = .011$ ). La consistencia interna evidenció valores mayores a .87. Finalmente, al evaluar la equivalencia de la medición según sexo, el instrumento presenta invarianza de la medición. **Conclusión:** El instrumento es válido y confiable para su uso en la medición de la satisfacción con la vida.

**Palabras Clave:** Satisfacción con la vida. Psicometría. Validación. Confiabilidad. Invarianza de la medición.

## INTRODUCTION

Life satisfaction is based on psychological and subjective well-being approaches derived from positive psychology in the fields of mental health, well-being and quality of life (Flores-Jara et al., 2021; Reppold et al., 2020; Valdemoros-San-Emeterio et al., 2020). In the current context associated with the Sars-Cov-2 pandemic, there is evidence of a significant increase in stress, anxiety and depression, resulting from deprivation and/or social isolation and new lifestyles (Zanon et al., 2020), generating a significant negative effect on the mental health and well-being of the population (Zanon et al., 2020).

Life satisfaction is defined as the liking or disliking that people experience about their life processes as a whole (Gumà & Arpino, 2021; Calizaya et al., 2020). In the case of young university students, life satisfaction is related to variables such as motivation, self-esteem, social environment and optimism to cope with academic pressure, it is women who present better life satisfaction scores, especially related to a broad sense of social well-being and in some cases with the better economic situation than male students (D'Incao Marrone & Hutz, 2020). On the other hand, students from private universities are more satisfied with life, since they present greater desires for growth, self-improvement, a better economic situation and the perception of having high levels of health in general compared to students from public universities (Moreta-Herrera et al., 2018).

As can be seen, the study of life satisfaction contemplates contextual and psychological aspects, so its measurement must approach these dimensions and explain these experiences related to well-being and quality of life to determine whether or not they are satisfied (Merino et al., 2021).

Among the tests developed to measure the construct, the life satisfaction scale (SWLS), originally proposed by Diener et al. (1985), was validated to measure overall life satisfaction in different age groups, and was adapted to Spanish by Atienza et al. (2000), and validated in several Latin American contexts.

Cabañero et al. (2004) studied the reliability and validity of the instrument in a sample of Spanish pregnant and postpartum women. They obtained a Cronbach's alpha of .82 and analyzed the structure by means of its principal components, finding a unidimensional structure that explained 58.6% of the variance. Evidence based on the relationship with other variables was also studied.

In Mexico, Padrós et al. (2015) studied the psychometric properties of the instrument in two groups, university students and adult population. They applied confirmatory factor analysis using the maximum likelihood (ML) method. The scale

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is grouped into a single latent variable for both groups and the internal consistency according to Cronbach's alpha was .832. Likewise, Jurado et al. (2019) performed a confirmatory factor analysis with the ML method in Mexican university students, finding evidence of a unifactorial structure and with Cronbach's alpha of .857.

In Colombia, Vinaccia-Alpi et al. (2019) studied the psychometric properties of the instrument. Evidence of structure-based validity was studied employing a confirmatory factor analysis finding a unidimensional structure that explains 62.3% of the variance and, for reliability, a Cronbach's alpha coefficient of .839 was found.

In Peru, Oliver et al. (2018), applied confirmatory factor analysis in a sample of university students and a Cronbach's alpha value of .78. On the other hand, Arias et al. (2018) developed an instrumental study with adolescent students at the school level. The confirmatory factor analysis (CFA) yields a unidimensional structure (polychoric correlations and MV method), for reliability it was performed using the Omega coefficient being the value of .99. However, it is specified that for the Peruvian case the scale also collected evidence of its validity in other groups, such as: Peruvian workers (Calderón de la Cruz et al., 2018), adults (Chiroque et al., 2021) and older adults (Caycho-Rodriguez et al., 2018).

From what has been described, consistency in the use of the instrument has been observed, but there are still no studies that provide evidence of validity in the current context. The judgment experienced by the human being differs on sociodemographic variables such as age, sex, marital status and occupation, but also according to contextual variations such as the current pandemic. Similarly, the life satisfaction scale has been adapted and validated in several countries and in different groups, however, for the Peruvian reality, there are few studies, specifically on university students.

