Factorial Invariance, Latent Mean Differences of the Panas and Affective Profiles and Its Relation to Social Anxiety in Ecuadorian Sample

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Abstract: Positive (PA) and negative affect (NA) are related with aspects that are part of people's psychological well-being, and the possibility of combining both dimensions to create four affective profiles, self-fulfilling (high PA and low NA), low affective (low PA and low NA), high affective (high PA and high NA) and self-destructive (low PA and high NA), has recently appeared. The current work aims to validate the short version of the Positive and Negative Affect Schedule (PANAS) in Ecuador, test the existence of the four affective profiles and analyze its relation with social anxiety. The Positive and Negative Affect Schedule for Children and the Social Anxiety Scale for Adolescents was employed in a sample of 1786 Ecuadorian students aged from 15 to 18 years ($M = 16.31$, $SD = 1.01$). The factorial invariance of the scale across sex and age groups was proved and latent mean analyses showed that girls and 18-year-old students obtained the highest scores in negative affect. With regard to the affective profiles, the cluster analyses confirmed the existence of the four mentioned profiles, and the self-fulfilling profile obtained the lowest scores in all the dimensions of social anxiety, whereas the self-destructive profile obtained the highest scores.

Keywords: positive affect; negative affect; social anxiety; PANAS-C-SF; SAS-A; factorial invariance; latent mean differences; affective profiles

1. Introduction

Since the emergence of the tripartite model of emotions (TME) [1], people's affective state dimensions have been used in the scientific literature as an important indicator associated to both anxiety and depression that can be used to distinguish both variables [2]. According to this model, positive affect (PA), negative affect (NA) and physiological hyperarousal (PH) are considered to be higher-order factors, whose associations with depression and anxiety can help to differentiate them, NA being commonly linked to both depression and anxiety, whereas low PA levels are exclusively related to depression and high PH levels associated to anxiety [1].

Affect can be divided into state affect and trait affect. State affect makes reference to the temporary variations in mood (measured by self-reported measures over a short period of time), and trait affect implies the stable individual willingness to given states (measured by self-reported measures during long periods of time) [3]. As has been mentioned before, the relation between state affective dimensions and

several disorders are used in the scientific literature to differentiate them [2] and, in this sense, Watson et al. [4] defined affect as a mood factor which is divided into two distinctive dimensions known as PA and NA. High levels of PA have been associated with energetic, focused and participative states, whereas low levels of PA are defined in terms of sadness and apathy. For its part, NA is characterized by aversive emotional states (fear, nervousness, guilt, etc.) whose low scores correlate with states of calm and serenity.

Taking the distinction of affective dimensions, several studies have related them to aspects that are part of the psychological and emotional wellbeing of humans [5–7], such as life satisfaction, perfectionism or emotional intelligence, among others [8–13]. However, due to the fact that current research has identified that the associations of the TME do not consistently fit with all anxiety disorders and clinicians are working on improving the use of the model [14], the number of studies that analyze the relation between affect and social anxiety has increased during the last years.

Social anxiety is understood as the fear generated during social situations in which individuals meet unknown people or they feel they are being evaluated by others [15]. In this sense, people experiencing social anxiety can show aversive moods, which have been considered by the scientific literature as a way of relating it to affect and acting accordingly. Consequently, Watson et al. [16] analyzed in a clinical sample that NA positively correlated both to anxiety and depression, whereas PA only showed a negative correlation to depression. This idea has recently been questioned because investigations have found new links between affective dimensions and social anxiety. On the one hand, Kashdan and Roberts [17] identified in a non-clinical adult sample ($M = 78.0$; $SD = 20.5$) that social anxiety positively correlated to NA, according to the TME, but they also discovered that PA negatively correlated to social anxiety. Other authors have also found results with an English-speaking adult sample, supporting the negative relation between PA and social anxiety [18,19]. On the other hand, Valenas and Szentagotái-Tatar [20] in Psychology undergraduates ($M = 21.54$; $SD = 2.95$) did not find statistically significant differences between NA and social anxiety, and proposed rumination as a possible explanation and mediator of the relation between NA and social anxiety. Although research in the current literature has concluded in several meta-analyses that social anxiety is related to high NA and low PA [21,22], there is no consensus about the conclusions of the TME of Watson et al. [16] in an adult sample.

Due to the lack of consensus regarding adult samples, investigations have been performed in child and young populations. In this sense, it has been studied in a sample of 175 American children from nine to 14 years old that NA positively and significantly correlated with social anxiety [23], in line with the identified relation by Watson et al. [16]. Nevertheless, Hughes and Kendall [24] indicated in a sample of 139 children ($M = 10.40$; $SD = 1.75$) diagnosed with anxiety disorders that high scores of NA and low scores of PA were considered possible risk factors of presenting social anxiety disorders. In line with this study, different results from the TME have been obtained in a non-clinical sample of American adolescents aged between 13 and 17 years because NA positively correlated with social anxiety but PA showed a negative correlation [25].

