

Psychometric analysis of the Marc Leary Social Anxiety Scale in Peruvian university students

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Abstract

Social anxiety is currently considered a public health crisis, largely affecting several adolescents and young adults. The situation has caused worldwide concern due to the mental health of these individuals. The objective of this study is to establish the psychometric evidence of the Social Anxiety Scale in Peruvian university students. The type of study is instrumental and non-experimental. The subjects were 517 university students between the ages of 18 and 38 who participated in total (M = 20.7; SD = 2.50). The instrument used was the Marc Leary Social Anxiety Scale. The results are based on the statistical analysis of each item, through item-by-item testing and item-to-scale correlation, identifying values higher than .20. An analysis model was formed called the Confirmatory Factor Analysis (CFA), whose original dimensional model was carried out, finding inadequate fit indices, three items with low factorial weight, and correlated errors. A new CFA was conducted without these items and correlated errors, obtaining optimal fit indices for the new structure ($\chi^2/gl = 2.48$; CFI = .945; TLI = .939; RMSEA = .054). Regarding reliability, it was estimated with the omega coefficient ($\omega = .949$). Lastly, scales and cut-off points were developed according to the sex of the subjects. In conclusion, the structure of the test was composed of 26 items, with two items, 24 and 28, being eliminated, making the test reliable for use based on its values.

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1. Introduction

Globally, social anxiety in adolescents and young adults has been on the rise, becoming an ever-growing concern for mental health specialists. Numerous studies and reports indicate that this problem affects a sizable proportion of the younger population, with serious implications for their emotional well-being and social development.

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Social anxiety is considered a form of behavior characterized by intense and even repetitive fears of exposure to social situations, which causes imbalances in the normal development of a person in their social, emotional, and academic spheres [1].

However, it should be noted that anxiety is considered a natural response to warning signs of danger and is inherent to every human being, thus manifesting itself with organic responses such as excessive heart palpitations, palm sweating, "cold sweats," and in certain cases, tremors.

There are many anxiety-inducing situations that everyone has experienced at some point, with organic manifestations such as trembling, palpitations, cold hands, and sweating, among other experiences. The externalization of social anxiety will depend on the perceptual, cognitive, and emotional characteristics of the individual, their prior experiences, and their support systems [2].

In this regard, the author Bulacio [3] emphasizes that the cognitive, intellectual, and self-assessment capacities of the subject must be optimal; otherwise, they will present a poor self-assessment of how others see them, valuing themselves negatively. This is why they develop avoidance responses to not expose themselves to a group, in addition to the presence of anxious symptoms.

An argument can be made for the implementation of communication and social skills as necessary strategies for the development of maturity and adaptive socialization in any context. In other words, it's normal to experience anxiety due to a situation one considers may threaten one's prestige and social acceptance; however, this is modulated as social homeostasis is established in that experience.

At the same time, Leary and Schlenker [4] emphasize that the experience of anxious attitudes is linked to the subject's motivation to make a positive impression on the group, but ultimately fears they cannot achieve it.

According to Caballo, et al. [5], social anxiety is related to the subject's fear of situations of social exposure where they can be observed or evaluated by the group.

The reasons considered normal within the maturation process of adaptation to the social environment instead turn into social anxiety as a consequence of the difficulties faced under unexpected and abrupt circumstances. A mention must be made regarding the global pandemic that reduced once vital social spaces to four walls; this social confinement affected the normal development of socialization.

There have been several studies focused on the response of adolescents and young adults now presenting symptoms of anxiety from virtual education and being observed through a camera, where their family could potentially issue judgments, which awakened in them anxiety problems with manifestations of fear, stuttering, and even unjustified connection problems, among others.

Therefore, faced with this contingency that has altered socialization and the normal adaptation mechanisms within the psychological development process worldwide, it is urgent to evaluate the manifestation of social anxiety in order to prevent and treat the problem that prevents adolescents and young adults from adapting to university life normally.

