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Abstract

From the perspective of positive psychology, the study and measurement of subjective well-being has popularized a growing interest towards variables such as affective perception. In an attempt to explain and evaluate the affective structure in positive terms (PA) and negative terms (NA), PANASN affect scale (Sandín, 2003) constitutes the version adapted for children and teenagers of the Positive and Negative Affect Schedule (Watson et al., 1988). Opposite to the confirmatory study made in teenagers by Sandín (2003), this paper proceeds to analyse the internal structure and reliability of the above-mentioned questionnaire after being administered to 636 students aged between 6 and 14 years. An instrumental type of research methodology was carried out. The instrument used was the Positive and Negative Affect Scale for Children and Adolescents (PANASN). While confirmatory and exploratory analysis show an appropriate adjustment, these properties tend to fade when three or four factors are considered. In response to this, we reflect on the need to consider certain aspects of improvement in content and form, which are essential if we want to use said instrument with primary education students.

Keywords: Psicología Positiva, bienestar subjetivo, estructura interna, fiabilidad, Educación Primaria.

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Propiedades psicométricas y estructura factorial de la escala de afecto PANASN en una muestra de escolares españoles

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Resumen

Desde la perspectiva de la Psicología Positiva, el estudio y medida del bienestar subjetivo ha popularizado un creciente interés hacia variables como la percepción afectiva. En un intento por explicar y evaluar la estructura afectiva en términos positivos (AP) y negativos (AN), PANASN (Sandín, 2003) constituye la versión adaptada para niños y adolescentes del Positive and Negative Affect Schedule (Watson et al., 1988). Frente al estudio confirmatorio realizado en adolescentes por Sandín (2003), en este trabajo se procede a analizar la estructura interna y fiabilidad de dicho cuestionario tras ser administrado a 636 alumnos escolarizados en cuatro colegios públicos españoles, con edades comprendidas entre los 6 y 14 años. Se llevó a cabo una metodología de investigación de tipo instrumental. El instrumento utilizado fue la Escala de Afecto Positivo y Negativo para Niños y Adolescentes (PANASN). A pesar de que los análisis confirmatorios y exploratorios arrojan un adecuado ajuste, dichas propiedades tienden a desvanecerse cuando se consideran tres y cuatro factores. Ante ello se reflexiona sobre la necesidad de considerar ciertos aspectos de mejora en contenido y forma, algo imprescindible si pretendemos utilizar dicho instrumento con alumnos de Educación Primaria.

Palabras clave: positive psychology, SWB (Subjective Well-Being), internal structure, reliability, primary education.

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Affective-emotional education should be aimed at objectives such as acquiring and implementing a language to describe the inner state, from which the awareness of one's own actions and their application in society will emerge. In contrast to classical competences, emotional education that develops emotional competence in classroom contexts characterised by happiness becomes necessary (Bisquerra & Hernández Paniello, 2017; Desan et al., 2021; Oliver et al., 2010). In this sense, following the approach of Positive Psychology, the evaluation of affect implies accepting that affect is a dependent variable, as it can always be educated or even improved, which would contribute to favouring the emergence and development of strengths and virtues with their respective educational impact. Moreover, students are not only differentiated in curricular terms, but also in affective terms, which is essential in aspects such as adaptation in the classroom, learning styles, and social relations. It is then when the need arises to reconsider the instrumental character attributed to educational practices, where affective-emotional development, in most cases, is restricted to a transversal character without considering its global dimension in the development of students (López et al., 2021).

Despite the importance attributed in educational praxis to the value of emotions and affect (Bisquerra & Hernández Paniello, 2017), the study and evaluation of the latter has predominantly taken place in the field of psychology, albeit in adolescents in psychopathological situations (Watson, 1988), adult women (Joiner et al., 1997), and subjects with anxiety disorders (Sandín, 2005). Among its objectives, we find the need to identify cross-cultural (Santángelo, Brandariz et al., 2016; Young et al., 2010), sexual (Santángelo, González et al., 2016) or sexual variances (Santángelo, González et al., 2016) or to validate questionnaires taking as a reference the students of compulsory secondary education and primary education (Sandín, 2003; Vicent et al., 2016).

In this sense, difficulties can be expected in generalising these results to the primary school classroom, which could lead to a serious situation of foreign validity. In the field of psychology itself, such research is characterised by the emergence of criticisms due to the disparity of the results obtained depending on the implicit designs and study variables.

Therefore, because of the synonymy between terms, in an attempt to carry out a factor analysis, up to three affective dimensions of a bipolar nature have been identified, such as pleasure-pleasure, activation-inhibition, and attention-rejection (Bush, 1973), which shows us the existing variance in terms of construct validity, which tends to increase when using self-reports as an assessment instrument (Russell & Mehrabian, 1977).

