

## ***Propiedades psicométricas de la Escala de Actitudes sobre el Amor (LAS) en universitarios peruanos***

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### Resumen

El objetivo de este estudio fue analizar la validez de constructo y la fiabilidad de la Escala de Actitudes sobre el Amor (*Love Attitudes Scale [LAS]*) de Hendrick & Hendrick (1986). La muestra estuvo compuesta por 381 estudiantes universitarios de Lima, Perú, (61.7 % mujeres) de entre 17 y 25 años de edad. Aparte del *LAS*, se aplicó el I-PANAS-SF adaptado por Gargurevich (2010), el cual evalúa el afecto positivo y negativo. Como resultados, el análisis factorial exploratorio del *LAS* arrojó una solución de seis factores (*Eros*, *Ludus*, *Storge*, *Pragma*, *Manía* y *Ágape*) que explicaron el 47.87 % de la varianza total. Las correlaciones entre las puntuaciones de los estilos *Eros* y *Pragma* y el afecto positivo fueron positivas y significativas; mientras que los estilos *Manía* y *Ludus* tuvieron correlaciones positivas y significativas con el afecto negativo. Utilizando el método de consistencia interna, la fiabilidad de los seis factores encontrados fue de .62 a .85; mientras que con el método *test-retest*, los coeficientes de estabilidad fueron de .44 a .77. Estos resultados permiten concluir que el *LAS* y sus puntuaciones son una medida válida y fiable para medir las actitudes hacia el amor en la población de universitarios de Lima, Perú.

*Palabras clave:* Actitudes hacia el amor, validez, confiabilidad, universitarios.

## ***Psychometric properties of the love attitudes scale in peruvian undergraduate students***

### Abstract

The aim of this article was to analyze the construct validity and reliability of the Love Attitude Scale (LAS, Hendrick & Hendrick, 1986). The sample consisted of 381 undergraduate students (61.7 % of them women) between the ages of 17 and 25 years old. The LAS and the I-PANAS - SF (adapted by Gargurevich, 2010) that evaluates positive and negative affect were applied. The exploratory factor analysis resulted in six factors (*Eros*, *Ludus*, *Storge*, *Pragma*, *Mania* and *Ágape*), that explained 47.87 % of the total variance. The correlations between the score of *Eros* and *Pragma* styles and positive affect were positive and significant; while *Manía* and *Ludus* styles had positive and significant relationships with negative affect. Reliability by the method of internal consistency of the six factors found was from .62 to .85; while the stability coefficients for test-retest method were .44 to .77. These results allow concluding that the LAS and their scores are valid and reliable to measure attitudes toward love in the college population of Lima.

*Key words:* Attitudes toward love, validity, reliability, university.

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## ***Propiedades psicométricas da Escala de Atitudes sobre o Amor (LAS) em universitários peruanos***

### Resumo

O objetivo deste estudo foi analisar a validade de construto e a confiabilidade da Escala de Atitudes sobre o Amor (Love Attitudes Scale [LAS]) de Hendrick e Hendrick (1986). A amostra foi composta por 381 estudantes universitários de Lima, Peru (61.7 % mulheres) de 17 a 25 anos. Além da LAS, foi aplicado o I-PANAS-SF adaptado por Gargurevich (2010), o qual avalia efeito positivo e negativo. Como resultados, a análise fatorial exploratória da LAS mostrou uma solução de seis fatores (*eros, agape, ludus, storge, mania e pragma*) que explicaram 47.87 % da variação total. As correlações entre as pontuações dos estilos *eros* e *pragma* e o afeto positivo foram positivas e significativas; enquanto os estilos *mania* e *ludus* tiveram correlações positivas e significativas com o afeto negativo. Utilizando o método de consistência interna, a confiabilidade dos seis fatores encontrados foi de .62 a .85; enquanto, com o método teste-reteste, os coeficientes de estabilidade foram de .44 a .77. Esses resultados permitem concluir que a LAS e suas pontuações são uma medida válida e confiável para medir as atitudes sobre o amor na população de universitários de Lima.

*Palavras-chave:* Atitudes sobre o amor, confiabilidade, universitários, validade.

### INTRODUCTION

The human being has always been interested in the subject of interpersonal relationships, the search for a partner and especially for love, considered as an important aspect of human experience (Graham & Christiansen, 2009). At the beginning of the history of culture, the study of the construct of love received considerable attention and discussion from Philosophy. For Plato, e.g., love is conceived as an emotion that exists in a hierarchical way, while for Socrates, love is a combination of several elements (Wan, Hoesni & Chong, 2012). However, for many years, there has been little interest from scientific psychology in researching about love. In spite of this fact, the last three decades have seen a growing interest in the scientific psychological field for reviewing and researching this construct (Todosijević, Arančić & Ljubinković, 2009). This interest resulted in the emergence of several operationalization models of love based on the measurement of attitudes, styles, or dimensions of love, such as the works of Rubin in 1970, Bardis in 1978, Hatfield in 1986, or the contributions of Sternberg and his Triangular Theory of Love (1986, 1987, 1997, as cited in Carreño & Serrano, 1995).