Consequently, due to the active role of the child when participating in an environment that could be linked to future anxiety syndromes [26] and the lack of scientific consensus in the relation between affective dimensions and social anxiety, more investigations in young samples are needed to deepen and broaden the scientific knowledge of the topic [27]. In this line, a study in a Spanish-speaking adolescent sample could provide valuable information to the current area of study.

With regard to the most used scale to assess affect, it is important to highlight the Positive and Negative Affect Schedule (PANAS) of Watson et al. [4]. It is a self-report measure that tests PA and NA in adult samples through 20 items (10 items for each of the subscales: PA and NA) that show the frequency in which a person has experienced emotional adjectives during the last weeks. This test has been used and validated with good psychometric properties in adult samples of different nationalities: American [4], Chilean [28], Ecuadorian [29], Mexican [30] and Spanish [31], among others. Thompson [32] validated the short version of the scale (The International-Positive and Negative Affect Schedule-Short Form: I-PANAS-SF) in an English-speaking adult sample and the items of each of the subscales were reduced to five (PA and NA).

Owing to the association between the affect measure and anxiety and depression disorders [16], and the implications of this relation for being considered in preventive programs, the PANAS has been validated in different infantile and adolescent samples. As a result, the PANAS has been validated in American children with a version of 27 items (PANAS-C) [33,34], in Spanish children and adolescents with a version of 20 items (PANASN) [2,35,36] and in Mexican children with the original version of 20 items (PANAS) [37]. As it happened with the adult version, Ebesutani et al. [38] validated the short version of the PANAS-C (PANAS-C-SF) in American children aged between six and 18 years, thus providing a version of 10 items for child population (five items for PA and five items for NA). Recently, the PANAS-C-SF has been validated in a Spanish child sample of 1296 students aged between eight and 11 years [39]. However, the PANAS-C-SF is not validated in a Spanish-speaking adolescent sample. As a consequence, it is necessary to perform a study that analyzes the factorial invariance of the PANAS-C-SF scale in a Spanish-speaking adolescent sample, as it has been recently done with other scales in the child population [40,41].

Considering the above-mentioned necessity of studying the relation between affect and social anxiety, it is important to highlight the investigations that have been carried out during the last years to analyze individual differences [42]. In the field of affect, due to the existence of two distinct dimensions (PA and NA), Norlander et al. [43] suggested the use of affective profiles obtained from combining high and low scores of both dimensions. The reasons for obtaining individual profiles were various. On the one hand, they pretended to study this combination of affective scores at an individual level to enhance the knowledge of different affective personality types [43]. On the other hand, the identification of personality profiles provides an important and interesting use in Psychology and Clinical Psychology to design and apply individualized treatments [44]. Consequently, Norlander et al. [43] identified four affective profiles: a profile characterized by people who scored high in PA and low in NA (Self-Fulfilling affective profile), a profile with participants who scored low in both dimensions (Low affective profile), other profile characterized by individuals who scored high in PA and NA (High affective profile), and a profile with people who scored low in PA and high in NA (Self-Destructive profile). This typology of affective profiles has been used in subsequent studies, and it has been analyzed in adolescent samples that the Self-Fulfilling profile relates to high scores in life satisfaction or happiness and low scores in depression and stress, whereas the Self-Destructive profile is characterized by the opposite [39,45–51]. Consequently, the Self-Fulfilling profile seems to be associated with adaptive dimensions, whereas the Self-Destructive profile associates with maladaptive dimensions. In this sense, in order to widen the field of knowledge about affective profiles, it is important to include the study about the relation between affect and social anxiety, which has not been performed yet.

As a result, in order to respond to the gaps in research mentioned through the current literature review, this study is intended to fulfill the following aims in an Ecuadorian adolescent sample from 15 to 18 years: 1. Analyzing the factorial invariance of the PANAS-C-SF; 2. Examining the latent mean differences across sex and age; 3. Testing the existence of the four affective profiles suggested by Norlander et al. [43]; 4. Analyzing the relation between the affective profiles and the scores of social anxiety.

2. Materials and Methods

2.1. Ethics Statement

The current study has followed the standards established by the Ethics Committee of the University of Alicante and the Declaration of Helsinki.

2.2. Participants

The sample of participants for the study was recruited by random cluster sampling (12 high schools of Quito participated) and a total of 1786 Ecuadorian adolescents were obtained. The sample was divided into 51.0% males (910 participants) and 49.0% females (876 participants). With regard to the age of the sample, individuals were aged from 15 to 18 years ($M = 16.31$, $SD = 1.01$) and the age distribution was: 25.2% (15 years), 33.3% (16 years), 26.5% (17 years) and 14.9% (18 years). With regard

to the socioeconomic status of the sample, the parent's level of academic qualifications was asked: school graduate (30.2% of parents), secondary studies (18% of parents), and university studies (8.2% of parents). The rest of the families did not provide the mentioned information. Lastly, the Chi-squared test showed a uniform frequency distribution of the eight groups by age and sex ($\chi^2 = 3.35$; $p = 0.34$).

