



Research Article

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Psychometric Properties and Sociodemographic Profile of the Perceived Stress Scale in Peruvian University Students

Velia Graciela Vera-Calmet¹

Haydee Mercedes Aguilar-Armas¹

Lucy Angélica Yglesias Alva²

Susana Edita Paredes Diaz¹

Monica Elisa Meneses-La-Riva¹

Jessica Vicuña Villacorta¹

Mirtha Mercedes Fernández-Mantilla¹

Maricelys Jimenez Barrera³

¹Division of Research,
Universidad César Vallejo,
Lima, Perú

²Division of Research,
Universidad Nacional de Trujillo,
Perú

³Pontificia Universidad Católica del Ecuador,
Ecuador

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Abstract

The university population had to adapt to new ways of learning causing in them a strong emotional impact. Therefore, there is a need for an instrument with adequate psychometric properties to develop a profile of perceived stress. Objective: To demonstrate the psychometric properties of the EEP-10 Perceived Stress Scale and to characterize perceived stress according to sociodemographic profile in university students. Method: Instrumental and non-experimental design, sample of 820 university students from 16 to 42 years of age, probabilistic sampling. Results: The internal structure of the scale presents a good fit of the two-dimensional model with RMR= .036; AGFI= .985; NFI= .982, RFI= .976 and PNFI= .791, as well as factor loadings between .643 and .797. A reliability of .835 and .825 omega coefficient for each of the dimensions. In the General Distress dimension of perceived stress, it was found that the differences according to sociodemographic variables differed from null, gender ($p=.000^{**}$), age ($p=.003^{**}$), economic dependence ($p=.001^{**}$), and the effect size of the differences was of small magnitude. Discussion and conclusions: The study showed adequate psychometric properties of the perceived stress scale and differences in perceived distress according to sex, age and economic dependence. However, no differences were found in coping capacity based on sociodemographic variables.

Keywords: Perceived stress, Psychometric properties, sociodemographic variables, university students

1. Introduction

There are many psychological reactions that have been experienced in recent years, one of the most significant is that caused by stress (Huarcaya-Victoria, 2020). The impact of stress is associated with physiological, emotional and cognitive-behavioral responses to cope with, endure or reduce its negative aspects, perceived as uncomfortable, unpleasant or dangerous (Muvdi Muvdi et al., 2021). It could be said that it is perceived as unmanageable, unpredictable and generates a lot of fatigue (Baik et al., 2019) (Lozano, 2020) (Nielsen et al., 2016). Perceived or psychological stress is considered to result from the link between the person, their context and the way they individually evaluate threats, which endanger their physical and emotional health (Oblitas, 2005) (Ávila, 2014) (Barbosa-Leiker et al., 2013) (Gutiérrez Vásquez & Lázaro Alcántara, 2019) (González Ramírez & Landero Hernández, 2007) (Kopp et al., 2010)

Perceived or psychological stress is considered to result from the link between the person, their context and the way they individually evaluate threats, which endanger their physical and emotional health (Oblitas, 2005) (Navarro, 2001) (Valero Cedeño et al., 2020) (González Ramírez & Landero Hernández, 2007) (Kopp et al., 2010) There are many young people affected by stress (Almadi et al., 2012), who evidence different emotional responses to these situations and it will depend on how their organism processes this accumulation of tensions when facing the stressor event (Kopp et al., 2010); (Al Rasheed et al., 2017), (González Velázquez, 2020).

The unexpected appearance of SARS-Cov-2 has left havoc around the world and university students constitute a segment of the population that has been affected emotionally, facing complex and stressful situations, new to their lives, being a challenge for the proper management of their emotions, limiting their ability to respond and adapt (Chávez-Amavizca et al., 2020); (Niño Higuera et al., 2019).

In this context, the priority is to have a scale with appropriate evidence of validity and reliability that measures perceived stress, taking into account that there is a 14-item version that was later refined to 10 items, which has been translated into several languages; a model supported by (Kopp et al., 2010) who propose that stress is understood from three angles: the environmental, centered on stressful life events; the psychological, related to the subjective experience and emotional response to events; and the biomedical, which responds to the physiological systems involved in coping with vital events.