An important proposal regarding love styles was the typology suggested by Lee in 1973 (Camacho et al., 2012; García et al., 2012; Ubillos et al., 2002). Lee reflects on the proposition made by Plato who, in the year 380 BC, in his work “The Symposium,” proposed three forms of love: Eros, Storge, and Ludus (García et al., 2012). From this typology, Lee empirically corroborates the love styles based on Plato’s theory and adds three secondary styles (Mania, Pragma, and Agape), which arise from the mixture of the three original styles, thus obtaining six love attitudes or styles (Ubillos, Páez & Zubieta, 2004). Lee represents the styles of love

as aspects of cognitive domain linked to each individual’s belief and attitude system about the romantic situations in their life (Hendrick & Hendrick, 1986; Hendrick, Hendrick & Dicke, 1998), which direct their behavior and experiences toward the person they love (Wan et al., 2012). Each one of these six styles proposed—even if they may have some degree of relationship— have differentiated qualitative characteristics, which makes each one independent from all other styles (Lee, 1973).

Based on Lee’s theory it was possible to structure a measurement instrument, the Love Attitudes Scale (LAS, Hendrick & Hendrick, 1986) consisting of 42 items, that allowed to measure the styles of love; which are divided into (a) Eros, described as passionate or romantic love; (b) Storge, friendly love based on intimacy and affection, and (c) Ludus, as a playful, manipulative love with little emotional involvement. The three, as they mix with each other, generate other types of love: (d) Mania, obsessive and possessive love that arises from the combination of Eros and Ludus; (e) Pragma, established by Ludus and Storge, which leads to the logical and rational search for the ideal compatible couple; and (f) Agape, an altruistic love made up of Eros and Storge, one of total surrender toward the partner (García et al., 2012).

In summary, the authors claim that the scale evaluates the attitudes toward love relationships from an individual approach; taking into account the six styles of love as different variables under a scale that describes each form of love, which allows each person to establish a profile of their attitude toward love (Hendrick & Hendrick, 1986).

In spite of the theorizations mentioned regarding love, in addition to the LAS not many valid instruments for measurement (Brenlla, Brizzio & Carreras, 2004) have been concurrently developed, except for the Loving and

Liking by Rubin (1970), Passionate Love Scale (PLS) by Hatfield and Sprecher (1986), and Sternberg's Triangular Love Scale (1986; as cited in Graham, 2011). And to the extent that research has linked the high levels of romantic love experienced to a greater satisfaction and stability of the couple relationship, and to higher levels of psychological and general health (Fehr, 2001; Graham & Christiansen, 2009), it is necessary to have valid measures to have an approximation to the construct of love and its related aspects.

However, only a few studies have been reported in Spanish that gather evidence of the psychometric properties of the instruments constructed for this purpose, such as Hendrick and Hendrick's LAS (1986). Of the few studies in Spanish where psychometric results on LAS are reported, we found those of Brenlla et al. (2004), Cooper and Pinto (2008), Otazzi (2009), and Rodríguez, Montgomery, Peláez and Salas (2003), which we will review next.

Within these few studies, there is that of Rodríguez et al. (2003), who investigated love attitudes and courtship experiences in young adults from three different cultures, in a sample of 268 Spanish, Mexican and Hispanic-American undergraduate students between the ages of 17 and 27. They used the LAS as an instrument, which was translated and adapted to an adolescent sample (as EAA: *Escala de Actitudes Amorosas*). With respect to EAA, the authors reported a reliability analysis with alpha coefficients between .54 for Storge and .79 for Pragma. Additionally, they reported the results of a principal component analysis (PCA) as evidence of validity of the internal structure of the EAA, which yielded a six-component solution similar to the original model, although six items presented: (a) cross factor loading (item 7 of Eros), (b) in a component other than the theoretical component (item 8 of Ludus and items 15 and 19 of Storge), or (c) with a factor loading below .30 (items 16 and 17 of Storge).

Although it is true that a first exploration of the psychometric properties of the LAS is made, at a methodological level, some limitations are made evident, such as the use of Little Jiffy (PCA, eigenvalues criterion greater than 1 and varimax rotation) as part of the analysis, which is not recommended when the internal structure of an instrument is to be examined in an exploratory way (Dominguez-Lara & Merino-Soto, 2016; Lloret-Segura, Ferreres-Traver, Hernández-Baeza & Tomás-Marco, 2014). Furthermore, regarding the alpha coefficient report, the calculation of their confidence intervals is not shown, which is an important and currently recommended practice, since this coefficient may be influenced by different characteristics such as number of items, sample error and because the reliability of the scores cannot be assumed as stable in each

sample evaluated (Dominguez-Lara & Merino-Soto, 2015; Sánchez-Meca & López-Pina, 2008).

Similar procedures for psychometric analysis are found in the study by Brenlla et al. (2004), who applied the LAS to a sample of 280 young Argentine adults, with a mean age of 27.4 years ( $SD = 5.66$ ). As part of the internal structure (when applying PCA with varimax rotation), they found a six-factor solution that together accounted for 41 % of the total variance. The item distribution was similar to the original except for 5 items that presented low factor loadings ( $< .35$ , items 9 and 10 of Ludus, and items 15, 16 and 17 of Storge), although it was decided to maintain them. The internal consistency estimated through Cronbach's alpha coefficient yielded values between .40 for Ludus and .72 for Agape.