2.3. Measures

The Positive and Negative Affect Schedule for Children Short Form (PANAS-C-SF) [38,39]: It is a self-report scale which assesses the scores of PA and NA in people aged between 6 and 18 years. Through a five-point Likert scale (from one "very slightly or not at all" to five "extremely"), the test includes 10 items (five items for PA and five items for NA) in which the participant must indicate the frequency of feeling these emotional states (PA = joyful, lively, happy, energetic, and proud; NA = depressed, angry, fearful/scared, afraid and sad) during the last weeks. The Spanish version of the PANAS-C-SF [39] was used in the current investigation. The two subscales showed appropriate internal consistency values in the original study (PA: 0.86; NA: 0.82).

The Social Anxiety Scale for Adolescents (SAS-A) [52,53]: It is a self-report tool that is used to obtain scores of social avoidance, fears and worries in social situations among adolescents. It makes use of a Likert scale of five points (one: not at all; five: all the time) and it is formed by 22 items, four of which are filling items. As a result, the 18 remaining items are divided into three subscales: Fear of Negative Evaluations (FNE: eight items that test fears, concerns, or worries regarding peers' negative evaluations), Social Avoidance and Distress in New Situations (SAD-N; six items that assess social avoidance and distress in new social situations or with unfamiliar peers) and Social Avoidance and Distress-General (SAD-G: four items to obtain the score of general social inhibition, distress, and discomfort). In the original study [53], the subscales obtained acceptable internal consistency values: FNE: (0.91), SAD-N (0.83) and SAD-G (0.76). Moreover, the scale has shown to be invariant across sex and age in Hispanic American adolescents [54] and in Spanish adolescents [55]; it has also shown good internal consistency indices in Chinese adolescents [56]. In the current study, the three subscales mentioned before were used and the internal consistency coefficients were: 0.85, 0.78 and 0.75 for the FNE, SAD-N and SAD-G, respectively.

In order to administer the two measures, three Ecuadorian psychologists and two Ecuadorian educators examined the two scales and evaluated the clarity of the items. The changes proposed were not significant and did not imply modifications of the structure of the instruments. In this sense, some sentences were adapted to Ecuadorian common linguistic structures.

2.4. Procedure

Firstly, meetings with the head-teachers and the management teams of the school centers were performed to present them the investigation, defining the aims of the study and describing the tools that were going to be used. Subsequently, they were asked if they were interested in participating in the investigation and if they give their permission. Once obtained, the research team sent letters to the legal tutors of the participators asking for the written consent to participate in the study. When administering the scales, before starting the sessions the students were told that the participation was voluntary and anonymous, so they could answer with complete sincerity. During the fulfillment of the scales, a member of the team and the respective group tutor were inside the rooms to solve doubts and to be sure that the students followed the instructions. The sessions of collecting the data lasted 25 minutes (5–10 minutes for the PANAS-C-SF and 10–15 minutes for the SAS-A).

2.5. Statistical Analyses

To analyze the two-factorial structure of the PANAS-C-SF [38], seven confirmatory factorial analyses (CFA) were done: one for the total sample, one for men, one for women, one for the 15 years old group, one for the 16 years old group, one for the 17 years old group and one for the 18 years old group. It was found to be of non-existence of multivariate normality because the Mardia's coefficients

(Total sample: 29.95; Men: 24.27; Women: 17.41; 15 years: 13.13; 16 years: 15.15; 17 years: 15.70; 18 years; 9.58) were higher than the five points limit established by Bentler [57]. Consequently, to study the adequacy of the two-factorial model, the Satorra-Bentler scaled χ^2 (S-Bχ^2) and the goodness-of-fit indices proposed by Brown [58] and Hu and Bentler [59] were used: Robust Root Mean Square Error of Approximation (R-RMSEA: <0.08 acceptable and <0.06 excellent), the Standardized Root Mean Square Residual (SRMR: close to 0.08 acceptable and <0.05 good fit), the Robust Comparative Fit Index (R-CFI: ≥0.90 acceptable, >0.95 good fit) and the Tucker Lewis Index (TLI: ≥0.90 acceptable). The following statistical analyses were performed: a classical item analysis, a Pearson product-moment correlation coefficient to analyze the correlation between the factors of the scale and the Cronbach's alpha coefficients for each one of the subscales of the PANAS-C-SF (taking into account that values equal or higher than 0.70 are considered to be acceptable).

