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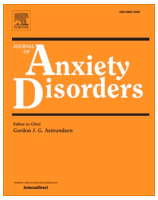

The Nighttime Fears Scale: Development and psychometric evidence of a standardized self-report scale to assess nighttime fears in children

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ABSTRACT

Nighttime fears are highly prevalent in children and are linked to children's distress and internalizing problems, especially childhood anxiety. Although its assessment may be critical, there is a lack of available standardized self-reports. This study aimed to describe the development and psychometric evaluation of the Nighttime Fears Scale (NFS), a new standardized self-report for assessing nighttime fears in school-aged children. The construction of the scale was based on prior relevant research and involvement of researchers and clinicians, experts in childhood anxiety, and fears. A total of 794 Spanish-speaking children (51.1 % girls) aged 8–12 years completed the NFS along with measures of anxiety, sleep problems, internalizing and externalizing problems, and positive behaviors. Exploratory and confirmatory factor analyses supported a four-factor structure of the NFS, consisting of 21 items measuring a range of potentially fear-provoking stimuli at nighttime. Strong internal consistency (alphas ranging from .87 to .94), adequate test-retest reliability, and evidence of convergent, divergent and incremental validity was found. This study provides initial support for the use of the NFS by clinicians and researchers, suggesting that it is a promising tool for a rapid and easily-administered assessment to identify the presence and intensity levels of a set of common children's nighttime fears.

1. Introduction

Specific fears are considered normative and highly prevalent in children, with rates above 86 % of children presenting at least one fear being reported, while their intensity may differentiate normative from clinical manifestations (Laporte et al., 2017). Normative fears tend to be transitory, but if they occur intensively, problematic symptoms can arise, which can evolve into anxiety disorders if they persist (Beesdo-Baum & Knappe, 2012). The presence of nighttime fears among schoolchildren has been shown to be quite common, with rates around 70 % (Gordon, King, Gullone, Muris, & Ollendick, 2007; Muris, Merckelbach, Ollendick, King, & Bogie, 2001). In most children, they are a developmentally normative occurrence, and are transient and non-problematic. Some children may also experience these fears intensely and persistently, generating considerable child and family distress and interference (Gordon & King, 2002; King, Ollendick, & Tonge, 1997).

Despite the considerable frequency of nighttime fears (e.g., fear of the dark, imaginary stimuli such as monsters or ghosts; Laporte et al., 2017; Meltzer et al., 2009), the available literature continues to be limited but has been growing over the last decades. Existing research has proposed that nighttime fears are heterogeneous and can include fear of a variety of stimuli (e.g., darkness, noises, being alone, imaginary creatures, intruders; King et al., 1997). Moreover, relevant studies addressing the frequency and content of nighttime fears in community samples of schoolchildren have reported interesting data. For instance, the study by Muris et al. (2001) found in 4- to 12-year-old children that fear of intruders (e.g., kidnappers, burglars) was the most common nighttime fear, followed by fear of imaginary creatures (e.g., monsters, ghosts), frightening dreams, environmental threats (e.g., thunderstorms, the dark), animals (e.g., spiders), and frightening thoughts (e.g, worry about parents dying or about personal health). These authors also found that nighttime fears were more prevalent in the age range of 7–12 years than in younger children, and similar in girls snd boys. Furthermore, Gordon et al. (2007) showed that children aged 8–12 ha d significantly more and more severe nighttime fears than adolescents aged 13–16 years, with girls reporting higher nighttime fears than boys. These authors classified nighttime fears similarly to Muris et al. (2001) and found that the most frequent nighttime fears were related to environmental threats (indoor or outdoor noises), personal security (intruders),

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frightening dreams (fear of bad dreams), darkness (fear of the dark), and imaginary creatures (e.g., ghosts, witches, skeletons).

Fear is intended to be an adaptative and integrated behavioral, physiological, and cognitive-emotional response to danger. However, inappropriate or excessive fear can be linked to psychiatric disorders, including anxiety disorders (e.g., phobias; Fanselow & Pennington, 2018; Garcia, 2017). In this regard, specific fears have been related to internalizing problems (i.e., symptoms of depression and anxiety) and anxiety disorders such as separation anxiety disorder, specific phobia, and generalized anxiety disorder (Muris, Mannens, Peters, & Meesters, 2017; Muris, Merckelbach, Mayer, & Prins, 2000). Similarly, nighttime fears have been related to the presence of moderate levels of anxiety, but may also be related to the above-mentioned anxiety disorders in a small percentage of children (Gordon et al., 2007; Muris et al., 2001). Symptoms of such anxiety disorders and overall anxiety are highly prevalent in school-age children within the 8–12 age range. These are, in turn, associated with considerable risk of homotypic and heterotypic comorbidity (e.g., depression), significant impairment, and a high symptom persistence (Canals, Voltas, Hernández-Martínez, Cosi, & Arija, 2019; Romero et al., 2010). Moreover, children's nighttime fears have been related to sleep problems (e.g., difficulties in sleeping alone, resistance to going to bed, sleeping less), internalizing and externalizing symptoms, and it is argued that frequent nighttime fears may be a maintenance or risk factor of sleep-disruptive practices (El Rafihi-Ferreira, Lewis, McFayden, & Ollendick, 2019).