On the other hand, the study of Cooper and Pinto (2008) also used the LAS as an instrument, applied to a sample of 388 young Bolivian university students between 18 and 24 years of age. As part of the psychometric properties, they only reported evidence of reliability by the internal consistency method, obtaining Cronbach's alpha coefficients between .70 for Ludus and .89 for Agape; however, no confidence intervals or validity evidence for LAS were reported, such as the internal structure analysis. The same aspect appears in our country, where the only study carried out with this instrument is that of Otazzi (2009), where she uses the LAS with some linguistic adaptations in the phrasing of certain items. The author worked with a population of 71 male and female adults between 37 and 78 years old. In the study, evidence of reliability is reported by the internal consistency method (alpha coefficients between .40 for Ludus and .88 for Eros), but again the absence of evidence of validity is repeated. Additionally, reliability results were obtained with small samples of less than 100 subjects.

The above mentioned studies stem from research studies carried out in Spanish-speaking samples. However, it is worth mentioning the Portuguese adaptation of the LAS performed by De Andrade and García (2009, 2014), who, in their second study, evaluated a Brazilian sample of 1,530 male and female young adults from different states in Brazil with an average age of 25.5 years ( $SD = 8.7$ ). As part of the exploratory factorial analysis with the principal axis extraction method, a parallel analysis determined the extraction of six factors, which were then subjected to an oblique rotation (Promax). From the analysis, we obtained a version of 37 items distributed in the six factors similar to the theoretical model that explained 45.3 % of the total variance. Two items of Ludus, two of Storge, and one of Mania were taken out of the final version because they exhibited low factor loadings.

These data were subjected to a confirmatory factor analysis in which the interrelated six-factor model (with 37 items) presented the best goodness of fit index [ $\chi^2 = 1766.310$ ,  $df = 614$  ( $p < .001$ ),  $\chi^2/df = 2.877$ ,  $RMR = .066$ ,  $GFI = .88$ ,  $AGFI = .87$ ,  $CFI = .85$ ,  $RMSEA$  (90 % CI) =  $.50$  (.47 - .52)]. They also performed a reliability analysis using the internal consistency method, with alpha coefficients between .67 for Storge and .84 for Agape. This study stands out for its representativeness and for the methodology used in the analysis of psychometric properties, although as already mentioned, it does not correspond to a Spanish version of LAS.

As we can see, in the studies on Spanish-speaking samples mentioned in previous paragraphs, several researchers (Brenlla et al., 2004, Cooper & Pinto, 2008, Otazzi, 2009; Rodríguez et al., 2003) have approached the topic of love using the Hendrick and Hendrick scale (1986). However, the data correspond to very small samples, in some cases, and although evidence of reliability of test scores is reported, most studies lack evidence of validity, which is a necessary requirement in all test validation and adaptation processes, and is also recommended by the guidelines of the International Test Commission (Muñiz, Elosua & Hambleton, 2013).

Based on our review, there is no psychometric evidence in the Peruvian context to support the use of the LAS in university students, although it has been used as part of studies related to the topic of the couple, assessing satisfaction and commitment (Otazzi, 2009), but without reporting the recommended evidence of validity and reliability. In this sense, the main objective of this research is to analyze the psychometric properties of the LAS in a sample of Peruvian university students, in response to the need to establish an adaptation that has methodological rigor in the analysis of the evidence of validity and reliability.

Based on the main objective, (a) evidence of reliability (internal consistency and stability) and (b) evidence of validity (internal structure and relationships with other variables) of the scale in a sample of university students will be examined. Therefore, this study is an instrumental one, since it is included in the category of papers that analyze the psychometric properties of psychological instruments, specifically in the adaptation of existing tests (Ato, López & Benavente, 2013).

We consider that it is important to have scales that allow us to evaluate, with evidence of validity and reliability, the styles of love adopted by university students, since the forms of social and affective relationship with each other, as are friendship and love, are consolidated in this context. Also, it is in this context that the choice of a partner is presented

as a need for affection and interdependence that includes historical, cultural, biological and psychosocial variables (Valdéz, González & Sánchez, 2005). In addition, as mentioned by Rodríguez-Castro, Lameiras-Fernández, Carrera-Fernández and Vallejo-Medina (2013), the socio-cultural norms of romantic love that play an important role in the myths or false beliefs associated with love come into play in this socialization process. This will provide a range of emotional and cognitive aspects associated with the choice of a partner, as well as an understanding of the students' attitudes toward love relationships and an alternative that contributes to the strengthening of their relationships and their well-being (Galicía, Sánchez & Robles, 2013; Lema et al., 2009).