With respect to the factorial invariance of the PANAS-C-SF across sex and age, multigroup CFAs were performed following the hierarchical method by steps [41,60,61]. In this way, constraints to the models were imposed to test their invariance: Model 1 (base model free of constraints), Model 2 (Model 1 with constraints in the factor loadings: metric invariance), Model 3 (Model 2 with constraints in the intercepts of the variables: scalar or strong invariance), Model 4 (Model 3 with constraints in the error variances and covariances: strict invariance) and Model 5 (Model 3 with constraints in the factor variances and covariances: structural invariance). All the generated models through the procedure should accomplish the goodness-of-fit indices mentioned before (TLI, R-CFI, R-RMSEA and SRMR). In addition, the level of non-significant probability associated to the ΔS-Bχ^2 [62] and the ΔCFI (ΔCFI < 0.01) [63] were used to confirm the invariance of the nested model (Models 2, 3, 4 and 5) with regard to the model which was constrained (Models 1, 2 and 3, respectively). Once the factorial invariances of the PANAS-C-SF across sex and age were confirmed, the latent mean differences were analyzed. In the sex groups, men were the reference group and they were set to zero when comparing with women, whereas in the age groups each of the groups of 15, 16 and 17 years old acted as reference group to study all the possible relations between the four groups. To test the existence of significant differences, the Critical Ratio (CR) was used, considering that the existence of significant differences was determined by scores higher than 1.96 or lower than −1.96 [64]. Once the differences were identified, the Cohen's d was used to know its size [65].

With regard to the identification of affective profiles, the non-hierarchical method of quick cluster analysis was used because the research team needed to obtain the four affective profiles suggested by Norlander et al. [43]; it is also the recommended method to identify profiles in samples of big size [66]. This method allows the specification of the number of clusters to be formed, in this case the replication of Norlander et al. [43] four affective profiles, and it permits the movement of individuals between clusters in order to optimize the grouping solution. In order to divide the scores of the participants in PA and NA into high and low and combine them to create the four profiles, the criterion of Cumming and Duda [67], Nordin-Bates et al. [68], and Inglés et al. [42] was used: z < −0.5 (low scores), z between −0.5 and +0.5 (moderate scores) and z > +0.5 (high scores). Once the profiles were identified, diverse analyses of variance (ANOVA) were applied to analyze the differences between the four affective profiles in the scores of social anxiety. Following the Scheffé method, post hoc tests were performed when statistical significant differences were found to determine their direction. Finally, as happened with the latent mean differences, Cohen's d was used to indicate the size of the identified differences [69]: 0.20–0.49 (small effect size), 0.50–0.79 (moderate effect size) and > 0.80 (large effect size).

The statistical analyses were carried out with the SPSS 22 and EQS 6.1 statistical packages.

3. Results

3.1. Confirmatory Factor Analyses

The data from the seven CFAs that were performed can be observed in Table 1. The two-factorial model for the total sample, for both sex groups and for the four age groups, showed acceptable results in all the goodness-of-fit indices (R-RMSEA ≤ 0.055; SRMR ≤ 0.056; R-CFI ≥ 0.954; TLI ≥ 0.938).

With regard to the reliability coefficients, the Cronbach's alpha for each of the factors that make up the scale were: 0.83 (PA) and 0.74 (NA). Moreover, the correlation between factors was −0.37.

Table 1. Confirmatory factor analyses: goodness-of-fit indices of the statistic two-factorial model of the PANAS-C-SF.

	χ^2	S-Bχ^2	d.f.	R-RMSEA 90% CI	SRMR	R-CFI	TLI
Model Total Sample	173.09	143.50	33	0.043 [0.036, 0.051]	0.036	0.975	0.965
Model Men	100.82	83.07	33	0.041 [0.030, 0.052]	0.037	0.977	0.968
Model Women	109.24	92.31	33	0.045 [0.034, 0.056]	0.039	0.972	0.962
Model 15 years	58.46	49.82	33	0.034 [0.011, 0.052]	0.037	0.985	0.980
Model 16 years	109.45	92.90	33	0.055 [0.042, 0.068]	0.047	0.954	0.938
Model 17 years	75.60	61.37	33	0.043 [0.025, 0.059]	0.043	0.976	0.967
Model 18 years	66.02	54.07	33	0.049 [0.023, 0.072]	0.056	0.974	0.964

Note: S-Bχ^2 = Satorra-Bentler scaled χ^2; d.f. = degrees of freedom; R-RMSEA = Robust Root Mean Square Error of Approximation; CI = confidence interval; SRMR = standardized root mean square residual; R-CFI = robust comparative fit index; TLI = Tucker Lewis Index. $p < 0.001$ for S-Bχ^2 in all cases.

3.2. Classical Item Analyses

The item means obtained values that ranged from 1.92 (NA: item nine) to 3.82 (PA: item one), with standard deviation results from 0.97 (NA: item nine) to 1.27 (PA: item five). All the values of correlations between items and corrected scale were higher than 0.36. Regarding the correlations between item-scale, they were of high magnitude (>0.57) because they ranged from 0.57 (PA: item five) to 0.83 (PA: item three). Lastly, the internal consistency of the scale after removing an item ranged from 0.71 (NA: item six) and 0.82 (PA: item five).