Therefore, considering that nighttime fears can have negative effects on children's lives warrants the need for their accurate assessment and early detection. In addition, considering the heterogeneous nature of nighttime fears and that they occur mostly as part of normal child development and are not problematic (Gordon & King, 2002; Muris et al., 2001), having adequate and specific assessment tools would be especially interesting to tap them efficiently and to deepen their study and understanding within child development. However, although progress has been made in the development of effective treatments for nighttime fears in recent years (e.g., Lewis, Amatya, Coffman, & Ollendick, 2015; Simon, Driessen, Lambert, & Muris, 2020), the literature shows the need to develop more specific assessment instruments. Self-report instruments are considered an important assessment method because internalizing experiences, such as fears and fear-related anxiety, are not always observable and are only accessible through the child's introspection (Muris, 2019). Previous relevant studies tended to use only children's interviews to assess nighttime fears and not self-report questionnaires. This has been noted as a limitation and it has been argued that interviews may involve limitations (e.g., interviewer interpretation bias), whereas standardized self-report questionnaires can be also useful in identifying specific fear-producing stimuli through predetermined fear categories or structures (Gordon et al., 2007; Muris et al., 2001). Moreover, self-report questionnaires are among the most commonly used assessment methods in clinical psychology. It allows a quick assessment with low financial and time cost, it offers information given by the respondent, it can be applied in clinical and epidemiological studies, and within a more comprehensive assessment (Demetriou, Ozer, & Essau, 2015).

Following Kushnir, Gothelf, and Sadeh (2015), prior research focused on school-aged children's common fears has relied on standardized self-report questionnaires composed of lists of potentially fear-provoking situations or stimuli. For instance, widely used for the measure fearfulness, including a variety of specific fears types (e.g., fears of animals, heights, danger, death, unknown things, social or medical situations), are the revised version of the Fear Survey Schedule for Children (FSSC-R; Ollendick, 1983) or the Koala Fear Questionnaire (KFQ; Muris et al., 2003). However, they are not designed to measure fears only experienced at nighttime, and few items refer to stimuli that could be considered to specifically occur at night, when the children score it (e.g., darkness-related fears, scary dreams). In this regard, to the best of our knowledge, there is currently a lack of self-report questionnaires focused on specifically assessing nighttime fears. Some recent studies have used self-reports to evaluate only a specific nighttime-related fear (e.g., the dark), but created only for the study purposes (e.g., Simon et al., 2020). Authors such as Mooney (1985) and Mooney, Graziano, and Katz (1985) tried to advance in the study of nighttime fears and used original checklists for its research (i.e., including categories such as "security-separation or loss of others," "security-personal life, loss, and safety," "inherent characteristics," "dark," "dreams," and "imaginal-numinous"). Nevertheless, this approach was not further developed in terms of analyzing psychometric properties and providing a reliable and valid self-report instrument to be widely used. Although these early contributions were important in this field, they have been serving mainly to guide the classifications of nighttime fears in subsequent research (e.g., Gordon et al., 2007).

Therefore, it is still necessary to advance in the development of a self-report questionnaire with sound psychometric properties to specifically assess children's nighttime fears and to fill in this gap. Thus, given the paucity of specific self-reports available in this field, this study aimed to describe the development and psychometric properties of a new measure, the Nighttime Fears Scale (NFS). The NFS was intended to offer advantages such as providing an innovative standardized self-reporting instrument that (a) is brief, easily administered, reliable, and valid, allowing researchers and clinicians to quickly identify the presence and intensity levels of a range of common nighttime fears from the children's perspective, b) can be useful mainly to improve the study and understanding of normative nighttime fears in childhood, but also the early detection of problematic fears in large epidemiological investigations, and c) can be used in conjunction with other strategies (e.g., interview) in a more in-depth assessment throughout the clinical or research process. The current research consists of two steps. In Step 1, we developed a new scale to assess nighttime fears in children. In Step 2, we examined the psychometric properties of the final version of this new tool in a sample of Spanish-speaking children aged 8–12 years, taking into account prior findings suggesting a greater frequency and severity of nighttime fears in this age group (Gordon et al., 2007; Muris et al., 2001), as well as a considerable presence of emotional problems (e.g., Canals et al., 2019; Romero et al., 2010).

2. Material and methods

2.1. Participants and procedure

Participants in this study were a total of 794 children (51.1 % girls, $n = 406$), aged 8–12 years, who were recruited from three primary schools located in urban areas of the South-east region of Spain. Group mean age was 9.65 ($SD = 1.19$) and age distribution was as follows: 8 years (22 %), 9 years (24.1 %), 10 years (25.8 %), 11 years (22.9 %), and 12 years (5.2 %). Children were students distributed in primary school levels from third to sixth grade within the Spanish school system: grade 3 (24.2 %), grade 4 (24.8 %), grade 5 (25.3 %) and grade 6 (25.7 %). Of all the participants, 98.6 % were from Spain and the rest were from Colombia, Ecuador, Greece, China, Chile, Romania, or France (1.4 %), and all the children were Spanish-speaking. More than half of the children had one sibling (61.34 %), with the mean number of siblings being 1.15 ($SD = 0.81$). A randomly selected subsample of children ($n = 419$) was asked to fill in the form again 8 weeks after the initial assessment to explore the test-retest reliability of the NFS and its subscales.

Authorization was obtained from the school principals and the written informed consent of the parents of all participants. The children completed the battery of questionnaires in this study during school hours. The evaluation was done in groups of around 20 students, within the children's classrooms. There was always a psychologist in each classroom, who administered the questionnaires. This research received ethical approval from the Ethics Board of the authors' institution (Ref. CEIm:PI2020-080 - ISABIAL:200171).