Likewise, when the research focuses on intra- and inter-individual affective dimensions (nomothetic perspective), these dimensions tend to be grouped in a bipolar way in terms of positivity and negativity (Flores-Kanter & Medrano, 2018). In this same line, Watson and Telleger (1985) identified that positive and negative affect constitute the factors that most clearly tend to characterise the basic affective structure (dimensions that are descriptively bipolar, but effectively unipolar).

Core affect can manifest as a mood or can be produced by an external cause (Russell, 2003). At this point, it is worth noting that positive affect (PA) encompasses the extent to which a person feels active and lively (Vicent et al., 2016). In contrast, negative affect (NA) reflects subjective discomfort and emotional states such as anger, guilt, fear, and nervousness (Otsuka et al., 2019). However, many of the terms involved tend to be characterised in an ambivalent or even mixed way (e.g., content-happy), so the need arose to identify pure constructs to help differentiate one from the other. Additionally, the low poles of each of the affects represent the lack of affective involvement, with the low negative affect components being calmness and relaxation, and the low positive affect components being listlessness and slowness (Díaz-García et al., 2020; Watson & Telleger, 1985).

Constituted and manifested as subjective states or dispositions towards environmental situations, several studies (Burce & Ian, 2012; Clark et al., 1994; Hervás & López-Gómez, 2016; Morán et al., 2017) confirm that PAs tend to be associated with extraversion and ANs with neuroticism (Aritio-Solana et al., 2022). However, it was the necessity to offer an evaluative instrument about them that led Watson et al. (1988) to construct the Positive and Negative Affect Schedule questionnaire (PANAS), isolating 10 items alluding to PA and another 10 about AN, obtaining a score in terms of positive and negative affectivity, respectively. Both subscales tend to reach adequate levels in terms of reliability and factorial validity, convergent and discriminant (Medrano et al., 2015; Ruiz-Pérez et al., 2021; Watson et al.,

1988). Subsequently, Watson and Clark (1994) developed an expanded version by including 60 items. The expanded version, called PANAS-x, not only measures the two original higher-order scales (PA and NA), but also 11 specific affects: Fear, Sadness, Guilt, Hostility, Shyness, Fatigue, Surprise, Joviality, Self-Assurance, Attentiveness and Serenity.

Two decades later, Gonçalves et al. (2013) designed PANAS-t, an eleven-feeling psychometric scale adapted to the context of Twitter. Such a scale is based on the extended version of PANAS-x (Watson & Clark, 1994). The authors test the effectiveness of PANAS-t on ten real-life notable events drawn from 1.8 billion tweets and prove that it is possible to efficiently capture expected feelings on a wide variety of topics ranging from tragedies, technology launches, political debates, and medical care.

Nevertheless, despite its international acceptance, this test was designed to be administered to adults, so Sandín (2003) tackled its adaptation so that it could be administered to children and adolescents who were non-clinical individuals. Thus, the Positive and Negative Affect Schedule for Children and Adolescents (PANASN) was created, which consists of 10 items designed to assess each subtype of affect, as in the original version, albeit with a reduced Likert scale (from 5 to 3 options), preceded by a series of items written in a more familiar and understandable vocabulary. However, the reduction of options in the Likert scale implies that the scores reach different meanings that may affect the factor analyses (Cañadas & Sánchez, 1998; Schriesheim & Castro, 1996). Laurent et al. (1999) designed a similar scale made up of 30 items.

In recent years, the PANASN has already been used in several research studies aimed at describing the effects on Primary School students (Barrón-Sánchez & Molero, 2014; Sandoval, 2016), evaluating the affective component of subjective well-being in children (Luna et al., 2020), examining the influence of physical fitness on positive and negative affect in children and adolescents (Desan, et al. 2021; Río-de-Cózar et al., 2020), studying the link between subjective well-being, gender and emotional intelligence in pre-adolescents (Martínez-Marín & Martínez, 2019) or examining anxiety sensitivity and positive and negative affect in secondary school students as possible modulators of the drop in sport performance associated with psychological pressure (Molina et al., 2014).

Sandín's study (2003) empirically supported the two-dimensional structure of the test (positive and negative affect), as well as its reliability and convergent and discriminant validity with self-report measures of anxiety and depression. There are also several studies that have analysed the dimensional structure of the PANAS scale in different samples (García & Arias, 2019; Moral, 2011; Santángelo et al., 2019), but in this research we are interested in the structure of the PANASN questionnaire for children and adolescents. Despite having been explored in the works of Seminario (2017) with a sample of adolescents, González Arratia and Valdez Medina (2015) with a sample of children between 9 and 12 years old, Sanmartín et al. (2018) with a sample of 8 to 11 year olds, and Castillo and Heredia (2019) with a sample of students aged 8 to 12 years old, neither the psychometric properties nor the different structures of the instrument have been studied with students aged 6 to 12 years old, that is, whether it responds to a structure of two, three or four factors in this population. Furthermore, the internal consistency of the instrument may vary due to the presence of students with special educational needs (Galarce Muñoz et al., 2020).