3.3. Factorial Invariance Across Sex and Age for the PANAS-C-SF

The results of factorial invariance across sex and age can be observed in Tables 2 and 3, respectively. Following the stepwise hierarchical method mentioned before, it could be analyzed that the PANAS-C-SF confirmed in an Ecuadorian sample the measure and structural invariance across sex and age. This is because all the nested models (from Model 2 to Model 5) showed good fit indices (TLI, R-CFI, R-RMSEA and SRMR) and no significant differences (ΔS-Bχ^2: $p > 0.05$; ΔCFI < 0.01) were found when the constraints were imposed: Model 2 with Model 1, Model 3 with Model 2, Model 4 with Model 3 and Model 5 with Model 3.

Table 2. Goodness-of-fit indexes for the two-factorial model of the PANAS-C-SF depending on sex.

	χ^2	S-Bχ^2	df	TLI	R-CFI	R-RMSEA 90% CI	SRMR	ΔS-Bχ^2 (Δdf, *p*)	ΔCFI
Model 1	210.06	175.26	66	0.965	0.974	0.030 [0.025, 0.036]	0.038		
Model 2	224.01	187.75	74	0.968	0.973	0.029 [0.024, 0.035]	0.041	12.15 (8, 0.145)	−0.001
Model 3	235.60	199.37	84	0.966	0.973	0.030 [0.024, 0.035]	0.041	10.56 (10, 0.393)	0.000
Model 4	256.00	216.18	95	0.966	0.972	0.029 [0.024, 0.034]	0.042	16.95 (11, 0.110)	−0.001
Model 5	237.90	201.58	87	0.967	0.973	0.029 [0.024, 0.034]	0.042	2.02 (3, 0.568)	0.000

Note: Model 1 = Free model; Model 2 = Model 1 with factor loadings; Model 3 = Model 2 with intercepts; Model 4 = Model 3 with error variances and covariances; Model 5 = Model 3 with variances and covariance factors; S-Bχ^2 = Satorra-Bentler χ^2 scaled; df = degrees of freedom; TLI = Tucker-Lewis Index; R-CFI = Robust Comparative Fit Index; R-RMSEA = Robust Root Mean Square Error of Approximation; CI = confidence interval; SRMR = Standardized Root Mean Square Residual; ΔCFI = comparative fit index difference test. ΔS-Bχ^2 = χ^2 difference model comparison test; Δdf: difference between degrees of freedom.

Table 3. Goodness-of-fit indexes for the two-factorial model of the PANAS-C-SF depending on age.

	χ^2	S-Bχ^2	df	TLI	R-CFI	R-RMSEA 90% CI	SRMR	ΔS-Bχ^2 (Δdf, *p*)	ΔCFI
Model 1	309.53	257.71	132	0.961	0.972	0.023 [0.019, 0.027]	0.046		
Model 2	342.58	288.33	156	0.965	0.970	0.022 [0.018, 0.026]	0.053	29.58 (24, 0.200)	−0.002
Model 3	374.44	323.70	186	0.959	0.969	0.021 [0.017, 0.025]	0.053	32.07 (30, 0.364)	−0.001
Model 4	410.29	355.74	219	0.963	0.971	0.019 [0.016, 0.023]	0.057	31.60 (33, 0.537)	0.002
Model 5	387.33	334.76	195	0.961	0.969	0.021 [0.017, 0.024]	0.063	11.08 (9, 0.270)	0.000

Note: Model 1 = Free model; Model 2 = Model 1 with factor loadings; Model 3 = Model 2 with intercepts; Model 4 = Model 3 with error variances and covariances; Model 5 = Model 3 with variances and covariance factors; S-Bχ^2 = Satorra-Bentler χ^2 scaled; df = degrees of freedom; TLI = Tucker-Lewis Index; R-CFI = Robust Comparative Fit Index; R-RMSEA = Robust Root Mean Square Error of Approximation; CI = confidence interval; SRMR = Standardized Root Mean Square Residual; ΔCFI = comparative fit index difference test. ΔS-Bχ^2 = χ^2 difference model comparison test; Δdf: difference between degrees of freedom.

3.4. Latent Mean Differences across Sex and Age on the PANAS-C-SF

To carry out the analysis of the latent mean differences across sex, the group of men was set to zero to perform the comparisons. The model statistics for this case met the minimum indices required (χ^2 = 273.39, S-Bχ^2 = 233.55, d.f. = 82, $p < 0.000$, R-CFI = 0.975, TLI = 0.966, R-RMSEA = 0.032, CI = 0.027–0.037 and SRMR = 0.042) and it can be observed in Table 4 that women scored higher than men in the NA dimension with a small size effect (d = 0.49). In the PA dimension, there were no statistically significant differences.

Table 4. Latent means differences across sex and age groups in the PANAS-C-SF.