2.2. Scale development

Based on a review of the scientific literature (e.g., Gordon et al., 2007; Mooney et al., 1985; Mooney, 1985; Muris et al., 2001), the researchers created an initial pool of 46 items that encompassed several potential areas or factors: 1. Own security or loss, 2. Safety of others and loss, 3. Imaginary creatures, 4. Characteristics of the night, and 5. Darkness.

For the development of the NFS, we followed the recommendations for conducting a content validity analysis (Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003; Sireci, 1998). Five judges who were experts in child anxiety and fears (i.e., researchers and clinicians) were provided with definitions of nighttime fear and potential fear-provoking stimuli at nighttime, and of each potential factor mentioned above. All items were evaluated by each judge in terms of their representativeness of the construct, item ambiguity, item understandability, and item clarity, using a Likert-type scale ranging from 1 (*Not at all*) to 4 (*Very*). Judges were able to propose an alternative item wording if necessary. After receiving their responses, we calculated the judge agreement percentage. When the judges' recommendations were under 80 % of agreement, the items were deleted (Rubio et al., 2003). Based on the judges' responses, three items were combined to create a new item with several imaginary elements that may generate fear in children ("Ghosts, zombies or skeletons"). The final version of the item pool consists of 30 items (obtained from the initial pool of 46 items) and was tested in a small pilot sample of 7 children aged 8–12. No changes were made based on this pilot study.

2.3. Measures

2.3.1. Nighttime Fears Scale (NFS)

The NFS is a new measure intended to assess the presence and intensity level of a range of common nighttime fears in school-aged children. Higher scores indicate greater intensity levels of nighttime fears. Following Mooney (1985), the children were asked to rate the items, each of which described a potentially fear-provoking stimulus or a nighttime situation on a 5-point Likert scale ranging from 0 (*Nothing*) to 4 (*A lot*). They received the following instructions before starting to fill in the questionnaire: *Almost everyone has sometimes felt fear at nighttime. We would like to know what scares you at night when you are lying in bed. Now, tell us, do any of the things listed below scare you at nighttime? If so, how much?* An open response item was included at the end of the questionnaire so that children could report other possible nighttime fears and their intensity. This item is not included in the NFS scoring.

2.3.2. Brief Child Version of the Spence Children's Anxiety Scale (SCAS-C-8)

The SCAS-C-8 (Reardon, Spence, Hesse, Shakir, & Creswell, 2018) is a self-report questionnaire developed to assess children's anxiety symptoms based on the DSM-5 anxiety disorders, and is a reduced version of the full SCAS. It comprises 8 items that children rate on a 4-point Likert scale ranging from 0 (*never*) to 3 (*always*). A total anxiety score is obtained by summing all the items, with higher scores indicating higher severity of symptoms. This tool has shown to have good reliability and validity (Reardon et al., 2018). In the current sample, the internal consistency of the SCAS-C-8 was acceptable (ordinal alpha = .75). This measure was used to examine the convergent validity of the NFS.

2.3.3. Sleep Self-Report (SSR)

The SSR (Orgilés, Owens, Piqueras, Espada, & Carballo, 2013) is a self-report questionnaire that examines children's sleep habits and problems. It consists of 16 items divided into four subscales: Sleep Quality, Bedtime Refusal, Sleep Anxiety, and Sleep Routines. Items are rated on a 3-point scale, indicating the frequency of occurrence, ranging from 0 (*rarely*) *to* 2 (*usually*). The SSR total score is obtained through the sum of the scores in each subscale, with higher scores indicating overall more frequent sleep-related problems. It has been shown to have adequate psychometric properties, and to be significantly and positively correlated with symptoms of anxiety (Orgilés et al., 2013). In the current sample, the internal consistency of the SSR total score was acceptable (ordinal alpha = .78). The SSR total score was used to investigate the convergent validity of the NFS.

2.3.4. Strengths and difficulties questionnaire (SDQ)

The SDQ (Goodman, 1997) comprises five subscales with five items each rated on a 3-point scale ranging from 0 (*Not true*) to 2 (*certainly true*). In this study, we used the Internalizing Problems subscale (adding the scores of Emotional Symptoms and Peer Problems subscales) to investigate the convergent validity of the NFS. The Externalizing Problems subscale (adding the scores of Conduct Problems and Hyperactivity/Inattention subscales) and the Prosocial Behavior subscale were employed to examine the divergent validity of the NFS. The SDQ has proven to be a reliable and valid measure (Ortuño-Sierra, Fonseca-Pedrero, Inchausti, & Sastre i Riba, 2016). Higher scores in the SDQ subscales indicate more problems, except for the Prosocial Behavior subscale, which is scored inversely. The internal consistency for the subscales included herein was acceptable (ordinal alphas ranging from .70 to .78).

2.4. Statistical analysis

R 3.5.2 with R Studio Version 1.2.5033 software (R Core Team, 2018) was used to analyze the data. Following the recommendations of Gadermann et al., 2012, a polychoric matrix was used. The sample ($n = 794$) was divided into two subsamples to run Exploratory Factor Analysis (EFA) ($n = 350$) and Confirmatory Factor Analysis (CFA) ($n = 444$). Psychometric properties (mean, standard deviation, corrected item-total correlation, and alpha if the item is removed) of the final version of the scale were explored. Ordinal alpha was calculated for the total scale and its subscales (Gadermann et al., 2012). Psych (Revelle, 2017) and corrplot (Wei & Simko, 2013) were used. The visualization of the CFA model was performed using the semPaths function of the semPlot package (Epskamp, 2014). Following Hu and Bentler (1999), an adequate proper fit of the model was determined by values greater than .90 for the comparative fit index (CFI) and the Tucker-Lewis index (TLI), and less than .08 for the root mean square error of approximation (RMSEA). Spearman correlations among NFS, SCAS-C-8, and SSR were calculated to provide evidence of construct validity. Because Kolmogorov-Smirnov indicated a violation of the assumption of normality ($p < .05$), differences in NFS by sex and children's age-groups (8−9 years old vs. 10−12 years old) were analyzed using Mann-the Whitney *U*-test. The effect size of the statistically significant differences was estimated using Rosenthal's *r*, which was interpreted as follows: .10 = small, .30 = medium, and .50 = large (Rosenthal, 1991). Data from baseline and 8-week post-assessment were used to calculate the intraclass correlation coefficient (ICC) for the NFS and its subscales. Values may be considered excellent (> .75), fair to good (from .40 to .75) and poor (< .40) (Fleiss, 1986).