The structure of this instrument varies depending on the study carried out. Therefore, differences are found in the number of factors that make up the instrument. On the one hand, most research (Caicedo Cavagnis et al., 2018; Castillo & Heredia, 2019; Flores-Kanter et al., 2021; Galinha et al., 2013; Kim & Wang, 2021; Medrano et al., 2015; Sandín et al., 1999; Sandín, 2003; Seminario, 2017; Watson et al., 1988) defends the existence of two independent factors. On the other hand, there is support for the idea of the existence of a three-factor model in which negative affect is divided into two factors: disgust and fear (Gaudreau et al., 2006; Killgore, 2000). Or three factors are composed of positive affect, negative affect, and affective polarity (Leue & Beauducel, 2011). The controversy is not only due to the number of factors but also lies in the relationship between them, distinguishing between the orthogonal model in which the factors are independent (Caicedo Cavagnis et al., 2018) and the oblique model in which the factors are related (Flores-Kanter et al., 2021).

Therefore, considering the variability of the dimensions involved when the factors are reduced, the first objective of the present research is to study the factor structure of this questionnaire in order to check which model is the most appropriate (two, three, or four factors) for students aged 6 to 14. Therefore,

the research hypothesis was that the PANASN has a two-factor structure or clearly delimited dimensions in a sample of primary school students, as occurs in adult and adolescent populations or in cross-cultural studies (Sandín et al., 1999; Sandín, 2003).

In addition, the second objective of the research aims to study the internal structure, that is, whether the items alluding to positive affect (PA) tend to saturate in negative affect (NA) or vice versa, in order to study the validity of the questionnaire. In this line, the following hypothesis needs to be answered: the positive affect items will not saturate in the negative affect items.

Method

Participants

A total of 636 students from four public primary schools in Spain participated in this study. According to sex, 318 were boys and 318 girls, aged between 6 and 14 years (M = 9.06; SD = 1.93). Specifically, pupils aged 12-14 have special educational needs.

The sample was chosen by means of non-probabilistic purposive sampling in which the selected schools were predominantly of a medium or medium-low socioeconomic level, and the sample included an equal number of boys and girls (Sáez, 2017) as well as the nonexistence of other variables that would tend to favour the dispersion of the sample.

Instruments

The instrument used was the Positive and Negative Affect Scale for Children and Adolescents, PANASN (Sandín, 2003). This is a test developed by Sandín (2003) for children and adolescents based on the adult version of the PANASN by Watson et al. (1988). The PANASN, like the PANAS, is a 20-item self-report questionnaire. Positive affect is assessed by 10 items ("I am a lively person, I tend to get excited") and negative affect by another 10 items ("I feel nervous"). The questionnaire is completed by the child/adolescent taking into account the way he/she usually feels and/or behaves, following a scale of three response alternatives, described as "Never" (1), "Sometimes" (2), and "Many times" (3). The PANASN is characterised by high internal congruence, with alphas of .86 to .90 for positive affect and .84 to .87 for

negative affect. The correlation between the two affects (positive and negative) ranges from -.12 to -.23, and the test–retest coefficients are sufficiently high: .71 and .68 for positive and negative affect, respectively (Watson et al., 1988).

Procedure

Following authorisation from the institution and informed consent from the parents, all participants completed the scale in one session and in approximately 25 minutes, in their reference classroom and during academic hours, voluntarily and anonymously. In the case of first-cycle pupils (first and second years of primary education), the tests were administered individually and orally, using a pleasant, familiar, and understandable vocabulary without altering the implicit construct.

All participants were informed of the confidentiality of the data and research objectives, following the ethical standards indicated by the Ethics Committee of the Spanish university of researchers (2021), and any doubts that arose at the time of application were dealt with by the authors of the research.

Data Analysis

Firstly, confirmatory factor analysis (CFA) was carried out to study the bifactorial structure of the PANASN, its reliability, and its validity. Once some shortcomings in the validity of the model had been identified, several exploratory factor analyses (EFAs) were carried out to detect alternative structures, which were analysed through new confirmatory analyses. The EFA was carried out using the principal components method with oblimin rotation, as the initial CFA showed signs of correlation among the factors.

As for the CFA, the polychoric correlation matrix, more suitable for ordinal variables (Jöreskog & Sörbom, 2007), was used for the model parameter estimates. Due to the lack of multivariate normality, the robust maximum likelihood method (RML) was used as a method for model estimation. In relation to the assessment of model fit, the CFI (comparative fit index) was used as an incremental index, and the SRMR (standardized root mean residual) and RMSEA (together with the 90% CI) as absolute fit indices. The RMSEA (root mean square error of approximation) refers to the amount of variance not explained by the model per degree of freedom.