	PANAS-C-SF Dimensions	
	FI	**FII**
Men (reference)		
Women		
Mean estimate (ME)	−0.06	0.41
Standard error (SE)	0.04	0.04
Critical Ratio (CR)	−1.50	10.14 *
15-year-old (reference)		
16-year-old		
ME	−0.00	−0.07
SE	0.05	0.05
CR	−0.02	−1.40
17-year-old		
ME	−0.04	−0.02
SE	0.06	0.05
CR	−0.66	−0.36
18-year-old		
ME	0.00	0.07
SE	0.07	0.07
CR	0.01	1.03
16-year-old (reference)		
17-year-old		
ME	−0.04	0.06
SE	0.06	0.05
CR	−0.69	1.20
18-year-old		
ME	0.00	0.14
SE	0.07	0.06
CR	0.03	2.39 *

Table 4. *Cont.*

	PANAS-C-SF Dimensions	
	FI	**FII**
17-year-old (reference)		
18-year-old		
ME	0.04	0.09
SE	0.07	0.06
CR	0.56	1.48

Note: FI: Positive Affect; FII: Negative Affect; *: Statistically significant difference (>1.96 or <−1.96).

With regard to the latent mean differences across age, the age groups of 15, 16 and 17 years old were established as the reference group to obtain the results of all the possible comparisons. In each of the comparisons, the younger age group was set to zero: the group of 15 years when it was compared with 16, 17 and 18; the group of 16 years when it was compared with the 17 and 18; the group of 17 years when it was compared with 18. In all the cases the fit indices were adequate (15 years as reference: χ^2 = 394.28, S-Bχ^2 = 341.03, d.f. = 180, p < 0.000, R-CFI = 0.969, TLI = 0.959, R-RMSEA = 0.022, CI = 0.019–0.026 and SRMR = 0.054; 16 years as reference: χ^2 = 309.36, S-Bχ^2 = 265.28, d.f. = 131, p < 0.000, R-CFI = 0.965, TLI = 0.953, R-RMSEA = 0.028, CI = 0.023–0.032 and SRMR = 0.055; 17 years as reference: χ^2 = 158.10, S-Bχ^2 = 132.92, d.f. = 82, p < 0.000, R-CFI = 0.973, TLI = 0.963, R-RMSEA = 0.029, CI = 0.020–0.038 and SRMR = 0.055). In Table 4, it can be observed that the age group of 18 years old significantly scored higher than the group of 16 years old with a small size effect (d = 0.16). Notwithstanding, there were no significant differences in PA. Moreover, in the rest of comparisons there were no statistically significant differences in any of the affective dimensions.

3.5. Identification of Child Affective Profiles

According to the criterion mentioned in the statistical analysis section and as seen in Figure 1, the first profile was formed by 560 individuals (31.35%) who scored high in PA and low in NA, so they received the name of Self-Fulfilling profile. The second group was formed by 547 participants (30.64%) who obtained low scores in PA and NA. This group was called Low affective profile. The third group was made up by 326 people (18.25%) who scored low in PA and high in NA, so they were called Self-Destructive profile. Lastly, 353 individuals (19.76%) scored high in both dimensions and received the name of High affective profile.
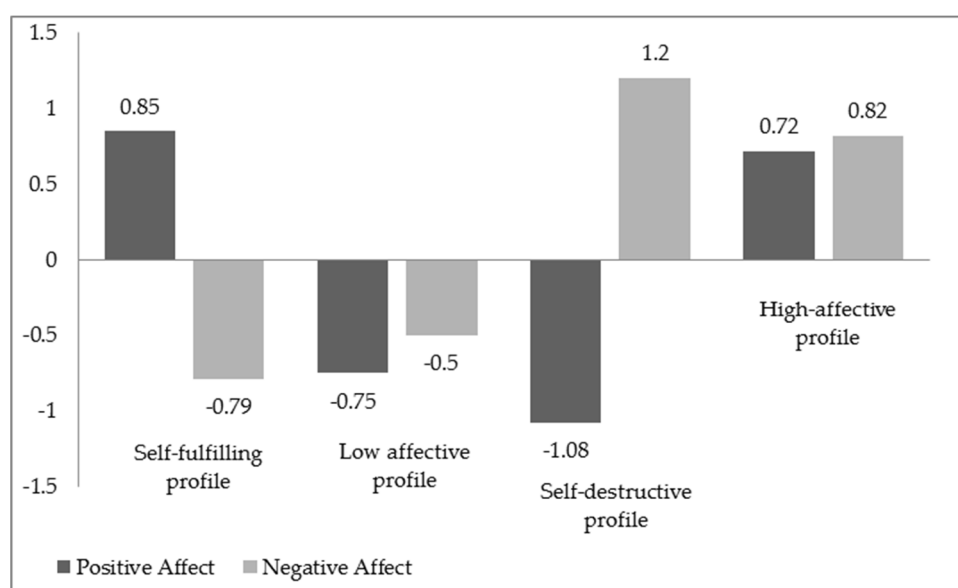

Figure 1. Graphic representation of the four child affective profiles through cluster analysis.

