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Psychometric properties of the Positive and Negative Affect Scale for Children (PANAS-C) in Peru

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ABSTRACT
This study aims at investigating the psychometric properties of The Positive and Negative Affect Schedule for Children (PANAS-C) in Peru. After translating the scale into Spanish, its validity and reliability were investigated in data collected from a two-wave longitudinal study with a sample of Peruvian preadolescent students (N = 170). The factor structure of the scale was investigated by confirmatory factor analytic techniques and the convergent and discriminant validity were explored using the Louvain Loneliness Scale for Children and Adolescents and the Stressful Events Inventory for Preadolescents. Results support the suitability of a two-factor model (Positive affect and Negative affect) in all cases. Results also showed good convergent and discriminant validity as well as good reliability. The present findings suggest that PA and NA constructs are less distinguishable in younger children and that these constructs become more clearly defined as young children grow up, possibly due to an increasing ability to categorize emotional experience.

Keywords:
Positive Affect, Negative Affect, Preadolescence, Stress, PANAS-C

RESUMEN
Este estudio tiene como objetivo investigar las propiedades psicométricas de la Lista de afecto positivo y negativo para la Infancia (PANAS-C) en Perú. Después de traducir la escala en español, su validez y fiabilidad se investigaron en los datos obtenidos de un estudio longitudinal de dos ondas con una muestra de estudiantes peruanos preadolescentes (N = 170). La estructura factorial de la escala fue investigada por técnicas de análisis factorial de confirmación, mientras que la validez convergente y discriminante se analizaron utilizando la Escala de Soledad Lovaina para Niños y Adolescentes y el Inventario estresantes eventos para preadolescentes. Los resultados apoyan la idoneidad de un modelo de dos factores (afecto positivo y afecto negativo) en todos los casos. Los resultados también mostraron una buena validez convergente y discriminante, así como una buena fiabilidad. Los presentes hallazgos sugieren que los cosntructos de PA y NA son menos distinguibles en los niños más pequeños y que dichos conceptos se presentan más claramente definidos a medida que los niños crecen, posiblemente debido a una creciente capacidad para categorizar la experiencia emocional.

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Positive and negative affect have been considered the two major mood dimensions characterizing the affective quality of an individual's self-experience (DePaoli & Sweeney, 2000; Merz & Roesch, 2011). According to Watson, Clark and Tellegen (1988), positive affect (PA) reveals the degree to which a person tends to experience enthusiastic, active, alert and pleasurable engagement. Negative affect (NA) refers to the tendency to experience subjective distress and a diversity of negative mood states and unpleasant engagement.

Throughout the years, positive and negative affect have been studied in a wide variety of psychological areas such as personality, stress, depression, anxiety, health among others in children and adults (Laurent et al. 1999: Wilson & Gullone, 1999; Cohen & Pressman, 2006; Steptoe, O´Donnell, Marmot, & Wardle, 2008; Leue & Lange, 2011). Interestingly, PA and NA, have been considered traits or states (Watson et al., 1988; Chida & Steptoe, 2008) depending on the focus and the time frame of the evaluation of the constructs (e.g. right now, past week, past few weeks, general)

These two dimensions of affect are not opposite poles of a continuum (DePaoli & Sweeney, 2000) as originally proposed (Watson et al.,1988) but as research has proven that can be moderately interdependent (Mineka, Watson & Clark, 1998; Crawford & Henry, 2004; Gargurevich & Matos, 2012). However, there is evidence suggesting that PA and NA may have distinct associations with several outcome variables. For example, NA, but not PA, has been related to self-reported stress, while PA, and not NA, is related to social activity (Watson et al, 1988). Also, NA and PA have been shown to correlate differentially with depression and anxiety in clinical samples (Crawford & Henry, 2004), being NA a significant predictor of anxiety and depression while PA only predicted depression (Dyck, Jolly & Kramer, 1994). Additionally, PA (and not NA) has emerged as a significant positive predictor of health outcomes and there is increasing evidence showing that PA has an effect on biology suggesting that it activates the neuroendocrine, autonomic and immune systems (Chida & Steptoe, 2008; Dockray & Steptoe, 2010). Contrary to PA, NA has emerged as a strong negative predictor of health symptoms in several studies (Van Diest et al. , 2005; Put et al., 2004).

Evaluating positive and negative affect: PANAS

One of the most widely used scales to assess positive and negative affect in adult populations is the *Positive and Negative Affect Schedule* (PANAS; Watson et al., 1988). The PANAS has two 10-item scales representing positive and negative affect and it can be used to evaluate affect as a trait or state by changing the time window of the retrospective self-reports for example, right now, past week, past few weeks, in general (Watson et al., 1988).

