

## Confirmatory factor analysis and psychometric properties of the Revised Child Anxiety and Depression Scale–30 (RCADS-30) in clinical and non-clinical samples

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**Abstract:** The 30-item shortened version of the Revised Child Anxiety and Depression Scale (RCADS-30) is a self-report instrument to assess symptoms of anxiety and depressive disorders. This study examined the factor structure, reliability, and construct validity of the RCADS-30, based on a sample of children and adolescents in clinical and community settings. Results provide evidence for (a) the six factors of the scale (separation anxiety disorder, generalized anxiety disorder, panic disorder, social phobia, obsessive-compulsive disorder, and major depressive disorder), (b) reliability (alpha and omega), and (c) convergent and discriminant validity against self-report and clinical interview criteria. The RCADS-30 demonstrated sound psychometric properties and that it is a suitable instrument to assess depression and anxiety disorder symptoms. Based on established cut-off scores, the scale also showed adequate capacity to differentiate emotional disorders from other mental disorders or the absence of diagnosis.

**Keywords:** RCADS-30; anxiety disorders; depression; children; adolescents; assessment.

*Análisis factorial confirmatorio y propiedades psicométricas de la Revised Child Anxiety and Depression Scale (RCADS-30) en muestras clínicas y no clínicas*

**Resumen:** La versión abreviada de 30 ítems de la Revised Child Anxiety and Depression Scale (RCADS-30) es un instrumento de autoinforme para evaluar síntomas de los trastornos de ansiedad y depresivos. Este estudio examinó la estructura factorial, la fiabilidad y la validez de constructo de la RCADS-30 en una muestra de niños y adolescentes procedentes de muestras clínicas y comunitarias. Los resultados aportan evidencia sobre (a) los seis factores de la escala (trastorno de ansiedad de separación, trastorno de ansiedad generalizada, trastorno de pánico, fobia social, trastorno obsesivo-compulsivo, y trastorno depresivo mayor), (b) fiabilidad (alfa y omega), y (c) validez convergente y discriminante sobre autoinformes y entrevista clínica. La RCADS-30 demostró poseer buenas propiedades psicométricas y ser adecuada para evaluar los síntomas de los trastornos de ansiedad y depresivos. Sobre la base de puntos de corte establecidos, la escala mostró adecuada capacidad para diferenciar los trastornos emocionales de otros problemas mentales o la ausencia de diagnóstico.

**Palabras clave:** RCADS-30; trastornos de ansiedad; depresión; niños; adolescentes; evaluación.

Depression and anxiety disorders are among the most frequent causes of illness and disability in children

and adolescents between 10 and 19 years of age (WHO, 2014). A recent meta-analytic review stated the global prevalence rates of these disorders as 6.5% for anxiety disorders and 2.60% for depressive disorders in the children and adolescent population (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015), with a marked comorbidity between both disorders (Al-Asadi, Klein, & Meyer, 2015; Cummings, Caporino, & Kendall, 2014; Melton, Croarkin, Strawn, & McClintock, 2016). Meanwhile, the prevalence in clinical samples varies

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between 13% and 41.9% for anxiety and between 13% and 16.9% for depression (Walter et al., 2016).

The assessment of symptoms of anxiety and depression is a necessary step in research and clinical and preventive practice related with emotional disorders (depression and anxiety disorders) in different settings and related with common problems of children and adolescents (Magaz, Chorot, Santed, Valiente, & Sandín, 2016; Sánchez-Hernández, Méndez, & Garber, 2014). One of the most widely used measures of anxiety and depressive disorder symptoms is the Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Unemoto, & Francis, 2000). It consists of 47 items and the following six subscales: separation anxiety disorder (SAD; 7 items), social phobia (SP; 9 items), generalised anxiety disorder (GAD; 6 items), panic disorder (PD; 9 items), obsessive-compulsive disorder (OCD; 6 items), and major depressive disorder (MDD; 10 items). Although other multidimensional measures of anxiety symptoms have been published, it is interesting to note that the RCADS is the only one that includes a subscale of depression.

The RCADS has shown good psychometric properties in identifying anxiety and depression in children and adolescents (Chorpita, Moffitt, & Gray, 2005). Likewise, studies based on the RCADS structure have shown good consistency and adjustment to the 6-factor model (Piqueras, Martín-Vivar, San Luis, Sandín, & Pineda, 2017). Also the RCADS-47 has demonstrated appropriate validity properties (Chorpita et al., 2005; Ferrer, Martín-Vivar, Pineda, Sandín, & Piqueras, in press; Gormez et al., 2017). Specifically, the RCADS-47 has shown higher validity and reliability properties than most of the self-report instruments used to evaluate anxiety and depression in children and adolescents (Chorpita et al., 2005). Some studies that have analysed the efficacy of the RCADS-47 to identify anxiety or depressive disorders previously diagnosed by means of a diagnostic interview have suggested good levels of diagnostic validity for both kinds of diagnosis (Chorpita et al., 2005; Gormez et al., 2017). In order to aid professionals in their research and/or clinical practice and save time during the assessment, some shortened versions of the RCADS have been developed. The 30-item version (RCADS-30) was developed by Sandín, Chorot, Valiente, and Chorpita (2010). This is a shortened version that retains the original 6-factor structure of the RCADS-47. Furthermore, the levels of validity and reliability of the RCADS-30 are equivalent to the 47-item version, along with the time-saving advantage of the 30-item version (Sandín et al., 2010). A recent review and meta-analysis suggested that the

internal consistence of the different versions of the RCADS is equivalent both in community and clinical samples (Piqueras, Martín-Vivar, et al., 2017).

