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Reliability and validity evidence of the School Anxiety Inventory scores in a sample of Spanish children: A new self-report

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Abstract

Anxiety and school fears are relatively frequent in childhood. Psychology and education professionals need to have assessment instruments for screening for school anxiety in schools. This study aimed to develop, adapt, and examine the reliability and validity evidence of the School Anxiety Inventory for Primary Education (SAI-PE) scores. Using random cluster sampling, a sample of 843 Spanish students (51.7% girls), ages ranging from 8 to 12 years ($M = 10.03$, $SD = 1.25$), was selected from public and concerted schools. The content validity of the SAI-PE scores was analyzed through experts' judgment and students' assessment of their comprehension of the instrument's items. Exploratory and confirmatory factorial analyses support the validity of the SAI-PE scores. The results revealed a multifactorial structure for the scores of anxiety reactions (cognitive, psychophysiological, and behavioral) and school situations scores (school punishment, victimization, social, and academic evaluation). The study conclusions reinforce the importance of having instruments that assess the complexity of emotional responses such as school anxiety, favoring its early detection and evaluating the effectiveness of preventive and/or therapeutic programs in schools.

KEYWORDS

childhood, primary education, school anxiety, self-report, validation

Practitioner points

- School Anxiety Inventory for Primary Education presented a multidimensional structure comprising four correlated situational factors: School Punishment Anxiety, Victimization Anxiety, Social Evaluation Anxiety, and School Evaluation Anxiety.
- School Anxiety Inventory for Primary Education allows the evaluation of the anxiety triple response system (cognitive, behavioral, and psychophysiological).
- School Anxiety Inventory for Primary Education is a valid, reliable and simple self-report which allows the complete evaluation of school anxiety in Spanish childhood population.

1 | INTRODUCTION

School anxiety can be defined as a person's set of cognitive, behavioral, and psychophysiological reactions to school situations appraised as threatening, ambiguous, and/or dangerous, although objectively, they are not (García-Fernández et al., 2008). This definition is based on Lang's (1968) three-dimensional theory, which establishes that any anxiety response is made up of a triple system of reactions (cognitive, physiological, and behavioral) that could function partially independently, although they also interact with each other (Cano-Vindel, 2003; see Martínez-Monteagudo et al., 2012, for a review). Furthermore, this definition of school anxiety includes the premises of Endler's (1975) interactionist theory, which states that each person has a different emotional profile depending on the interaction between their personal characteristics and those of the situation in which they are immersed.

Canals et al. (2019), in a study conducted with Spanish children aged 9–12 years, found that the prevalence of any anxiety disorder was 11.8%, with specific phobias being more common (16.2%). Within phobias or more specific anxieties, school anxiety and fears are relatively common in Spanish children. In this sense, Fernández-Sogorb et al. (2018) found that 20.1% of Spanish children aged between 8 and 12 had high school anxiety, using a community sample.

However, after an exhaustive review of the scientific literature, no epidemiological studies have been found that examine the prevalence of anxiety or school phobia in any official Spanish body. Obviously, this could be because the School anxiety/phobia is not currently recognized as a nosological entity in international manuals such as the *Diagnostic and Statistical Manual of Mental Disorders-fifth edition* ([DSM-V], American Psychiatric Association, 2013, its update, the DSM-V-TR; American Psychiatric Association, 2022) or the *International Classification of Diseases* ([ICD-11], World Health Organization, 2018).

Specifically, school anxiety may occur in childhood with greater intensity, frequency, and duration before school changes, such as those derived from the expansion of Sars-Cov2 (Kamran & Naeim, 2021), transitions of the educational stage (La Greca & Burdette, 2022; Xu et al., 2021), or certain school events such as academic evaluation, social evaluation, failure, school punishment, or circumstances linked to peer aggression and/or victimization (García-Fernández et al., 2014; Gómez-Núñez et al., 2017; Ingles et al., 2015). Among the

consequences of school anxiety are the likelihood of lower academic performance and problems in school well-being (Hossain et al., 2021; Shamionov et al., 2021), increased experiences of bullying and higher rates of aggressiveness (Delgado, García-Fernández, et al., 2019; Torregrosa et al., 2020), somatic complaints (Jastrowski Mano, 2017), increase in school refusal (Gómez-Núñez et al., 2019; Gonzálvez, Ingles, Sanmartín et al., 2018; Tekin & Aydın, 2022), cognitive distortions (Abend et al., 2017), depressive symptoms (Alesi et al., 2014), and social anxiety (Delgado, Escortell Sánchez, et al., 2019).

In this line, it is important to highlight the bibliometric study recently published by Urbán et al. (2023). The aim of this bibliometric analysis was to analyze the scientific output on adolescent social anxiety and its relationship with 15 psychoeducational variables in peer-reviewed journals during the 2002–2021 period, using the Web of Science. This review revealed that school anxiety was the fourth most studied variable related to social anxiety, after school achievement, school adjustment, and school refusal behavior.

Currently, some instruments are adapted to the Spanish child population, such as the "Inventario de Miedos Escolares" ([Inventory of School Fears] SFSS-II; García-Fernández et al., 2010), which assesses fear and anxiety in different school situations, the Test Anxiety Inventory for Children and Adolescents (Unruh & Lowe, 2010), or the Scale for Early Mathematics Anxiety (SEMA; Sánchez-Pérez et al., 2021), which evaluates anxiety in specific school situations such as exams (academic evaluation) or specific disciplines such as mathematics.

In addition, the School Anxiety Scale-Teacher Report (SAS-TF; Orgilés et al., 2017) assesses students' school anxiety from the teacher's perspective. Similarly, the Visual Analogue Scale for Anxiety-Revised assesses school anxiety as a function of its anticipation, social situations, or more unspecific and/or general situations (Fernández-Sogorb et al., 2018).

