Psychometric properties of the Revised Children's Manifest Anxiety Scale–Second Edition in Peruvian students

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Abstract

The aim of this study was to analyze the psychometric properties of the Revised Children's Manifest Anxiety Scale–Second Edition (RCMAS-2) among Peruvian students. The sample consisted of 472 participants aged between 7 and 18 years, of whom 250 were female (53%). Likewise, 191 were enrolled from third to sixth grade of primary school (40.5%), and 281 were registered from first to fifth grade of secondary school (59.5%). The results of the study indicated that the RCMAS-2 scores had adequate levels of reliability for all its dimensions (ordinal alpha > .70). On the other hand, a four-factor structure (Physiological anxiety, Worry/Social anxiety, Defensiveness I, and Defensiveness II) was found to be invariant to gender and schooling level. Also, convergent and discriminant validity evidence was provided. Finally, a moderate difference in Defensiveness II according to the schooling level through the latent mean structure analysis was found. Taking into account the results, it was concluded that the RCMAS-2 scores have evidence of reliability, validity, and equity for its use in Peruvian regular elementary school students.
Keywords: RCMAS-2, anxiety, psychometric properties, factorial invariance, Peruvian students.

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Propiedades psicométricas de la Escala de Ansiedad Manifiesta en Niños Revisada, Segunda Edición, en estudiantes peruanos

Resumen

El objetivo del estudio fue analizar las propiedades psicométricas de la Escala de Ansiedad Manifiesta en Niños Revisada, Segunda Edición (CMASR-2), en estudiantes peruanos. La muestra estuvo conformada por 472 participantes con edades entre 7 y 18 años, siendo 250 mujeres (53%). Asimismo, 191 pertenecían del tercero al sexto grado de primaria (40.5%) y 281 cursaban del primero al quinto grado de secundaria (59.5%). Los resultados del estudio indicaron que las puntuaciones en el CMASR-2 presentan adecuados niveles de fiabilidad para todas sus dimensiones (alfa ordinal > .70). Por otro lado, se encontró una estructura de cuatro factores (Ansiedad fisiológica, Inquietud/Ansiedad social, Defensividad I y Defensividad II) que se mantuvo invariante al sexo y nivel de escolaridad. Además, se aportaron evidencias de validez discriminante y convergente. Finalmente, el análisis de medias latentes encontró una diferencia moderada en Defensividad II según el nivel de escolaridad. A partir de los resultados, se concluyó que, las puntuaciones en el CMASR-2 cuentan con evidencias de fiabilidad, validez y equidad para su uso en estudiantes peruanos de educación básica regular.
Palabras clave: CMASR-2, ansiedad, propiedades psicométricas, invarianza factorial, estudiantes peruanos.

Introduction

According to the World Health Organization (2020), anxiety was the sixth cause of disability and illnesses in children from 10 to 14 years old and the ninth cause in adolescents from 15 to 19 years old worldwide in 2020. In this sense, according to Cohen et al. (2018), 10% of minors from 6 to 17 years old, approximately 117 million, would have suffered from some kind of anxiety disorder. Similarly, a meta-analysis of 41 studies in 27 countries reported that anxiety disorders were present in 6.5% of children and adolescents (Polanczyk et al., 2015).

In Peru, according to the National Institute of Mental Health (Instituto Nacional de Salud Mental [INSM], 2012) in 2007, the prevalence of anxiety disorders in children between 6 and 10 years old was 3%. Also, in adolescents between 11 and 18 years old, there was a prevalence of generalized anxiety disorder of 5.2%, where the highest prevalence was in adolescents between 15 and 18 years old (6.3%). The following year, the INSM (2013) undertook a new epidemiologic study and concluded that the prevalence of generalized anxiety disorder in adolescents from 12 to 17 years old was 3% with similar rates between males (3.1%) and females (3%). Besides, the Ministry of Health (Ministerio de Salud, 2018) states that the annual prevalence of anxiety disorder in people aged 12 years and over is 5.9% on average, and that, between 2009 and 2017, the number of cases of anxiety treated at health facilities went from 165,461 to 245,503, which is higher than depression and other disorders' cases.

It is important to highlight that the prevalence of anxiety disorders varies according to the measurement instrument utilized; for example, Puerto Rico had a prevalence of 2.9% in children from 4 to 17 years old according to the results presented by the Diagnostic Interview Schedule for Children (DISC-IV) (Shafferet al., 2000). In Brazil, the Evaluation of Development and Well-Being Assessment (DAWBA) was used, and it was found that there was a prevalence of 5.2% among children aged from 7 to 14 years. In Mexico, a prevalence of 29.8% was evidenced through the Composite International Diagnostic Interview (CIDI-A). While in Chile, it was determined that 7.4% of children had an anxiety disorder after administering questionnaires and semi-structured interviews (Flora de la Barra, 2009).