An RMSEA value of less than .05 is considered to indicate a good fit to the data if, in addition, the 90% confidence interval is between 0 and .05. Regarding the CFI, it is recommended that it exceeds .95 and the SRMR is less than .08 (Bentler, 1992), although a model can be considered acceptable if the SRMR is equal to or less than .09 and the CFI is equal to or greater than .96 (Hu & Bentler, 1999). The parsimonious normed fit index (PNFI) was used to compare the models presented. Minimal differences in this index of .06 to .09 would indicate substantial improvement between the models compared (Rial et al., 2006).

The convergent validity of each model was determined by the value of the standardised factor loadings and the average variance extracted (AVE), both values being recommended to be greater than .5 (Hair et al., 1999). Discriminant validity was tested by obtaining the value of the square of the correlation between the factors, which should be lower than the value obtained for the AVE. On the other hand, reliability was analysed by means of the composite reliability coefficient (CR), which must exceed the value of .7 (Bagozzi & Yi, 1988).

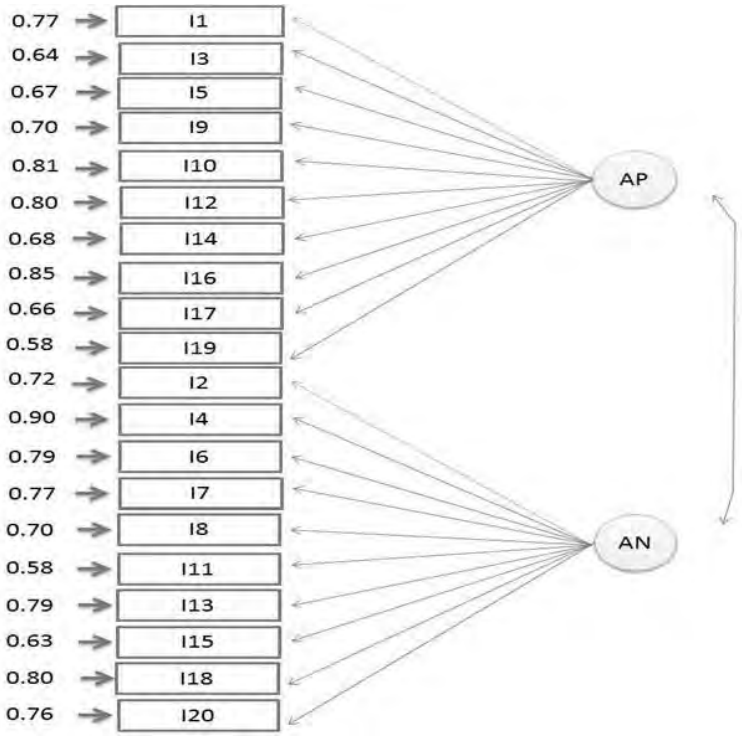
IBM SPSS Statistics software (version 27.0.1.0, 2020) was used for descriptive analyses and exploratory factor analysis, while confirmatory analyses were performed with LISREL software (Jöreskog & Sörbom, 2007).

Results

Following the two-factor model, as shown in Figure 1, after the extraction of principal components we can affirm that 10 items emerge that are clearly linked to positive factors and another 10 to negative factors, all of them grouped in the same positive (PA) and negative (NA) factors identified by Sandín (2003), although the level of saturation obtained indicates that not all of them have sufficient factor loadings to provide evidence of their significance.

Figure 1

Path Diagram and Two-Factor CFA Results



In this sense, according to Bagozzi and Yi (1988), assuming that significance is considered as such if the standardised factor loadings and the analysis of variance explained (AVE) is greater than .5, as shown in Table 1, items alluding to positive affectivity tend to be more significant than their negative counterparts. The CR and AVE values, whose ordinary limits are set at .60 and .50, respectively (Bagozzi et al., 1991), tend to be acceptable.

Table 1
Confirmatory Factor Analysis PANASN 2-Factor Model

Positive Affects (PA)			
Items	Standardized factor loadings	CR	AVE
1. Interested	.48	.7950	.5306
3. Excited	.46		
5. Strong	.58		
9. Enthusiastic	.55		
10. Proud	.43		
12. Alert	.45		
14. Inspired	.57		
16. Determined	.38		
17. Attentive	.58		
19. Active	.65		
Negative Affects (NA)			
Items	Standardized factor loadings	CR	AVE
2. Distressed	.53	.7699	.4703
4. Upset	.31		
6. Guilty	.46		
7. Scared	.48		
8. Irritable	.55		
11. Hostile	.65		
13. Ashamed	.46		
15. Nervous	.61		
18. Jittery	.45		
20. Afraid	.49		

A more exhaustive analysis shows that item 4 (“I feel upset”) reaches the lowest saturation of the entire questionnaire with .31. On the other hand, classifying the data according to Sandín (2003), other items such as 6 (“I feel guilty”) and 7 (“I am scared”) also reach borderline scores. In addition,

positive items reach low (item 16 = .38, "I make decisions easily") or relatively low saturations (item 10 = .40, "I am satisfied"). Even the AVE does not reach the minimum score required for such a case.