Morales [6] sought to determine the psychometric properties of the Marc Leary Social Anxiety Scale in 530 incoming first-year university students at a private university in the city of Trujillo, Peru, finding the correlation indices to a maximum of 0.707; however, items such as 7, 19, 24, and 28 reached values below the criteria. Reliability was determined by temporal stability using the Spearman-Brown coefficient, where the audience anxiety scale showed a degree of 0.903 and the interaction anxiety scale showed a degree of 0.904. In the general scale, a highly significant degree of 0.928 was found (p < .01). The Cronbach's Alpha Coefficient was used for internal consistency reliability, obtaining 0.757 for the audience anxiety scale, 0.786 for the interaction anxiety scale, and a coefficient of 0.865 for the general social anxiety scale. At a later date, Vite [7] carried out a similar study in Piura, Peru, with the purpose of gathering and identifying evidence of validation and adaptation of Marc Leary's social anxiety scale in a sample of 384 university students, obtaining, through construct validity by confirmatory factor analysis, values from -0.113 to 0.796 in the different items, as well as a reliability of 0.891.

Recognizing the importance of updating psychological instruments for their use and allowing their sustainability, the following objectives were proposed for the psychometric analysis of the Marc Leary Social Anxiety Scale:

General objective: To establish the psychometric evidence of the Social Anxiety Scale in university students. Specific objectives:

(1) To analyze the items through the item-test correlation of the Social Anxiety Scale in university students.

(2) To analyze the items through the item-scale correlation of the Social Anxiety Scale in university students.

(3) To determine the evidence of construct validity through confirmatory factor analysis of the Social Anxiety Scale in university students.

(4) To estimate the reliability by internal consistency through the omega index of the Social Anxiety Scale in university students.

(5) To develop the percentile scales of the Social Anxiety Scale in university students.

(6) To define the cut-off points of the Social Anxiety Scale in university students.

2. Theoretical Framework

Social Anxiety (SA) constitutes a complex and multidimensional system of adaptive responses based on a neurobiological state of alert in the face of certain social contexts perceived as uncertain and/or threatening [8]. However, when this behavioral system is exacerbated, it can become dysfunctional, causing Social Anxiety Disorder (SAD). The DSM V-TR [9] includes SAD among anxiety disorders whose essential characteristic is the excessive presence of emotional responses of fear in the face of an imminent threat and anxiety in response to a potential future threat. Both emotional phenomena are presented differentially on a continuum. In this regard, one of the noteworthy facts is the rise of anxiety

disorders, which now have the highest prevalence globally [10] around 4% of the world's population. These disorders have worsened after the public health confinement due to the COVID-19 pandemic, with a significant increase, with SAD being one of the most prevalent [11]. This is a significant development if we consider the social nature of human beings and the subsequent need for human interaction.

SAD is highly disabling since it is a disorder that disrupts people's quality of life [12]. Its distinctive feature is an excessive fear of being negatively evaluated by other people in specific social contexts, especially when these interactions cannot be avoided [13]. Thus, these social situations often generate a sense of fear or anxiety followed by great intensity along with different levels of ill adaptation; the behavior displayed is avoidance. These emotional responses of fear and anxiety are disproportionate to the real threat posed by the sociocultural context [9]. Consequently, the symptoms of fear, anxiety, and avoidance produce clinically significant discomfort and social impairment coupled with a lot of social pain, which results in a dysfunction of social interactions and social dimensions such as relationships or the ability to perform well in certain jobs [14].

AS and SAD can disrupt academic performance due to the high requirement for social interaction. It is estimated that around 45% of university students suffer from some type of difficulty related to AS [15]. The prevalence of SAD is around 7% of the global population; in countries such as the United States, it affects adolescents and young adults, especially women, who make up around 2% of the population [9]. There is evidence that points to women as more likely than men to suffer from SAD, although this gender difference tends to blur concerning symptoms, their evolution, dysfunctionality, and comorbidity [16]. It should be noted that during undergraduate studies, many students continue in the human life cycle stage of adolescent development, given that neurobiologically, the brain finishes maturing its frontal lobes approximately around the age of 23 [17].

In this sense, adolescents may find themselves in a vulnerable position concerning SAD. The presence of SAD negatively affects their academic achievements, especially regarding their performance and school permanence throughout their university studies. Likewise, SAD is associated with personality traits such as neuroticism and introversion [18], whose reactive symptomatology worsened as a result of the health confinement due to the COVID-19 pandemic [19, 20]. SA and SAD in university students can assume certain cognitive patterns characterized by cognitive distortions and biases that may present themselves as self-esteem, self-concept, and body image issues.