In the Peruvian context, there is a lack of instruments to measure anxiety in children since most of them were created for the adult population and, to a lesser extent, for adolescents (Domínguez et al., 2013). One of the tests that have been used in children is the Anxiety Checkup List for Children (Vega et al., 2005), while for adolescents, there is the State-Feature Anxiety Inventory STAI (Celis et al., 2001) and the General Questionnaire of Health GHQ-12 (Gelaye et al., 2015). Thus, an instrument to measure anxiety is the Revised Children's Manifest Anxiety Scale–Second Edition (RCMAS-2), which evaluates children aged six years and over (Reynolds & Richmond, 2008). One advantage of this test is that, besides measuring the normal and pathological levels of anxiety, it identifies the type of anxiety the examined patient suffers from as well.

The first version was the CMAS, which was composed of 53 items and was developed by McCandless et al. (1956).

Subsequently, Reynolds and Richmond (1978) created a revised version of 37 items (RCMAS) with a five-factor structure: Physiologic anxiety, Worry, Social anxiety, and two Lie factors. A second edition of the revised version was published in 2008, the RCMAS-2, composed of 49 items grouped into five scales: Physiological anxiety, Worry, Social anxiety, Defensiveness, and Inconsistent responding index (Reynolds & Richmond, 2008).

The psychometric properties of the RCMAS-2 have been analyzed in different contexts. Zhu and Lowe (2017) made a Chinese adaptation in which they found four factors (Physiological anxiety, Worry/Social anxiety, Defensiveness I, and Defensiveness II). They obtained adequate levels of internal consistency, except Physiological anxiety. Similar results were obtained by Cha et al. (2020) in a sample of Korean elementary students. On the other hand, Ahmad and Mansoor (2011) made the Pakistani adaptation and obtained low levels of internal consistency ($\alpha < .70$), except for Worry ($\alpha = .71$). The study by Raad (2013) stated that the RCMAS-2 was administered in students with specific learning problems and reported a three-factor structure (Physiological anxiety, Worry, and Social anxiety) with adequate levels of reliability and convergent and discriminant validity evidence. Similarly, the studies by Lowe (2014) and Ang et al. (2011) found a five-factor structure (Physiological anxiety, Worry, Social anxiety, Defensiveness I, and Defensiveness II), with acceptable internal consistency estimates of reliability ($\alpha > .70$).

However, the use of the RCMAS-2 is not restricted only to educational contexts since it has also been used in the clinical field (Mahakwe et al., 2021). In a group of 370 children with cancer, Wuet al. (2016) found adequate reliability levels with exception of the Physiological anxiety factor ($\alpha = .65$). Also, the confirmatory factorial analysis tested a three-factor structure (Physiological anxiety, Worry, and Social anxiety), although it did not have a correct fit.

Finally, nowadays equity or bias absence is considered an indispensable requisite for all measurement scales because it assures that the instrument's contents have the same meaning concerning the evaluated construct within the different categories of a sociodemographic variable (Aliaga, 2018). In this sense, the literature indicates that the RCMAS-2 meets this criterion in other realities (Ang et al., 2011; Lowe, 2014). However, given that anxiety is affecting children and adolescents more and more (Orgilés et al., 2012), it is necessary to verify this psychometric property through gender and schooling level in the sample composed of Peruvian students.

Therefore, this study seeks to analyze the psychometric properties of RCMAS-2 in a sample of Peruvian children and adolescents. Likewise, the study seeks to compare latent means among the found factors according to the participants' gender and schooling level.

Method

Design

The study was instrumental because the RCMAS-2 psychometric properties were examined (Ato et al., 2013). These properties refer to the scores' reliability, validity, and equity which were obtained after administering a test (Aliaga, 2018). The methodological planning followed different directives for instrumental studies (American Educational Research Association et al., 2014; Zickar, 2020).