At this point and in view of the results, it can be stated that, according to the two-factor model, the items that best represent the positive factor of the questionnaire are item 19 ("I am active"), followed by item 3 ("I am excited"), item 14 ("I feel inspired"), and item 9 ("I am enthusiastic"). In negative terms, item 11 ("I have a bad mood") and item 8 ("I am irritable") seem to be the most sensitive estimates of the subjective feeling of discomfort, all of which should be taken into account if the development of a reduced version of the questionnaire is to be considered.

To estimate the presence of discriminant validity between constructs, it is necessary that the square root of the AVE is greater than the correlation between them (Chin, 1998; Fornell & Lacker, 1981). In our case, the correlation between the factors in the two-factor model is non-significant at .23 (Table 2), which indicates the divergent validity of the model and indicates that the factors are independent of each other.

Table 2

Inter-Factor Correlations and Discriminant Validity of the Two-Factor Model

Factors	PA	NA
PA	.5306	
NA	.23	.4703

Subsequently, several principal factor analysis (PFAs) were carried out to detect possible alternative models to the initial two-factor model. The results of these, looking at the saturations of the different items, indicated the possibility that the questionnaire revealed a three- or four-factor internal structure that contrasts with the two-factor model (Tables 3 and 4).

Table 3

Principal Component Analysis of the PANASN after Oblique Rotation (oblimin). Factor Weights of the Four Dimensions in Isolation

Items	Affects	4 factors			
		1	**2**	**3**	**4**
I1	Interested	***.424**	.060	.258	.164
I2	Distressed	-.238	***.507**	.293	-.031
I3	Excited	***.531**	.112	-.150	.204
I4	Upset	-.088	-.157	***.739**	.083
I5	Strong	***.719**	-.083	-.101	.050
I6	Guilty	.126	***.323**	.217	.063
I7	Scared	-.121	***.715**	-.073	.074
I8	Irritable	-.102	.152	***.699**	.015
I9	Enthusiastic	-.005	.295	.072	***.582**
I10	Proud	-.094	.244	-.186	***.602**
I11	Hostile	.294	.193	***.541**	-.348
I12	Alert	-.006	-.123	.078	***.571**
I13	Ashamed	***.457**	.418	-.058	-.121
I14	Inspired	.095	.009	.023	***.603**
I15	Nervous	.351	***.415**	.188	-.066
I16	Determined	.133	-.118	.094	***.380**
I17	Attentive	.209	-.084	-.053	***.538**
I18	Jittery	.053	***.397**	.191	.134
I19	Active	***.530**	-.246	.100	.267
I20	Afraid	.103	***.630**	-.093	-.053

Note. Extraction method: principal component analysis. Rotation method: oblimin with Kaiser normalisation.

Table 4

Principal Component Analysis of the PANASN after Oblique Rotation (oblimin). Factor Weights of Three and Two Isolated Dimensions

Items	Affects	3 factors			2 factors	
		1	2	3	1	2
I1	Interested	***.437**	.155	.281	.24	***.41**
I2	Distressed	-.249	***.477**	.235	***.58**	-.11
I3	Excited	***.515**	.210	-.110	-.10	***.64**
I4	Upset	.076	-.144	***.708**	***-.54**	-.20
I5	Strong	***.542**	.058	-.014	.19	***.69**
I6	Guilty	.104	***.361**	0203	***.60**	.01
I7	Scared	-.130	***.692**	-.129	***.52**	-.08
I8	Irritable	-.042	.165	***.659**	***.43**	-.14
I9	Enthusiastic	***.461**	.286	-.011	-.29	***.43**
I10	Proud	***.412**	.203	-.273	-.21	***.60**
I11	Hostile	-.101	.289	***.592**	***-.50**	-.16
I12	Alert	***.513**	-.137	.016	-.21	***.51**
I13	Ashamed	.142	***.516**	-.008	***.45**	-.15
I14	Inspired	***.588**	.014	-.035	-.12	***.41**
I15	Nervous	.131	***.501**	.213	***.59**	.05
I16	Determined	***.443**	-.097	.070	-.30	***.51**
I17	Attentive	***.618**	-.058	-.084	.25	***.31**
I18	Jittery	.103	***.417**	.158	***.69**	.02
I19	Active	***.636**	-.142	.143	-.13	***.66**
I20	Afraid	-.075	***.655**	-.102	***.60**	-.07

Note. Extraction method: principal component analysis. Rotation method: oblimin with Kaiser normalisation. Colour saturation indicates the items that identify each scale.