The PANAS has demonstrated solid psychometric properties in several countries. The great majority of these studies have reproduced the two factor structure of the scale, and both scales have proven to be reliable (Petters, Ponds, & Vermeeren, 1996; Hilleras, Jorm, Herlitz, & Winblad, 1998; Sandín et al, 1999; DePaoli & Sweeney, 2000; Schmukle, Egloff, & Burns, 2002; Pandey & Srivastava, 2008; Merz & Roesch, 2011; Terracciano, McCrae, & Costa, 2003; Leue and Lange, 2011) including in Peru (Grimaldo, 2003; Matos & Lens, 2009; Gargurevich & Matos, 2012).

The Spanish version of the PANAS (SPANAS) was first adapted in Spain (Sandín, et al., 1999). Sandín et al., (1999) explored the psychometric properties of the scale by performing a factor analytic study to analyze the cross-cultural convergence of the scale in 712 Spanish undergraduate students and he found a robust and reliable two dimensional structure (PA and NA) providing support for the two dimensional structure of the SPANAS. The same two-factor structure (and good reliability) was found in a study with three different Mexican samples (Robles & Paez, 2003) and such factor structure (also good reliability) was found in Peru by Grimaldo (2003) and Matos and Lens (2009) using exploratory factor analysis, and by Gargurevich and Matos (2012) using confirmatory factor analytic procedures.

Evaluating positive and negative affect in children and adolescents: PANAS C

The need for evaluating positive and negative affect and its association with anxiety and depression in children and adolescents gave birth to the PANAS C (Laurent et al. 1999). However the evaluation of affect in children has some specific aspects to consider. That is, children as well as adolescents may report mood and affect states differently than adults and more according to their ages (Bushman & Crowley, 2010).

Already in 1982, Glasberg and Aboud reported that children of 5 years of age denied sad experiences more than their counterpart peers of 7 years old and were less likely to include this emotion in their emotional disposition. Later, in a study involving the tripartite model of Clark & Watson (1981), in 4th, 7th and 10th year old children (*N*=510), Ollendick, Seligman, Goza, Byrd & Singh, (2003) found that anxiety and depression were more differentiated in preadolescents than in children.

When developing the PANAS C Laurent et al. (1999) studied the validity and reliability in the scale in a sample of 707 students from 4th to 8th grades. The total sample was divided in two groups: one for the scale development (*N* = 349) and the other one for replication purposes (*N* = 358). Principal axis factor (PAF) analysis with oblique rotation was used to determine the factor structure of the PANAS-C and a two-factor solution with PA and NA was found. This solution was consistent with the original PANAS measure and a negative correlation ($r = -.23$, $p < .05$) between PA and NA was found as it was expected and reported before (Watson et al., 1988). Also, this good convergent and discriminant validity emerged when the scale was correlated with the Children´s Depression Inventory (CDI; Kovacs, 1992) and the State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973) respectively. Reliability was later calculated for the PA and NA scales, considering items below .30 as weak. The Cronbach´s alpha internal consistency coefficients for the PA scale were .89 in the scale development sample and .87 for the replication sample, whereas for NA was .94 in the first sample and .92 in the second sample. Thus, the PANAS C has been found to be a useful measure to differentiate anxiety from depression in children (Laurent et al. 1999; Lonigan, Phillips, Hooe, 2003; Ebesutani, Regan, Smith, Reise, Higa-McMillan & Chorpita, 2012).

More concretely, in a study about extraversion, neuroticism, PA and NA in a multiage sample (*N* = 555) participants were divided in three groups: children and early adolescents (ages 8 to 15), late adolescents and young adults (ages 16 to 29), and adults (ages 30 to 68). Several differences were found in self-report scores of PA and NA (using the PANAS) in these different lifespan moments. Although, extraversion correlated with PA and neuroticism with NA, interestingly, these correlations were significantly stronger for adults than children and early adolescents (Wilson & Gullone, 1999).

Although research investigating the psychometric properties of the PANAS C has been consistent in reporting PA and NA, several contradictory findings regarding the association between the two affect scales have been reported (Laurent et al. 1999; Bushman & Crowley, 2010; Lonigan, Phillips & Hooe, 2003). For example, using the PANAS C Bushman and Crowley (2010) used a confirmatory factor analytic approach to test one-factor, two correlated factors and two uncorrelated factor models of PA and NA in two different populations of children. A one factor structure suggests that PA and NA are the same construct in a continuum meanwhile a two-factor structure show that both constructs are different. In the two-factor models, the constructs may be independent or orthogonal (no correlations between them) while if they are correlated, both constructs may share some components. Bushman and Crowley (2010) found that both two factor models fit adequately in both age groups (3rd and 6th graders) but when testing the two-correlated factor model, the correlation between PA and NA was smaller in the older group, which may suggest an increasing differentiation in the perception of affect along the age remains (Lonigan et al., 1999).