A hierarchical model investigated the incremental validity of the NFS in the prediction of children's sleep habits and problems (SSR), after controlling for the SCAS-C-8 total score. We explored the relative proportion of variance in the dependent variable (children's sleep habits and problems) associated with the SCAS-C-8 (Step 1) and the NFS total score (Step 2) (Haynes & Lench, 2003; Hunsley & Meyer, 2003). The comparison followed two parameters: Adjusted R^2 (the difference of increment between Steps 1 and 2) and the *F*-test of the robustness of the increment between both steps (Haynes & Lench, 2003) as a reasonable contribution for the second step of the hierarchical model (Hunsley & Meyer, 2003).

3. Results

3.1. Exploratory factor analysis

First of all, using a subsample of 350 cases, we analyzed the polychoric matrix with EFA. Weighted least squares (WLS) was used as the extractor method, as well as Oblimin rotation. The WLS estimation method is recommended for tetrachoric and polychoric correlations, using the asymptotic variances and covariances as a weight matrix (Barendse, Oort, & Timmerman, 2015). Parallel Analysis (PA) was also conducted to estimate the number of factors, and it identified four factors, one less than the initial theoretical structure. The items theoretically associated with Factors 4 and 5 were grouped around a common factor, indicating a latent factor related to characteristics of the night, including darkness. Of the initially administered 30 items, 22 loaded above .30 on their theoretical factor, and the rest were deleted (Items 8, 9, 12, 20, 25, 27, 28, and 29). Item 6 "Dangerous animals or bugs that scare me" was deleted because it did not load on either factor. In a second step, we ran EFA, and the four-factor structure was supported by PA.

The final version of the NFS consists of 21 items divided into four factors, which were named as follows based on the items' content covered: Fear of nighttime features and distressing experiences (Factor 1; 8 items), Fear of loss or separation from the family (Factor 2; 5 items), Fear of imaginary stimuli (Factor 3; 4 items), and Fear of real stimuli (Factor 4; 4 items). Table 1 shows the weights of the items and the variance of each factor.

3.2. Confirmatory factor analysis

Using a subsample of 444 cases, a CFA was performed to test the four-factor structure of the NFS. The *R* algorithm ran the model using a bounds-constrained quasi-Newton optimization method (NLMINB) and ended normally after 48 iterations. The results showed that the model had adequate fit: $\chi^2(183) = 573.67, \chi^2/df = 3.13$, CFI = .958, TLI = .952, RMSEA = .069, 95 % CI [.063, .076]. All standardized factor loadings were above .65, except for item 30 "Think about characters from videos, movies, or video games" (.49), as shown in Fig. 1.

3.3. Psychometric properties and reliability

Descriptive statistics (mean, standard deviation, corrected item-total correlation) and ordinal alpha if the item is removed are presented in Table 2. The standard deviations of all items were greater than 1 (except for Items 14 and 16) and item-total corrected correlations ranged from .36 to .71, which suggests moderate to large item discrimination (Penfield, 2014). The internal consistencies were adequate for the total score of the NFS (ordinal α = .94) and its four subscales: Fear of nighttime features and distressing experiences (ordinal α = .89), Fear of loss or separation from the family (ordinal α = .90), Fear of imaginary stimuli (ordinal α = .89), and Fear of real stimuli (ordinal α = .87). As shown in Table 3, inter-correlations between the four NFS subscales were also calculated, with values ranging from .29 (Fear of loss or separation from the family and Fear of imaginary stimuli) to .73 (Fear of loss or separation from the family and Fear of real stimuli), and also between the subscales and the total score, which ranged between .63 (Fear of imaginary stimuli) and .88 (Fear of nighttime features and distressing experiences). Correlations were significant at $p < .01$, overall displaying moderate-to-strong correlations.

A subsample of 419 participants (52.77 % of retention) was randomly selected to calculate test-retest reliability. There were no statistically significant differences as a function of gender [$\chi2(1) = 0.78$, p = .37], Nighttime Fears Scale total score [t(792) = 1.20, p = .22] and its subscales, including Fear of loss or separation from the family [t(792) = 1.17, p = .24], Fear of imaginary stimuli [t (792) = 0.12, p = .90], and Fear of real stimuli [t(792) = -.83, p = .40], as well as the SCAS-C-8 [t(792) = -1.05, p = .29], SDQ total score [t(792) = -.06, p = .94], Externalizing Symptoms subscale of the SDQ [t(792) = -.14, p = .88] and Internalizing Symptoms subscale of the SDQ [t(792) = -.11, p = .90] between the test-retest subsample and those who were not involved in the second evaluation. Compared to children who did not answer the second evaluation, those who answered the retest were slightly older [t(792) = -3.73, p ≤ .001, d = 0.26], and scored lower in Fear of nighttime features and distressing experiences subscale [t (792) = 2.25, p = .02, d = 0.15] and SSR total score [t(792) = 2.23, p = .02, d = 0.29], but higher in Prosocial subscale of the SDQ [t(792) = -2.59, p = .003, d = 0.21]. However, effect sizes of these differences were small.