The review of the previous empirical evidence conduct in this study also reveals other tools that are not specific for measuring school anxiety, but that include factors or items linked to this emotion such as the "Inventario de Miedos para Niños-Versión Española" ([Inventory of Fears for Children-Spanish Version] FSS-R-E; Sandín & Chorot, 1998), which presents some items related to school fears, the screen for child anxiety-related emotional disorders—in whose Spanish version (Vigil-Colet et al., 2009) the factor "school phobia" included in the original version (Birmaher et al., 1997) was eliminated due to the low factorial loadings of its items and their loadings on other dimensions—, as well as the Spanish Version of the School Refusal Assessment Scale-Revised (Gonzálvez et al., 2016)—whose first two factors (school refusal to avoid stimuli that provoke negative emotions and school refusal to avoid aversive social situations) are associated with increased anxiety in school situations (Gonzálvez et al., 2020).

Finally, there is the "Inventario Infantil de Estresores Escolares" ([Children's Inventory of School Stressors] IIEC; Trianes et al., 2009), which includes a dimension called "School/Peers," which groups school situations or peer interactions that can be stressful in childhood.

Despite the adequate psychometric properties of the aforementioned instruments, it is important to emphasize that they do not consider the triple system of reactions that make up the anxiety response (Lang, 1968; see Martínez-Monteagudo et al., 2012, for a review), they mix emotional responses such as fear and anxiety (see Craske et al., 2009, for a review) or do not specify all the school situations that are most threatening for children.

Therefore, it is important for educational psychologists, clinicians, and education professionals in general to have instruments that allow measuring and evaluating the complexity of emotional responses such as school anxiety. In this sense, the SAI-PE aims to make up for these shortcomings. Thus, this instrument would contribute to improving the early detection of school anxiety, as well as the evaluation of the effectiveness of preventive and/or therapeutic programs aimed at mitigating this maladaptive response in Spanish students of primary education.

1.1 | The School Anxiety Inventory for primary education

The development of the "School Anxiety Inventory for Primary Education" (SAI-PE) was primarily based on the "School Anxiety Inventory for Adolescents-Short Version" (SAI-SV; García-Fernández & Ingles, 2017; García-Fernández et al., 2014; Ingles et al., 2015).

The SAI-PE was developed using a representative sample of Spanish children. The instrument's scores are based on the postulates of Lang's (1968) tridimensional theory and Endler's (1975) interactionist theory. The fusion of these models is one of the most exhaustive and accurate ways to evaluate and measure school anxiety in childhood and adolescence (García-Fernández & Ingles, 2017).

The SAI-SV comprises 5 cognitive responses, 5 physiological responses, and 5 behavioral responses, as well as 15 situations. The exploratory and confirmatory factor analyses revealed the existence of three correlated situational factors (aggression anxiety, social evaluation anxiety, and school failure anxiety), each comprising five items. Similarly, three dimensions related to anxiety responses (cognitive, psychophysiological, and behavioral) were found, each with five items.

The main differences between the SAI-SV and the SAI-PE lie in the adaptation of the items of the SAI-SV to the child population, the modification of some of the situations and responses of school anxiety examined—more in line with the stage of Primary Education (an aspect that entails modifications in the factorial structure of school situations)—and the revision of the test's format, going from a double-entry table to several simple tables that are easier for children to read and understand (i.e., SAI-PE).

Therefore, the main purpose of this study was to develop, adapt, and examine the reliability and validity evidence of the SAI-PE scores in a sample of Spanish children. This general goal is divided into the following specific goals: (a) to analyze the content validity of the SAI-PE through experts' judgment and assess the comprehension of the items in a small independent sample of students with characteristics very similar to those of the children recruited in the sample of this study; (b) to examine the factorial structure of the SAI-PE scores through exploratory factor analyses (EFAs) of iterated principal axes (i.e., PAFs) and confirmatory factor analyses (CFAs), using the cross-validation procedure; (c) to determine the correlation coefficients between the various factors obtained; (d) to estimate the test scores's internal consistency indices for all the identified factors or dimensions of the SAI-PE.

Based on the previous empirical evidence found mainly in samples of Spanish children, we expect that the SAI-PE scores: (a) will present a multifactorial structure for school situations, with statistically significant correlations between them; (b) will present a multifactorial structure for the assessed anxiety responses (i.e., cognitive, psychophysiological, and behavioral) that, in turn, will be statistically correlated; (c) will have high internal consistency coefficients for the situational factors and the different school anxiety responses.

2 | METHODS

2.1 | Participants

In the present study, random cluster sampling was ejectuded in the province of Alicante. Two schools were randomly selected for each geographical area of this province (i.e., north, south, east, west, and center), resulting in a total of 10 schools, of which 7 schools were public and 3 were concerted (i.e., concerted schools are private schools with public subventions by Spanish Government) schools. Subsequently, four classrooms were randomly selected for each of the 10 participating schools, which included an average of 22 students (one for each educational level examined, from third to sixth grade of primary education).

The initial sample included 880 students, of whom 37 (4.20%) were excluded because they did not have their families' informed consent, due to errors or omissions in their responses, because they had significant difficulties with the Spanish language, and/or because they presented outlier data.

Regarding the outliers' data, we note that, when observing the answers of six values of this type, we found that in all the items, the same answer had been given. Therefore, we decided to eliminate them because we concluded that there was a striking lack of participants' interest in answering. In this sense, the influence that outliers' data may have on research results is minimal (Cousineau & Chartier, 2010).

Therefore, the final sample was composed of 843 students (51.7% girls) from the second and third cycle of Primary Education (19.8% from third, 19.8% from fouth, 27.9% from fifth, and 32.4% from sixth grade), aged between 8 and 12 years (M = 10.03, SD = 1.25).