Meanwhile, Lonigan, et al., (2003) in a longitudinal study of 270 children (4th to 11th graders) found that an orthogonal solution represented better the data. This result is consistent with the study of Ebesutani, Okamura, Higa-McMillan & Chorpita (2011) where they found no correlation between PA and NA using the PANAS C in a sample of more than 600 children (3 to 12th graders).

The present study

Given that the evidence regarding the evaluation of positive and negative affect in children and adolescents is not conclusive, the aim of this study is explore the psychometric properties of the PANAS C in a sample of children in Peru. More concretely, this research will investigate the construct validity of the PANAS C by means of factor analysis and convergent and discriminant validity, and its reliability by means of internal consistency. However, because to our knowledge there is no research reported using the Spanish version of the PANAS C adapted in Latin America, the PANAS C was first translated from English to Spanish.

Also, because there is evidence suggesting that children may have a different conceptual expression of PA and NA than adults and because the reports of negative and positive affect could change over time (Glasberg & Aboud, 1982; Wilson & Gullone, 1999; Bushman & Crowley, 2010; Ebesutani, Okamura, Higa-McMillan et al., 2011) we decided to used Confirmatory factor analytic (CFA) techniques to elaborate and compare three different models (Models 1, 2 and 3) that were consistent with previous research with the PANAS and PANAS C. Model 1 is a one-factor model with all the items converging in a single latent variable (PA and NA as one factor). In Model 2, the items are grouped in two uncorrelated factors of PA and NA (orthogonal). In Model 3 the items are grouped in two correlated factors of PA and NA (oblique).

Based on previous findings on the convergent and discriminant validity of the PANAS C, NA was expected to correlate positively with stress (Watson, et al., 1988; Ebesutani, Smith, Bernstein, et al., 2011), and with loneliness (Stewart, Craig, MacPherson & Alexander, 2001; Margrett et al, 2011), meanwhile PA is expected to correlate negatively with loneliness and with both stress measures, however lack of significant correlation between PA and stress have been reported before when using the PANAS (Watson et al., 1998). Also, previous results have shown good internal consistency on the PA and NA scales (Laurent et al. 1999; Lonigan, Phillips, Hooe, 2003; Ebesutani, Regan, Smith, Reise, Higa-McMillan & Chorpita, 2012) and so we expected to have similar results.

Finally, this study is part of a longitudinal study involving affect, stress, loneliness and colds. So data from two different time points (two data collections) are presented here and they are called Time 1 and Time 2. So, the data presented in the present research comes from two different data collections performed on the same group of participants with a one year time frame.

Method

Participants

A total of 170 students from 4th (*N*=84) and 5th grade (*N*=86) completed the Spanish version of the PANAS-C along with other measures. From the total sample 79 were girls and 91 were boys. Data collection was performed at two times, (1 and 2), in two consecutive years, to the same sample of students. Time 1 had a total of 214 participants and Time 2 a total of 170 (students at Time 2 were evaluated one year after Time 1).

The data for this study was collected in two schools in the urban area of Lima (Peru). The majority of participants came from the private school (*N*=121) in comparison to those from public schools (*N*=49). It is important to mention that in Perú, pupils going to public schools mostly come from poor families with low SES and have parents with inferior education levels than students attending private schools, therefore, the school type (private or public) can be consider as a proxy for socioeconomic status (Matos, 2005).

Instruments

Positive and Negative Affect Schedule for Children (PANAS-C ; Laurent et al., 1999). It is based on the 60 item original version of the PANAS-X (Watson & Clark, 1991), which was later adapted and reduced to the 27 version used in the present study (Laurent et al., 1999). The PANAS-C asks children to report on a 5-point Likert scale, from 1 ("very slightly or not at all"), to 5 ("extremely") how

often they felt "interested", "sad" and so on, during the "past few weeks". This 27 item version of the scale obtained good psychometric properties (Laurent et al., 1999) as it reproduced the factor structure of the original PANAS Watson et al., 1988. Also, PANAS C showed evidence of convergent and discriminant validity when correlating it with the CDI (Kovacs, 1992) and STAIC (Spielberger, 1973) respectively. As reported earlier, the PANAS C showed good reliability.

