

■ The Short-Form of the Positive and Negative Affect Scale for Children (PANAS-C-SF): Psychometric properties among clinical and nonclinical samples of Portuguese school-aged children

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Abstract

Positive and negative affect (PA/NA) are important mechanisms underlying emotional disorders. The Positive and Negative Affect Schedule for Children-Short Form (PANAS-C-SF) is a 10-item self-report measure evaluating PA and NA (five items each) in children. This study aimed to examine the factorial structure, reliability, and validity of the Portuguese PANAS-C-SF, explore associations with anxiety and depression symptoms, assess its ability to discriminate between clinical and community samples, and analyze age and sex differences in PA and NA. A sample of 341 Portuguese community children aged 8-13 years (51.8% girls) and 185 children with emotional disorders aged 6-13 years (56.2% girls) was used. A two-factor model was confirmed through confirmatory factor analysis, presenting good model fit in both samples. PANAS-C-SF validity was supported by significant correlations with child anxiety and depression measures. No significant sex effect on PA and NA was observed. A significant age effect was found, with older children exhibiting lower levels of PA than younger ones. The PANAS-C-SF emerged as a valid measure for assessing PA and NA in both community and clinical Portuguese samples. This is the first study to evaluate the factorial structure and psychometric properties of this scale using a clinical sample of children with emotional disorders.

Keywords: negative affect, positive affect, PANAS-C-SF, psychometric properties, emotional disorders.

Resumen

Versión Reducida de la Escala de Afecto Positivo y Negativo para Niños (PANAS-C-SF): Propiedades Psicométricas en una muestra clínica y no clínica de niños portugueses en edad escolar. El afecto positivo y negativo (AP/AN) son mecanismos fundamentales subyacentes a los trastornos emocionales. La versión breve de la Escala de Afecto Positivo y Negativo para Niños (PANAS-C-SF) es una escala de autoinforme compuesta por 10 ítems que evalúa el AP y el AN (cinco ítems cada uno) en niños. Este estudio tuvo como objetivo examinar la estructura factorial, la fiabilidad y la validez de la versión portuguesa del PANAS-C-SF, explorar sus asociaciones con síntomas de ansiedad y depresión, evaluar su capacidad para discriminar entre muestras clínicas y comunitarias, y analizar las diferencias de edad y sexo en los niveles de AP y AN. Se utilizó una muestra de 341 niños portugueses de la comunidad, de entre 8 y 13 años (51,8% niñas), y 185 niños con trastornos emocionales, de entre 6 y 13 años (56,2% niñas). Un modelo de dos factores fue confirmado mediante análisis factorial confirmatorio, mostrando un buen ajuste del modelo en ambas muestras. La validez del PANAS-C-SF fue respaldada por correlaciones significativas con medidas de ansiedad y depresión infantil. No se observaron efectos significativos del sexo en los niveles de AP y AN. Se identificó un efecto significativo de la edad, con niveles más bajos de AP en los niños mayores en comparación con los más jóvenes. El PANAS-C-SF se presentó como una medida válida para evaluar el AP y el AN tanto en muestras comunitarias como clínicas portuguesas. Este es el primer estudio que evalúa la estructura factorial y las propiedades psicométricas de esta escala en una muestra clínica de niños con trastornos emocionales.

Palabras clave: afecto negativo, afecto positivo, PANAS-C-SF, propiedades psicométricas, trastornos emocionales.

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Highlights

- The bifactorial structure of the PANAS-C-SF (positive and negative affect) was validated in Portuguese children with and without emotional disorders.
- The scale demonstrated adequate psychometric properties and internal consistency in both clinical and community samples.
- Negative affect was positively associated with anxiety and depression symptoms; positive affect was negatively associated, especially with depression.
- The PANAS-C-SF effectively discriminated between clinical and nonclinical child samples.
- Age differences were found in positive affect, but no significant sex differences were observed.

Puntos clave

- Se validó la estructura bifactorial del PANAS-C-SF (afecto positivo y negativo) en niños portugueses con y sin trastornos emocionales.
- La escala mostró adecuadas propiedades psicométricas y consistencia interna en ambas muestras.
- El afecto negativo se asoció positivamente con síntomas de ansiedad y depresión; el afecto positivo se asoció negativamente, especialmente con depresión.
- El PANAS-C-SF discriminó eficazmente entre muestras clínicas y no clínicas infantiles.
- Se hallaron diferencias por edad en afecto positivo, pero no se observaron diferencias significativas por sexo.

Anxiety and depressive disorders are the most prevalent mental health problems in youth (e.g., Barican et al., 2022; Merikangas et al., 2010) and have been on the rise in recent years both worldwide (Lebrun-Harris et al., 2022) and in Portugal (Augusto, 2014; Costa et al., 2020), which underlines the need for research on children's mental health to improve the treatment of these disorders.