Studies related to stress with sociodemographic variables indicate large differences between men and women in the work situation, as well as the degree or educational level, age is another variable that affects this condition (Vallejo-Sánchez & Pérez-García, 2016). In more up-to-date contexts, it was observed that young people, women and the unemployed, presented higher levels of stress (Correa et al., 2020). Studies conducted internationally in university students during pandemic times show that stress reaches 31.92%, psychosomatic reactions almost 5.9%, difficulties to fall asleep 36.3%, limitations to perform their daily activities 9.5%, signs or feeling of depression 4.0%; this study also shows that women and students between 18 and 25 years old are the most affected (González Velázquez, 2020); (Calderón Carvajal et al., 2017).

Based on the above, it is proposed to evidence the psychometric properties of the perceived stress scale that allows measuring this variable in university students; as well as to know the presence of perceived stress by gender, age, marital status, presence of children, occupational status and economic dependency relationship, in order to identify the groups of students at greater risk of suffering stress, informing the authorities, so that they can take preventive measures and avoid complications in the mental health of students at risk.

2. Methodology

Research with instrumental design in order to revise the psychometric properties of the instrument to demonstrate its usefulness (Keele et al., 2019). In addition, a non-experimental, transectional

comparative design, which seeks to identify similarities or differences in two or more different groups, was used (Hurtado De Barrera, 2000); The study consisted of a probabilistic sample of 820 university students from the department of La Libertad. Information was collected through online survey data.

Instruments the sociodemographic sheet used gathers data such as sex, age, marital status, presence of children, occupational status and economic dependence. Perceived stress scale the Spanish version of the EEP-10, which assesses the perception of psychological stress, and how everyday life experiences are rated as stressful, was used. The instrument responds to five response options: 'never', 'almost never', 'occasionally', 'many times' and 'always', which are rated from zero to four. Items 4, 5, 7 and 8 are reverse rated.

Strategies for results analysis: The statistical analysis was performed using the IBM SPSS Statistics 28 program with its AMOS extension and Microsoft Excel, applying confirmatory factor analysis, estimating using the unweighted least squares method and evaluating the quality of the model with fit indicators such as relative fit index (RFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), parsimony normed fit index (PNFI) and root mean square error (RMSE). Likewise, as part of the exploratory analysis, a box-and-whisker plot was prepared, calculating summary statistics, minimum and maximum values, mean, standard deviation, quartiles, kurtosis and asymmetry. On the other hand, to identify differences between two groups, the nonparametric Mann-Whitney U test was applied, because the distributions in at least one of the groups under comparison evidenced highly significant difference ($p < .01$) from the normal distribution, establishing the magnitude of the difference with the effect size. Similarities were detected by means of multiple correspondence analysis using the optimal scaling method, and percentile scales were developed to identify the cut-off points for perceived stress. Ethical considerations: The study was approved by the Ethics Committee of the Universidad César Vallejo. The participants agreed voluntarily, signing the informed consent form and safeguarding the anonymity of the information.

3. Results

As for content validity, it was approved by experts through qualitative analysis of the ten items that constitute the perceived stress scale which reported significant Aiken's V values ranging from .86 to 1.0 in relevance, .86 to 1.0 in clarity, and .81 to 1.0 in item coherence.

The structure validity of the scale was carried out, reporting the confirmatory factor analysis, indicators of good fit of the model, RMR= .036; AGFI= .985; NFI= .982 and RFI= .976, PNFI= .741; as well as factor loadings between .643 and .797 within the recommended limits (Figure 1).

Regarding the reliability analysis, a value of .835 was obtained for the omega coefficient in the general distress dimension, and a value of .825 in the coping capacity dimension.