Louvain Loneliness Scale for Children and Adolescents adapted in Peru (Casuso, Gargurevich**,** Van den Noortgate & Van den Bergh, 2013). This Spanish version of the scale was adapted in Peru from the Louvain Loneliness Scale for Children and Adolescents (Marcoen, Goossens, & Caes, 1987). This scale was originally developed in Dutch (Marcoen, Goossens, & Caes, 1987), and it was later translated into English (Terrell-Deutsch, 1999) and now in Spanish as part of a broader study on stress and illness. This multidimensional measure of Loneliness comprises four subscales of 12 items each which are (1) loneliness in the relationships with parents, (2) loneliness in the relationships with peers, (3) aversion to aloneness and (4) affinity for aloneness.

The Spanish adapted version for Peru (Casuso, et al., 2013) was used in a sample of 170 children that were evaluated in two moments (Times 1 and 2, with one year in between). CFA for the Peruvian adapted version of the scale supported the four-factor structure reported before (Marcoen, et al., 1987; Terrell-Deutsch, 1999) as CFA yielded acceptable fit indices from Time 1 (RMSEA=.044, CFI=.93, SRMR=.092) and Time 2 (RMSEA = .047, CFI = .94 and SRMR = .098). Also, in the present study, Cronbach´s alpha internal consistency coefficients went from .72 to .88 in both years (Casuso, Gargurevich, Van den Noorgate & Van den Bergh, 2013), which were very close to the similar to the Cronbach´s alpha coefficients of .80 and above found in the Dutch and English versions (Marcoen, et al., 1987; Terrell-Deutsch, 1999).

Based on the recommendation of the authors to use the four scales independently (Goossens & Beyers, 2002) we used only the loneliness scales for parents and peers due to the findings about PA and NA with loneliness but not aloneness.

Stressful Events Inventory for Preadolescents. The number of stressful events and its subjective impact were assessed using the Stressful Events Inventory for Preadolescents (SEIA), a questionnaire developed for a Peruvian population. The SEIA was developed originally for adolescents (Tapia, 2004) and it was later adapted into a preadolescent version (Casuso, Van den Noortgate, Gargurevich & Van den Bergh, 2013). The instrument identifies the occurrence of several stressors experienced in the last 12 months and rates its intensity in a 4-point scale (ranging from 1 to 4). This scale has 78 items and evaluates four domains of stress: self, family, friends and school (Casuso, et al., 2013). The instrument was evaluated using statistical multilevel analyses of data collected in four waves across two subsequent years based in a non-clinical sample (N = 170, 9-11 years) from low and high socioeconomic status.

Procedure

The PANAS C was first translated from English into Spanish. Later, the assessment process started. When the final version of the scale was ready, and given that the study was going to be performed in children, several letters explaining the study and a consent forms were sent to all the parents of 4th to 5th graders in the selected schools. The school principals also received letters explaining the scope of the research and they gave permission to perform the measurements at the schools. Only children with a parental written permission participated in the study. All tests and interviews were guaranteed and all questionnaires were applied in classrooms.

PANAS-C Translation into Spanish. The Spanish translation of the PANAS-C schedule was performed in a series of steps, following the suggestions of the translation process protocol proposed by Guillemin, Bombardier and Beaton (1993):

1. Translation: the items of the PANAS-C were initially translated from English into Spanish by two independent professional translators. Conceptual translation was emphasized in addition to the literary translation to ensure the use of simple language for children. Later, the two translations were compared by the translators and by two of the researchers, in order to arrive to an agreement on the Spanish translation.

2. Evaluation of the initial translation: the Spanish version was back translated into the original language by an English native speaker, who was not previously involved in this study and works in Lima as a professional translator and as a school teacher.

3. The resulting instrument was compared with the original instrument by a bilingual team to resolve divergences between the translations. All members of the team had large research experience, and their specialties included social psychology ($N = 2$), clinical psychology ($N = 3$), educational psychology ($N = 1$), and two of them were teachers of preadolescents. After this process it was possible to obtain a final version of the PANAS-C in Spanish and suitable for Peru.

4. Pre-test (pilot study): the final Spanish version was applied to ten children from eight to ten years old. Later, an interview was performed with the evaluators in order to discuss doubts regarding the application of the scale.

Data analysis

Because the first aim of the research was to investigate the factor structure of the scale several Confirmatory Factor Analyses (CFA) were first performed. So, three different models were performed in each sample (from each year) separately, using CFA. In order to investigate the factor structure of the PANAS-C, maximum likelihood estimation method was performed using LISREL 8.5. The best fitting model was identified by comparing several fit indexes (Jöreskog & Sörbom, 1993): the chi-square ($\chi 2$), the root mean squared error of approximation (RMSEA), the comparative fit index (CFI), the standardized RMR (SRMR) and the Akaike Information Criterion (AIC). The CFI index should be equal to .90 or higher for an acceptable fit and close to .95 or higher for a good fit (Byrne, 1998). The SRMR value should be close to .08 or smaller to have a good fit and a RMSEA equal or lower than .08 indicates an acceptable fit, whereas RMSEA values close to .06 indicate a good fit (Hu & Bentler, 1999). In case of similarity of fit indices in several models, the one with the lowest AIC was considered as the best-fitting model because the AIC index compares models by considering model fit as well as parsimony (Jöreskog & Sörbom, 1993).