2.2 | Instruments

SAI-PE.

It was developed for students aged from 8 to 12 years and comprising 34 items in its final version: 19 referring to school situations that can cause anxiety (school punishment = 5 items; victimization = 5 items; social evaluation = 5 items; school evaluation = 4 items), and 15 items that present the different school anxiety responses (5 cognitive, 5 psychophysiological, and 4 behavioral responses).

2.3 | Procedure

Following the ethical standards of scientific research, first, an interview was conducted with the participating schools' management teams to explain the research's purposes, the evaluation instruments, and request their authorization and collaboration. After obtaining authorization, assistant researchers sent a letter to the families explaining the study and requesting their written informed consent to authorize their children's participation in the research. Moreover, it was also explained that students could withdraw from participation at any time during the study.

Subsequently, the instrument was administered voluntarily, anonymously (i.e., bearing in mind the number of each child on the class list, sex, age, grade, and school code), and collectively in the classroom in the presence of one of the researchers and with the support of the school counselors and the group tutors. Before completing the inventory, the students were instructed to fill in the identification data, and the instructions were read aloud. After completing the questionnaire, we thanked the groups and the educational teams for their participation in the project, ensuring the descriptive return of the results to the educational counselor of each participating school after the research was completed.

The present research protocol was approved by the Ethical Committee of the Universities included in this study. The participation and all the procedures were conduct following the ethical standards of the 1964 Helsinki Declaration and its subsequent amendments.

2.4 | Data analysis

When planning the statistical analyses, we considered the model and recommendations of previous research to evaluate a new test (Schmitt, 2011).

To analyze the internal structure of the SAI-PE scores, we used EFAs. To determine sample size adequacy for conducting the EFAs, we used Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) coefficient. In addition, the internal structure of SAI-PE scores was examined through CFAs, using a cross-validation procedure. Thus, the total sample was randomly divided into two subsamples. EFAs were performed with the first subsample (n = 386), and CFAs were performed with the second subsample (n = 457), as recommended by Ferrando-Piera et al. (2022).

Four iterated principal axes factor (PAFs) analyses were performed with oblimin rotation for anxiety situations and responses, assuming a relationship between these dimensions. The number of factors was determined according to Kaiser's criterion (selecting factors with an eigenvalue equal to or greater than one), following the recommendations of Hair et al. (2008). The items included had factor loadings greater than or equal to .30 (Gorsuch, 1983).

Four CFAs were performed to test the models obtained in the PAFs: one for school situations and three for the different school anxiety responses, applying the maximum likelihood (ML) estimation method. For this purpose, univariate and multivariate normality were examined, as well as the residual dispersion plots.

Multivariate kurtosis was analyzed through the Mardia coefficient, obtaining indices ranging between 12.87 and 129.58 for the different scales of the SAI-PE. These coefficients indicated that the sample of this study did not meet the assumptions of normality in the distribution of frequencies, so following the recommendations of Finney and DiStefano ([2006]) and Bentler ([2005]), we evaluated the fit of the proposed models taking into account the χ^2 statistic and the following goodness-of-fit indices (Hu & Bentler, [1999]): the robust comparative goodness-of-fit index (R-CFI), the Tucker-Lewis index (TLI), the normed fit index (NFI), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the robust standardized root mean square residual (R-RMSEA).

To calculate the correlations between the different factors of the SAI-PE, we calculated Pearson's product-moment correlation coefficients, describing their effect sizes according to Cohen ([1988]).

Based on the interpretations of the Cronbach α coefficients proposed by George and Mallery ([2003]) and Ponterotto and Ruckdeschel ([2007]), we calculated the internal consistency of the scores of the SAI-PE factors (situations, responses, and total score).

All statistical analyses were performed using the SPSS statistical packages version 23.0, and EQS. 6.1.

3 | RESULTS

3.1 | SAI-PE: Content validity

The SAI-PE, initially composed of 70 items, divided into 32 school situations and 38 responses (18 cognitive, 8 psychophysiological, and 12 behavioral), was evaluated according to the criteria of 10 judges (52% women), 5 specialists in educational and clinical psychology for children and 5 educational counselors (psychologists and educational psychologists) with an average experience of 8.2 years. Individually, the experts determined the degree of adequacy of each of the instrument's items using a 5-point Likert scale (0 = *irrelevant*; 4 = *very relevant*).

To maintain a situation or response from the initial set, we established as a criterion that at least eight of the judges had to rate it as *quite* or *very relevant* (Cohen's κ coefficient ≥.80). The items that did not reach the agreement according to the experts' judgments were eliminated. Thus, the SAI-PE was composed of 33 items distributed in 23 school situations and 10 anxiety responses (3 cognitive, 3 psychophysiological, and 4 behavioral).

All items related to anticipatory anxiety (e.g., *On the way to school*), which were included in this analyzed version, were eliminated due to their low factorial loads. Subsequently, and according to the criteria of the expert judges, some of the statements of the school situations were modified (e.g., *If they punish me at school* became *If the teacher punishes me*), and some new items were added to the responses to increase the inventory's content validity (e.g., *I can't sit still, I ruminate about it, I think about it*).

After analyzing face and content validity according to the judges' criteria and the consequent refinement or elimination of items, the SAI-PE was administered to a small sample, independent of the main sample of this study, although with similar characteristics. This sample comprised 309 primary school students aged between 8 and 12 years (51% girls, $M = 9.96$, $SD = 1.30$). The sample was selected with nonprobability convenience sampling of three public schools in the province of Albacete, Spain (whose sociodemographic characteristics were very similar to those of the province of Alicante, Spain, where the main sample of this study was recruited probabilistically).