The tripartite model by Clark and Watson (1991) is a key framework for understanding anxiety and depression, identifying shared and distinct components: negative affect (NA), positive affect (PA), and physiological hyperarousal (PH). PA reflects pleasant engagement with the environment and is characterized by feelings of enthusiasm, alertness, and activity (Watson et al. 1988), and NA is characterized by a broad general factor of emotional distress that includes mood states such as being nervous, miserable, or upset (Wróbel et al., 2019). Then, PA has been shown to predict positive individual experiences, while NA is associated with the expectation of negative experiences (Sánchez-Aragon et al., 2008). PH refers to a state of heightened physiological activation characterized by increases in the heart rate, respiration rate, and muscle tension, which are often described as characteristics of anxiety (Watson et al., 1995). This model proposes that both anxiety and depression share a common component of general emotional distress conceptualized as NA – a transdiagnostic mechanism underlying anxiety and depression. However, according to this model, these disorders differ in the other two components: in the case of depression, there is an absence or reduction of PA—anhedonia—and in the case of anxiety, there is the specific presence of high levels of PH (Clark & Watson, 1991).

Although the tripartite model was initially developed for adults (e.g., Clark et al., 1994), later research extended its application to youth (e.g., Cannon & Weems, 2006). While studies consistently support the shared role of NA in anxiety and depression, findings on PA and PH in children are less consistent. Some evidence suggests that PH is not specific to anxiety but also present in depression (e.g., Greaves-Lord et al., 2007; Jacques & Mash, 2004), and that low PA, though a hallmark of depression, is also linked to anxiety—especially social anxiety (e.g., Chorrita & Daleiden, 2002; Hughes & Kendall, 2009). Furthermore, despite being conceptualized as distinct, PA and NA often show moderate negative correlations in youth (Chorrita & Daleiden, 2002; Laurent et al., 1999). Some studies have

found that PA and NA are more highly correlated in young children and become distinct constructs with increasing age (e.g., Ollendick et al., 2003; Veronese & Pepe, 2017). Therefore, future studies are needed, particularly with child samples, to explore the transdiagnostic role of NA and PA in explaining anxiety and depression and to clarify the correlation or independence of these factors in child populations.

Previous studies have also analyzed how PA and NA vary by sex and age (e.g., Jacques & Mash 2004; Wróbel et al., 2019). In general, girls have higher levels of NA than boys, and older children/adolescents have higher levels of NA than younger children/adolescents (Ciucci et al., 2017; Jacques & Mash, 2004; Lotfi et al., 2020). Regarding PA, inconsistent results have been found. For example, Stevanovic et al. (2013) found that younger girls obtain higher scores than older girls. However, contrary to what was expected, Chaplin and Aldao (2013) found that adolescent girls express more positive emotions than boys, while adolescent boys express fewer externalizing emotions, such as anger, compared to girls.

Despite extensive research on PA and NA, several questions remain, particularly in child populations. Recent transdiagnostic models of emotional disorders have highlighted shared mechanisms—such as high NA and low PA—as core features underlying anxiety and depression, supporting interventions that target these common factors (e.g., Barlow et al., 2017; Ehrenreich-May et al., 2017). This has led to increased interest in understanding the transdiagnostic role of NA and PA, including in youth. In turn, future research requires evidence-based instruments to assess these constructs.

The Positive and Negative Affect Schedule for Children (PANAS-C) and the PANAS-C Short Form (PANAS-C-SF)

To assess PA and NA Watson et al. (1998) developed the Positive and Negative Affect Schedule (PANAS), a widely used self-report measure for adults with good psychometric properties in samples of different nationalities [e.g., American (Watson et al., 1988), Chilean (Dufey et al., 2012), Ecuadorian (García & Arias, 2019), Mexican (Rubia, 2011) and Spanish (López-Gómez et al., 2015)]. A shortened version (The International-Positive and Negative Affect Schedule-Short Form: I-PANAS-SF), has also demonstrated good validity in a sample of English adults (Thompson, 2007) and later in a sam-

ple of French and Pakistani university students (Karim et al., 2011) and Chinese students (Liu et al., 2020). The PANAS and I-PANAS-SF have supported research on the role of PA and NA in the origins and maintenance of psychopathology (e.g., Dunkley et al., 2017) and the development of adequate psychological interventions and even the assessment of the effectiveness of these interventions (e.g., Ellard et al., 2010).