In the four-factor model, the factors do not have the same number of items, and there are several items in their corresponding factors that do not reach .50 (I1, I13, I6, I15, I18, I16). In the same way, the items, when grouped together, do not present any superior category in which they can be grouped, since in

the same factor there are contradictory positive and negative items. Along the same lines, the three-factor model groups the positive items into one factor while the negative items are grouped into two factors, and presents items in which the factor loadings do not reach .50 (I1, I2, I6, I9, I10, I16). On the other hand, the two-factor model presents a smaller number of items that do not exceed .50.

In Tables 5 and 6, it is observed that the results obtained to demonstrate a four-factor internal structure are not conclusive. The correlations show that they are not independent factors since PA is related to PA1 and NA to NA1.

Table 5

Confirmatory Factor Analysis PANASN Four-Factor Model

Items	Standardized factor loadings	CR	AVE
1. Interested	.52	.7748	.5887
3. Excited	.64		
5. Strong	.62		
19. Active	.68		
Items	Standardized factor loadings	CR	AVE
2. Distressed	.49	.7179	.4089
6. Guilty	.47		
7. Scared	.52		
13. Ashamed	.51		
15. Nervous	.64		
18. Jittery	.47		
20. Afraid	.51		
Items	Standardized factor loadings	CR	AVE
9. Enthusiastic	.56	.6995	.4020
10. Proud	.49		
12. Alert	.49		
14. Inspired	.6		
16. Determined	.4		
17. Attentive	.62		

Items	Standardized factor loadings	CR	AVE
4. Upset	.34	.6480	.4564
8. Irritable	.62		
11. Hostile	.85		

Table 6

Inter-Factor Correlations and Discriminant Validity of the Four-Factor Model

Factors	PA	NA	PA1	NA1
PA	.5887			
NA	.34	.4089		
PA1	.79	.24	.4020	
NA1	.17	.66	-.08	.4564

Note. *The diagonal indicates the AVE for each factor.

Figure 2 indicates the three-factor EQS model defined from the EFA, which allows all items to be combined into three well-defined factors. Similarly, Table 7 shows that the correlation between positive factors tends to reach a high score (.79) as opposed to the negative ones, where it also occurs (.65).

Figure 2.
Three-Factor CFA Path Diagram.

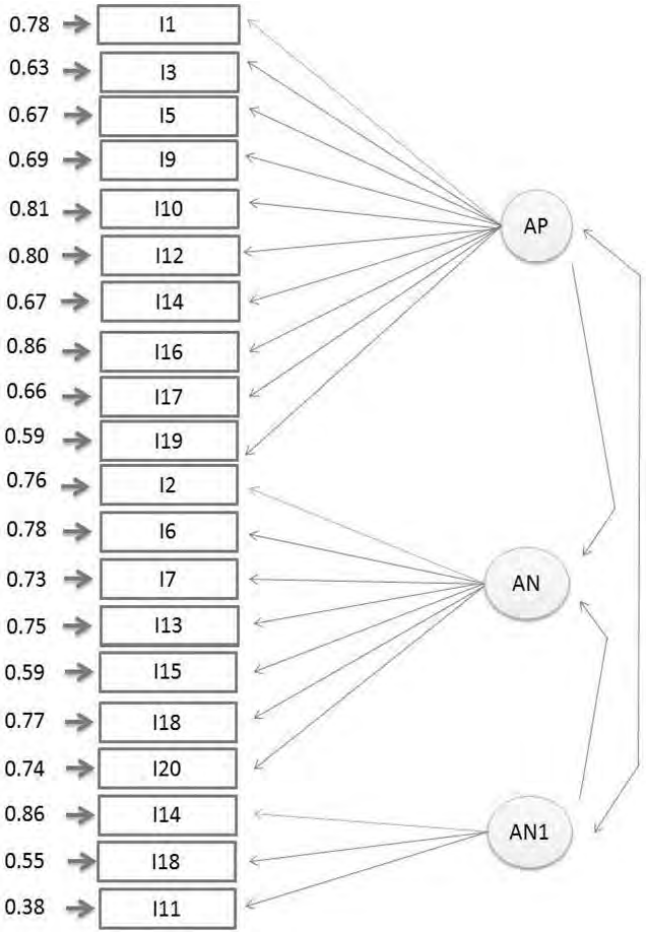


Table 7

Confirmatory Factor Analysis of the PANASN Considering Three Factors

Items	Standardized factor loadings	CR	AVE
1. Interested	.47	.7944	.5283
3. Excited	.61		
5. Strong	.57		
9. Enthusiastic	.55		
10. Proud	.44		
12. Alert	.45		
14. Inspired	.57		
16. Determined	.38		
17. Attentive	.58		
19. Active	.64		
Items	Standardized factor loadings	CR	AVE
2. Distressed	.49	.7179	.4088
6. Guilty	.47		
7. Scared	.52		
13. Ashamed	.5		
15. Nervous	.64		
18. Jittery	.48		
20. Afraid	.51		
Items	Standardized factor loadings	CR	AVE
4. Upset	.37	.6517	.4499
8. Irritable	.67		
11. Hostile	.79		

This fact, together with the fact that the AVE indicates a poor convergent validity and in view of the low saturation of some items, it is considered that it is possibly more convenient to try a structure that considers at least three factors (Table 8).