2.1. Etiology and Explanatory Models

In relation to the etiology of SAD, the convergence of various biological, psychological, and sociocultural factors must be considered. Among the psychological variables involved in SAD are personality traits, which may comorbidly involve avoidant personality disorder [21], perfectionism [22], shyness [23], emotional regulation [24], and cognitive biases [25], along with attentional dysfunction, lack of interpretive memory, and a deficit of social skills [5], as well as cultural differences [26].

According to Wong and Rapee [8], among the influencing factors in the etiology of AS are genetic vulnerability, shy temperament, self-centered cognitions and cognitive biases, circumstantial and developmental crises, overprotective parents and parenting styles, insecure attachments to parents, vicarious learning of AS, modeling and molding, experiences of rejection by peers, deficits in social skills, and neurobiological factors due to a low level of neurotransmitters, particularly in individualistic cultural environments. Among the influencing factors in the maintenance of AS are anticipatory cognitive processing and avoidance behavior prior to situations of social evaluation, negative social evaluation cognitions, self-focused and threat-selective attention, cognitive and behavioral avoidance, deficits in social skills, and anxiety management during situations of social evaluation, as well as cognitive processing after the social evaluation event [8]. It's worth noting that recent research indicates that fear and anxiety are not limited to negative evaluations; paradoxically, they can also involve positive evaluations, which can trigger the appearance of AS [27-29].

In relation to the explanatory models, the following are found:

2.2. Cognitive-Behavioral Models

A) The self-presentation model of Leary and Schlenker [4] maintains that the trigger for social anxiety disorder (SAD) is the personal expectation of making a good impression regarding one's social performance in front of a given audience. B) The cognitive model [30] suggests that SAD is generated by the influence of a person's behavioral skills and life experiences, from which he or she perceives the social world as potentially dangerous and feels that he or she does not have enough capacity to handle it, which implies a negative evaluation. C) The cognitive-behavioral model [31], in line with the earlier ones, emphasizes that SAD is activated to the extent that social environments are valued as threatening and the degree to which said threats are predicted from a specific signal. D) Hofmann's cognitive-behavioral model (2007) states that the trigger for social anxiety is the personal perception of one's inability to successfully achieve the expected social standards and the consequent tendency to maintain low performance. E) The central fear in social anxiety, an individualized model [32], supports the theory that the fear of negative evaluation or shame is not really the stimuli that cause SAD, but rather their consequences. What truly leads to the development of SAD are the personal characteristics that are perceived as deficient in relation to social expectations. Therefore, it emphasizes the self-perception of one's own social skills, physical and character defects, as well as the inability to hide anxiety-provoking symptoms. F) The importance of the self in social anxiety [33] maintains that the self-perceived self as a social object has multiple representations; however, during SAD, only certain perceptions of the self are recovered, especially devaluing ones.

2.2.1. Other Explanatory Models

A) The etiological model [34] includes biological, psychological, and social aspects involved in SAD, which is the result of a specific biological predisposition to associate fears with expressions of anger, criticism, or rejection by others through eye contact. B) The etiological model [31] maintains that SAD is the result of the interaction of personal, genetic, and contextual factors in which the continuous concern about negative social evaluation is fundamental. C) The reinforcement sensitivity model [35] explains SAD by the dysfunctional interaction of the inhibitory brain subsystems, the behavioral activation system, and the fight-flight-freeze system. Thus, during SAD, these neurobiological subsystems come into conflict. D) The integral model [8], referred to as the "Integrated" aetiological and maintenance (IAM) model of SAD (Comprehensive model of development and maintenance of SAD), supports that SAD is generated and maintained by neurobiological, cognitive, behavioral, and contextual factors. In short, SAD is a multidimensional phenomenon in which factors such as sex, age, marital status, employment, country of residence and origin, as well as self-perception of one's own personality, including character, and expectations and processing of social evaluation towards the person converge [36].

Leary's theory clarifies the manifestations of anxiety in the face of contingent and non-contingent situations, mentioning that contingent interactions refer to the response that a subject gives to what the other expresses verbally or non-verbally and can partially adapt to the responses of others. The non-contingent encounter refers to the subject's behavior being preestablished, making it unlikely to adapt the responses in order to please or provoke certain reactions in the audience. Example: an actor, a lecturer, etc. [37].