3.6. Inter-group Differences in Social Anxiety

The ANOVA tests identified statistically significant differences between the four affective profiles in terms of the mean scores of all the subscales of social anxiety. As can be observed in Table 5, the Self-Fulfilling profile presented the lowest mean scores in the three subscales of social anxiety, whereas the Self-Destructive was identified as the group with the highest scores.

Table 5. Means and standard deviations obtained by the four affective profiles for each dimension of social anxiety.

Dimensions	SF Profile		LA Profile		SD Profile		HA Profile		Statistical Significance		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	$F_{(3,1782)}$	*p*	η^2
FNE	15.75	5.98	16.88	5.91	19.47	6.46	18.10	6.43	28.27	<0.001	0.045
SAD-N	13.35	4.74	14.07	4.40	16.14	5.16	15.10	5.09	26.55	<0.001	0.043
SAD-G	8.39	3.33	9.09	3.42	10.63	3.49	9.80	3.55	32.62	<0.001	0.052

Note: SF: Self-Fulfilling; LA: Low Affective; SD: Self-Destructive; HA: High affective; FNE: Fear of Negative Evaluations; SAD-N: Social Avoidance and Distress in New Situations; SAD-G: Social Avoidance and Distress-General.

After performing the *post hoc tests*, statistically significant differences were found between the Self-Fulfilling and the Low Affective profiles in the dimensions of FNE and SAD-G; these differences had a small effect size (*d* = 0.20 and 0.21, respectively). However, no statistically significant differences were found between both profiles in the SAD-N dimension. For its part, the Self-Fulfilling and the Self-Destructive profiles showed statistically significant differences of moderate effect size in the three dimensions of social anxiety (*d* for FNE = 0.60; *d* for SAD-N = 0.57; *d* for SAD-G = 0.66). The differences between the Self-Fulfilling and the High Affective profiles were statistically significant in all the dimensions of social anxiety and they were of small effect size that ranged between *d* = 0.36 (SAD-N) and *d* = 0.41 (SAD-G). With regard to the differences found between the Low affective profile and the Self Destructive and the High Affective profiles, it is important to highlight that, in all the dimensions of social anxiety, differences of small effect size were found: Low Affective with Self Destructive (*d* for FNE = 0.42; *d* for SAD-N = 0.44; *d* for SAD-G = 0.45) and Low Affective with High Affective (*d* for FNE = 0.20; *d* for SAD-N = 0.22; *d* for SAD-G = 0.20). Finally, the differences found between the Self-Destructive and the High Affective profiles were statistically significant for all the dimensions of social anxiety and they showed a small effect size because they ranged from *d* = 0.20 for the SAD-N to *d* = 0.24 for the SAD-G. As the analyses have confirmed, the highest effect size of the found differences was produced between the Self-Fulfilling and the Self-Destructive profiles.

4. Discussion

The first aim of the current investigation was to validate the PANAS-C-SF in a Spanish-speaking adolescent sample. The scale had been validated in an American sample [38] but there was no Spanish version. Consequently, this study provides the first results of the Spanish validation of the PANAS-C-SF in an Ecuadorian sample aged from 15 to 18 years.

The results of the CFAs confirmed that the scale obtained acceptable internal consistency indices according to the classification of Brown [58]. Moreover, the negative correlation of small magnitude (−0.37) between PA and NA, and the adequate reliability coefficients for both factors confirmed the suitability of the two-factorial model of affect that has obtained good results in the current literature [2,35,36,38]. However, the current research provides the confirmation of the measure and structure invariance of the PANAS-C-SF across sex and age. In this sense, the ability to use an affect scale that remains invariant gives researchers the opportunity to use a useful and shorter resource to measure affect in a Spanish-speaking adolescent sample. Consequently, Latin American researchers do not have to translate the original American version as has been happening until now, as for the case of the studies performed in the Mexican population [28,30,37]. Conversely, they can now administer the

Spanish-speaking version of the PANAS-C-SF, which has shown to be a valid and reliable measure in an Ecuadorian sample.

As a result, once the factorial invariance of the PANAS-C-SF was confirmed, the latent mean differences across sex and age were analyzed, as was programmed in the aims of the study. The results of the analyses for sex indicated that, although no significant differences were found in the scores of PA, women scored significantly higher than men in NA. Regarding the differences between the age groups, only the 18 year old group scored significantly higher in NA than the group of 16 years. Consequently, the identification of these differences is partially in line with the conclusions of the work that Ortuño-Sierra et al. [35,36] conducted with Spanish adolescents aged from 10 to 15 years old. They found that females scored higher than males in NA and superior-level students scored higher in PA than younger students. Regarding the differences about sex, it is known that women tend to be more related to feelings of insecurity and sadness [70], and the results obtained support this idea. With regard to the differences across age, although older Spanish adolescents obtained significantly higher levels of PA than younger ones, in the current research the statistically significant differences affected the NA factor. It is true that the oldest Ecuadorian adolescent group also scored higher in PA than the youngest group, but these differences were not significant. A possible explanation for this difference could be that adolescent students are at a life stage in which they experience more intense affective reactions than young students and these situations could lead them to be associated with negative feelings, especially with 18-year-old students. Besides, the oldest students of the Spanish sample were 15 years old and the difference of age with the oldest group of the current study could be affecting. Moreover, the differences of the culture of the sample between Ecuador and Spain could be also considered. As a consequence, the results of the current study show that both Ecuadorian women and the oldest Ecuadorian adolescent group obtained high levels of NA, which are characterized to be linked with insecurities and internal fears. Therefore, it is necessary to consider these findings for future and analyzing whether is something that only happens in the studied sample or it can be replicated in other studies.