Table 8
Inter-Factor Correlations and Discriminant Validity of the Three-Factor Model

Factors	PA	NA	NA1
PA	.5887		
NA	.31	.4089	
NA1	.06	.68	.4020

Similarly, the saturation plot of the AFC according to the initial AFE has been obtained for model 2 (Table 9). The results are similar to the previous case, although certain aspects tend to improve, such as an increase in the fit indices, convergent validity, and the saturations of some items, showing that this model tends to be characterised under the same conditions as the previous one. On the other hand, in comparison to the two-factor model, the high correlation between negative factors, together with the small difference in the rest of the fit indices (the PNFI values are similar), indicate that, due to the principle of parsimony, the three-factor model does not improve the two-factor model.

Table 9
Measures of Fit of the Proposed Models

Model	X^2	*Gl*	*P*	*SRMR*	*RMSEA (IC 90%)*	*CFI*	*PNFI*
Model 1	653.32	169	.000**	.087	.043; .034; .052	.9	.816
Model 2	599.67	167	.000**	.082	.037; .027; .046	.9	.817
Model 3	525.07	164	.000**	.079	.033; .022; .043	.8	.807

Note. **p < .001

Discussion and Conclusions

In this study, we have analysed the factor structure, reliability, and validity of the PANASN, having taken a sample of 636 primary school students as a sample. According to the literature on the subject and the results of this study, the PANASN responds to a bifactor structure in accordance with the dimensions or scales of PA and NA.

The statistical evidence provided in our study suggests the adequacy of the bifactor model (Caicedo Cavagnis et al., 2018; Castillo and Heredia, 2019; Flores-Kanter et al., 2021; Galinha et al, 2013; González Arratia & Valdés Medina, 2015; Jovanović & Gavrilov-Jerković, 2016; Medrano et al., 2015; Sandín et al., 1999; Sandín, 2003; Seminario, 2017; Watson et al., 1988), as opposed to four- and three-factor models, which tend to show lower fit. Therefore, the best factor structure of those that are proposed is the one that distinguishes a model composed of only two factors. From a three-factor structure, three interdependent factors were identified, with the positive items being clearly delimited in the first factor and the negative items in the other two (Gaudreau et al., 2006; Killgore, 2000).

Considering the specific samples of certain studies, the study by González Arratia and Valdez Medina (2015), with a sample of Mexican children between 9 and 12 years old, tested the two-dimensional structure, explaining psychometric characteristics like those of the original version. Castillo and Heredia (2019), in a sample of students aged 8 to 12, supported both content validity and internal structure validity for a two-factor model, with acceptable fit indices and factor loadings. On the other hand, the study by Sanmartín et al. (2017) demonstrated adequate reliability and psychometric properties in a sample of children aged 8 to 12.

Medrano et al. (2015), considering that age is a factor that can impact affective behaviour, they evaluated the psychometric properties of the PANAS with a sample of university students, in comparison with the adult population. The orthogonal bifactor structure was maintained and, although it showed similar explanatory value in both populations, greater homogeneity was observed in the positive affect of young people.

In accordance with Young et al. (2010), who studied the psychometric properties of the questionnaire with a Korean adolescent and adult population, we can affirm that, despite possible cultural differences, none of the models we have used provides optimal levels of fit. Kim and Wang (2021) applied

Bayesian structural equation modelling (BSEM) with a sample of Chinese high school students; after testing four models (two-factor orthogonal, two-factor oblique, three-factor and two-factor oblique), with prior specifications including cross-loadings and residual covariances of approximately zero, the results showed that the two-factor orthogonal model has the best fit of the two-factor orthogonal model and the two-factor oblique model with the best fit of the two-factor orthogonal model.

However, after conducting a new study under the characteristics of our sample, with a university population (Sandín et al., 1999) and adolescents (Sandín, 2003), we obtained a third factor with greater interdependence, which seems to show that the structure of affect in children and adolescents is similar to that of adults (Medrano et al., 2015). Although due to the principle of parsimony, the model that best explains the structure of the PANAS is the orthogonal bifactor model.