Given the relevance of assessing PA and NA among children, Laurent et al. (1999) developed the Positive and Negative Affect Schedule for Children (PANAS-C), a self-report measure design for children aged 9 to 14 years old. based on the expanded adult version of the PANAS (PANAS-X; Watson & Clark, 1991), the authors selected items according to children's abilities to read and understand them, resulting in a final 27-item version (12 PA items and 15 NA items). The 27-item PANAS-C demonstrated good internal consistency ($\alpha = .94$ for the NA; $\alpha = .90$ for the PA) both in community and clinical samples and was later studied in European countries (e.g., Kiernan et al., 2001) and in Japan (Yamasaki et al., 2006). In addition, the original 20-item version of the PANAS (Watson et al., 1998) was also validated among Spanish children and adolescents (Ortuño-Sierra et al., 2015; Ortuño-Sierra et al., 2019) and among Mexican children (González-Arratia & Valdez, 2015).

To provide a brief and efficient tool for mental health professionals, Ebesutani et al. (2012) developed the PANAS-C Short Form (PANAS-C-SF) from the 27-item PANAS-C (Laurent et al., 1999). The original version included several overlapping adjectives (e.g., "nervous"/"jittery", "sad"/"blue"), and some items showed weak performance (e.g., "calm" lacked face validity and had low item-total correlations). Using item response theory (IRT) and a sample of 799 American children aged 6–18, Ebesutani et al. (2012) selected five PA items (joyful, cheerful, happy, lively, proud) and five NA items (miserable, mad, afraid, scared, sad) based on their psychometric properties. Both subscales showed good internal consistency ($\alpha = .86$ for PA; $\alpha = .82$ for NA). Therefore, the final PANAS-C-SF is composed of 10 items, which are rated on a 5-point Likert scale ranging from 1 (*very slightly or never*) to 5 (*very much*), assessing the frequency with which a child has experienced emotional adjectives related to PA and NA during the past few weeks.

The PANAS-C-SF has since been adapted and validated in various cultural contexts, including Spanish (Sanmartín et al., 2018), Polish (Wróbel et al., 2019), Ecuadorian (Sanmartín et al., 2020), and Iranian (Lotfi et al., 2020) samples. In all cases, confirmatory factor analyses supported the two-factor structure (PA and NA). Notably, in the Polish and Persian studies, the PANAS-C-SF showed better model fit than the original PANAS-C, suggesting its suitability for younger children who may struggle to distinguish between overlapping items (Lotfi et al., 2020; Wróbel et al., 2019; Bushman & Crowley, 2010). To date, however, no instrument assessing these constructs has been validated for Portuguese children.

The Present Study

Given the particular relevance of having psychometrically valid instruments to assess PA and NA in child samples, the main goal of this present study is to validate the PANAS-C-SF for Portuguese children with and without emotional disorders.

The first goal of this study was to assess the factorial structure and psychometric properties of the Portuguese version of the PANAS-C-SF in a sample of Portuguese children aged between 6 and 13 years old with and without emotional disorders. It was expected to confirm that the two-factor model (PA and NA scales, composed of 5 items each) was well-fitting in both samples, similar to previous studies (Ebesutani et al., 2012).

Second, it was intended to analyze the internal consistency of the PA and NA scales and to explore the association between them. Based on previous studies with youth samples (e.g., Jacques & Mash, 2004; Ollendick et al., 2003), it was expected the PA and NA scales to be reliable and to be moderately/strongly negatively associated with each other.

Third, it was aimed to assess the validity of the PA and NA scales through their associations with anxiety and depression symptoms. According to the tripartite model (Clark & Watson, 1991) and previous studies (e.g., Clark & Watson, 1991; Ebesutani et al., 2012), it was expected NA to be positively associated with anxiety and depression and PA to be negatively associated with depression. We acknowledged that there may be a negative association between positive affect (PA) and anxiety, as observed in some previous studies (e.g., Chorpita & Daleiden, 2002; Hughes & Kendall, 2009). However, based on the tripartite model of anxiety and depression, which posits that low PA is specifically linked to depression rather than anxiety, we expected this association to be weaker than the one between PA and depression. Fourth, we analyzed whether the PANAS-C-SF is able to discriminate between children with and without emotional disorders. It was expected to find higher NA scores and lower PA scores in the sample of children with emotional disorders than in the community sample, given that high levels of negative affect and low levels of positive affect are associated with childhood anxiety and depression (Barlow et al., 2017).

Finally, it was also intended to analyze age and sex differences in PA and NA. Based on previous research, it was expected to find higher levels of NA among girls (compared with boys) and older children (compared with younger children) (e.g., Ciucci et al., 2017; Jacques & Mash, 2004; Lotfi, et al. 2020; Stevanovic et al., 2013). Regarding PA, since the results of the previous studies were not consistent (e.g., Chaplin & Aldao, 2013; Stevanovic et al., 2013), it wasn't expected specific results and considered this aim exploratory.