The results show that in the distress dimension, women showed a higher average than men, evidencing that the difference between averages differs from being null in a highly significant way ($p < .01$), and that the size of the effect of the difference observed between genders is of small magnitude. Likewise, the test found evidence that the difference in the average according to age groups, in this dimension of stress, differs from being null ($p < .01$), identifying as of small magnitude the difference found between the group of 16 to 24 years old with the group of 25 to 42 years old, and observing that the average decreases when passing from the younger to the older age group. As for the students who do not work, it is observed that they obtained a higher average with respect to those who work, evidencing a difference in averages that differs from being null ($p < .01$), however, the magnitude of the effect size of the difference is null. However, students with economic dependence present greater distress than those who did not present this condition, with an effect size of small magnitude, whose difference in averages differs from being null (Table 1).

Table 1: Comparison of perceived stress by dimension according to gender

	Gender		Mann-Whitney U test
	Male (n=249)	Female (n=571)	
Distress	332.8	444.4	p=.000**
Coping capacity	401.8	414.3	p=.482
	Age (years)		
	16-24 (n=681)	25-42 (n=139)	
Distress	421.4	357.2	p=.003**
Coping capacity	412.3	401.5	p=.621
	Marital status		
	Without a partner (n=761)	With a partner (n=59)	
Distress	413.4	373.4	p=.212
Coping capacity	412.6	384.1	p=.371
	Presence of children		
	Si (n=100)	No (n=720)	
Distress	383.6	414.2	p=.223
Coping capacity	399.2	412.1	p=.609
	Occupational status		
	Yes (n=376)	No (n=444)	
Distress	385.5	431.7	p=.005**
Coping capacity	407.3	413.2	p=.718
	Economic dependence relationship		
	Yes (n=570)	No (n=250)	
Distress	429.0	368.3	p=.001**
Coping capacity	412.7	405.6	p=.692

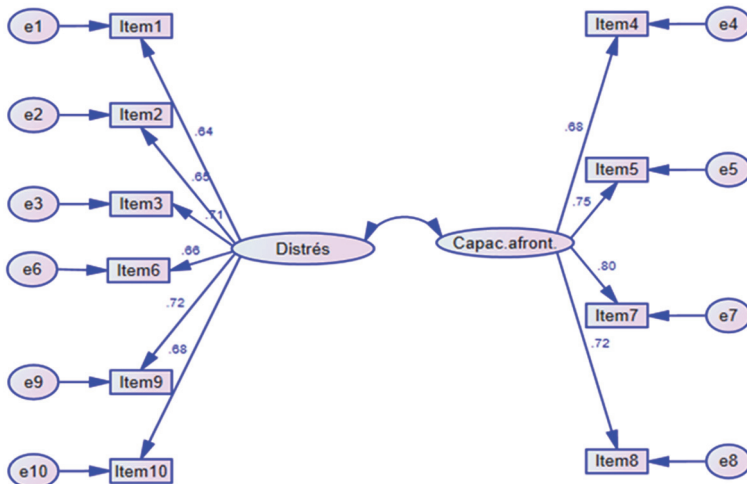


Figure 1: Factor loadings of the two-dimensional model of perceived stress

Figure 1 shows that the factor loadings oscillate between .64 and .80, evidencing a high correlation between the items and the dimensions of the test.

3.1 Cut-off points

Percentile scales were elaborated, obtaining the cut-off point that allowed to classify with the presence of little distress or absence thereof, the students who registered less than ten points and with perceived distress those students with ten or more points (Hernández Santa Cruz et al., 2022).