With regard to the third aim of the study, it has been observed that the affective profiles suggested by Norlander et al. [43] have been replicated. In this way, the Self-Fulfilling (high PA and low NA), the Self-Destructive (low PA and high NA), the High affective (high PA and NA) and the Low affective (low PA and NA) profiles have been confirmed in Ecuadorian adolescent sample. Additionally, the Self-Fulfilling included the highest percentage of participants, whereas the Self-Destructive profile was the one with the lowest percentage.

Once the possibility of using the affective profiles was confirmed, the last aim of the investigation was the identification of differences in the scores of social anxiety according to the affective profiles. As it has been observed, the Self-Fulfilling profile obtained the lowest scores in all the dimensions of social anxiety and showed significant differences of small and moderate effect size with the rest of profiles. On the other hand, the Self-Destructive profile showed the highest scores in social anxiety and obtained significant differences of small and moderate effect size with the rest of profiles. These results provide support to the study of the association between different levels of PA and NA and social anxiety. In line with previous research, the combination of high levels of PA and low levels of NA (Self-Fulfilling profile) appears to be the most adaptive at levels of emotional development (associated with high scores in life satisfaction and happiness, and low scores in social anxiety, depression and stress), whereas the opposite combination (Self-Destructive profile) is linked to more maladaptive results (correlated with low scores in life satisfaction and happiness, and high scores in social anxiety, depression and stress) [16,23–25,39,45–51]. The identification of the relation between the affective profiles and social anxiety during adolescence provides useful information that could be considered for the treatment and prevention of future disorders [71], such the case of treatment response in adolescent depression and anxiety. It is important to promote in students adaptive profiles as the Self-Fulfilling through techniques that have shown a positive relation to PA and negative relation to NA such as cognitive restructuring, mindfulness, promoting self-esteem, working resilience or attentional control,

among others [18,72–76]. All these techniques could be associated to the high levels of PA and the low levels of NA of the people taking part on them. As a result, this fact could be associated to the presence of a Self-Fulfilling profile in the individuals that could be negatively related to the appearance of social anxiety disorders and it could also act as a possible partial mediator of people's life satisfaction [77], as it has been studied through longitudinal studies.

Limitations and Practical Implications

Despite the results of the current study, it is important to mention that there are several limitations that should be considered in future investigations. Firstly, the study has studied affect in adolescent participants, therefore it should be necessary to investigate lower age groups (Primary School Education), perform longitudinal studies to analyze the change of the measure of affect over time and to establish causal relations through structural equation modeling approaches [78,79]. However, not only would it be necessary to assess affect through self-report measures, but it would also be useful to use other sources of information such as parents, schoolmates or teachers. In this sense, it would be convenient to analyze the relation between affect and other psychoeducational variables that can have an impact on anxiety, as in the case of aggression, school refusal or even perfectionism [80–83]. Finally, it would be necessary to be able of analyzing the existence of the identified affective profiles in other Spanish-speaking countries, such the case of Spain, to analyze the cultural effect mentioned before [84].

To conclude, the current study provides important and pioneering knowledge to the field of the study of the affect. On the one hand, it is the first study to validate and test the factorial invariance of the Spanish version of the PANAS-C-SF in an adolescent sample across sex and age, so it is an innovative work that provides evidence about the validation of the internal structure of the scale in a specific Spanish-speaking adolescent sample. As it has been mentioned before, being able to obtain a valid and reliable measure of affect is an important fact to relate to the possible appearance of future anxiety problems. Additionally, after validating the scale, the existence of the four affective profiles suggested by Norlander et al. [43] could be studied for the first time in Spanish-speaking adolescent participants. These affective profiles are useful because they can be related to psychoeducational variables that can have an impact on the psychological and emotional development of the human being. Consequently, the negative relation found in the current study between the Self-Fulfilling profile and the scores of social anxiety supports the idea of promoting this kind of profile in adolescents. By doing so, adolescents could associate their high PA levels and their low levels of NA with more adaptive behaviors and away from emotions related to social anxiety. The results of the current study provide an interesting and important finding because the validation of the PANAS-C-SF in a Spanish-speaking adolescent sample allows obtaining a reliable and robust measure of affect which can be used to be linked to future psychological disorders in preventive and treatment programs.

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