Participants

The initial sample was comprised of 488 students of regular basic education, obtained through a non-probability sampling (purposive sample), who belonged to a public educational institution of the Constitutional Province of Callao, Peru. From the sample, 16 were not considered because of having a different nationality. The final sample was composed of 472 students aged between 7 and 18 years ($M = 12.46$, $SD = 2.56$). The students were enrolled in different grades, from third to sixth in Primary ($n = 191$, 40.50%) and from first to fifth in Secondary (n = 281, 59.50%). Most of the students were female ($n = 250$, 53.00%), who studied in the morning shift ($n = 305$, 64.60%) and lived in Callao ($n = 422$, 89.40%).

Instrument

The RCMAS-2 is a self-report instrument developed by Reynolds and Richmond (2008). For this study, the Spanish version of the RCMAS-2 was used (Reynolds & Richmond, 2012). The RCMAS-2 is made up of 49 items; whose objective was to measure the anxiety level and nature in children and adolescents aged between 6 and 19 years. The answer format is dichotomous (*yes* = 1 and *no* = 0). The RCMAS-2 is composed of five scales: Physiological anxiety (12 items), Worry (16 items), Social anxiety (12 items), Defensiveness (9 items), and Inconsistent responding index. The combination of the first three scales gives a score for total anxiety, while the last two refer to the validity of the application. The RCMAS-2 has adequate psychometric properties in its original study with an alpha coefficient higher than .70 in all the scales and an exploratory factor analysis determined the presence of three related factors (Reynolds & Richmond, 2008).

Procedure

Data collection started with the obtaining of permission of the educational institution' director. Subsequently, the schedule of the instrument application was coordinated with the teachers and gave informed consent to all the students where the objective of the study was explained and ensured the confidentiality of their answers. This consent was signed by the sample students' parents or caretakers and, afterward, it was given back to the examiners before the RCMAS-2 administration. The students completed the scale voluntarily during classes, which took between 15 and 20 minutes.

Once the database was obtained, the pattern of missing values was examined through the Little test for missing completely at random data [MCAR] (Little, 1988). The pattern of missing values was random (χ^2 = 112.00, df = 144, p = .978), with less than 5% of them per variable. Therefore, the pairwise method was used to manage the missing values.

Ethical statement

The ethical aspects of the study were approved by the Ethics Committee of the Universidad César Vallejo, Lima, Peru, which evaluated the research project and the informed consent. All procedures performed in the study involving human participants were following the 1964 Helsinki declaration and its later amendments or comparable ethical standards, and in compliance with the code of ethics of the Colegio de Psicólogos del Perú. In the informed consent, it was stated that the study activities did not present any risk for the participants, also ensuring the conditions of confidentiality, the anonymity of the responses, use of the information and terms of publication of the results. Likewise, the respect, dignity, privacy, well-being and rights of the participants were safeguarded throughout the study.

Data analysis

The descriptive analysis of the items was done through the mean and standard deviation. Validity evidence based on the internal structure was collected through the confirmatory factor analysis (CFA). Diagonally Weighted Least Squares (DWLS) with robust standard errors were used, based on a matrix of tetrachoric correlations (DiStefanoet al., 2018). The goodness-of-fit indices used were Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Weighted Root Mean Square Residual (WRMR). Thus, the following values were considered acceptable: RMSEA < .05, SRMR < .08, CFI > .90, TLI > .90, and WRMR < 1.00 (DiStefano et al., 2018; Keith, 2019). For the respecification of the models, the magnitude of modification indices was considered for correlated errors so its presence can have a theoretical justification (Dominguez-Lara, 2019).

For the bias analysis, the RCMAS-2 factorial invariance through the multi-group CFA (MGCFA) according to gender and schooling level was tested. The MGCFA followed Wu and Estabrook's (2016) proposal, using theta parameterization and restricting parameters equality sequentially. In the first evaluation, the baseline model obtained was established through the CFA for the referred groups (configurational invariance). For the second evaluation, the factor loadings, intercepts, and thresholds were equalized (scalar invariance). Additionally, in the third evaluation equality of means was added. The goodness-of-fit indices used were the same that in CFA, considering the following differences (Δ) among these indexes: ΔCFI < .010, ΔTLI < .010, and ΔRMSEA < .010 invariance criteria (Rutkowski & Svetina, 2017).

Validity evidence based on the relationship with other variables was gathered from convergent and discriminant evidence. The convergent evidence was evaluated through average variance extracted (AVE), accepting values over .500 (Hair et al., 2019) as a general criterion. However, for a more precise evaluation, the criteria established by Moral (2019) was followed. The discriminant evidence was evaluated through the heterotrait-monotrait ratio (HTMT), where values under .850 (Henseler et al., 2015) were accepted.