To increase the face and content validity of the SAI-PE, we presented the instrument's items and asked the children, *"Do you understand what this question means?"* The children responded *yes* or *no*. Of them, 98.6% responded *yes*, supporting the experts' judgment, so the wording of the SAI-PE items was not modified.

Finally, the SAI-PE consisted of 37 items corresponding to 22 school situations and 15 school anxiety responses (5 cognitive, 5 psychophysiological, and 5 behavioral).

3.2 | Exploratory factor analysis of the school situations

The Kaiser-Meyer-Olkin sample adequacy test (KMO = .92) and Bartlett's sphericity test (x^2 = 11279.75, df = 171, p < .001) showed satisfactory values. The factorial solution was composed of 19 items grouped into four factors referring to anxiogenic school situations with an eigenvalue greater than one, which explained 61.85% of the total variance (see Appendix A for a review of school situations).

Factor I, School Punishment Anxiety (λ = 3.13), is related to anxiety shown in situations of explicit punishment at school or that could lead to punishment, such as *"If the teacher asks me for homework and I have not done it"* or *"If the teacher says he/she is going to call my parents to come to school"*. This factor has 5 items that explain 16.48% of the variance. The factor loadings ranged between .67 and .78 (M = .72).

Factor II, Victimization Anxiety (λ = 3.10), reflects the anxiety caused by situations in which a person feels physically or psychologically assaulted by peers, for example, *"If I am insulted or threatened at school"* or *"If I am in the middle of a fight"*. This factor presents 5 items that explain 16.32% of the variance. The factor loadings ranged between .65 and .76 (M = .72).

Factor III, Social Evaluation Anxiety (λ = 2.85), refers to the anxiety felt when expecting to be judged negatively by others at school, for example, *"Go to the blackboard"* or *"If the teacher asks me something in front of the class"*. This factor comprises 5 items that explain 15.02% of the variance. The factor loadings ranged between .55 and .75 (M = .69).

Finally, Factor IV, School Evaluation Anxiety (λ = 2.66), included 5 items related to anxiety associated with test situations, such as *"A few moments before taking an exam"* or *"When I'm taking an exam"*. This factor explains 14.01% of the variance. The factor loadings ranged between .62 and .83 (M = .75).

3.3 | Exploratory factor analysis of cognitive responses to school anxiety

Adequate indices were found in the Kaiser-Meyer-Olkin sample adequacy test (KMO = .74) and in the Bartlett's -Test of Sphericity (x^2 = 959.75, df = 10, p < .001). A factor with an eigenvalue greater than one (λ = 1.76) was found, which explained 35.15% of the variance (see Appendix A for a review of cognitive reactions).

This single factor, comprising 5 items, refers to the cognitive symptoms of school anxiety, including reactions such as: *"I ruminate about it, I think about it"*, or *"I feel guilty"*. The factor loadings ranged between .41 and .75 (M = .58).

3.4 | Exploratory factor analysis of behavioral responses to school anxiety

The Kaiser-Meyer-Olkin sample adequacy test (KMO = .72) and Bartlett's Test of Sphericity (x^2 = 839.06, df = 6, p < .001) presented adequate values.

The factorial solution consisted of one factor with an eigenvalue greater than one (λ = 1.67) that explained 41.75% of the variance (see Appendix A for a review of behavioral reactions). Only one of the five items included after the initial inventory refinement was removed (*"I get blocked, I don't know what to do"*) because it did not reach the minimum required factor load of .30. Therefore, this factor was finally made up of 4 items associated with behavioral manifestations of school anxiety, such as *"I cannot find the words"* or *"I cannot sit still"*. The factor loadings ranged between .49 and .82 (M = .64).

3.5 | Exploratory factor analysis of psychophysiological responses to school anxiety

The Kaiser-Meyer-Olkin sample adequacy index (KMO = .77) and Bartlett's Test of Sphericity (x^2 = 1087.54, df = 10. p < .001) showed adequate values.

One factor with an eigenvalue greater than one ($\lambda = 1.67$) was found, which explained 41.75% of the variance (see Appendix A for a review of psychophysiological reactions). This factor contained 5 items, which reflected the most involuntary anxious responses; that is, those caused by the Autonomic Nervous System (ANS) and the Somatic Nervous System (SNS), such as *"My head aches"* or *"I breathe faster"*. The factor loadings ranged between .45 and .76 ($M = .61$).

3.6 | Confirmatory factor analysis of school situations

The factorial structure was analyzed through four CFAs, evaluating the fit of four different models: (M0) a model without factors, (M1) a one-factor model, (M2) a model with four uncorrelated factors, and (M3) a model with four correlated factors.

The results of the CFAs revealed a significant χ^2 statistic for all the proposed models, indicating their poor fit. However, according to the goodness-of-fit indices, the model that best fit the data was the model with four correlated factors (M3; $\chi^2 = 678.64$, $p < .001$; GFI = .93, AGFI = .91, R-RMSEA = .06, NFI = .94, TLI = .94, R-CFI = .95), showing a significant improvement over the one-factor model (M1; $\chi^2 = 4705.23$, $p < .001$) and the model with four uncorrelated factors (M2; $\chi^2 = 1663.27$, $p < .001$) (see Figure 1).

3.7 | Confirmatory factor analysis of cognitive responses to school anxiety

The factorial structure was also analyzed through three CFAs, evaluating the fit of three different models: (M0) a model without factors, (M1) a one-factor model, and (M2) a model with one factor, correlating Items 1 and 3, and Items 4 and 5.