Therefore, the objective of this study was to analyze the psychometric properties of the life satisfaction scale in university students in Arequipa, Peru.

## METHOD

### Participants

A total of 1,211 persons between 17 and 60 years of age participated. It was decided to remove

those older than 28 years because they had small frequencies ( $< 20$ ). This left a sample of 970 persons ( $M = 20.92$ ,  $SD = 2.68$ ), of whom 629 (64.8%) were women and 341 (35.2%) were men. Regarding marital status, 901 (92.9%) are single, 46 (4.74%) are cohabiting and 23 (2.37%) are married. Seventy-nine percent (79.8%) say they live in urban areas and 20.2% live in rural areas. The majority (92.9%) say they have no children. Regarding educational level, 70.4% say they have incomplete higher education, 21.0% say they have complete higher education and finally 7.11% say they have complete basic education and 1.44% say they have incomplete basic education.

### Instrument

The life satisfaction scale of Diener et al. (1985) was applied, adapted and translated into Spanish by Atienza et al. (2000). The instrument consists of 5 items that evaluate the level of life satisfaction through the global judgment that people make about it. In this version, a reduction in the response options of the instrument was carried out, with values between 1 and 5 Likert-type responses, where 1 is "totally disagree" and 5 is "totally agree". The total score of the scale ranges from 5 (low satisfaction) to 25 (high satisfaction). The instrument also included sociodemographic characteristics such as age, sex, marital status, occupation, place of residence and level of education, as well as data on informed consent.

### Procedures

For the application of the instrument, the participants were contacted, then the instrument was adapted to the google forms format and sent through social networks and email, it was applied individually after being informed of the objective of the research, the instructions of the scale and the confidentiality of the data provided, accepting to participate voluntarily (admitting the respective informed consent).

### Statistical análisis

The data were digitized in a .sav file in SPSS software. The R programming language version 4.05 (R Core Team, 2020) and its development environment RStudio version 1.4.1106 (RStudio Team, 2020) were used for statistical analysis. The following packages were used: haven (Wickham & Miller, 2020) for data import, tidyverse (Wickham et al., 2019) and psych

(Revelle, 2020) for manipulation, cleaning and descriptive analyses. Confirmatory Factor Analysis (CFA) was applied to the unidimensional structure using the Weighted Least Squares Robust Weighted Method of Estimation (WLSMV) with the lavaan package (Rosseel, 2012) and internal consistency was assessed using the Omega coefficient of the MBESS package (Kelley, 2020). For the evaluation of the fit indices, the following criteria were taken into account: values  $\geq .90$  and  $\geq .95$  in the CFI and TLI as adequate fit and good fit respectively, and values  $\leq .08$  and  $\leq .05$  in the RMSEA as adequate fit and good fit respectively and for the SRMR, values  $\leq .08$  and  $\leq .06$  were considered as a good fit and ideal respectively (Keith, 2015).

For measurement invariance, the procedure developed by Wu and Estabrook

**Table 1**

*Distribution of participants' responses*

Items	TD	ED	NDNA	DA	TA
1. My life is very similar to the life I would like to have.	9.18	11.44	40.93	29.28	9.18
2. My life is good	5.15	8.14	30.62	38.04	18.04
3. I am happy with my life	5.98	8.97	28.35	36.19	20.52
4. I have achieved the most important things I have ever wanted	5.67	14.85	37.53	28.97	12.99
5. If I could live my life over again, I would live it in much the same way	17.32	17.84	25.36	25.46	14.02

Note: TD: Strongly Disagree, DE: Disagree, NDNA: Neither Disagree nor Agree, DA: Agree, TA: Totally Agree.