Results

Evidence regarding the Factor structure of the PANAS-C

Results of fit indices obtained after performing confirmatory factor analyses are shown in Table 1. Results showed that regarding the first model (one-factor model) it did not obtained good or acceptable fit indices so it was rejected as an acceptable model in times 1 and 2. In relation to models two and three, the fit indices for both times were almost identical, although there are small differences between both models. At Time 1, Model 3, the correlated two-factor model, had a slightly better fit (lower AIC) than the uncorrelated two-factor model. At Time 2, Model 2 (uncorrelated two-factor model) showed a slightly better fit (lower AIC) than the Model 3 (see Table 2 for fit indices). At each Time, for Models 2 and 3, the CFI indicated an acceptable fit while the SRMR and RMSEA presented good fit (Hu & Bentler, 1999).

Table 1
Fit indices of PANAS-C models at Times 1and 2

	Time 1			Time 2		
	one-factor model	uncorrelated two-factor model	correlated two-factor model	one-factor model	uncorrelated two-factor model	correlated two-factors
$\chi 2$ *(df)*	1,583.2(324)	579.3(324)	571.3(323)	1,816.6(324)	559.9(324)	559.7(323)
p	<.001	<.001	<.001	<.001	<.001	<.001
AIC	1691.2	687.3	681.3	1924.62	667.9	669.7
CFI	.79	.91	.92	.73	.90	.90
SRMR	.13	.10	.08	.16	.08	.07
RMSEA	.15	.07	.07	.17	.07	.07

Note. AIC = Akaike Information Criterion; CFI = Comparative fit index; SRMR = standardized root mean square residual; RMSEA = robust root mean square error of approximation.

Examining the item factor loadings (see Table 2), the contribution of the item "interested" to the factor PA was weak at Time 2 (.18) but it was decided to keep it due to the absence of structural differences in the two moments.

Table 2
Factor loadings based on CFAs performed on PANAS-C (N = 170) at Times 1 (correlated two-factor model) and 2 (uncorrelated two-factor model)

Items	Time 1		Time 2	
	PA	NA	PA	NA
Interested	.36		.18	
Excited	.46		.52	
Happy	.70		.60	
Strong	.52		.64	
Energetic	.70		.73	
Calm	.39		.47	
Cheerful	.61		.78	
Active	.61		.67	
Proud	.57		.61	
Joyful	.69		.75	
Delighted	.45		.57	
Lively	.67		.55	
Sad		.53		.57
Frightened		.43		.24
Ashamed		.53		.41
Upset		.51		.61
Nervous		.57		.63
Guilty		.71		.46
Scared		.57		.60
Miserable		.51		.53
Jittery		.35		.47
Afraid		.65		.56
Lonely		.59		.48
Mad		.50		.55
Disgusted		.41		.53
Blue		.52		.62
Gloomy		.60		.49

Evidence of Convergent and Discriminant Validity

Before performing the correlation analyses to evaluate the convergent and discriminant validity of the scale, a Kolmogorov Smirnov test (K-S) was performed in order to verify if the data was or not normally distributed. Results of the K-S analyses proved that the samples of the PA and NA scores in Time 1 (PA: $D(170) = 0.00, p < .05$; NA: $D(170) = 0.00, p < .05$) and Time 2 (PA: $D(170) = 0.073, p < .05$; NA = $D(170) = 0.00, p < .05$) were non normally distributed and therefore Spearman correlation was recommended to be applied (Field, 2013) when calculating the relationship between PA and NA, and between both affect scales and loneliness and stress at both times.

Correlation analyses showed that there was a negative relationship between PA and NA at Time 1 ($p < .01$) but it was not significant at Time 2, although the correlation was also negative. PA and NA at Time 1 correlated significantly with their PA and NA counterparts at Time 2. Also, PA at Time 1 was negatively correlated with NA at Time 2 (not significantly), and the correlation between NA at Time 1 with PA at Time 2 was also negative and significant (see Table 3).

Regarding the correlations with loneliness and stress, the negative correlations between PA and loneliness with parents as well as with loneliness with peers were significant at both times. Also, NA obtained positive correlations with loneliness (peers and parents) at Time 1 but only with *Loneliness with*

peers at Time 2. Also, NA but not PA correlated significantly with *Number of life events and Intensity of life events* at both Times (see Table 3).