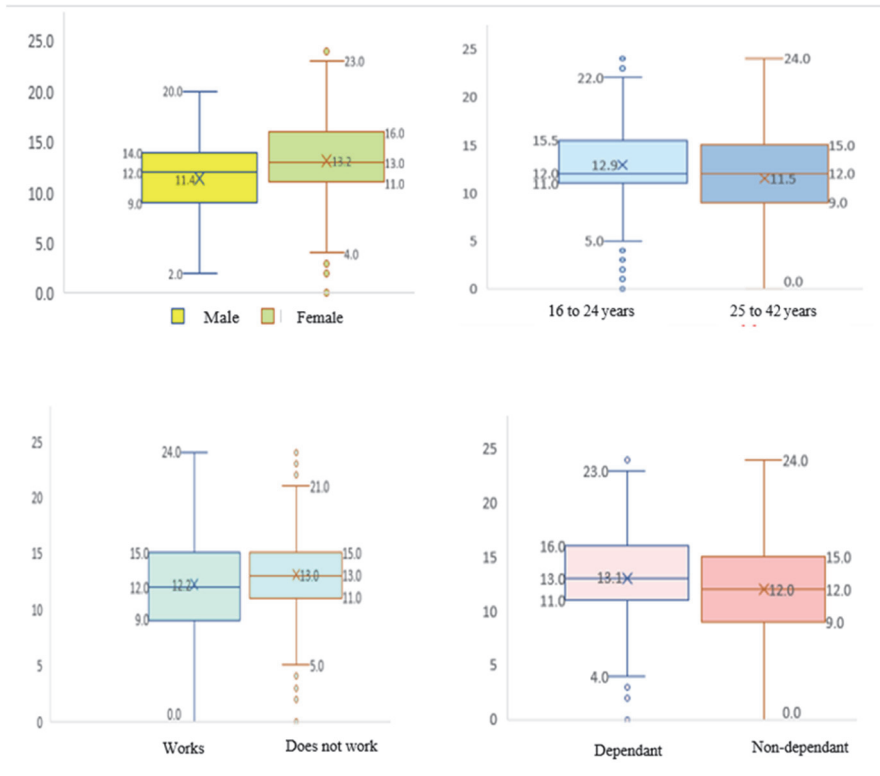


Figure 2: Characterization of the variability and shape of the distribution of the Distress dimension of perceived stress according to the boxplot diagram

Note: The value at the bottom of each box corresponds to quartile 1, the second to the median and the value at the top line of the box to quartile 3. At the center of the box appears the arithmetic mean, and finally, the data located outside the values shown in the lower and upper whiskers respectively correspond to outliers.

Figure 2 characterizes the dispersion and shape of the distributions of the different groups constructed on the basis of the sociodemographic characteristics compared to the distress dimension, thus corroborating the difference found between them. Likewise, the shape of the distribution of each variable can be deduced from its respective box plot, characterizing it as asymmetric skewed to the left when the mean is lower than the median and skewed to the right otherwise.

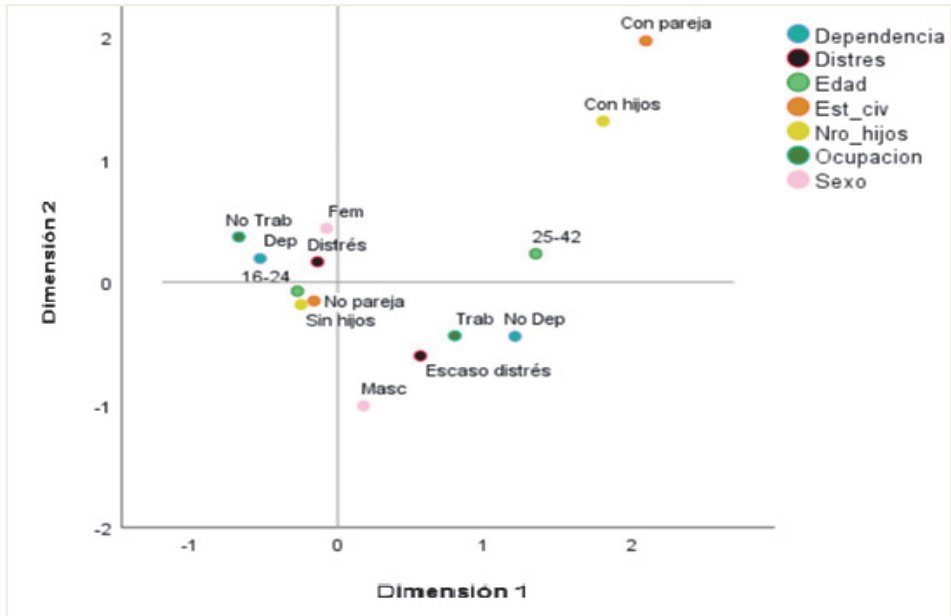


Figure 3: Multiple Correspondence Analysis

In Figure 3, the closeness of the categories of sociodemographic variables to the presence of perceived distress in university students indicates a direct association, whereas the opposite categories by origin indicate a negative association.