Table 2 shows the descriptive statistics of the items and the matrix of polychoric correlations. The values of the means range from 3.01 to 3.56 and the standard deviations are between 1.04 and 1.30. The values of skewness and kurtosis are

**Table 2**

*Descriptive statistics of the items*

Items	M	Mdn	DE	Asymmetry	Kurtosis
Item 1	3.18	3	1.05	-0.360	-0.218
Item 2	3.56	4	1.04	-0.575	0.002
Item 3	3.56	4	1.09	-0.582	-0.180
Item 4	3.29	3	1.05	-0.214	-0.406
Item 5	3.01	3	1.30	-0.109	-1.086
Matriz	Item1	Item2	Item3	Item4	Item5
Item 1	1				
Item 2	.72	1			
Item 3	.73	.83	1		
Item 4	.64	.54	.59	1	
Item 5	.63	.55	.62	.52	1

(2016) was used, following the recommendations of Svetina et al. (2019). As criteria for assessing invariance, sample size ( $>300$ ) is considered, and the possibility of non-invariance is established when  $CFI \geq .010$ ,  $TLI \geq .010$ ,  $SRMR \geq .030$  and  $RMSEA \geq .015$  (Chen, 2007; Svetina et al., 2019)

**RESULTS**

Table 1 shows the percentages of responses to the five items of the instrument. It can be seen that the percentages are concentrated in the responses Neither disagree nor agree for items 1 and 4. The responses Agree and Strongly Agree were those with the highest percentages in items 2 and 3, while in item 5, the responses were more evenly distributed between the responses indicating Disagree and Agree.

close to zero, which would indicate that the items follow distributions close to normal. In the matrix of polychoric correlations, it is observed that all are high and range from .52 to .83.



### Confirmatory factor analysis

A confirmatory factor analysis was applied to evaluate the unidimensional structure using the WLSMV estimator. The fit indices indicate a good fit, with the exception of the RMSEA ( $\chi^2(5) = 137.99, p < .001; CFI = .987; TLI = .974; RMSEA = .166; SRMR = .037$ ). Localized analysis using the modification indices indicates that items 2 and 3

have correlated errors. When reviewing the statements of these items, it is observed that both have similar contents, so it is decided to test this new model with the covariation between the errors of items 2 and 3. The fit indices obtained indicate a good fit ( $\chi^2(4) = 16.60, p < .05; CFI = .999; TLI = .997; RMSEA = .057; SRMR = .011$ ). The factor loadings of this model were greater than .708 and are presented in Figure 1.

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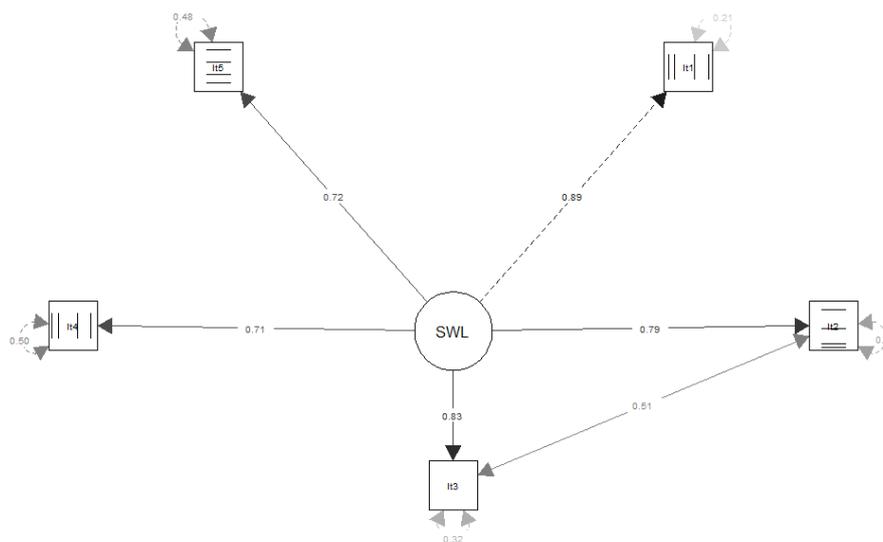


Figure 1

Factor loads of the final model

### Internal consistency

Reliability was evaluated by the internal consistency method using the Omega coefficient on the unidimensional structure, finding a value of .87 (95% CI: .85 - .88), which indicates that the instrument has a good internal consistency.