Method

Participants

The participants were 341 community Caucasian children (51.8% girls) with a mean age of 9.74 years ($SD = 1.26$, range = 8–13 years) recruited from the third (26.7%), fourth (16.7%), fifth (31.7%), and sixth (24.9%) grades of six public schools in central Portugal. Regarding age distribution, 22.9% of the children were 8 years old, 19.1% were 9, 25.5% were 10, 26.4% were 11, 5.6% were 12, and 0.6% were 13 years old.

Additionally, the sample was composed by 185 clinical Caucasian children (56.2% girls) diagnosed with an emotional disorder (83.2% with a primary diagnosis of anxiety, 9.7% with an anxiety-related disorder and 7% with a primary diagnosis of depression) with a mean age of 9.24 years ($SD = 1.88$, range = 6–13 years). Regarding age distribution, 9.7% of children were 6

years old, 10.8% were 7, 15.7% were 8, 16.8% were 9, 17.8% were 10, 18.4% were 11, 7.6% were 12 and 3.2% were 13 years old.

All participants were born in Portugal and were native speakers of European Portuguese. The schools involved in the study were located in the central region of the country, specifically in the districts of Viseu and Coimbra. The selection of these schools was based on convenience, considering logistical and institutional accessibility.

Measures

Sociodemographic Variables

Children completed a sociodemographic form assessing their age, sex and education grade.

The Positive and Negative Affect Schedule for Children-Short Form (PANAS-C-SF; Ebesutani et al., 2012).

The PANAS-C-SF is a 10-item scale that assesses positive and negative affect experienced in recent weeks through two scales: the PA scale (5 items, e.g., happy) and NA scale (5 items, e.g., scared). Participants are asked to rate the extent to which they experienced each feeling over the past few weeks, and these items are rated on a 5-point Likert scale ranging from 1 (*very slightly or never*) to 5 (*very much*). Higher scores on these scales are indicative of greater levels of positive or negative affect, respectively.

The Revised Child Anxiety and Depression Scale (RCADS; Chorpita et al., 2000; Pereira & Pedro, 2018).

The clinical sample completed the RCADS, a 47-item scale measuring anxiety and depression symptoms across six subscales: Depression, separation anxiety, generalized anxiety, panic disorder, social phobia, and obsessive-compulsive disorder. Items are rated on a 4-point Likert scale from 0 (*never*) to 3 (*always*). The RCADS provides a total internalizing scale score, a total anxiety scale score and a total score for the anxiety subscale and the depression subscale. This study used the total anxiety score, total internalizing score, and depression subscale score. Higher scores indicate more severe symptoms. Cronbach's alphas were .94 (internalizing), .82 (depression), and .93 (anxiety).

The Revised Child Anxiety and Depression Scale – Short Form (Ebesutani et al., 2012).

The community sample completed the RCADS-SF, a 25-item short form of the RCADS assessing depression and anxiety symptoms on a 4-point scale from 0 (*never*) to 3 (*always*). It has two subscales: depression (10 items, e.g., "I feel sad or empty") and anxiety (15 items, e.g., "I worry that something bad will happen to me"), with anxiety items covering the same five domains as the full RCADS. The RCADS-SF provides total internalizing, anxiety, and depression scores. Cronbach's alphas in this study were .87 (total), .71 (depression), and .87 (anxiety).

Procedure

The Portuguese PANAS-C-SF Adaptation Process

The Portuguese version of the PANAS-C-SF was developed based on a preexisting translation of the 30-item PANAS-C (Carvalho et al., 2017). Authorization from the authors of both the original PANAS-C-SF and the Portuguese translation of

the PANAS-C was obtained to study the factorial structure and psychometric properties of the short form of the questionnaire. Access to the Portuguese version of the questionnaire can be obtained by contacting the correspondence author of the present manuscript.

Sample Collection

Approval for the study was obtained from the Ethics Committee of the Faculty of Psychology and Educational Sciences, University of Coimbra, the Boards of Directors of Schools, and the Ethics Committee of Unidade Local de Saúde Viseu Dão-Lafões for community and clinical samples, respectively. All parents gave informed consent, and children gave verbal assent to participate. Inclusion criteria for both samples were Portuguese children aged 6–13 years (8–13 in the community sample) without cognitive disabilities or learning difficulties severe enough to impair understanding, as assessed by teachers or clinicians.

The community sample was recruited from six public schools in central Portugal between December 2019 and December 2020. Parents of 588 children aged 8–13 years received informed consent forms via teachers. A total of 345 children met inclusion criteria, were present during data collection, had parental consent, and provided verbal assent. Children completed the protocol in classrooms, in groups, with a researcher present. Recruitment spanned a year due to multi-step data collection and COVID-19 interruptions: data collection started in December 2019, paused in March 2020 due to school closures, and resumed September–December 2020. The pandemic delayed recruitment but did not affect study aims or instruments. Four child protocols were excluded for incomplete PANAS-C-SF responses, resulting in a final sample of 341 children.