4. Discussion

The study demonstrates the psychometric evidence based on the content through the criterion of ten judges, treatment in which the Aiken V coefficient was used, verifying that the ten items that make up the scale have relevant, clear and coherent content to measure the construct, with indicators above .80 (Tobon et al., 2020).

The structure validity of the scale certifies indicators of good model fit, as indicated by (Hox, 2021); (Clark & Bowles, 2018), with mean squared error less than .05; AGFI, NFI and RFI fit indices greater than .90; and parsimony normed fit index greater than .50; values that point to the adequacy of the two-dimensional structure of the perceived stress scale in the university students in reference. The structural validity is corroborated by the factor loadings of the model according to CFA, which range between .643 and .797 (Shi et al., 2019) indicating the relevance of each of the 10 items. (Shrestha, 2021), mentions that they present values higher than .40, according to (Campo-Arias et al., 2015) it is the minimum recommended value for the item.

The internal consistency reliability obtained McDonald's omega coefficient values of .835 in the general distress dimension and .825 in the coping capacity dimension, representing a solid reliability exceeding .80 (Kalkbrenner, 2021). The emotional impact arising from the appearance of Covid 19 produced rapid and abrupt changes in the university environment (Huanca-Arohuanca et al., 2020) associated with the presence of stress. However, it can be seen that the perception of this disease has changed, since having more knowledge to identify and describe symptoms and forms of treatment, people have generated various coping strategies (Ozamiz-Etxebarria et al., 2020); (Cozzo & Reich, 2016). The present investigation evaluated the differences between sociodemographic characteristics

and perceived stress (EPP-10), which after a structural and reliability analysis showed good psychometric properties in Peruvian university students.

The results obtained show that the average score in the distress dimension differs between men and women. Therefore, gender is a risk factor, with women being the group slightly more affected by registering a higher average score in this dimension; a situation compatible with the trend in research where the female sex reflects high levels of somatization, sleeping difficulties and stress (Wang et al., 2020; Scorsolini-Comin et al., 2021). It is understood then that the population under study expresses stress to a greater extent with emotionality, somatic and physiological reactions that puts them in a position of vulnerability (Estrada-Araoz et al., 2021). However, in the coping capacity dimension, a null magnitude of the effect size of the difference according to gender was evidenced.

With respect to age, it is evident that the population group aged 16 to 24 years in the distress dimension maintains a higher average than the group aged 25 to 42 years, with an effect size of small magnitude; being this generational group those who face challenges that they must face, taking into account how they perceive environmental stimuli (Correa et al., 2020), whereas the magnitude of the effect size in the comparison of averages in the coping capacity dimension between the age groups turned out to be null.

Regarding occupational status, the magnitude of the effect size indicates a difference between students who work and those who do not. The economic dependence emphasizes that the group that depends on their parents presented greater distress, showing that the effect size of the difference between the two groups is small, in agreement with Chilean research that observes fear and doubts regarding their economic situation due to lower salaries (Duarte and Jiménez, 2020; Dagnino et al., 2020; Acevedo and Amador, 2021).

Therefore, from the previous paragraphs it can be deduced that the factors related to distress are age, sex and economic dependence. University students face constant challenges inherent to their education, whether personal or family-related. In the academic environment, according to the student's development and assessment, the perceived stimuli may or may not generate stress (García et al., 2020; Worku, 2020).

Conclusions:

The EEP-10 perceived stress scale has evidence of robust psychometric properties, which allow the use of the instrument in the Peruvian university population.

The perceived stress profile, in its distress dimension, varies according to sociodemographic characteristics, observing that female students, aged between 16 and 24 years and with economic dependence on their parents, tend to present greater distress, highlighting the importance of considering these factors when evaluating stress in students, since there may be differences in the way they experience and perceive it.

In the coping dimension, the magnitude of the effect size of the differences is null, according to sociodemographic characteristics, which would indicate that regardless of gender, age, occupational status, marital status and economic dependence, students use similar coping strategies to deal with perceived stress.

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