## METHOD

### *Participants*

In order to obtain the sample, an intentional non-probabilistic sampling was used; from this sample, 393 undergraduate students were evaluated. However, 12 evaluations were discarded because they were incomplete. Of the total sample of 381 students, 61.7 % were female and 38.3 % were male. The age range was 17-25 years, and the mean age was 20.45 years ( $SD = 2.25$ ). As for their romantic status, 62.2 % were not in a relationship but had been in one previously, and 37.8 % were in a relationship. Of the total students, 54.3 % were psychology students and the rest belonged to business (25.2 %) and engineering (20.5 %) study programs.

### *Instruments*

*Love Attitudes Scale (LAS, Hendrick & Hendrick, 1986).*

We used the Spanish translation by Ubilllos et al. (2004), called *Escala de Actitudes sobre el Amor*. This scale evaluates the six styles of love proposed by Lee (1973). These are considered as independent styles, regardless of the distinction between primary and secondary styles (García et al., 2012). The scale is comprised of 42 items classified in six sub-scales: Eros: items 1-7, Ludus: 8-14, Storge: 15-21, Pragma: 22-28, Mania: 29-35, Agape: 36-41. The response scale goes from 1 (totally disagree) to 5 (totally agree).

In three prior studies, the average alpha coefficient was found to be .80 (Hendrick & Hendrick, 1989; Hendrick et al., 1998). According to a study by White (2003), the consistency of the coefficients of the six love sub-styles

was found to be as follows: for Eros (.71), Ludus (.75), Storge (.84), Pragma (.82), Mania (.71), and Agape (.84).

*The International version of the Positive and Negative Affect Schedule — Short Form (I-PANAS-SF, Thompson, 2007).*

We used the reduced international version of the Positive and Negative Affect Schedule (PANAS, Watson, Clark & Tellegen, 1988). It consists of 10 items —5 items per affect— whose psychometric properties have been studied in several countries, including Peru (Gargurevich, 2010). In this research, a confirmatory factor analysis (CFA) was performed to corroborate the factorial structure of the scale. The goodness of fit indices evaluated in the AFC for the two-factor model were quite satisfactory:  $SB\chi^2/df = 3.27$  ( $S-B\chi^2 = 111.19$ ,  $df = 34$ ),  $RMSEA = .084$ ,  $GFI = .92$ . The factor loading of the items reached values between .27 and .83, all being significant. The correlation between the positive and negative affect schedules was negative and significant ( $r = -.52$ ,  $p < .001$ ) (Gargurevich, 2010). For both types of affects, Cronbach's alpha coefficients equal to .72 were obtained.

### Procedure

In the first place, the necessary authorizations were processed so as to access the institutions in order to evaluate the specific sample. Prior to application, a pilot study was carried out in order to revise linguistic aspects of the version used, which was also reviewed by judges, who were university teachers and psychologists, with experience in research, and a minimum master's degree. They validated the modifications made from the pilot application. From this procedure, non-consideration of item 29 (*Cuando algo no va bien con mi pareja, se me hace un nudo en el estómago*) was determined, because it was considered of low relevance for measuring the Mania style. This was determined after performing the analysis of the degree of agreement with respect to its relevance with a result of very low ( $V_{Aiken} < .50$ ). After the pilot study, the application process was carried out in the classrooms of the universities, informing the students that their participation in the study would be voluntary and anonymous, for which they were given an Informed Consent. The research was approved by an Evaluation Committee of the School of Psychology of the university where the research was carried out.

### Data analysis

For the data analysis, evidence of validity related to the internal structure and relationship to external criteria has been reported, as well as evidence of reliability, such as test-retest and internal consistency for the LAS. As to the

evidence of the validity of construct (analysis of internal structure), the number and composition of factors necessary to summarize the scores in a large set of observed variables were identified. For this purpose, an exploratory factorial analysis (EFA) was applied, using the principal axis extraction method with Promax rotation. This extraction method is an option against the violation of the multivariate normality assumption (Lloret-Segura et al., 2014, Osborne, 2014). Also, to determine the number of factors to be extracted, a parallel analysis was used, which is a simulation method that compares empirical eigenvalues —versus eigenvalues— produced at random (Timmerman & Lorenzo-Seva, 2011). It was decided to use an exploratory approach to the extent that this methodology is less restrictive than a confirmatory approach and, thus, applying an exploratory methodology would allow us to obtain a first approximation to the factorial structure of the LAS in the Peruvian context without restrictions on the item's factor loading, given that cross-loading items can be identified in certain dimensions (Lloret-Segura et al., 2014).

In order to complement this study, it was considered important to report evidence of external validity, by analyzing the relationship between LAS and I-PANAS-SF. This instrument was selected because of the relationship it has with the topic of love and couple relationships, and due to the existence of previous research where both scales were used together (Neto, 2012).

In relation to the evidence of reliability, specifically test-retest (intraclass correlation coefficient, ICC), two measurements were performed to analyze the stability of the results in a period of one month between both applications to a subsample of 50 undergraduate students. The Cicchetti (1994) criterion was used to determine the levels of the coefficients obtained:  $< .40$ : poor;  $\geq .40$ : acceptable;  $\geq .60$ : good;  $\geq .75$ : excellent. Finally, in terms of internal consistency, the reliability of the factors will be calculated, using Cronbach's coefficient of internal consistency. For the interpretation of the coefficient, the criterion of DeVellis (2012) will be taken into account, a criterion that states that alpha coefficients starting at .65 are considered acceptable for research purposes, and greater than .80, good. For both cases, their respective 95 % confidence intervals will be reported.