Temporal stability was appropriate for the NFS total score (ICC = .80, 95 % CI [.75, .84]), and its subscales: Fear of nighttime features and distressing experiences (ICC = .81, 95 % CI [.76, .85]), Fear of loss or separation from the family (ICC = .71, 95 % CI [.65, .76]), Fear of imaginary stimuli (ICC = .63, 95 % CI [.55, .70]), and Fear of real stimuli (ICC = .72, 95 % CI [.66, .77]). Following Fleiss' criteria (1986), these coefficients were considered excellent for the NFS total score and

Table 1
Component rotation matrix, communalities (h^2), and percentage of explained variance.

Item in the new inventory	Item in the original pool	F1	F2	F3	F4	h^2
1. Remembering a scary story that I have been told	1	.62				.49
2. Calling my parents at night and they don't answer me	7	.49				.48
3. Thinking that I am alone	17	.67				.64
4. Hearing strange noises	18	.82				.73
5. Waking up in the middle of the night and being in the dark	22	.79				.64
6. Seeing shadows in my room	21	.65				.62
7. Having nightmares or dreams that scare me	23	.56				.56
8. Thinking about characters from videos, movies or video games that are scarey for me	30	.55				.30
9. Thinking that something bad can happen to someone in my family	10		.58			.50
10. Letting something bad happen to me	14		.36			.60
11. Having someone come into my house and hurt my mother, father or siblings	19		.91			.79
12. Someone taking me with them	24		.56			.62
13. Someone could harm my mother or father	26		.83			.70
14. Monsters	4			.62		.65
15. Ghosts, zombies or skeletons	13			.75		.71
16. Vampires	11			.90		.72
17. Witches or beings with special powers	16			.85		.74
18. A thief enters our home when we are sleeping	2				.85	.73
19. A stranger comes into my house and hurts me	3				.71	.79
20. Thinking that someone can harm me	5				.51	.61
21. Letting there be a stranger in my room	15				.35	.67
Variance		21 %	15 %	14 %	13 %	

F1 = Fear of nighttime features and distressing experiences, F2 = Fear of loss or separation from the family, F3 = Fear of imaginary stimuli, and F4 = Fear of real stimuli. Factor loads lower than .30 were eliminated; Items 8, 9, 12, 20, 25, 27, 28, and 29 were eliminated.

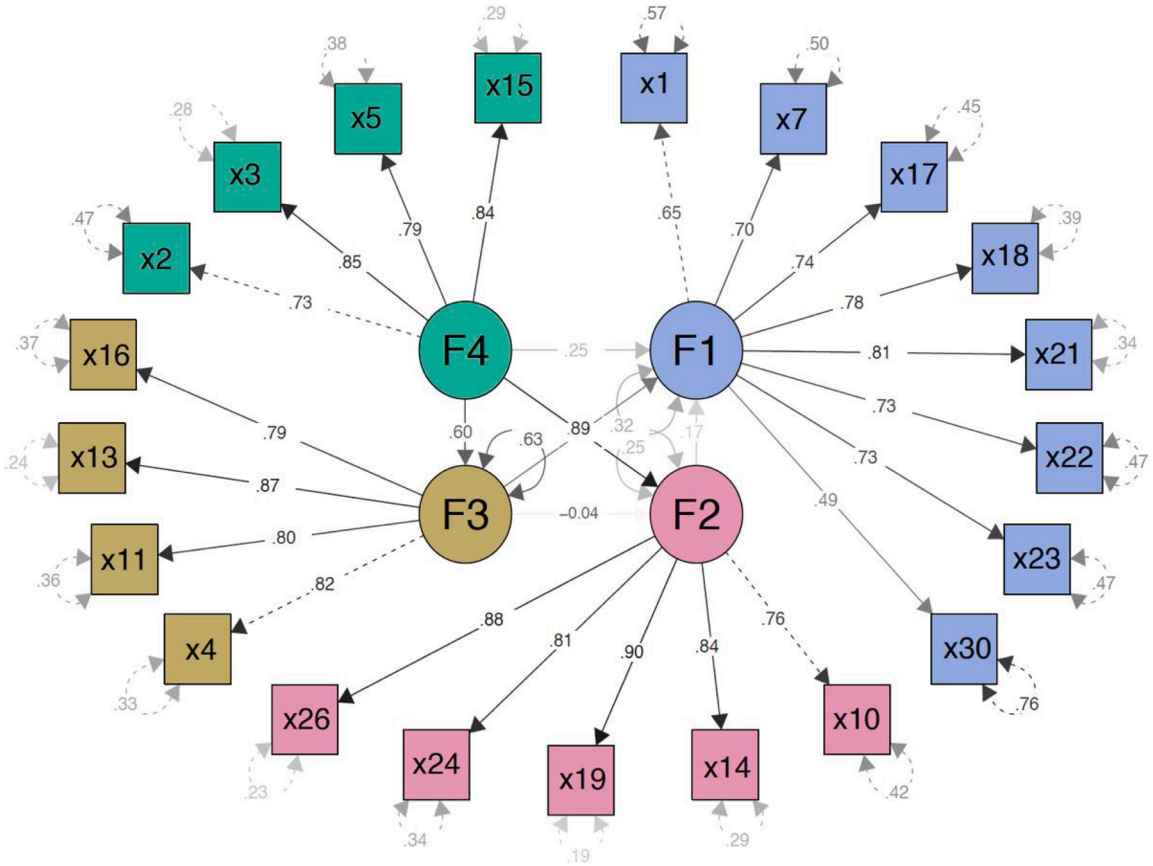

Fig. 1. Flow diagram of the model. Standardized weights are presented.