The results of the CFA showed a significant χ^2 statistic for all the proposed models ($p < .001$), indicating their poor fit. However, after examining the goodness-of-fit indices, the model that best fit the data was the one-factor model that correlated Items 1 and 3, and Items 4 and 5 (M2; $\chi^2 = 16.33$, $p < .001$). Although the one-factor model (M1; $\chi^2 = 80.78$, $p < .001$) also fit the criteria established for the proposed indices (except for the R-RMSEA index, which was greater than .08), M2 represented a significant improvement over M1 and the null model or model without factors (M0; $\chi^2 = 962.16$, $p < .001$; GFI = .99, AGFI = .97, R-RMSEA = .07, NFI = .98, TLI = .95, R-CFI = .99) (see Figure 2).

3.8 | Confirmatory factor analysis of behavioral responses to school anxiety

The factorial structure was also analyzed through two CFAs to evaluate the fit of two different models: (M0) a model without factors, and (M1) a one-factor model.

According to the results of the CFA, the χ^2 statistic was significant for all the proposed models ($p < .001$), indicating their poor fit. However, according to the goodness-of-fit indices, the one-factor model fit the data optimally (M1; $\chi^2 = 13.56$, $p < .001$; GFI = .99, AGFI = .97, R-RMSEA = .07, NFI = .98, TLI = .95, R-CFI = .99) (see Figure 3).

3.9 | Confirmatory factor analysis of the psychophysiological responses to school anxiety

The factorial structure was analyzed through two CFAs to evaluate two types of models: (M0) a model without factors, and (M1) a one-factor model.
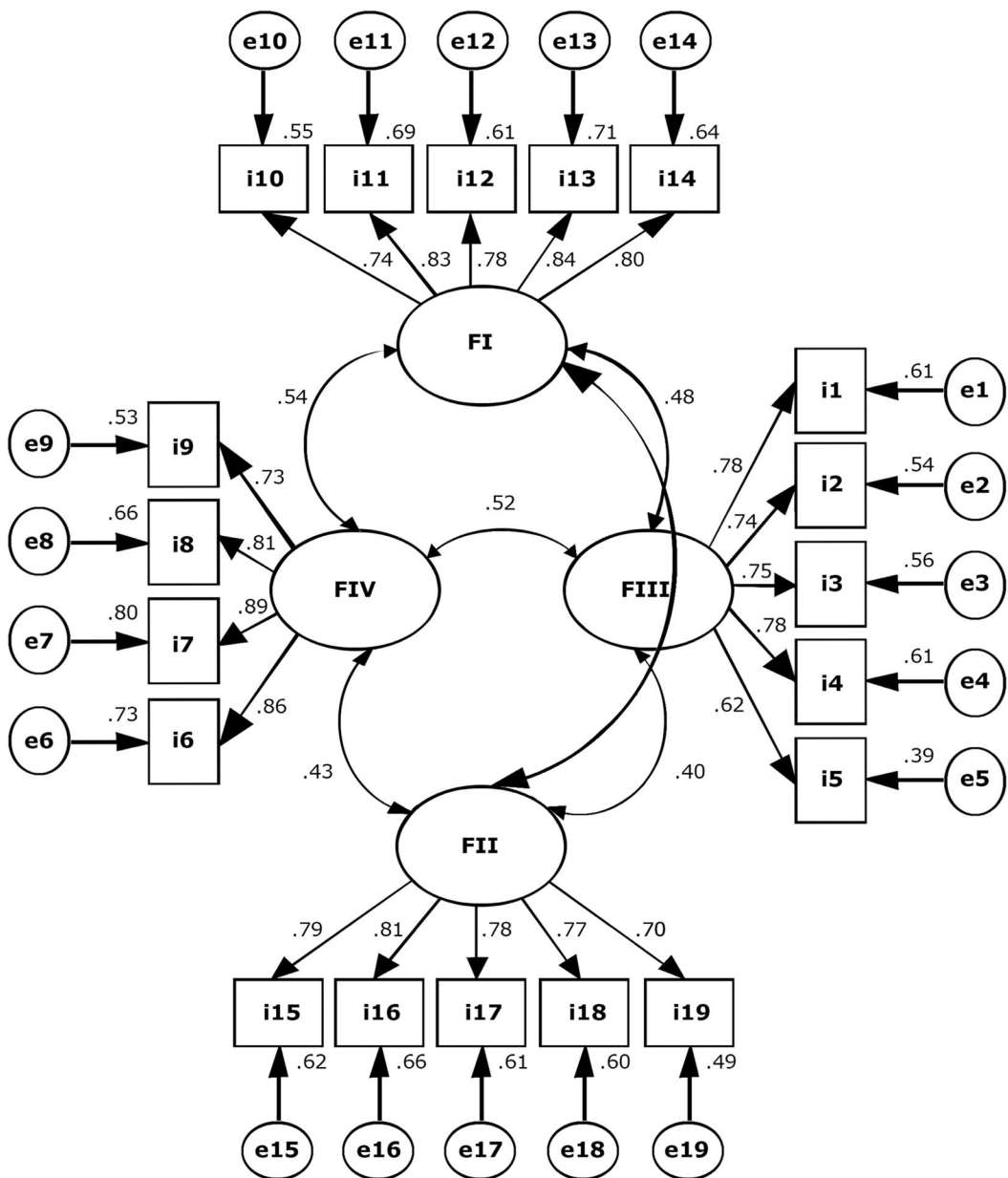
FIGURE 1 Structural equations model for the situational factors of the SAI-PE. See Appendix A (School Anxiety Inventory for Primary Education), at the end of this manuscript, for a review of the items. F1, School Punishment Anxiety; FII, Victimization Anxiety; FIII, Social Evaluation Anxiety; FIV, School Evaluation Anxiety.