Faced with this, he proposes two kinds: Anxiety that arises from contingent interactions, which in other cases is called interpersonal anxiety, occurs in situations in which one interacts contingently with others, and their respective labels obscure the fact that they are not conceptually different. Thus, the term interaction anxiety refers to social anxiety that results from contingent interactions. Anxiety that arises in non-contingent encounters refers to situations in which the subject's social responses are not strongly influenced by the actions of others in the encounter; thus, the term audience anxiety refers to social anxiety that results from anxiety that results from non-contingent interactions [4, 37].

Hence, highlighting the importance of managing communication strategies. The use of social skills within a contingent interaction, along with self-confidence strategies, provides the security that the subject must manifest within a non-contingent encounter. All this is learned and shaped through continuous exposure of the subject during their development of social interaction, interpersonal connections, and intrapersonal maturity. Therefore, the responses of the subject within any social context are related to the individuals with whom they interact [38].

3. Methodology

For this type of applied study, the instrumental parameters used during our analysis are based on the psychometric analysis test, which in itself is used to declare the validity and reliability within acceptable ranges for its use in psychometric measurement and evaluation of its subjects [39, 40]. The instrument used was the Marc Leary Social Anxiety Scale, created in the United States in 1983. For its development and validation process, the Marc Leary Social Anxiety Scale was meticulously developed, involving multiple stages from the identification of the construct to adjustments made based on empirical data. The first stage presented 87 items in the self-report. The report consisted of imaginary situations ranging from social interaction in a contingent and non-contingent manner. This was applied to 112 university subjects, and then 37 items with coefficients greater than or equal to .40 were selected. Later, it was applied to a school of 123 students, with a total of 27 items remaining, obtaining a Cronbach's Alpha of .88. Finally, the last version with 29 items was applied to university students, where the analysis of items revealed a value above .50 according to the totals of their respective scales. Cronbach's Alpha showed .89 for anxiety in relation to social interaction and .91 for anxiety in relation to the audience.

The instrument can be divided into two dimensions: Anxiety in the face of interaction, which highlights the fear of establishing interpersonal or social relationships (See Items: 1, 2, 4, 5, 7, 8, 10, 14, 16, 17, 18, 19, 21, 23, 25, 28), and Anxiety in the face of the audience, which manifests itself as the persistent fear of situations of public exposure (See Items: 3, 6, 9, 11, 12, 13, 15, 20, 22, 24, 26, 27, 29).

The sample used in our study consisted of 517 university students from 18 different majors, ranging in age from 18 to 38 years old (M= 20.7; SD= 2.50), where 61.5% were female and 38.5% male. Simple random probabilistic sampling was used, along with ethical criteria such as informed consent, autonomy, and respect for the participant, as well as confidentiality in the treatment of data.

Sample distribution by sex.

	Ν	%
Female	318	61.5
Male	199	38.5
Total	517	100.0

4. Results

In Table 2, descriptive statistics for each item that makes up the instrument are shown, such as the variation of 2.03 and 3.42, and the standard deviation. Additionally, asymmetry and kurtosis values within the ranges of -1 and 1 are considered acceptable. Other observed factors include the corrected item-test correlation indices (RITC), which ranged between .26 and .76, with the ideal being noted. Furthermore, the item-scale correlation indices of the agents in each dimension are presented.

For example, those related to anxiety before interaction (AI) obtained values ranging between .26 and .74, while those related to anxiety before the audience (AA) had values between .24 and .77.