Table 3
Spearman correlations between PA, NA, loneliness and stress at Times 1 and 2.

	Time 1		Time 2	
	PA	NA	PA	NA
PANAS-C				
NA Time 1	-.21**			
PA Time 2	.45**	-.16*		
NA Time 2	-.08	.31**	-.04	
LLCA				
Loneliness parents	-38**	.34**	-.26**	.03
Loneliness peers	-.28**	.51**	-.27**	.41**
SEIP				
Number of life events	-.03	.39**	-.09	.39**
Intensity of life events	.01	.38**	-.08	.41**

Note. *p<.05, **p<.01. PA=Positive Affect. NA=Negative Affect, LLCA=Loneliness and Aloneness for Children and Adolescents, SEIP=Stressful Events Inventory for Preadolescents.

Reliability

At both times, PA and NA showed good internal consistency. Cronbach´s alpha reliability coefficients for PA obtained were .85 and .87 at Times 1 and 2 respectively, and for NA coefficients .85 and .80 also for Times 1 and 2 respectively.

Most items presented an acceptable item-total correlation. Even if the value of .30 is often regarded as the cut-off for considering the item discrimination as good (Field, 2013), values lower than .30 are not necessarily poor (Ebel & Frisbie, 1986). The item-total correlations in the items "strong", "calm", "miserable" and "disgusted" are relatively small (lower than .20 at Time 1) however these values improved in Time 2, obtaining a range between .27 to .37. In the case of NA items "frightened" and "gloomy" the values of .25 and .31 decreased from Time 1 to values of .15 and .18 respectively at Time 2. Nevertheless in order to keep the analysis of two moments identical and given that the reliability coefficients were acceptable at Times 1 and 2, it was decided to keep all the items as the original PANAS-C (see Table 4). Also, CFA performed at both times yielded acceptable results and significant factor loadings, another reason to decide to keep the original 27 items of the scale.

Table 4
Corrected item-total correlations and alpha if item deleted scored for items of PA and NA at Times 1 and 2

	Time 1		Time 2	
Scale and Items	Corrected item-total correlation	Alpha if item deleted	Corrected item-total correlation	Alpha if item deleted
Positive Affect				
Interested	.28	.74	.25	.80
Excited	.21	.75	.47	.79
Happy	.30	.74	.42	.79
Strong	.16	.75	.37	.79
Energetic	.27	.74	.43	.79
Calm	.15	.75	.34	.80
Cheerful	.33	.74	.55	.80
Active	.28	.74	.47	.79
Proud	.33	.74	.44	.79
Joyful	.23	.75	.45	.79
Delighted	.48	.73	.43	.79
Lively	.22	.75	.24	.80
Negative Affect				
Sad	.33	.74	.31	.80
Frightened	.25	.74	.15	.82
Ashamed	.31	.74	.32	.80
Upset	.32	.74	.32	.80
Nervous	.37	.74	.34	.80
Guilty	.37	.74	.25	.80
Scared	.37	.74	.30	.80
Miserable	.08	.75	.27	.80
Jittery	.30	.74	.36	.80
Afraid	.28	.74	.29	.80
Lonely	.24	.75	.22	.80
Mad	.22	.75	.36	.80
Disgusted	.17	.75	.27	.80
Blue	.26	.74	.31	.80
Gloomy	.31	.74	.18	.80

Descriptive results

Mean scores and standard deviations for positive and negative affect as well as in the other measures can be seen in Table 5. To investigate differences in relation to gender and SES at Times 1 and 2 several Mann-Whitney non parametric tests were performed.

Results for gender showed that no significant differences between boys and girls in Time 1 regarding PA (*U*=3438, *Z* =-.49, p=.63, *Mdn boys*=3.75, *Mdn girls*=3.75) and NA (*U*=3341.5, Z =-.79, *p*=.43, *Mdn* boys=1.80, *Mdn* girls=1.73). The same results were found in Time 2 for PA (*U*=3418, *Z* =-.55, p=.58, *Mdn boys*=3.33, *Mdn girls*=3.33) and NA (*U*=3247, *Z* =-.97,p=.33, *Mdn boys*=1.47, *Mdn girls*=1.67).

The results for SES also showed that no significant differences between Low SES and High SES in Time 1 regarding PA ($U = 3223$, $Z = -.25$, $p = .80$, *Mdn LSES*=3.75, *Mdn girls*=3.67) and NA ($U = 3196.5$, $Z = -.34$, $p=.74$, *Mdn*LSES=1.77, *Mdn*HSES = 1.77) were found. The same results were found in Time 2 for PA ($U = 3177$, $Z = -.40$, $p = .69$, *Mdn* LSES=3.38, *MdnHSES* = 3.29) and NA ($U = 3061$, $Z = -.69$, $p = .49$, *MdnHSES* = 1.53, *Mdn*HSES = 1.67).