The results of the CFA showed that the χ^2 statistic was significant for all the proposed models ($p < .001$), indicating their poor fit. However, according to the goodness-of-fit indices, the model that best fit the data was the model with one factor (M1) ($\chi^2 = 40.25$, $p < .001$; GFI = .98, AGFI = .95, R-RMSEA = .07, NFI = .96, TLI = .94, R-CFI = .97), showing a significant improvement over the null or no-factor model (M0) ($\chi^2 = 1090.26$, $p < .001$) (see Figure 4).
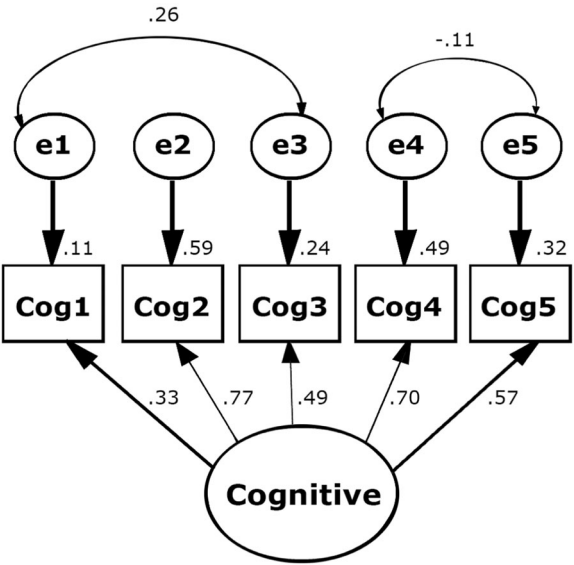
FIGURE 2 One-factor model correlating Items 1 and 3, and Items 4 and 5 (M2) for the Cognitive Anxiety Scale. See Appendix A (School Anxiety Inventory for Primary Education), at the end of this manuscript, for a review of the items.
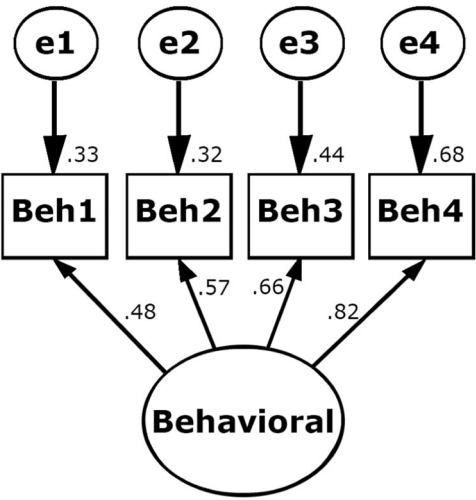

FIGURE 3 One-factor model (M1) for the Behavioral Anxiety Scale. See Appendix A (School Anxiety Inventory for Primary Education), at the end of this manuscript, for a review of the items.

3.10 | Correlation coefficients between different situational factors, anxiety responses, and the total score of the SAI-PE

All correlations between the different factors were positive and statistically significant, ranging from moderate (r = .35) to high (r = .55) magnitude (see Table 1). The correlations between the SAI-PE factors and the total SAI-PE score were high, ranging from .67 (social evaluation anxiety factor) to .86 (school punishment anxiety factor).
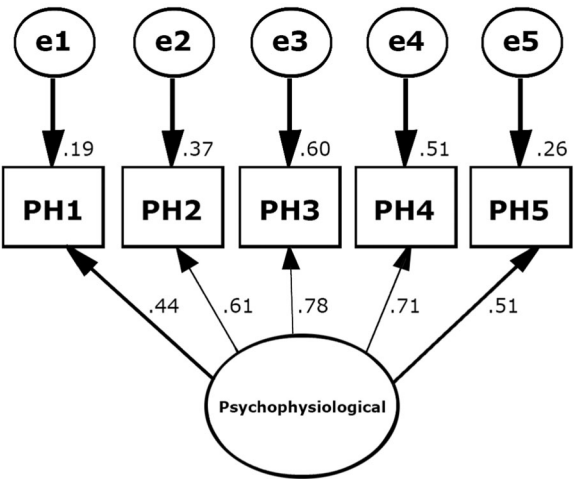
FIGURE 4 One-factor model (M1) for the Psychophysiological Anxiety Scale. See Appendix A (School Anxiety Inventory for Primary Education), at the end of this manuscript, for a review of the items.

TABLE 1 Correlation coefficients between the different situational factors of the SAI-PE and the total score.

	School Punishment Anxiety	Victimization Anxiety	Social Evaluation Anxiety	School Evaluation Anxiety
Victimization Anxiety	.55			
Social Evaluation Anxiety	.43	.35		
School Evaluation Anxiety	.52	.40	.47	
Total SAI-PE	.86	.79	.67	.72

Note: $p < .001$ for all the correlations.

Abbreviation: SAI-PE, School Anxiety Inventory for Primary Education.

In addition, the correlations between the different scales of school anxiety responses were positive and statistically significant ($p < .001$), all of them of a high magnitude ($r > .50$). These correlation coefficients (Pearson's r) were: $r = .70$ between the Cognitive Anxiety Scale and the Behavioral Anxiety Scale; $r = .77$ between the Behavioral Anxiety Scale and the Psychophysiological Anxiety Scale; and $r = .79$ between the Cognitive Anxiety and Psychophysiological Anxiety Scales.

3.11 | Internal consistency of situational factors, responses and total SAI-PE score

The internal consistency coefficients (Cronbach α) were α = .92 for the SAI-PE, α = .90 for Factor I (School Punishment Anxiety), α = .88 for Factor II (Victimization Anxiety), α = .85 for Factor III (Social Evaluation Anxiety), and α = .89 for Factor IV (School Evaluation Anxiety). All indices ranged from good (α = .80–.90) to excellent (α > .90) magnitude.