### Factorial invariance

The equivalence of the factor structure of the measures was evaluated according to sex. The results are presented in Table 3. Good fit indices

were obtained at all levels. Furthermore, the differences between the indices were lower than the established values, which indicates that the factorial structure of the instrument presents measurement invariance and is equivalent for both groups (men and women). In addition, a test of comparison according to sex was applied, finding that men ( $M = 17.1, SD = 4.64$ ) present, on average, greater satisfaction with life than women ( $M = 16.3, SD = 4.39$ ). However, the effect size was small ( $d = .174$ ).

Table 3

Measurement invariance by sex

Model	X <sup>2</sup>	gl	CFI	TLI	RMSEA	SRMR	ΔCFI	ΔTLI	ΔRMSEA	ΔSRMR
Configural	19.29	8	.999	.997	.054	.012				
Threshold	29.02	18	.999	.999	.036	.012	.000	.002	-.018	.000
Metrics	24.69	22	1.000	1.000	.016	.012	.001	.001	-.020	.000
Scale	58.62	26	.997	.998	.051	.012	-.003	-.002	.035	.000
Strict	80.84	31	.995	.997	.058	.018	-.002	-.001	.007	.005



Note: CFI = comparative fit index, TLI = Tucker Lewis Index, RMSEA = root mean squared error of approximation, SRMR = root mean standardized residual.

## DISCUSSION

The purpose of the study was to analyze the psychometric properties of the life satisfaction scale of Diener et al. (1985) adapted and translated into Spanish by Atienza et al. (2000) in university students. The results show that there is evidence of the unidimensionality of the scale and that it has high internal consistency.

Evidence of validity based on the internal structure was studied, finding a unidimensional structure supported by the good fit found in the indices used. Previous studies have reported the existence of the same structure in different populations, such as: adolescent schoolchildren (Atienza et al., 2000; Arias et al., 2018), pregnant and puerperal women (Cabañero et al., 2004), university students (Padrós et al., 2015; Jurado et al., 2019; Vinaccia-Alpi et al., 2019, Oliver et al., 2018) and adult population (Padrós et al., 2015). This finding could suggest greater robustness in the structure of a dimension and evidences the existence of a possible cross-cultural validity. The vast majority of studies have analyzed the structure of the instrument, so it is recommended that future studies can use other sources of evidence, such as the relationship with other variables, content and consequence of test use.

In addition, it has been found that the instrument has a high internal consistency denoted by the Omega value (.87). Similarly, this result coincides with previous studies developed in different Latin American countries. However, in the reviewed antecedents, it has been seen that they have employed the alpha coefficient (Cabañero et al., 2004; Pádrós et al., 2015; Jurado et al., 2019; Vinaccia-Alpi, 2019; Oliver, 2018) instead of the Omega (Arias et al., 2018). It is recommended that future studies report the value of Omega, because it is the recommended coefficient for assessing internal consistency (Ventura-León & Caycho-Rodríguez, 2017).

Another important finding was the equivalence of the measurement according to sex evidenced by good fit indices at all levels. This means that the instrument has measurement invariance and is equivalent for men and women. However, in the comparison of life satisfaction, it was found that men had higher scores on average than women.

These differences according to sex are contradictory in the scientific literature since there are studies that report no differences, while other studies have found slight differences for men (Ruiz et al., 2018). **2765**

Among the limitations of the study, the following can be mentioned: the choice of a convenience sample, which could bias the results presented, due to the lack of representativeness of the sample. Another limitation is the use of only one source of evidence for the validity of the present study. Although the results are concordant with previous studies, future studies must address different sources of evidence to give greater robustness to the instrument analyzed.

Finally, it has been found that the life satisfaction scale presents a unidimensional structure and high internal consistency. The main contribution lies in the collection of evidence on the use of the instrument in different contexts, populations and its possible cross-cultural validity. Studies of psychometric properties of variables with positive characteristics of human beings are necessary, since the current pandemic concentrates efforts mainly on the study of its adverse effects, reducing the importance of variables that are also necessary for the prevention and promotion of health, at the individual level, as well as at the population level.

## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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