Table 2
Psychometric properties of the Nighttime Fears Scale.

Item in the new inventory	Item in the original pool	*M*	*SD*	r_{it} [c]	α-i
F1. Fear of nighttime features and distressing experiences					
Item 1	1	1.56	1.31	.57	.92
Item 2	7	1.64	1.48	.60	.91
Item 3	17	1.28	1.34	.65	.91
Item 4	18	1.90	1.42	.68	.91
Item 5	22	1.23	1.38	.61	.91
Item 6	21	1.62	1.45	.68	.91
Item 7	23	1.98	1.41	.65	.91
Item 8	30	1.11	1.42	.36	.92
F2. Fear of loss or separation from the family					
Item 9	10	2.77	1.31	.57	.92
Item 10	14	2.17	1.37	.70	.91
Item 11	19	3.19	1.22	.60	.91
Item 12	24	2.95	1.40	.59	.91
Item 13	26	3.16	1.20	.59	.91
F3. Fear of imaginary stimuli					
Item 14	4	0.45	0.97	.50	.92
Item 15	13	0.60	1.07	.71	.92
Item 16	11	0.27	0.77	.42	.92
Item 17	16	0.49	1.04	.49	.92
F4. Fear of real stimuli					
Item 18	2	2.34	1.48	.58	.92
Item 19	3	2.73	1.45	.67	.91
Item 20	5	1.79	1.32	.69	.91
Item 21	15	2.35	1.47	.71	.91

Note. *M* = Mean; *SD*= Standard Deviation; r_{it}^{c} = corrected item-total correlation; α-i = ordinal alpha if the item is removed.

the Fear of nighttime features and distressing experiences subscale, and fair to good for the rest of subscales.

3.4. Evidences of convergent and divergent validity

Table 3 shows the means, standard deviations, and Spearman correlations with confidence intervals for the NFS and related measures (i.e., SCAS-C-8, SSR, and SDQ). Overall, there was support for the convergent and divergent validity of the NFS. Evidence of convergent validity was found through the positive significant correlations between the NFS total score and subscales with a measure of anxiety symptoms as measured by the SCAS-C-8 (*r*'s between .37 and .57), with the strongest links between the SCAS-C-8 and the NFS total score and the NFS Fear of nighttime features and distressing experiences subscale (.57). Convergent validity was also supported by significant positive correlations between the NFS scores and measures of sleep-related problems (SSR total score) (*r*'s between .20 and .41) and internalizing problems as measured by the SDQ (*r*'s between .14 and .35). Correlations between the NFS scores and the SDQ scale measuring externalizing problems were significant but lower (*r*'s between .08 and .13) than those observed with theoretically more related measures (e.g., SCAS-C-8, SSR, and SDQ internalizing problems), but no significant correlations (except for a significant but low correlation) were noted with a theoretically unrelated measure such as the SDQ scale of Prosocial Behavior (*r*'s between -.03 and .11), providing support for the divergent validity of the NFS.

3.5. Evidence of incremental validity

We tested whether nighttime fears (NFS total score) show incremental validity in predicting children's sleep habits (RSS total scores) after controlling for an anxiety measure (SCAS-C-8). In the first step, the

Table 3
Means, standard deviations, and correlations with confidence intervals for Nighttime Fears Scale (NFS) and related measures.

Variable	*M*	*SD*	1	2	3	4	5
1. NFS total score	37.58	17.01					
2. Fear of nighttime features and distressing experiences	12.31	7.98	.88** [.87, .90]				
3. Fear of loss or separation from the family	14.25	5.16	.80** [.77, .82]	.51** [.46, .56]			
4. Fear of imaginary stimuli	1.81	3.05	.63** [.59, .67]	.55** [.50, .60]	.29** [.23, .35]		
5. Fear of real stimuli	9.21	4.68	.84** [.81, .86]	.58** [.53, .62]	.73** [.70, .76]	.38** [.32, .44]	
6. SSR total score	9.89	5.00	.36** [.27, .43]	.41** [.33, .48]	.20** [.11, .29]	.28** [.20, .36]	.20** [.11, .28]
7. SDQ Prosocial	8.55	1.47	.07 [-.00, .14]	.05 [-.02, .11]	.11** [.04, .18]	−.03 [-.10, .04]	.07 [-.00, .14]
8. SDQ Internalizing	4.28	3.21	.32** [.26, .38]	.35** [.29, .41]	.14** [.07, .21]	.30** [.23, .36]	.22** [.15, .28]
9. SDQ Externalizing	6.50	3.51	.13** [.06, .20]	.13** [.06, .20]	.08* [.01, .14]	.12** [.05, .19]	.11** [.04, .17]
10. SCAS-C-8 total score	5.80	3.43	.57** [.52, .62]	.57** [.52, .61]	.37** [.31, .43]	.43** [.37, .48]	.43** [.37, .48]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95 % confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014).
* Indicates $p < .05$.
** Indicates $p < .01$.

inclusion of a measure of anxiety (SCAS-C-8) to predict children's sleep habits and problems reached statistical significance (β = .48, $p < .001$), with a statistically significant regression coefficient ($R = .48$, Adjusted $R^2 = .23$, $F_{1,467} = 67.43$, $p < .001$). In the second step ($R = .49$; Adjusted $R^2 = .24$; $F_{1,467} = 76.29$, $p < .001$), the inclusion of the NFS significantly increased the adjusted R^2 (ΔR^2 Adj = .01) and the *F*-change ($\Delta F = 5.65$, $p = .01$), with nighttime fears having a statistically significant regression coefficient (β = .12, $p = .01$).