The clinical sample was collected between August 2020 and May 2022 as part of a study evaluating the feasibility and efficacy of the Unified Protocol for the Transdiagnostic Treatment of Children's Emotional Disorders (UP-C; Ehrenreich-May et al., 2017) in Portugal (e.g., Caiado et al., 2022, 2024). Participants were recruited from a central hospital, three public schools in central Portugal, and via parental self-registration on the project website. Referrals came from mental health professionals, school psychologists, and parents. The research team then contacted parents to provide study information, obtain informed consent, and assess eligibility. In addition to the aforementioned eligibility criteria for this present study, to participate in the clinical study of the UP-C program, children had to present a primary diagnosis of an emotional disorder (i.e., anxiety or depressive disorders). Eligible children completed a baseline assessment, including the PANAS-C-SF and other self-report measures, before starting the intervention.

Statistical analyses

Statistical Package for the Social Sciences (SPSS, version 26.0; IBM SPSS, Chicago, IL) and AMOS (IBM® SPSS® AMOS™ Version 24.0; IBM Corporation, Meadville, PA, USA) were used for data analyses.

There were no missing values in the PANAS-C-SF in either sample. Missing values found in the RCADS and RCADS-SF were handled through SPSS Missing Values Analysis (MVA). Little's MCAR test was conducted to test whether the data were

missing completely at random (MCAR). Nonsignificant results were obtained for the RCADS ($\chi^2(720) = 697.89, p = .72$) and RCADS-SF ($\chi^2(261) = 260.64, p = .50$), indicating that MCAR may be inferred (Tabachnick & Fidell, 2007). Therefore, missing values were imputed via the expectation maximization technique (Little & Rubin, 2019).

Descriptive statistics were used to summarize sociodemographic characteristics and mean scale scores in both samples. To test the two-factor structure of the PANAS-C-SF (PA and NA) in Portuguese children with and without emotional disorders, a CFA with maximum likelihood estimation was performed for each sample. The fit of the models was assessed through the comparative fit index (CFI), the root-mean square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR). According to Hu and Bentler (1999), acceptable fit thresholds were CFI > 0.90, RMSEA < 0.08, and SRMR < 0.06; good fit was indicated by CFI/TLI $\geq$ 0.95, RMSEA $\leq$ 0.06, and SRMR $\leq$ 0.08. Factor loadings $\geq$.32 were deemed meaningful (Tabachnick & Fidell, 2007).

Cronbach's alpha coefficients were calculated to assess the internal consistency of the PA and NA scales, with values above 0.70 indicating good reliability (Nunnally, 1978). Pearson correlations between PA and NA were also computed. Validity of the PANAS-C-SF was examined through its associations with anxiety and depression. According to Cohen (1998), values of r around .10, .30 and .50 indicate small, medium, and large effects, respectively.

A t test for independent samples was used to compare the PA and NA scores between children diagnosed with emotional disorders and children from the general community, with p values < .05 indicating significant mean differences. Cohen's d (Cohen, 1998) was used to estimate the clinical magnitude of the group differences. An effect size magnitude of .20 was indicative of a small effect, .50 was indicative of a medium effect, and .80 was indicative of a large effect.

A mixed ANOVA with two dependent variables (PA and NA) and two independent variables (age and sex) was used to assess whether there were statistically significant differences in PA and NA levels regarding children's age, sex and the age*sex interaction. To analyze age differences, two age groups were created: a group aged 6-9 years and a group aged 10-13 years (*note*: in the community sample, since the ages of the present sample ranged from 8 to 12 years, the organization of the groups was from 8-9 years old and 10-13 years old).

The definition of these age groups was based on previous literature indicating that within middle-childhood or school age (i.e., approximately 6 to 12 years old), there are some developmental differences with regard to the most common fears or symptoms of anxiety (Weems & Costa, 2005). Particularly, 6-9-year-olds are characterized by the development of the sense of self as separate from their parents, and the main developmental challenge is the process of individuation, autonomy and secure self-reliance, which may give rise to concerns regarding separation from their parents, with separation anxiety symptoms being predominant (Warren & Sroufe, 2004; Weems & Costa, 2005; Westenberg et al., 2001). On the other hand, 10-13-year-olds are characterized by the gain of insight into mortality and about world concerns (Warren & Sroufe, 2004; Westenberg et al., 2001); thus, fears concerning danger

and death are predominant fears in this age group (Weems & Costa, 2005), which are preoccupations typical of generalized anxiety symptoms. Finally, in adolescence and preadolescence, emerging social understanding may lead to social and evaluative concerns (Warren & Sroufe, 2004; Weems & Costa, 2005; Westenberg et al., 2001).