## RESULTS

The homogeneity of the items was analyzed previously using corrected item-test correlations ( $r_{itc}$ ), for which values over .20 were retained (Kline, 1986). From this analysis, item 9 (*Lo que mi pareja desconoce de mí, no debería*

*llamarle la atención particularmente*) had to be eliminated because it did not meet this criterion ( $r_{ic} = .18$ ). In addition, we calculated the statistics of central tendency and dispersion of the items (see Table 1) where, with exception of item 30, no violations were identified for the univariate normality assumption as the skewness and kurtosis rates were lower than  $\pm 1.5$  (Forero, Maydeu-Olivares & Gallardo-Pujol, 2009), so the Pearson correlation matrix was used. Finally, the Mardia (1970) analysis was used for multivariate skewness and kurtosis, where a skewness coefficient of 240.77 was found,  $gl = 11480$ ,  $p = 1.0$  and a kurtosis coefficient of 1801.94,  $p < .001$ . According to this result, the absence of a normal multivariate distribution of the data is demonstrated.

Before the application of the EFA, a sample adequacy measure (KMO) of .81 was found, a measure that is considered acceptable (Ferrando & Anguiano-Carrasco, 2010). In addition, Bartlett's Sphericity Test was found as statistically significant,  $X^2(820) = 4598.43$ ,  $p < .001$ . These results reflect that the degree of relationship between the items of the instrument is enough to be factorially analyzed.

In order to extract and determine the number of factors, it was decided to use parallel analysis, in which it was suggested that there were six factors that presented higher eigenvalues than those randomly generated, which was in line with the original model proposed by Hendrick and Hendrick (1986). When the first analysis was carried out assuming six factors, and using the principal axis method, it was obtained that these explained 46.37 % of the total variance explained. However, it was identified that item 36 (*Trato siempre de ayudar a mi pareja a sobrellevar los momentos difíciles*), presented a factor loading under .20 and was placed in a factor different from the theoretical model proposed. In addition, item 17 (*Espero permanecer para siempre junto a mi pareja*), presented factor loading in three factors and under .20. For this reason, we decided to eliminate these items from the analysis because they did not present acceptable loads (Tabachnick & Fidell, 2013).

When performing the second analysis without the above mentioned items, and applying a Promax rotation, it was obtained that the six extracted factors explain 47.87 % of the total variance. Table 1 presents the eigenvalues obtained, as well as the respective percentages of explained variance corresponding to the Eros styles (items 1 to 7), Agape (items 37 to 42), Pragma (items 22 to 28), Ludus (items 8, and 10 to 14), Mania (items 30 to 35), and Storge (items 15, 16, and 18 to 21). In all cases, the factor loads obtained are considered acceptable, since they exceed the minimum .30 value recommended by Tabachnick and Fidell (2013).

It is important to note that in the Pragma factor, items 22 (*Antes de comprometerse con una persona hay que*

*considerar lo que él/ella va a llegar a ser en la vida*) and 23 (*Hay que planificar cuidadosamente la vida antes de elegir pareja*) presented cross factor loading with the Storge Factor. Finally, for Storge, item 15 (*Es difícil decir exactamente dónde termina la amistad y empieza el amor*) presented a cross factor loading with the Ludus Factor (see Table 1).

Similarly, the estimates of the communalities extracted were obtained for the 38 items of the scale. It is important to analyze communalities since low values  $h^2 < .20$  (Child, 2006) and  $h^2 < .30$  (Costello & Osborne, 2005) can generate a significant alteration in the factor analysis results (Velicer & Fava, 1998). The results showed moderate communalities in most of the 38 items (mean  $h^2 = .40$ ): the lowest values were for items 8, 13, and 16 (.22, .22 and .23, respectively), while the higher values were the communalities of items 3 and 42 (.68 and .63, respectively).

As shown also in Table 1, reliability coefficients were obtained for the scores considered acceptable for the styles of love analyzed, except for the Storge and Ludus styles whose confidence interval falls below the acceptable minimum ( $\alpha < .65$ ). As part of the stability reliability, the Test-Retest method was used, which was calculated using the Intraclass Correlation Coefficient (ICC) and their respective 95 % confidence intervals (CI). This analysis was performed with the objective of measuring the level of agreement between the LAS' two quantitative measures. As shown in Table 1, we found that the Eros, Mania and Storge styles have good test-retest coefficients (greater than .60). On the other hand, in the Agape and Pragma styles, we found acceptable test-retest coefficients greater than .40 (Cicchetti, 1994; Prieto, Lamarca & Casado, 1998; Serra-Mayoral & Peña-Casanova, 2006). Finally, in the Ludus style, it is observed that the coefficient obtained is low since despite being equal to .44, the lower limit of the confidence interval is close to zero.