In addition, the internal consistency coefficients (Cronbach α) for the different scales of responses of the SAI-PE were: α = .80 for the Cognitive Anxiety Scale, α = .80 for the Behavioral Anxiety Scale, and α = .84 for the Psychophysiological Anxiety Scale. All indices had a high magnitude (α = .80 and .90).

4 | DISCUSSION

The results of the present study can motivate educational and clinical psychologists and education professionals to use a self-report measure that comprehensively assesses anxiety responses in schools. This study is an important, albeit initial, step in the study of childhood anxiety.

From the results obtained, we can state that the first hypothesis was confirmed, as the SAI-PE presented a multidimensional structure comprising four correlated situational factors: school punishment anxiety, victimization anxiety, social evaluation anxiety, and school evaluation anxiety. These findings are consistent with the SAI-SV, the instrument from which this new inventory was derived (García-Fernández & Ingles, 2017; García-Fernández et al., 2014; Ingles et al., 2015).

The correlation between the different situational factors was high, indicating that, although each dimension measured a specific type of anxious response depending on the school situation, the inventory evaluated different aspects of the same emotional response. Thus, the importance of assessing a school situation that provokes anxiety was confirmed, as established in the postulates derived from Endler's (1975) interactionist theory.

The second hypothesis was also confirmed because the SAI-PE presented a multifactorial structure for the evaluated responses (cognitive, psychophysiological, and behavioral), thereby following the postulates established by Lang's (1968) three-dimensional theory of anxiety responses. Similarly, these results coincided with the structure presented by the SAI-SV (García-Fernández & Ingles, 2017; García-Fernández et al., 2014; Ingles et al., 2015). In addition, the three anxious reactions presented statistically significant correlations of high magnitude, showing a strong relationship between them. This indicates that, although they function in a partially differentiated way, some reactions can influence the onset or increase of others (Cano-Vindel, 2003; see Martínez-Monteagudo et al., 2012, for a review).

The third hypothesis was also confirmed because, according to the classification established by various authors (George & Mallery, 2003; Ponterotto & Ruckdeschel, 2007), the four situational factors presented satisfactory internal consistency coefficients, varying between good and excellent magnitude. Likewise, adequate internal consistency indices were obtained for each dimension related to the triple response system (cognitive, psychophysiological, and behavioral). These data are similar to those found in the SAI-SV factors (García-Fernández & Ingles, 2017; García-Fernández et al., 2014; Ingles et al., 2015), which represent the primary model followed for the construction of the SAI-PE.

5 | LIMITATIONS, FUTURE DIRECTIONS, AND PRACTICAL IMPLICATIONS

We should consider a series of limitations in the findings with a view to future research on this topic. First, the SAI-PE is validated for children aged 8–12 years, so the results cannot be generalized to students of the first cycle of primary education (6–7 years) or to others who have different cultural/ethnic background, and/or characteristics from those of the sample of this study (e.g., Spanish child clinical population).

Second, the limitations and future lines of research are linked to the lack of a study of the measurement invariance of the factorial structure found in this study for SAI-PE scores as a function of age and sex, to verify the equivalence across sex and age of the semantic meaning of the SAI-PE items. This is a key issue to determine whether the differences found in these variables are real or, on the contrary, are derived from possible measurement errors in the items that make up the SAI-PE. Once the possible measurement invariance of the SAI-PE across sex and age has been verified, it would be advisable to conduct an analysis of latent mean differences (i.e., not observable) with their corresponding effect sizes. Only in this way would it be possible to establish precisely the possible differences between the variables measured with the SAI-PE.

In addition, future research should examine in greater depth the evidence of the reliability (i.e., temporal stability or test-retest reliability) and the validity of the SAI-PE scores. For example, concurrent validity can be examined by analyzing the relationship between this instrument and similar ones (e.g., social anxiety, school refusal

behavior, etc.), discriminant validity by analyzing SAI-PE scores using different measures (e.g., school engagement, school adjustment, etc.), and criterion validity by analyzing the correlation or predictive capacity of the SAI-PE scores compared with a criterion such as school achievement, measured using school records.

In addition, it would be desirable, from a practical point of view, to calculate normative data for the scores for all the dimensions or factors identified in the SAI-PE (i.e., centile scores or percentiles) across sex and age, which could be graphically reflected in a profile sheet. This would help the school psychologist and other psychology and education professionals to interpret the test results (e.g., establishing categories such as low, moderate, and high school anxiety taking into account the direct scores equivalent to the 25th, 50th, and 75th percentiles). Undoubtedly, this would also facilitate the evaluation of the effectiveness of preventive or corrective programs for school anxiety in primary education.

Similarly, it would be interesting to analyze cross-cultural factorial invariance, applying the SAI-PE in different cultures/ethnic groups or countries, to examine the possible cultural changes in the complex response of school anxiety in childhood, as observed in other types of anxiety such as social anxiety (e.g., Torregrosa et al., 2022).

Finally, future research should develop and validate parallel forms of the SAI-PE aimed at teachers and parents to enable the holistic assessment of school anxiety in childhood.

6 | CONCLUSION

School anxiety has emerged as one of the most frequent problems in school contexts after the recent periods of confinement derived from the expansion of Sars-Cov2 (Kamran & Naeim, 2021; Popovych et al., 2022). However, this emotional response should be thoroughly evaluated before planning any intervention (i.e., preventive programs y/or therapeutic programs).

To date, there was no specific instrument to evaluate school anxiety reactions and the situations that provoke them for the Spanish child population. However, the adequate psychometric properties of the SAI-PE scores, its simplicity and ease of administration, scoring, and interpretation make it a useful tool that is simple to administer collectively in schools. This would allow education and clinical professionals to evaluate the effectiveness of preventive and/or therapeutic programs to reduce or mitigate students' high anxiety levels, considering both the pattern of reactivity presented (cognitive, behavioral, or psychophysiological) and the specific school situation that provokes it.