Results

Factor structure - Confirmatory factor analysis

The two-factor model initially failed to present an adequate fit, both in the community sample ($\chi^2(42) = 189.17, p < .001$; CFI = .89; RMSEA = .10; SRMR = .08) and in the clinical sample ($\chi^2(34) = 199.67, p < .001$; CFI = .82; RMSEA = .16; SRMR = .19). An examination of the modification indices suggested that the errors belonging to items *scared* and *afraid* might be correlated. Because these pairs of items belonged to the same factor (NA), their measurement errors were allowed to correlate (Byrne, 2010). The respecified model presented a good fit to the data in both the community sample ($\chi^2(41) = 90.62, p < .001$; CFI = .96; RMSEA = .06; SRMR = .06) and in the clinical sample ($\chi^2(33) = 74.74, p < .001$; CFI = .96; RMSEA = .08; SRMR = .08). As presented in Table 1, standardized factor loadings were significant ($p < .001$) and above .32

Table 1. Factor loadings for the PA and NA scales – Confirmatory Factor Analysis

	Community sample $n = 341$	Clinical sample $n = 185$
PA		
1.Happy (<i>Feliz</i>)	.79***	.88***
2.Cheerful (<i>Bem-disposto</i>)	.79***	.80***
3.Proud (<i>Orgulhoso</i>)	.64***	.45***
4.Joyful (<i>Alegre</i>)	.81***	.83***
5.Lively (<i>Animado</i>)	.75***	.81***
NA		
6.Sad (<i>Triste</i>)	.63***	.75***
7.Scared (<i>Amedrontado</i>)	.56***	.40***
8.Miserable (<i>Miserável</i>)	.63***	.68***
9.Afraid (<i>Com medo</i>)	.56***	.37***
10.Mad (<i>Zangado</i>)	.61***	.57***

Reliability, descriptive statistics and correlations

PANAS-C-SF presented adequate reliability with Cronbach's alpha coefficients of .86 for PA and .77 for NA in the clinical sample, and Cronbach's alpha coefficients of .86 for PA and .76 for NA in the community sample.

The means and standard deviations of the different variables are presented in Table 2 for both samples. PA and NA were negatively and significantly correlated, with a large effect in the community sample ($r = -.49, p < .001$) and a moderate effect in the clinical sample ($r = -.38, p < .01$). In both samples, NA was positively and strongly associated with internalizing symptoms: in the community sample, correlations with total internalizing ($r = .60$), anxiety ($r = .51$), and depression ($r = .61$) were all significant at $p < .001$; in the clinical sample, the respective correlations were $r = .59, .57$, and $.53$ ($p < .01$).

Table 2. Descriptive statistics and matrix of intercorrelations among study variables for the community and clinical samples.

Variables	Community sample (<i>n</i> = 341)						
	M	SD	1	2	3	4	5
Sex	-----	-----	-.01	.10	.16**	.18**	.10
Age	9.74	1.26	-.21**	.02	-.14**	-.14**	-.11*
1. PA (PANAS-C-SF)	20.12	4.71	-----	-.49**	-.35**	-.24**	-.45**
2. NA (PANAS-C-SF)	9.12	3.86	-----	-----	.60**	.51**	.61**
3. Total Internalizing Scale (RCADS-SF)	25.22	11.05	-----	-----	-----	.95**	.88**
4. Total Anxiety Scale (RCADS-SF)	16.83	7.36	-----	-----	-----	-----	.69**
5. Depression Subscale (RCADS-SF)	9.39	4.59	-----	-----	-----	-----	-----
Clinical sample (<i>n</i> = 185)							
Sex	-----	-----	-.09	.13	.13	.14	.07
Age	9.24	1.88	-.31**	-.07	.13	.09	.25**
1. PA (PANAS-C-SF)	19.12	4.55	-----	-.38**	-.36**	-.31**	-.46**
2. NA (PANAS-C-SF)	12.82	4.58	-----	-----	.59**	.57**	.53**
3. Total Internalizing Scale (RCADS-SF)	55.32	24.83	-----	-----	-----	.99**	.85**
4. Total Anxiety Scale (RCADS-SF)	46.35	20.29	-----	-----	-----	-----	.76**
5. Depression Subscale (RCADS-SF)	8.97	5.63	-----	-----	-----	-----	-----

Table 3. Descriptive statistics and significant differences by sex and age groups.