As part of the evidence of convergent and divergent validity, we proceeded to correlate the six styles of love with the positive and negative affect of I-PANAS-SF (Gargurevich, 2010). For this purpose, the Spearman rho correlation test was used, since in the analysis of normality, using the Kolmogorov-Smirnov test, all distributions of the variables were statistically significant ( $p < .05$ ), thus they did not approximate to a normal distribution. As shown in Table 2, positive and statistically significant correlations were found between positive affect and Eros ( $r_s = .23$ ,  $p < .001$ ,  $CI[95\%] = .13, .32$ ), and Pragma ( $r_s = .17$ ,  $p < .001$ ,  $CI[95\%] = .07, .27$ ) love styles. As for negative affect, a negative and significant relationship was found with the Eros love style ( $r_s = -.14$ ,  $p < .05$ ,  $CI[95\%] = -.23, -.04$ ), and conversely, negative and significant relationship were found with the Ludus ( $r_s = .15$ ,  $p < .05$ ,  $CI[95\%] = .05, .25$ ) and

Table 1  
 Descriptive statistics and factor loadings for the items of Love Attitudes Scales

Items	Eros	Ágape	Pragma	Ludus	Manía	Storge	$h^2$	M	SD	$g_1$	$g_2$
3. Amor intenso y satisfactorio.	.82						.68	3.76	1.03	-.75	.22
4. Destinados el uno para el otro.	.74						.55	3.37	1.10	-.34	-.37
2. Buena química entre la pareja.	.73						.55	4.11	.96	-1.11	1.06
5. Rápida implicancia emocional.	.71						.53	3.63	1.05	-.56	-.26
6. Comprensión mutua.	.64						.45	3.73	1.02	-.62	-.15
7. Satisfacción del ideal de belleza física.	.47						.28	3.60	1.09	-.64	-.08
1. Atracción física inmediata.	.45						.27	3.08	1.26	-.18	-.90
42. Soportar todo por la pareja.	.39	.75					.63	3.45	1.18	-.41	-.61
41. Amor incondicional.		.74					.55	3.42	1.25	-.41	-.79
40. Estar a disposición de la pareja.		.67					.46	2.79	1.26	.09	-.99
39. Sacrificio de los propios deseos.		.68			.42		.51	2.65	1.20	.16	-.83
38. Su felicidad por encima de la mía.		.67					.51	3.30	1.23	-.34	-.77
37. Prefiero sufrir yo antes que mi pareja.		.65			.37		.44	3.15	1.22	-.12	-.78
25. Que mi familia acepte a mi pareja.			.71				.52	2.81	1.30	.13	-1.08
26. Saber si será buen(a) padre/madre.			.70				.51	2.79	1.25	.05	-1.01
27. Me ayudará en mi carrera profesional.			.67				.47	3.07	1.38	-.11	-1.22
28. Verificar compatibilidad genética.			.49				.30	1.81	1.10	1.20	.49
24. Que mi pareja sea de mi medio social.			.46				.29	2.67	1.22	.16	-.97
23. Planificar mi vida antes de elegir pareja.			.45			.48	.34	3.44	1.16	-.31	-.67
22. Considerar lo que mi pareja quiere ser en la vida.			.43			.46	.36	3.46	1.10	-.44	-.30
14. <i>Gilear</i> (cortejar) con diferentes personas.				.60			.38	2.10	1.26	.78	-.64
12. Que se entere que estuve con otras personas.				.58			.38	2.62	1.34	.30	-1.10
10. Relaciones con dos personas a la vez.				.55			.34	1.73	1.20	1.45	.79
11. Recuperarse rápido de una decepción amorosa.				.48			.26	2.27	1.27	.69	-.55
8. Inseguridad de mi pareja sobre mi compromiso.				.41			.22	2.69	1.18	.10	-.86
13. Distanciamiento debido a la dependencia.				.37			.22	3.08	1.22	-.16	-.88
32. Ponerse mal por falta de atención.					.59		.44	3.29	1.15	-.32	-.65
35. Hacer cosas sin sentido cuando me ignora.					.61		.40	2.54	1.27	.37	-.93
33. Desconcentración al pensar en mi pareja.					.59		.37	2.70	1.14	.19	-.77
31. No dormir por estar enamorado.					.58		.36	2.87	1.25	.01	-1.04
34. Intranquilo al pensar que está con otro(a).		.32			.57		.36	2.96	1.28	.01	-1.01
30. Pensar en suicidio, tras una ruptura.					.40		.27	1.59	1.03	1.66	1.74
18. El amor profundo nace de una amistad.						.67	.46	3.29	1.29	-.26	-.92
21. Relación satisfactoria viene de amistad.						.59	.35	3.37	1.32	-.38	-.97
20. El amor es una amistad profunda.						.50	.26	3.40	1.25	-.33	-.87
19. Nuestra amistad se convirtió en amor.						.36	.24	3.14	1.18	-.13	-.84
16. No se puede amar sin afecto previo.						.31	.23	3.84	1.25	-.83	-.39
15. Difícil discernir entre amistad y amor.				.39		.30	.28	2.91	1.28	.09	-.98
Eigenvalue	4.94	3.93	3.43	2.26	2.02	1.62	-	-	-	-	-
% variance explained	13.00 %	10.34 %	9.03 %	5.94 %	5.31 %	4.25 %	-	-	-	-	-
$\alpha$	.83	.85	.77	.67	.73	.62	-	-	-	-	-
[IC, 95 %]	[.80, .86]	[.82, .88]	[.73, .81]	[.61, .72]	[.68, .77]	[.56, .68]	-	-	-	-	-
ICC	.77	.62	.57	.44	.67	.72	-	-	-	-	-
[IC, 95 %]	[.60, .87]	[.32, .78]	[.22, .75]	[.01, .68]	[.41, .81]	[.50, .84]	-	-	-	-	-