Table 5
Mean and standard deviations of participants regarding Gender and SES (Times 1 and 2)

	Range	Time 1		Time 2	
		Mean		Mean	
Positive Affect (SD)	(1-5)	3.52(.80)		3.21(.85)	
Negative Affect (SD)	(1-5)	1.87(.66)		1.70(.63)	
		Time 1		Time 2	
Gender		Boys (N= 91)	Girls (N=79)	Boys (N=91)	Girls (N=79)
Age in years		9.76(.72)	9.70(.69)	10.76(0.72)	10.75(0.69)
Mean PA (SD)	(1-5)	3.54(.82)	3.50(.79)	3.15(.89)	3.28(.81)
Mean NA (SD)	(1-5)	1.92(.71)	1.82(.60)	1.68(.64)	1.74(.61)
Mean Stress events (SD)	(0-78)	19.51(10.50)	21.52(9.4)	9.76(8.26)	11,73(6.59)
Mean Stress intensity (SD)	(1-4)	0.63(.42)	0.74(.40)	0.28(.26)	0.37(.25)
Mean Loneliness pa (SD)	(0-48)	19.77(5.73)	19.32(5.37)	19.02(5.94)	18.63(6.07)
Mean Loneliness pe (SD)	(0-44)	19.13 (7.38)	19.41(6.02)	17.49(7.10)	17.52(6.58)
		Time 1		Time 2	
		Low SES (N= 60)	High SES (N= 110)	Low SES (N= 60)	High SES (N= 110)
Age in years		9.63(.61)	9.78(0.75)	10.67(0.63)	10.80(0.74)
Mean PA (SD)	(1-5)	3.49(.83)	3.53(.79)	3.25(.88)	3.20(.84)
Mean NA (SD)	(1-5)	1.89(.64)	1.87(.68)	1.63(.54)	1.74(.67)
Mean Stress events (SD)	(0-78)	22.18(9.99)	19.49(9.96)	12.55(8.39)	9.65(6.92)
Mean Stress intensity (SD)	(1-4)	0.74(.42)	0.64(.41)	0.39(.29)	0.29(.23)
Mean Loneliness pa (SD)	(0-48)	22.53(5.64)	17.94(4.81)	22.58 (6,15)	16.80(4.81)
Mean Loneliness pe (SD)	(0-44)	20.35(6.34)	18.66(6.94)	18.62(6.43)	16.90(7.02)

Note. SES= Socioeconomic status; *SD*= Standard Deviation; PA=Positive Affect. NA=Negative Affect; pa=Parents, pe= Peers;

Discussion

The aim of this study was to study for the first time in Peru the psychometric properties of the PANAS-C in a preadolescent sample in Lima. More concretely the present research evaluated evidences of construct validity and the internal consistency of the scale.

In order to achieve this aim, the PANAS C was first translated into Spanish using a back translation procedure (we recommend using this procedure when translating instruments into other languages). Then,

several confirmatory factor analyses were performed and later several correlational analyses were calculated in order to evaluate the factor structure and the convergent validity of the scale. Finally, Cronbach´s alpha internal consistency coefficient was used as a measure of reliability.

Before discussing the results of the psychometric analyses, it is particularly important to comment on the translation process of the scale. Because the scale was not applied before in Peru, and up to our knowledge there was no other known Spanish version of the scale, the translation of the instrument scale was performed using the methodology suggested by Guillemin, Bombardier and Beaton (1993) which included a back translation of the scale. The procedure suggested by Guillemin et al., (1993) has been used extensively and very recently when translating and adapting instruments into different cultures such as in Korea (Kwon, Kim Park, Oh & Han, 2013) or France (Reychler, Caty, Vincent, Billo, Yombi, 2013) among others. So, this is a particularly interesting achievement of this research that needed to be performed before the actual psychometric study of the scale, as a part of adapting the scale into a specific country, culture and language for the first time.

Regarding the internal structure of the PANAS C, several CFA analyses demonstrated the existence of two subscales, namely positive affect (PA) and negative affect (NA) which were consistent with previous research performed with the PANAS C (Laurent et al. 1999), the SPANAS (Gargurevich & Matos, 2012) and even the original PANAS (Watson et al., 1998) at Times 1 and 2.