		<i>M (SD)</i>		<i>F (df)</i>	<i>p</i>
Sex		Males	Females		
Positive Affect	Community Sample	20.17 (4.96)	20.07 (4.49)	.26 (1)	.61
	Clinical Sample	19.59 (4.61)	18.75 (4.50)	3.17(1)	.08
Negative Affect	Community Sample	8.71	9.51	2.88(1)	.09
	Clinical Sample	(3.82)	(3.88)	3.33(1)	.07
		12.07 (4.61)	13.39 (4.49)		
Age		8-9 y*	10-13Y		
Positive Affect	Community Sample	21.01 (4.27)	19.47 (4.91)	9.26(1)	.01
	Clinical Sample	19.98 (3.95)	18.15 (4.99)	7.82(1)	.01
Negative Affect	Community Sample	8.94 (3.71)	9.24 (3.97)	.62 (1)	.43
	Clinical Sample	13.21 (4.60)	12.37 (4.53)	1.27(1)	.26
Sex*Age					
Positive Affect	Community Sample			.33 (1)	.57
	Clinical Sample			4.27(1)	.04
Negative Affect	Community Sample			1.96(1)	.16
	Clinical Sample			1.76(1)	.19

Conversely, PA was significantly and negatively correlated with internalizing symptoms in both samples. In the community sample, correlations were small for internalizing ($r = -.35$) and anxiety ($r = -.24$), but strong for depression ($r = -.45$). In the clinical sample, these associations were slightly stronger, with $r = -.36$ (internalizing), $-.31$ (anxiety), and $-.46$ (depression), all significant at $p < .01$.

Differences in PANAS-C-SF scores between clinical and non-clinical participants

The PANAS-C-SF mean scores and standard deviations are presented in Table 2. Children with emotional disorders pre-

sented significantly higher levels of NA ($t(524) = -9.82$; $p < .001$; $d = .87$) and lower levels of PA ($t(524) = 2.35$; $p < .05$; $d = .24$) than children from the community sample.

Sex and age differences in PA and NA

As presented in Table 3, no significant differences were found regarding sex on PA or NA in either the community or clinical sample. Significant age differences were found regarding PA (but not NA) in both samples, with younger children presenting higher levels of positive affect than older children. The interaction between age and sex was only marginally significant for PA in the clinical sample.

Discussion

NA and PA are key components in theoretical models and empirical studies of anxiety and depression. While NA is consistently recognized as a transdiagnostic factor, PA's role is less clear. Some studies suggest that low PA is more specific to depression, aligning with the tripartite model, while others highlight PA's transdiagnostic relevance. Additionally, research is inconsistent regarding the independence or correlation of PA and NA and their relation to children's age and sex. Therefore, despite extensive literature, many questions remain unanswered, particularly in child populations, necessitating further research. Moreover, with the rise of transdiagnostic models and interventions for emotional disorders, it is also relevant to assess the impact of those interventions on PA and NA. To address these needs, psychometrically valid instruments are required to assess PA and NA in children across various contexts.

Therefore, one of the main aims of the present study was to confirm the two-factor structure of the PANAS-C-SF (composed of two factors: PA and NA) in a community and clinical sample of children with emotional disorders. As expected, the two-factor structure was confirmed in both samples, with the respecified models presenting a good fit to the data. Additionally, the PA and NA scales proved to be reliable measures, as both presented adequate Cronbach's alpha values ($>.70$; Nunnally, 1978) in both samples. The allowed error correlation between the items "afraid" and "scared" may reflect conceptual or semantic overlap between these items. However, despite this potential redundancy, both items demonstrated strong factor loadings and contributed to the internal consistency of the NA subscale; therefore, they were retained in the final model.

Moreover, as expected, in both samples, lower levels of PA were significantly associated with higher levels of NA (with moderate to strong effects). This was an expected result since, although originally PA and NA were conceptualized as separate and independent constructs (in adult samples, Watson et al., 1988), subsequent studies with children have found that these constructs most often appear to be correlated rather than independent (Laurent et al. 1999; Chorpita & Daleiden, 2002). Studies have found that this association decreases as children get older and are more capable of differentiating positive and negative affect (Ollendick et al. 2003). Interestingly, in the present study, the association between PA and NA was smaller in the clinical sample than in the community sample. One possible explanation is that children with emotional disorders are better able to differentiate PA and NA, possibly because they feel these emotional states, in particular, NA, more intensely.

Another important aim of the present study was to analyze the associations between positive and negative affect and anxiety and depression. As expected, in both samples, higher levels of NA were significantly and strongly correlated with higher levels of anxiety and depression, which was in accordance with the Tripartite Model (Clark & Watson, 1991) and with previous research (Chorpita & Daleiden 2002). Additionally, as expected, PA was significantly and negatively correlated with anxiety and depression, but this association was stronger for depression. Although according to the Tripartite Model (Clark & Watson, 1991), lower levels of PA are a specific characteristic of depression, previous studies with children have found that it can also be associated with anxiety, even though

less strongly than with depression (e.g., Hughes & Kendall, 2009; Laurent et al., 1999), as shown in the present study.