3.6. Differences in nighttime fears by gender and age

Table 4 presents the mean scores in the NFS total score and its subscales and differences found by children's sex and age groups. Regarding gender, the results showed that girls reported statistically and significant (p's < .001) higher scores than boys in the NFS total score and the nighttime fears measured by all the NFS subscales. The effect sizes were small (r's between .13 and .25). In addition, the results revealed significant differences by children's age groups. Specifically, younger children (8−9 years) reported higher scores in the NFS total score (z = -4.26, $p < .001$), and the nighttime fears measured by the following NFS subscales: Fear of nighttime features and distressing experiences (z = -4.48, $p < .001$), Fear of imaginary stimuli (z = -5.93, $p < .001$), and Fear of loss or separation from the family, which was marginally significant (z = -1.93, $p = .053$). The effect sizes were small (r's between .06 and .21). The Fear of real stimuli subscale did not show a significant difference by age ($p = .08$).

Table 4
Mean (standard deviation) in the Nighttime Fears Scale and its subscales by children's sex and age.

	F1 (0−32)[a] *M* (*SD*)	F2 (0−20)[a] *M* (*SD*)	F3 (0−16)[a] *M* (*SD*)	F4 (0−16)[a] *M* (*SD*)	Total (0−84)[a] *M* (*SD*)
Girls (n = 406)	14.21 (7.78)	15.16 (4.75)	2.12 (3.21)	10.31 (4.19)	41.81 (15.95)
Boys (n = 388)	10.31 (7.69)	13.28 (5.40)	1.48 (2.82)	8.04 (4.19)	33.13 (16.96)
U test	56154	61727.50	67731.50	57510.50	55856.50
z	−7	−5.29	−3.77	−6.95	−7.09
p	< .001	< .001	< .001	< .001	< .001
r	0.24	0.18	0.13	0.24	0.25
8−9 years (n = 366)	13.68 (8.10)	14.64 (4.92)	2.45 (3.46)	9.48 (4.75)	40.27 (17.61)
10−12 years (n = 428)	11.13 (7.69)	13.90 (5.42)	1.26 (2.51)	8.96 (4.59)	35.27 (16.13)
U test	63898.50	72116.50	61035.50	72825	64585
z	−4.48	−1.93	−5.93	−1.71	−4.26
p	< .001	.053	< .001	.08	< .001
r	0.15	.06	0.21	–	0.15

Note. F1 = Fear of nighttime features and distressing experiences, F2 = Fear of loss or separation from the family, F3 = Fear of imaginary stimuli, and F4 = Fear of real stimuli. *M* = Mean, *SD* = Standard deviation, U-test = The Mann-Whitney test was used to compare 2 independent groups, z = z scores; p = p-value; r = Rosenthal effect size.
[a] Possible scale range.

4. Discussion

This study describes the development and psychometric evaluation of the NFS, a new self-report scale designed specifically for assessing the presence and intensity levels of nighttime fears in children. To capture potentially common nighttime fears, we made an exhaustive initial review of studies in this field in the past decades, which provided relevant theoretical data on children's nighttime fears, included those related to content, frequency, and categories (e.g., Gordon et al., 2007; King et al., 1997; Mooney et al., 1985; Mooney, 1985; Muris et al., 2001). Also, the construction process was based on the judgment and degree of agreement of a panel of expert psychologists in child anxiety and fears. From this process, we obtained an item pool version of 30 items, which was further examined with a large sample of Spanish-speaking children aged 8–12 years.

The results of the EFA yielded a factor structure of 21 items divided into four factors measuring nighttime fears related to the night's inherent features, intrusive thoughts and possible unpleasant or distressing experiences associated with the night's rest time (namely, Fear of nighttime features and distressing experiences), something bad happening to the child and family, which may threaten their health/well-being and potentially associated with the loss or separation (namely, Fear of loss or separation from the family), imaginary creatures (namely, Fear of imaginary stimuli), and situations that may be considered by children as potentially realistic and dangerous caused by someone external or malicious (namely, Fear of real stimuli). Out of the 30 pool items, a total of 21 items remained, which loaded above .32 on their theoretical factor, as suggested by Tabachnick and Fidell (2007).

Subsequent CFA provided support for the four-factor structure of the final 21-item version of the NFS in the Spanish sample, showing good fit indices and items loading on the proposed factors with standardized values ranging from .49 to .90.

Thus, factor structure analyses supported a structure of children's nighttime fears that is different from the nighttime fear structure that prior research suggested (see Mooney, 1985: Mooney et al., 1985). In this regard, the present study may imply a novel contribution to the literature, providing a new framework, suggesting that common nighttime fears in school-aged children can be captured in a structure of only four factors or categories, which warrants future research in this field with other samples. It should also be noted that the NFS comprises in its four-factor structure and 21 items a number of categories and nighttime fears that previous studies reported (e.g., fears related to one's own and others' safety, loss or separation, darkness, shadows, noises, frightening dreams and thoughts, imaginary creatures, intruders) (Gordon et al., 2007; Mooney et al., 1985; Muris et al., 2001). Also, it includes nighttime fears not reported previously (e.g., remembering a scary story or thinking about characters from videos, movies, or video games).