In this line, preventive and therapeutic programs aimed at the management of anxiety, school refusal (Estévez et al., 2009; Galán-Luque, 2023; Gonzálvez, Ingles, & García-Fernández, 2018; Mateu-Martínez et al., 2013; Scaini et al., 2022), and social skills programs in childhood and adolescence (Ingles, 2011; Ugarte-Paz et al., 2021) have shown the importance of teaching and acquiring social skills (Huber et al., 2019; Sklad et al., 2012) and strategies for emotion self-regulation or anxiety reduction (Gallegos et al., 2012) as of early childhood. This would enhance the academic adaptation and personal well-being of Spanish children in primary education.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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APPENDIX A: INVENTORY OF SCHOOL ANXIETY FOR PRIMARY EDUCATION

Surname and first name....... Age.......................

Sex: Boy ☐ Girl ☐ Country of birth:...

Grade.............

On the following pages, you will find a series of phrases that describe situations you may encounter at school.

Your task is to assess from 0 to 4 how often you experience the feelings or perform the responses described in these situations, as follows:

0: Never

1: Rarely

2: Sometimes yes and sometimes no

3: Very often

4: Always

Here is an example to make your task much easier:

If my best friend is very sad

	0	1	2	3	4
1. I sit next to him/her in silence	0	1	2	3	4
2. I ask him/her what's wrong with him/her	0	1	2	3	4
3. I do silly things to make him/her laugh	0	1	2	3	4

What should you do? It is very simple, and we will explain it to you below. Follow the steps of the stars:

1. Read the first sentence.
2. Choose the most appropriate score for you and cross it out (0, 1, 2, 3, 4). Do the same with phrase number two.

Now, turn this page and answer all the boxes as we explained

0: Never	1: Rarely	2: Sometimes yes and sometimes no	3: Very often	4: Always

Going to the blackboard

	0	1	2	3	4
1. I think they will laugh at me	0	1	2	3	4
2. I blush	0	1	2	3	4
3. My voice is shaky	0	1	2	3	4

Reading aloud in class

	0	1	2	3	4
4. I think they will laugh at me	0	1	2	3	4
5. I blush	0	1	2	3	4
6. My voice is shaky	0	1	2	3	4

If the teacher asks me in front of the class

7. I think they will laugh at me	0	1	2	3	4
8. I blush	0	1	2	3	4
9. I get blocked and only remember a few things	0	1	2	3	4

If I have to explain a class assignment

10. I think they will laugh at me	0	1	2	3	4
11. I blush	0	1	2	3	4
12. My voice is shaky	0	1	2	3	4

If I have to ask the teacher something

13. I ruminate about it, I think about it	0	1	2	3	4
14. I blush	0	1	2	3	4
15. My voice is shaky	0	1	2	3	4

The night before the exam

16. I'm worried	0	1	2	3	4
17. My stomach feels uncomfortable	0	1	2	3	4
18. I get blocked and only remember a few things	0	1	2	3	4

Moments before taking an exam

19. I'm worried	0	1	2	3	4
20. My stomach feels uncomfortable	0	1	2	3	4
21. I get blocked and only remember a few things	0	1	2	3	4

When I'm taking an exam

22. I'm worried	0	1	2	3	4
23. My stomach feels uncomfortable	0	1	2	3	4
24. I get blocked and only remember a few things	0	1	2	3	4

When I'm going to get an exam grade

25. I'm worried	0	1	2	3	4
26. My stomach feels uncomfortable	0	1	2	3	4
27. I can't sit still	0	1	2	3	4

0: Never	1: Rarely	2: Sometimes yes and sometimes no	3: Very often	4: Always

If I haven't done my homework

28. I feel guilty	0	1	2	3	4
29. My head aches	0	1	2	3	4
30. I can't sit still	0	1	2	3	4

If the teacher asks me for my homework and I haven't done it

31. I feel guilty	0	1	2	3	4
32. I breathe faster	0	1	2	3	4
33. I cannot find the words	0	1	2	3	4

If the teacher says he/she is going to call my parents to school

34. It scares me, it overwhelms me	0	1	2	3	4
35. My heart beats very fast	0	1	2	3	4
36. I get blocked and only remember a few things	0	1	2	3	4

If the teacher scolds me or rebukes me

37. I ruminate about it, I think about it	0	1	2	3	4
38. I breathe faster	0	1	2	3	4
39. I cannot find the words	0	1	2	3	4

If the teacher punishes me

40. I ruminate about it, I think about it	0	1	2	3	4
41. I breathe faster	0	1	2	3	4
42. I cannot find the words	0	1	2	3	4

If I am insulted or threatened at school

43. It scares me, it overwhelms me	0	1	2	3	4
44. My heart beats very fast	0	1	2	3	4
45. I get blocked and only remember a few things	0	1	2	3	4

If they laugh at me at school

46. It scares me, it overwhelms me	0	1	2	3	4
47. My heart beats very fast	0	1	2	3	4
48. I get blocked and only remember a few things	0	1	2	3	4

If a classmate yells at me at school

49. It scares me, it overwhelms me	0	1	2	3	4
50. My heart beats very fast	0	1	2	3	4
51. I get blocked and only remember a few things	0	1	2	3	4

If a classmate tries to force me to do things I don't want to

52. It scares me, it overwhelms me	0	1	2	3	4
53. My heart beats very fast	0	1	2	3	4
54. I get blocked and only remember a few things	0	1	2	3	4

If I'm in the middle of a fight

55. It scares me, it overwhelms me	0	1	2	3	4
56. My heart beats very fast	0	1	2	3	4
57. I get blocked and only remember a few things	0	1	2	3	4