Additionally, the present study aimed to compare the PA and NA scores in both samples to assess the ability of the PANAS-C-SF to discriminate between children with and without emotional disorders. As expected, children with emotional disorders presented significantly higher levels of NA and significantly lower levels of PA than children from the community sample. The difference was larger for NA and smaller for PA. This result can be explained by the fact that the clinical sample of the present study was almost entirely composed of children with anxiety disorders and, according to the Tripartite Model (Clark and Watson, 1991) and subsequent research (Chorpita & Daleiden 2002; Hughes & Kendall, 2009), PA, unlike NA, is not a nuclear factor for anxiety disorders, which may explain why the difference between the groups was stronger for NA in this study. Moreover, the weaker association between positive affect and anxiety in the community sample may be due to lower symptom variability and intensity compared to the clinical sample, the possibility that more severe anxiety symptoms limit children's exposure to situations eliciting positive affect, and the common comorbidity of anxiety with depressive symptoms in clinical samples, which may strengthen the link with low positive affect. Furthermore, as discussed above, children from the clinical sample seemed more capable of differentiating between PA and NA than those from the community sample, which aligns with the greater difference observed between PA and NA in the clinical sample. These results support the understanding of PA and NA as transdiagnostic mechanisms that are capable of identifying and differentiating children with and without emotional disorders, which highlights the importance of interventions and preventions targeting these variables.

Finally, the present study intended to analyze age and sex differences in the responses to PA and NA scales. Although girls showed higher NA scores and lower PA scores than boys—consistent with findings by Ciucci et al. (2017) and Sanmartín et al. (2018)—no significant sex differences were found in either the clinical or community samples. This may be partly explained by the age range of our sample, as sex differences in affect tend to become more pronounced during adolescence when biological and psychosocial changes increase emotional sensitivity and internalizing symptoms in girls; this is supported by studies suggesting that sex differences in emotional disorders are typically small or non-significant in early childhood but tend to increase with age (e.g., Merikangas et al., 2010). As for age differences, significant differences in PA were observed in both samples, aligning with Stevanovic et al. (2013), that found that younger girls obtain higher scores than older girls, while no significant age-related differences were found for NA. Further studies are needed to better clarify these results.

Implications and limitations

The present study represents a novel contribution to the study of the assessment and understanding of child affect. To the best of our knowledge, this is the first study to validate the PANAS-C-SF in a clinical sample of Portuguese-speaking children and to compare the PA and NA scores from children with and without emotional disorders, supporting the ability of the

PANAS-C-SF to discriminate between clinical and nonclinical samples of children. In addition, this study contributes to supporting the psychometric robustness of the PANAS-C-SF by replicating its two-factor structure and showing adequate psychometric qualities in the Portuguese population. Therefore, this study provides Portuguese clinicians and researchers with a measure with good psychometric quality that allows a quick assessment of NA and PA in children as well as promotes the development of further studies aimed at understanding the role of child affect in the origin, maintenance and treatment of emotional disorders.

Despite the contributions of this study to the literature, it has a number of limitations that should be acknowledged and should guide future studies. Given the inconsistent results across studies regarding the role of age and sex in the explanation of PA and NA, further studies analyzing these effects are needed. Additionally, it would be relevant to collect a larger and more differentiated sample with a greater number of children with different psychological disorders to analyze the differential effects of PA and NA in specific disorders. In particular, taking into account the results of previous studies (e.g., Chorpita & Daleiden, 2002; Hughes & Kendall, 2009), it would be relevant to analyze the specific role of PA and NA in children with depression, social anxiety and other types of anxiety-related disorders. Moreover, since the theoretical background underlying the constructs of PA and NA were based on the tripartite model (which includes PA, NA and physiological hyperarousal in the understanding of anxiety and depression), the inclusion of a measure of physiological hyperarousal would be relevant, which was not done in the present study. Although the PANAS-C-SF demonstrated good discriminative ability between children with and without emotional disorders, a limitation of the present study is the absence of ROC curve analyses that could help identify optimal clinical cut-off scores. Additionally, factorial invariance analyses were not conducted, which would be important to explore in future studies to assess the stability of the factor structure across different groups. Also, although mixed ANOVAs were conducted to control age group differences, future research should further examine the measurement invariance of the model across different age groups to better understand potential developmental influences on negative and positive affect. Finally, it should also be taken into account that the sample used was recruited exclusively in the central region of Portugal, which may compromise the generalization of the results to the entire Portuguese population.

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Conflict of Interest

The authors declare no potential conflicts of interest concerning to the research, authorship, and/or publication of this article.

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