Note.  $h^2$  = communality;  $g_1$  = skewness;  $g_2$  = kurtosis; ICC = intraclass coefficient correlation.

Mania ( $r_s = .29, p < .001, CI[95\%] = .20, .38$ ) love styles. The remaining correlations were not statistically significant. From these relationships obtained, in interpretative terms and considering the limits of the confidence intervals, the positive relationship between Eros and positive affect, as well as the positive relationship between Mania and the negative affect are considered important. In both cases, the intervals are in a range of effect size between low ( $.10 \leq r < .30$ ) and moderate ( $.30 \leq r < .50$ ) (Cohen, 1998).

As for the correlations between love styles on the LAS scale, positive and statistically significant correlations were found between Eros and Agape ( $r_s = .25, p < .001, CI[95\%] = .15, .34$ ); Ludus and Mania ( $r_s = .24, p < .001, CI[95\%] = .14, .33$ ); Pragma and Storge ( $r_s = .25, p < .001, CI[95\%] = .15, .34$ ); and Agape and Mania ( $r_s = .35, p < .001, CI[95\%] = .26, .44$ ). It is worth mentioning that the correlations obtained were within the expected range, to the extent that the positive affect was positively related to the more adaptive and more committed love styles; while negative affect correlated positively with more maladaptive and less compromising styles. Also, in terms of the magnitude of the correlations analyzed, these have mostly been low. Table 2

## DISCUSSION

The aim of this study was to study the psychometric properties of the Hendrick and Hendrick (1986) Love Attitudes Scale (LAS) in its Spanish version by Ubillos et al. (2004) in a group of university students from Lima. The results obtained demonstrate that satisfactory psychometric properties were obtained for the LAS, both in the evidence

of validity and reliability of the analyzed scores criteria. This supports its use for research purposes in samples of Peruvian undergraduate students.

As for the reliability by internal consistency of the scores, alpha coefficients were found between good and acceptable (De Vellis, 2012), except for the Storge style that presented low reliability. These coefficients have been higher in comparison with those obtained by Rodríguez et al. (2003) and Brenlla et al. (2004); and similar to those obtained by Hendrick and Hendrick (1986), Otazzi (2009), and De Andrade and García (2014), although it should be mentioned that confidence intervals were not reported in these studies. In the above studies, the Ludus and Storge styles were the ones that presented the lower coefficients, which concurs with this study although the magnitudes were higher here. The minimum variability found among score reliability can be due to sample variability (Prieto & Delgado, 2010), and to the maintenance of some items with low factor loading, as in the case of items 9 (Ludus) and 15 (Storge). This is confirmed with what was found in the meta-analysis of Graham and Christiansen (2009), who argue that current results show that the differences in score reliability of the measures of love are due to the specific characteristics of the sample. Therefore, it is important to take into account this aspect of reliability to perform substantive interpretations of the scores obtained in various samples.

As for the stability of the instrument by the test-retest method, it was observed that the intraclass correlation coefficients were also satisfactory, although, in the Ludus and Pragma styles, a low indicator was seen, which could be due to the effect of the application after a month, period in

Table 2  
*Correlations between love styles and positive and negative affect<sup>a</sup>*

	M	SD	1	2	3	4	5	6	7	8
1. Positive Affect.	3.78	0.59	-							
2. Negative Affect.	2.60	0.56	-.18**	-						
3. Eros.	3.61	0.76	.24**	-.14**	-					
4. Ludus.	2.41	0.76	.04	.15**	-.11*	-				
5. Storge.	3.33	0.74	.03	.12*	-.05	.20**	-			
6. Pragma.	2.86	0.79	.17**	-.02	.01	.17**	.25**	-		
7. Manía.	2.66	0.77	-.09	.29**	.01	.24**	.14**	.14**	-	
8. Ágape.	3.13	0.92	-.01	.05	.25**	-.01	.08	-.12*	.35**	-

Note. <sup>a</sup>. The correlations presented correspond to the correlation coefficient of Spearman's rho. \* $p < .05$ ; \*\* $p < .01$ .

which some participants changed their romantic status, as logged in the socio-demographic record; or due to the little size of the sample. Hence, in these styles, the coefficients were considerably lower than those found by Hendrick and Hendrick (1986), who did so with 112 students over a period of six weeks. However, in general terms, it can be seen that the scores obtained with the LAS are consistent and stable over time.