	М	SD	Asymmetry	Kurtosis	RITC	AI	AA
IT1	2.33	1.16	0.47	-0.71	0.60	0.59	
IT2	2.54	1.18	0.47	-0.56	0.27	0.26	
IT3	2.80	1.27	0.11	-0.97	0.72		0.72
IT4	2.03	1.20	0.96	-0.07	0.45	0.47	
IT5	2.74	1.20	0.14	-0.81	0.61	0.59	
IT6	2.56	1.25	0.29	-0.95	0.72		0.71
IT7	2.80	1.12	0.13	-0.66	0.39	0.36	
IT8	3.01	1.24	-0.03	-0.94	0.55	0.54	
IT9	3.35	1.20	-0.27	-0.71	0.46		0.47
IT10	2.43	1.16	0.39	-0.68	0.65	0.62	
IT11	2.67	1.20	0.15	-0.90	0.62		0.59
IT12	2.59	1.27	0.28	-0.95	0.72		0.74
IT13	2.55	1.28	0.33	-0.96	0.73		0.75
IT14	2.24	1.18	0.62	-0.55	0.62	0.61	
IT15	2.71	1.28	0.29	-0.95	0.76		0.77
IT16	3.42	1.27	-0.37	-0.88	0.52	0.47	
IT17	2.31	1.26	0.60	-0.69	0.73	0.71	
IT18	2.47	1.19	0.33	-0.86	0.70	0.72	
IT19	2.49	1.18	0.31	-0.82	0.73	0.73	
IT20	2.67	1.31	0.30	-0.96	0.66		0.64
IT21	2.56	1.30	0.37	-0.93	0.69	0.67	
IT22	2.54	1.33	0.38	-10.00	0.71		0.67
IT23	2.06	1.11	0.77	-0.33	0.44	0.45	
IT24	2.97	1.23	0.00	-0.88	0.28		0.24
IT25	2.39	1.17	0.40	-0.65	0.52	0.52	
IT26	2.45	1.25	0.49	-0.75	0.73		0.74
IT27	2.49	1.26	0.40	-0.85	0.73		0.75
IT28	2.99	1.20	-0.07	-0.78	0.26	0.24	
IT29	2.82	1.33	0.15	-10.07	0.72		0.75

 Table 2.

 Descriptive statistics of the items, corrected correlation item test, and item-scale correlation.

Note: M: Media; SD: Standard deviation; RITC: Corrected correlation item test; AI: Interaction anxiety; AA: Audience anxiety.

Table 3.

Indices obtained through confirmatory factor analysis.						
	X ² /gl	CFI	TLI	RMSEA (90% CI)	SRMR	
Original model with 29 items	5.389	0.802	0.787	0.092 (0.088-0.096)	0.088	
Model with 26 items and correlated errors	2.488	0.945	0.939	0.054 (0.049-0.059)	0.058	

Table 3 presents the indices obtained from confirmatory factor analysis (CFA) to corroborate the suitability of the original model of the instrument scale, finding that the X²/gl index was much higher than the maximum of 4, the CFI and TLI indices were much lower than the minimum recommended value of .90. In addition, the RMSEA and SRMR indices were much higher than the maximum tolerance of .06, indicating that the proposed factor structure was not ideal. Thus, the presence of three items with low factor saturations was visualized, as shown in Table 4. Furthermore, the modification indices indicated the presence of correlation errors; therefore, it was decided to discard those items and correlate those errors, proceeding to a new analysis, which revealed a better fit by achieving optimal fit indices for the new structure of 26 items.

	Original mo	odel	Restructured model		
Items	Anxiety about interaction	Audience anxiety	Anxiety about interaction	Audience anxiety	
IT1	0.62		0.63		
IT2	0.25*		-		
IT4	0.48		0.49		
IT5	0.64		0.65		
IT7	0.36		0.36		
IT8	0.57		0.58		
IT10	0.68		0.68		
IT14	0.66		0.65		
IT16	0.55		0.57		
IT17	0.77		0.76		
IT18	0.77		0.72		
IT19	0.79		0.74		
IT21	0.70		0.72		
IT23	0.48		0.47		
IT25	0.56		0.55		
IT28	0.24*		-		
IT3		0.75		0.75	
IT6		0.75		0.76	
IT9		0.47		0.47	
IT11		0.62		0.63	
IT12		0.77		0.74	
IT13		0.78		0.75	
IT15		0.80		0.80	
IT20		0.68		0.68	
IT22		0.71		0.72	
IT24		0.24*		-	
IT26		0.78		0.75	
IT27		0.79		0.75	
IT29		0.77		0.77	

Table 4.

Note: *<0.35.



Table 5. Scale reliability

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	McDonald's ω			
Full scale	0.949			
Anxiety about interaction	0.897			
Audience anxiety	0.930			

Table 5 demonstrates the reliability of the indices through internal consistency, using McDonald's omega coefficient, and reveals high values for both the overall instrument and its dimensions.

Table 6.

Scales and cut-off points of the instrument.