For the scores' reliability analysis, the internal consistency method through the ordinal coefficient alpha (Zumbo et al., 2007) was used and values over .70 were considered appropriate (Nunnally & Bernstein, 1994). Additionally, for a more complete evaluation of reliability, the means and standard deviations of the matrix of tetrachoric inter-item correlations were obtained (Ventura-León & Peña-Calero, 2020).

The latent means difference according to gender and schooling level was evaluated through the effect size estimation (Hancock, 2001). This coefficient is analogous to Cohen's d effect size, for which values 0.20, 0.50, and 0.80, were considered small, medium, and large effect respectively (Cohen, 1988).

The analysis was done through the R software version 4.0.4 (R Core Team, 2021), using the packages by BaylorEdPsych version 0.5 (Beaujean, 2012), lavaan version 0.6-8 (Rosseel, 2012), psych version 2.1.3 (Revelle, 2020), and semTools version 0.5-4 (Jorgensen et al., 2021).

Results

Items analysis

The items' means were from .182 (item 28) to .841 (item 40), where higher values indicated a higher proportion of students who chose the "yes" answer. The standard deviations were between .366 (item 40) and .501 (item 31 and item 9), indicating a higher variability of answers in higher values (Table 1).

Validity evidence based on internal structure

Six models were tested through the CFA (Table 2). The first model was composed of five factors (Ang et al., 2011). The second model was the respecification of the first with two correlated errors added, item 23 with item 37 and item 4 with item 10. The third model was composed of four factors (Zhu & Lowe, 2017). The fourth model was the respecification of the third, with five correlated errors added, item 23 with item 37 (.636), item 4 with item 10 (.791), item 17 with item 10 (.681), item 17 with item 4 (.610), and item 23 with item 41 (.407). The fifth model was comprised of three factors (Wu et al., 2016). The sixth model was the respecification of the fifth with two correlated errors added, item 23 with item 37 and item 4 with item 10.

The models with the best goodness-of-fit indices were the fourth (modified four-factor) and the sixth (modified three-factor). In both models, the RMSEA, CFI, and TLI had satisfactory values, which is not the case for SRMR and WRMR. However, the evaluation of the goodness-of-fit indices was done globally. The difference between both models was not significant (ΔRMSEA = .002, ΔCFI = .009, and ΔTLI = .009); therefore, the two models were considered for the factorial invariance.

Equity

The evaluation of configurational invariance for the three-factor model modified according to gender indicated that the covariance matrix of latent variables was not positive definite in the group of females, because the Worry and Social anxiety factors had a correlation of 1.029. Hence, this model was excluded from the current and subsequent analysis.

Regarding the invariance for the four-factor model modified according to gender and schooling level (Table 3), the configurational model showed an adequate fit (RMSEA < .05, CFI > .90, and TLI > .90). Subsequently, the metric invariance produced small changes on the goodness-of-fit indices (ΔRMSEA < .010, ΔCFI < .010, and ΔTLI < .010), where the invariance level was considered satisfactory.

Table 1.

Descriptive analysis of the modified four-factor model's items and factor loadings

			Factor loadings			
Item	*M*	*SD*	PA	W/SA	D-I	D-II
15	.267	.443	.641			
39	.492	.500	.561			
7	.383	.487	.556			
34	.426	.495	.523			
43	.532	.500	.504			
46	.415	.493	.500			
25	.549	.498	.485			
1	.377	.473	.443			
20	.553	.498	.421			
5	.288	.453	.418			
31	.504	.501	.362			
11	.643	.480	.308			
26	.375	.485		.613		
32	.665	.472		.610		
22	.352	.478		.579		
10	.324	.469		.574		
30	.515	.500		.555		
18	.460	.499		.553		
16	.337	.473		.552		
9	.498	.501		.548		
4	.322	.468		.547		
27	.417	.494		.546		
17	.430	.496		.541		
35	.644	.479		.513		
42	.275	.447		.508		
36	.301	.459		.478		
8	.341	.475		.475		
2	.542	.499		.452		
37	.369	.483		.450		
49	.532	.500		.448		
41	.426	.495		.444		
45	.322	.468		.441		
3	.746	.436		.437		
47	.312	.464		.380		
13	.388	.488		.373		
12	.621	.486		.358		
6	.292	.455		.355		
28	.182	.386		.347		
23	.432	.496		.336		
21	.659	.475		.307		
29	.676	.469			.823	
19	.737	.441			.777	
33	.686	.464			.766	
24	.447	.498			.751	
38	.397	.490			.622	
14	.699	.459			.375	
44	.689	.464				.873
48	.767	.423				.700
40	.841	.366				.497

Note. M = Mean; *SD* = Standard deviation; PA = Physiological anxiety; W/SA = Worry/Social anxiety; D-I = Defensiveness I; D-II = Defensiveness II.