With regard to internal structure validity, the results obtained through the Exploratory Factor Analysis corroborated the original six-factor structure (Hendrick & Hendrick, 1986), which account for 47.87 % of the variance with higher factor loadings almost entirely over .30. This shows that the reagents considered contribute significantly to the measurement of love styles, providing a factorial strength (Zwick & Velicer, 1986). However, for this research the following items were eliminated: 17 (*Espero permanecer para siempre junto a mi pareja*), 36 (*Trato siempre de ayudar a mi pareja a sobrellevar los momentos difíciles*), and 29 (*Cuando algo no va bien con mi pareja, se me hace un nudo en el estómago*). In the case of item 29, the elimination resulted from an agreement among the judges regarding the literal and figurative interpretation of the same. Regarding items 36 and 17, it was decided to eliminate them because they had a factorial load under .20 and because they had loads in three factors, which would imply that these reagents would not be representing the styles for which they were theoretically elaborated in the evaluated sample. The case of item 17 matches the results of Brenlla et al. (2004), De Andrade and García (2014), and Rodríguez et al. (2003), so the lack of representation of this item in its theoretical style could even be a cultural issue.

Items with loads on two factors were also found: 15 (*Es difícil decir exactamente dónde termina la amistad y empieza el amor*) in the Storge (theoretical) and Ludus styles; and items 22 (*Antes de comprometerse con una persona hay que considerar lo que él/ella va a llegar a ser en la vida*), and 23 (*Hay que planificar cuidadosamente la vida antes de elegir pareja*) in the Pragma (theoretical) and Storge styles. The case of item 15 coincides with the results obtained by Rodríguez et al. (2003). Several causes can be proposed as an explanation for the fact that an item can be loaded on two factors, among them—and for the items mentioned—based on Lee's (1973) typology. The Pragma style is built upon characteristics of the Ludus and Storge styles, thus some attitudes can be shared and related, which is corroborated when analyzing the correlations obtained between these styles (De Andrade & García, 2014). For this reason, it was decided to maintain the items despite having shared loadings in these particular cases.

In general, we can mention that in terms of the dimensions of Hendrick and Hendrick's (1986) Love Attitudes Scale, we find that the six-factor structure is consistent with the finding by Rodríguez et al. (2003) in samples of Spanish-speaking university students; by De Andrade and García (2009) in a Brazilian sample; and by Brenlla et al. (2004) in young Argentinian adults. These results indicate that the theoretical model proposed by Hendrick and Hendrick (1986) has goodness of fit with the empirical data of the Peruvian sample. In addition, it adds evidence regarding the degree of consistency and stability of the internal structure of the LAS in different samples, since the items function to a great extent in a similar way, which supports the generalization of the theoretical model of the construct, even if this is an exploratory study which requires a confirmatory method and replications that add to the evidence found herein. The Eros style was observed as the factor with the greatest variance and the most preferred one in both men and women. This result shows clearly the validity in our environment, specifically in young university students, of the romantic love model, which coincides with results obtained in samples of Spanish youngsters (Ferrer, Bosch, Navarro, Ramis & García, 2008).

As for the correlations between the styles of LAS, they have been analyzed based on the criterion of their magnitude. It was obtained that the coefficients of correlation found were mostly statistically significant, although of low magnitude. This aspect corroborates the fact that, although there is some degree of association between the dimensions (De Andrade & García, 2014), each style also maintains independence from the others, which coincides with Hendrick & Hendrick (1986). On the other hand, the findings in terms of correlations with positive and negative affect reflects the fact that positive affects are more related to styles that seek to please and sympathize with oneself and others, whereas negative affects lead to negative evaluations of self-dislike and antipathy toward the others (Ubillos et al., 2004; Neto, 2012). Hence the Eros style, which implies romantic love, is positively associated with the positive affect and inversely with the negative. On the other hand, the Ludus (love of little emotional implication) and Mania (obsessive love) styles presented positive relationships with negative affect, since these styles impact the welfare of the person and the relationship in the long term. In this sense, this is important since affect can influence the attraction towards the partner (Jonason & Kavanagh, 2010; Ubillos et al., 2004).

Since it was a first exploration of the factorial structure of the LAS, an exploratory design was proposed and other

procedures, such as the Confirmatory Factor Analysis (AFC), could not be used, as it was desired to have the least restriction on the item loading. This is in line with the assertions that the AFC may differ in the confirmation of factor structures supported by previous exploratory analyses, because it is very restrictive (Ferrando & Anguiano-Carrasco, 2010; Lloret-Segura et al. 2014). However, for future research, it is recommended to replicate the model found in this study in a larger sample (to the extent that communalities have been moderate and in some cases less than .30) and using confirmatory methods to analyze the internal structure of the LAS, analyze the goodness of fit of the factor model found, and revise aspects related to factor invariance. In addition, a more varied sample is recommended in regards to study program, because having a high percentage of psychology students could be considered as a possible bias in the answers, given the characteristics of these students. It is concluded that the results found indicate that the LAS, applied in Peruvian undergraduate students, has adequate psychometric properties, which allows considering as a valid and reliable measure to be it used in future research as an instrument for measuring love styles.

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