	Social	Social anxiety Anxiety about interaction		Anxiety in front of the audience		
PC	F	М	F	М	F	М
99	124	111	64	57	60	55
95	108	94	56	50	54	46
90	101	87	51	45	51	42
85	95	82	49	43	47	39
80	90	76	46	41	45	37
75	86	74	44	39	43	35
70	83	72	43	37	41	34
65	81	69	41	36	39	33
60	77	67	40	35	38	32
55	75	65	39	33	36	31
50	71	61	38	32	34	30
45	69	58	36	31	32	28
40	64	56	34	29	31	26
35	62	53	32	27	29	25
30	58	51	30	26	27	23
25	54	47	29	25	25	22
20	50	43	27	23	23	20
15	45	40	24	21	20	18
10	41	35	22	19	18	14
5	36	30	20	18	16	13
1	31	26	17	14	13	12
Media	71.27	61.40	37.15	32.30	34.12	29.11
DS	21.97	19.31	11.01	10.02	11.81	10.00

Finally, the data collected were used to create percentile scales and define the cut-off points corresponding to the low, medium, and high levels, based on the 25th and 75th percentiles. In addition, these scales were developed separately according to the subjects' sex, as a comparison was previously made using T statistics for the students, revealing very significant differences (p < .01) between the male and female sexes, both in the total variable and its two dimensions.

5. Discussion and Conclusion

The present study was developed with the main purpose of establishing the psychometric evidence of the Social Anxiety Scale in university students. Firstly, the statistical analysis of the items was carried out, particularly with the discrimination index, which is obtained through the corrected correlation item test and the item scale correlation. Through the first, it was found that the items' achieved values were between .26 and .76, and during the second, that the anxiety reactions before interaction (AI) have values between .26 and .74, while those showing signs of anxiety before the audience (AA) have values between .24 and .77, all exceeding the minimum recommended value of .20 [41]. Therefore, it demonstrates the ability to distinguish between those evaluated who have a high degree of social anxiety as a variable along with varying dimensions, from those who have it to a lesser degree, which is ideal. Subsequently, it was proposed to analyze the evidence of construct validity through confirmatory factor analysis (CFA). The asymmetry and kurtosis of each of the items, when first analyzed, found that the values were lower than the maximums stipulated by Abad, et al. [42], since the asymmetry of all the items was less than 2 in absolute value and less than 7 in kurtosis in absolute value. Thus, the maximum likelihood method was determined for the estimation of parameters with CFA [43].

Through CFA, the original bifactor model of the instrument was subjected, finding that the X²/gl index was much higher than the maximum of 4 [42]. The CFI and TLI indices were much lower than the recommended minimum of .90 [44], as well as the RMSEA and SRMR indices, which were much higher than the maximum tolerable of .06 [45], thus indicating that the data collected did not correctly fit the original factor structure proposed and should be restructured. The following three items were identified with factor saturations below .35 [43], which were low, and their modification indices showed the presence

of correlated errors. Therefore, the wording of these items was reviewed, and it was ultimately decided to discard them, as they caused confusion among the respondents. Regarding the items with correlated errors, according to Dominguez-Lara [46], this can happen due to their phrasing or because their content is similar or redundant, facts that support correlating them and thus evaluating whether improvements can be made in this way. Future adjustments can be made to the instrument, and consequently, a new CFA was carried out, deleting the items with low factor loadings and correlated errors, revealing a better fit by reaching optimal fit indices and a new 26-item structure.

Likewise, reliability was estimated by internal consistency using McDonald's omega index, choosing this statistic because it shows more stability when working with factors and is not sensitive to sample size [47]. Very high values were found for both the global instrument and dimensions, indicating the instrument's ability to quantify the variable accurately.

Finally, before creating the scales, the scores of men and women were compared using the Student's t statistic, revealing very significant differences (p < .01) between the male and female sexes, both in the total variable and in its two dimensions, establishing the creation of differentiated percentile scales according to sex, and the cut-off points corresponding to the low, medium, and high levels were delimited based on the 25th and 75th percentiles [48].

Adapting Marc Leary's social anxiety instrument is essential to ensure that it continues to provide valid, reliable, and relevant information to the specific population where it is applied, which in turn improves diagnosis and treatment in both adolescents and young adults. At the same time, mental health professionals interested in the subject recognize that all instruments used within the last three years can utilize the Marc Leary social anxiety scale, which has been updated in the analysis of its psychometric properties.

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