Table 2.
Results of confirmatory factor analysis for the RCMAS-2

Model	X^2	df	χ^2/df	RMSEA [90% CI]	CFI	TLI	SRMR	WRMR
1. Five-factors	2360.088	1117	2.113	.049 [.046; .052]	.882	.876	.099	1.388
2. Five-factors(m)	2176.121	1115	1.952	.045 [.042; .048]	.899	.894	.096	1.333
3. Four-factors	2430.271	1121	2.168	.050 [.047; .053]	.876	.870	.100	1.409
4. Four-factors(m)	2027.450	1116	1.817	.042 [.039; .045]	.914	.909	.094	1.286
5. Three-factors	1572.165	737	2.133	.049 [.046; .053]	.903	.897	.095	1.385
6. Three-factors(m)	1397.701	735	1.902	.044 [.040; .047]	.923	.918	.091	1.306

Note. RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; WRMR = Weighted Root Mean Square Residual.

Table 3.
Factorial invariance for the four-factor model modified according to gender and schooling level

Model	χ^2	df	RMSEA (Δ)	CFI (Δ)	TLI (Δ)
Schooling level					
Configural	2993.037	2232	.038	.934	.930
Strong	3125.658	2273	.040 (.002)	.926 (.008)	.923 (.007)
Means	3148.371	2277	.040 (.000)	.924 (.002)	.922 (.001)
Gender					
Configural	3125.709	2232	.041	.918	.913
Strong	3202.568	2273	.042 (.001)	.915 (.003)	.912 (.001)
Means	3292.093	2277	.044 (.002)	.907 (.008)	.904 (.008)

Note. RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; Δ = Difference

Finally, the means invariance also had a small discrepancy (ΔRMSEA < .010, ΔCFI < .010, and ΔTLI < .010). These results prove the factorial invariance in the three levels according to gender and schooling level.

Validity evidence based on the relationship with other variables

Regarding convergent evidence measured through the AVE, only the Defensiveness II factor had a value equal to .500. However, it was necessary to value each factor in an independent way considering its reliability level and the number of items. In this sense, for the Defensiveness II factor, a value over .44 was accepted; for the Defensiveness I factor, a value over .28; and for the two factors left a minimum AVE of .25 (Moral, 2019). The convergent evidence was only supported by the Defensiveness factors (Table 4). About the discriminant evidence, it was evaluated through the HTMT ratio and was accomplished by the four factors, with values under .850 in all the cases (Table 4). Moreover, the latent correlations among the factors varied between -.095 and .725 (Table 4).

Reliability

Reliability was considered good for the four factors because of their being over .700 (Table 4). The ordinal alpha coefficient for each factor was between .734 (Defensiveness II) and .890 (Worry/Social anxiety). Likewise, the average inter-item correlation of the factors was found between .220 (Physiological anxiety) and .471 (Defensiveness II), indicating, on average, small and medium relationships between the items.

Latent means differences according to gender and schooling level

The comparison of means between males (reference group) and females indicated that there only existed small differences in the Defensiveness II factor, in favor of females (difference = 0.492, effect size = 0.435), in the other factors

Table 4.
Convergent and discriminant evidence, correlations among factors, and reliability

Variable	PA	W/SA	D-I	D-II	*n*	AVE	Ordinal alpha	Inter-item correlation	
								M	*SD*
PA	—	.738	.334	.425	12	.235	.773	.220	.105
W/SA	.725	—	.256	.369	28	.234	.890	.226	.125
D-I	-.253	-.095	—	.363	6	.493	.825	.440	.182
D-II	.374	.186	-.341	—	3	.500	.734	.471	.104

Note. Under the diagonal, the inter-factor correlations of the four-factor model modified of the CFA; over the diagonal, the HTMT ratio; PA = Physiological anxiety; W/SA = Worry/Social anxiety; D-I = Defensiveness I; D-II = Defensiveness II; n = Number of items; AVE = Average Variance Extracted; M = Mean; SD = Standard deviation.

the difference was trivial. On the other hand, regarding the comparison of means between the primary level (reference group) and the secondary level, small differences were observed in the Defensiveness I factor (difference = -0.344, effect size = 0.463) and moderate differences in the Defensiveness II factor (difference = 0.421, effect size = 0.699), in the first case it was favorable to the primary students and in the second, to the secondary ones.