In this sense, in Leue and Beauducel's (2011) study with an adult German sample, a superior model fit was produced for a two-factor model with trait-like PA, NA and a third general factor called Affective Polarity. Affective Polarity introduces an affect dimension that captures additional variation beyond AP and AN. Due to adjectives with relevant loadings on Affective Polarity, this general factor represents an individual's orientation towards approach and withdrawal, respectively. Killgore's (2000) research, in specifying a three-factor solution with a sample of university students, retained the PA factor, while the NA factor was split into two lower-order factors, consistent with the factors of Discomfort and Fear.

Under these circumstances, first of all, we must clarify that the fact of forming a questionnaire with 10 items alluding to positive affect and another 10 in relation to negative affect tends to strengthen the bipolar conception of the constructs evaluated, when in reality the level of affective adjustment is conditioned by the context. In turn, the lack of convergent validity and low significance indices suggest the need to review aspects related to both the format itself and the content of the items.

Regarding this last aspect, the fact that the test was based on a reduction in the number of items with respect to the original questionnaire seems to explain the dispersion of significance between items, as well as the type of relationships obtained by means of structural equations. In this sense, although

the data show that the factor structure seems to be coherent, not all the elements of the questionnaire seem to achieve the same significance or weight, which means that some items tend to represent PA and AN better than others. In addition to this, there is a need to reformulate certain items in view of the comprehension difficulties in the first cycle of primary school, where pupils hesitated when trying to respond to the situations "I am an active person" and "I feel inspired".

For its part, the absence of inverse items tends to favour acquiescence (or the tendency to answer in the affirmative), as well as the predisposition of responses conditioned by emotional desirability (item 10: "I feel proud of something, satisfied"), social (item 16: I am a determined person") or even curricular, as item 17 ("I am an attentive, careful person") can be assimilated as a synonym of good behaviour and item 19 ("I am an active person") as an undesirable aspect in the classroom environment, when in fact it is intended to estimate positive affectivity.

In the same way, PANASN has not only been elaborated from a reduction of items, but it has also undergone a structural modification in its response options, that is, a Likert scale of 5 options compressed into 3 (never, sometimes, very often). Following Cañadas and Sánchez (1998), the fact that the same score can be obtained from different combinations of items means that the same score can have different meanings, an aspect that may have influenced the confirmatory factor analysis study. Furthermore, although a large number of categories may lead to inconsistencies in the responses, a small number (two or three) contributes to low discrimination (less variability) and a notable reduction in reliability, which is a limitation of the study.

Although in populations such as ours it is recommended to incorporate few categories (Schriesheim & Castro, 1996), in order to avoid a central response tendency, it would be appropriate to include four options (1. Never; 2. Sometimes 3; Very often; 4. Always). Thus, the option "sometimes" can generate problems when it is continually chosen in the face of questions in which the learner either does not engage with what is being asked because of the ambiguous nature of the construct, or simply limits themselves to finishing the test as quickly as possible as if it were an exam.

Additionally, the limited number of studies on the PANASN in a sample of children does not allow us to know the degree of affectivity in a generalised way in this age group, nor has it allowed us to contrast the results obtained in

this study with others on the internal structure and psychometric properties of the scale.

One of the limitations of this work is the lack of tests that measure exactly the same as the PANAS in the age range (6-14 years) for which this research was designed, so we cannot provide data on the criterion validity. In addition, only high intensity effects have been considered, which is one of the limitations of this study. For future studies, both high intensity and low intensity affect can be used, as indicated by Russell's theory (2003). Future studies will consider the possibility of including reverse items to avoid emotional desirability and improve the PANASN scale.

The data on reliability and validity indicate that the test has acceptable properties in terms of internal consistency, although given the existing diversity in our classrooms, the necessity of studying its statistical properties in students with special educational needs is proposed as a line of future research (Galarce Muñoz et al., 2020).

On the other hand, although this questionnaire was the first of its kind to assess affectivity in children and adolescents, according to the two-dimensional model of affect proposed by Watson and Tellegen (1985) and Watson et al. (1988), beyond its traditional application, i.e. the study and diagnosis of psychopathological disorders such as anxiety and depression, it should be used to obtain an assessment of the affective world of the child or the classroom itself as a prior step to affective-emotional promotion and intervention (López et al., 2021).

Furthermore, once the test has been validated in the 6-12 age group, it is advisable to continue progressing in the research on affect in this age group and to analyse its influence on academic performance, as well as more specifically to study its relationship with variables such as creativity (of current importance in the educational context -OECD, 2019-), attention, and even reading comprehension (Jiménez et al., 2019).

In sum, after the above findings and reflections, it is complex to promote integral development in the primary education classroom without first identifying and understanding the affective structure around which learning and social relations revolve, so we must continue working to build –and even propose explanatory models– that allow us to understand the affective-

emotional structure in pupils with and without special educational needs associated with functional diversity of a cognitive type.

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