Although the two factor structure of the PANAS C reproduced the two factor structure of the scale (Bushman & Crowley, 2010; Laurent et al. 1999), some differences were found between Time 1 and Time 2 evaluation in relation to the oblique or orthogonal nature of the PA and NA factors. That is, although a two-factor correlated model obtained a slightly better fit at Time 1, the two-factor uncorrelated model performed better at Time 2. Interestingly, Time 1 and 2 samples were the same but evaluations were performed with one year in between. Results showed that the correlation between PA and NA at Time 1 (r = -.21, p < .01) decreased to almost zero at Time 2 (r = -.04, p = n.s.) that is, one year later.

So, although the present results are consistent with findings supporting the temporal stability of PA and NA in children (Lonigan et al., 2003) the conceptualization of these two constructs seem to vary across time. More concretely, results suggested that despite the difference of only one year between the two evaluation times, PA and NA were less distinct in younger age children. This is consistent with findings showing that a two-factor uncorrelated (orthogonal) model fits best in older children and that a two-factor correlated (oblique) model fits best for younger children (Lonigan, Phillips & Hooe, 2003; Bushman and Crowley, 2010).

Therefore, it is possible that PA and NA become more clearly defined as children grow up. Actually, similar findings were shown when researching about emotional development in children. Research suggests that younger children understand emotions in very broad categories and with maturity they gradually start differentiating those categories into more specific emotions (Widen & Russell, 2010). Thus, as they mature, seems easier for children (at older ages) to categorize their emotional experience (Bushman & Crowley, 2010), and this may help explaining why correlation between other affect related constructs such as anxiety and depression tend to decline with age (Ollendick, et al., 2003).

Later, after analyzing the factor structure of the scale, convergent and discriminant evidence of validity were inspected for PANAS C. Results were consistent with what was expected. First, PA correlated negatively with "loneliness with parents" and "with peers" at both Times. These findings are consistent with results of a program to diminish loneliness in adults, which led to increasing PA among an adult group (Stewart, Craig, MacPherson & Alexander, 2001). Also, the correlations between PA and stress (number of stressful events and event intensity) were not significant, and these results were consistent with the findings of Watson et al. (1988) when developing the PANAS. Meanwhile NA, correlated positively with *Loneliness with parents* only at Time 1 1, but it correlated significantly with *Loneliness with peers* and stress (number and intensity) at Times 1 and 2. The correlation between NA with stress also is consistent with the findings of Watson et al. (1988) when developing the PANAS for adults. Also, a strong relationship between NA and distress in a young sample was reported by Ebesutani, Smith, Berstein, et al. (2011) using the PANAS-C. So, the evidence of the present study is consistent with previous research findings and shows an acceptable convergent validity of the PANAS C at both times.

Regarding the reliability of the PANAS C in the present study, the scale was found to be reliable for both, PA and NA, at both times. However, it is interesting to comment that at Time 1 some items obtained a small total item correlation but it was not the case for the same item at Time 2. For example, an improvement of differenced values of items *strong, calm, miserable* and *disgusted* seemed to have occurred from one year to the next and could be due to a differentiation of affect as the child matures (Ollendick, Seligman, Goza, Byrd & Singh, 2003). Indeed, the improvement of some items from one year to another could support the fact that as the children get older is easier for them to identify their affect state (Bushman & Crowley, 2010). Only the items *frightened* and *gloomy* decreased their values from Time 1 to Time 2, both of them from the NA scale, but this decreased was not considered as an argument to eliminate the items from the scale specially because those items reported better item total correlations at Time 1.

With respect to the general means of PA and NA in Times 1 and 2, a decreasing tendency was observed in the results. This may be due for a lack of interest from the children in filling accurately the questionnaires if we consider that the results belong to the data gathering from a larger study with more questionnaires.

Finally, there are some limitations to the study that are important to consider. Although this study brings an important contribution to the psychology field in Peru, it is important to notice that this is the first time that the scale is being applied to a sample of children in Peru and it is therefore the first time that the psychometric properties of the scale are being explored in Peru. With these in mind it particularly important to focus on the sample size. So an important limitation of the present study is related to the number of participants that is, a sample size of 170 is rather small to obtain stable factor analytic results with 27 items (Hatcher, 1994). So although CFA analyses were performed it will be important to studied more thoroughly the psychometric properties of the scale in a larger data set with children of different ages. This will also allow a better understanding to the developmental issues related to the identification and description of affect states regarding age. It is important to perform further cross sectional and longitudinal studies to track the evolution of and the changes in affect along time. Further studies can measure if indeed there is an increased differentiation of affect across time. The present study is in fact can be consider a starting point for further research in this regard.

Although this is first study using the PANAS C in Peru, the present findings are consistent with those of other research in other countries. So, despite this consistency, the present results do not show conclusive evidence on the psychometric properties of the scale buy initial evidence instead. So far it is safe to say that the PANAS C could be a useful measure of PA and NA for preadolescents.

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