The NFS was shown to have adequate psychometric properties. Internal consistency for the total score (ordinal $\alpha = .94$) and subscales (alpha values ranging from .87 to .90) was strong. Overall, these findings highlight that the NFS is a reliable tool for the assessment of a range of children's nighttime fears. The reliability found for the NFS subscales is also remarkable, as other authors have informed of low reliability coefficients in subscales of anxiety-related measures that evaluated specific fears or phobias (e.g., Muris, Mannens et al., 2017; Orgilés, Rodríguez-Menchón, Fernández-Martínez, Morales, & Espada, 2019). Test-retest reliability was appropriate for the NFS total score and its subscales within a period of eight weeks.

Evidence of convergent and divergent validity was also obtained. Regarding convergent validity, the NFS showed the strongest positive significant correlations with measures related to internalizing symptomatology, such as anxiety (SCAS-C-8), sleep problems (SSR), and the SDQ's Internalizing Problems subscale. In addition, divergent validity was supported through positive but lower correlations with a measure of externalizing problems as measured by the SDQ and with low or nonsignificant correlations with unrelated measure of Prosocial Behavior of the SDQ. These results are consistent with previous studies that found similar patterns between measures of anxiety or specific fears/phobias and measures of sleep problems (e.g., Orgilés et al., 2013), internalizing and externalizing problems or prosocial behavior (e.g., Muris, Simon et al., 2017; Orgilés et al., 2019; Reardon et al., 2018). Overall, our findings suggest that a higher presence of children's nighttime fears as measured by the NFS are related to higher internalizing symptoms (e.g., anxiety) and sleep-related problems. Also, the low but positive significant correlations with externalizing problems, along with the other stronger positive correlations found, can be in line with authors suggesting links among nighttime fears, sleep problems, internalizing and externalizing symptoms (El Rafihi-Ferreira et al., 2019).

Differences in the nighttime fears by gender and age were also evidenced, although the effects sizes were small. Regarding gender, the results showed that girls reported statistically significantly greater levels of nighttime fears than boys in the NFS total score and subscales. When analyzing the differences by age groups, the results indicated that the younger children (8−9 years) reported greater levels of nighttime fears in the NFS total score, and in most of the nighttime fears subscales than the older children (10−12), suggesting a decreasing trend. These findings are in keeping with that found by previous research on nighttime fears with children from other origins (e.g., Australia, The Netherlands), finding that children aged 7–9 reported more nighttime fears compared to older children, aged 10−12, when fears decreased (Muris et al., 2001) and that girls reported more nighttime fears than boys (Gordon et al., 2007). This study with a Spanish sample adds further evidence to the existing literature about the age and gender developmental patterns of children's nighttime fears, which still require further cross-cultural study.

4.1. Limitations

This study presents some limitations to be acknowledged. First, the sample is from the southeast region of Spain, and it would be interesting in the future to test the measure on children from other regions and backgrounds for further generalization. Second, the children who participated in the study were from a normal community sample, and therefore, it would be appropriate to conduct future research also including clinical samples. Third, given the lack of specific nighttime standardized measures, this study did not include a gold standard for examining concurrent criterion validity. This limitation may be overcome in subsequent studies by using anxiety-related diagnostic interviews, as nighttime fears may be a characteristic of different anxiety disorders and structured interviews intended to measure nighttime fears as used in previous studies (e.g., Gordon et al., 2007; King et al., 1997; Muris et al., 2001). Fourth, the results of this study relied solely on self-report measures. Future studies should also measure parent-reported symptoms of anxiety and nighttime fears, as parents may be valuable informants, especially for younger children. Finally, there was a low representation of 12-year-old children in the sample, warranting further studies with a larger sample of this age.

4.2. Conclusions

Despite the limitations noted, the current study describes the development and the psychometric property evaluation of the NFS, a new self-report measure consisting of 21 items, designed to specifically assess nighttime fears in children. The internal consistency, test-retest reliability, validity, and factor structure of the NFS were found to be satisfactory in a large sample of school-aged Spanish-speaking children, providing initial support for its use as a valuable instrument to identify children's nighttime fears. Furthermore, it should be noted that this measure arises due to the lack of standardized self-reports in this field. Thus, the NFS may constitute a potential contribution, providing a reliable tool that allows researchers and clinicians to assess quickly and easily the presence and intensity levels of a set of common children's nighttime fears. The NFS could also be a useful instrument within a more comprehensive and multi-method assessment. In this regard, the NFS is likely to be useful when administered in conjunction with other strategies (e.g., well-established anxiety interviews or questionnaires) in a more in-depth assessment. For instance, the NFS may have a potential utility to determine whether there are also concerns at nighttime in youths who have elevated symptoms on traditional anxiety questionnaires (e.g., SCAS). It also may be of interest in cases of youths reporting sleep disturbances or whose parents inform of difficulties at bedtime, or in the context of psychological interventions (e.g., it can contribute to the elaboration of an exposure hierarchy during the intervention plan by identifying possible problematic fears at nighttime or assessing the impact of such interventions on targeted nighttime fears). Furthermore, the NFS may be useful to administer as a single measure to identify the presence of a range of problematic nighttime fears from the children's perspective and to improve the study and understanding of normative nighttime fears in childhood through large epidemiological investigations. Finally, more research on the psychometric properties of the NFS with children from different settings and backgrounds is warranted.

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Declaration of Competing Interest

The authors report no declarations of interest.

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