Discussion

Mental health is one of the main points in the agenda of different governments worldwide because its deterioration would have severe effects on people, and hence, on societies. Thus, disorders such as stress, depression, or anxiety are the ones that have received the most attention in the last year due to their constant increase. In this context, it is necessary to have measurement instruments that help these disorders diagnoses and, at the same time, permit to establish guidelines for their opportune treatment. In this way, the current study sought to cover that breach of knowledge, analyzing the RCMAS-2 psychometric properties in a sample composed of Peruvian children and adolescents.

The CFA was done testing different models found in the literature and the modified four-factor model was the one with the best goodness-of-fit indices. In this model, the items had factor loadings over .30, which can be seen as a very conservative criterion, however, previous studies have reported similar levels or even under them (Ang et al., 2011; Reynolds & Richmond, 2008; Wu et al., 2016). The modified four-factor model, composed of Physiological anxiety, Worry/Social anxiety, Defensiveness I, and Defensiveness II, has been previously found in the studies by Zhu and Lowe (2017) and Cha et al. (2020). However, in studies that reported a structure of three or five factors, the correlation between the factors Worry and Social anxiety was high, with values such as .73 (Reynolds & Richmond, 2008), .74 (Ang et al., 2011), and .77 (Lowe, 2014), justifying the combination of both factors into only one.

On the other hand, the modified four-model factor model has five correlated errors. These were added to the model because of their high modification indices and because their content justified their presence. The correlated errors between the items 23 with 37 and 4 with 10 have already been reported in the study by Zhu and Lowe (2017). Likewise, both pairs of items make up the Inconsistent responding index (Reynolds & Richmond, 2008). Other groups of correlated errors correspond to item 17 with 10 and 17 with 4, these three items share, in their phrasing, the fear of being laughed at by others. Finally, the correlation between the errors in items 23 and 41 was also highlighted by Zhu and Lowe (2017) since both items refer to the fear of talking in front of their partners during a class. It is important to add that all the referred items have been created for this new version of RCMAS-2 and are part of the Worry/Social anxiety factor.

Regarding RCMAS-2's equity, the modified four-factor structure remains invariant between males and females, as well as primary and secondary students. These results confirm what was found by Ang et al. (2011) and Lowe (2014) about the factorial invariance regarding gender.

Regarding the convergent and discriminant evidence, the study gives total support for the first and partial support to the second, because the factors Physiological anxiety, and Worry/Social anxiety were slightly under the established criterion. The results support what was found in previous research (Ang et al., 2011; Raad, 2013; Zhu & Lowe, 2017).

The internal consistency reliability obtained satisfactory levels, similar to the studies by Lowe (2014) and Raad (2013) and superior to what was reported by Ang et al. (2011), Wu et al. (2016), Zhu and Lowe (2017), and Cha et al. (2020),

where the Physiological anxiety factor had values under .70. Additionally, this coefficient was not remarkably high (.90 or superior), which indicates that the RCMAS-2 in the studied sample does not include redundant items (Streiner, 2003).

Finally, the comparison of latent means indicated that the defensiveness about positive aspects in females was slightly superior to the one in males (small effect), also found by Lowe (2014). However, the other factors' differences were null, different from what was found in other studies (Ang et al., 2011; Lowe, 2014; Wu et al., 2016). Regarding the schooling level, the differences were found in the factors of defensiveness, about positive aspects (superior in the primary) and negative aspects (superior in secondary).

One of the limitations of the study was the evaluation of reliability only through the internal consistency method because only one application is needed for its use. However, other studies have also evaluated RCMAS-2's temporary stability (Ahmad & Mansoor, 2011; Ang et al., 2011; Cha et al., 2020; Raad, 2013). Another limitation was the use of methods for the collection of convergent and discriminant evidence that involve only RCMAS-2 content when what is usual is to use other scales of measurement. The difficulty in this aspect was the lack of instruments that measure anxiety and are correctly adapted to the Peruvian population.

Future studies are necessary to examine the short version of RCMAS-2 (Lowe, 2015), given the current need to have brief instruments. Likewise, it is necessary to test the functioning of the full scale in a larger sample and with a larger representativeness of Peruvian population, in clinical as well as non-clinical samples.

Overall, the results of this study allow concluding that the RCMAS-2 scores have adequate psychometric properties in a group of Peruvian students and, hence, its use is pertinent, and it is a good alternative to measure anxiety in the educational context.

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