This shortened version has shown a stable 6-factor structure across sex, age, and kind of delivery format (Pineda, Martín-Vivar, Sandín, & Piqueras, in press). In addition, it has been reported recently that the RCADS-30 have good test-retest reliability over time and that it is sensitive to the treatment (García-Escalera, Chorot, Valiente, & Sandín, 2017).

However, so far no studies had established yet the diagnostic validity of the RCADS-30. Therefore, the main objective of this study was to examine the diagnostic accuracy of this scale by analysing its ability to discriminate between subjects having an emotional disorder diagnosis and those without it. To examine this goal, receiver operator characteristic (ROC) curve analysis was applied, with the resulting cut-off points based on an optimal balance between sensitivity and specificity of the subscales. In addition, we aimed to examine the factor structure, reliability and convergent and discriminant validity of the scale.

## Method

### *Participants*

The total sample consisted of 243 children and adolescents. Of these, 193 came from a school setting (79.40%) and 50 from a clinical setting (20.60%) (see Table 1). One hundred and thirty-eight (56.80%) participants were male, and the mean age was 11.51 years ( $SD = 2.68$ ; range = 8-18 years). The distribution by sex was not uniform [ $\chi^2(1) = 7.60$ ;  $p = .006$ ], because there was a higher number of males in the clinical sample. However, the phi coefficient was .18, which points to a very low effect size. Further, no differences were found between the mean age of the groups ( $t(241) = -0.81$ , n.s.).

The sample's socioeconomic status was mostly medium-low, and the participants were of Spanish nationality (see Table 1). There were no differences between groups in terms of socioeconomic status distribution [ $\chi^2(2) = 3.6$ , n.s.] or nationality [ $\chi^2(1) = 0.36$ , n.s.]

### *Measures*

*Revised Child Anxiety and Depression Scale-30* (RCADS-30; Sandín et al., 2010). This is a 30-item shortened version of the RCADS (Chorpita et al., 2000), which assesses anxiety and depression disorder

Table 1. Sociodemographic characteristics

	Clinical <i>n</i> = 50	School <i>n</i> = 193
Age [Mean (S.D.)]	11.78 (2.82)	11.44 (2.65)
Gender [n (%)]		
Females	13 (26.00)	92 (47.70)
Males	37 (74.00)	101 (52.30)
Socioeconomic status (FAS) [n (%)]		
Low	24 (48.00)	121 (62.70)
Medium	22 (44.00)	62 (32.10)
High	4 (8.00)	10 (5.20)
Nacionality [n (%)]		
Spanish	48 (96.00)	181 (93.80)
Other	2 (4.00)	12 (6.20)
Recruitment [n (%)]		
Clinical		
USMI-A Department 18 (San Vicente del Raspeig)	30 (60.00)	—
USMI-A Department 19 (Elche-El Raval)	16 (32.00)	—
Forensic Psychology Unit from CPA-UMH	4 (8.00)	—
Community/School		
Elche	—	51 (26.40)
San Juan de Alicante	—	25 (13.00)
Elda	—	61 (31.60)
Orihuela	—	17 (8.80)
Novelda	—	12 (6.20)
Alcoy	—	27 (14.00)

*Note.* FAS: Family Affluence Scale; USMI-A: Unidad de Salud Mental Infantil y de la Adolescencia (Child and Adolescents Mental Health Unit); CPA-UMH: Centro de Psicología Aplicada-Universidad Miguel Hernández de Elche (Applied Psychology Center-Miguel Hernandez University of Elche).

symptoms in children and adolescents. It consists of 30 items with 6 subscales (five items each) corresponding to separation anxiety disorder (SAD), social phobia (SP), generalised anxiety disorder (GAD), panic disorder (PD), obsessive-compulsive disorder (OCD), and major depressive disorder (MDD). The scale follows a Likert-type response format from 0 to 3 (never, sometimes, often, and always). A recent review highlighted that the scale (a) have excellent psychometric properties and is equivalent to the original RCADS (Piqueras, Martín-Vivar et al., 2017), and (b) has an invariable structure across sex, age, and delivery format (Pineda et al., in press).

*Family Affluence Scale* (FAS; Boyce, Torsheim, Currie, & Zambon, 2006). It assesses the socioeconomic status using 4 questions pertaining to certain family possessions, such as a car, computer, own bedroom, and

family vacation trips. The scores were classified into one of three categories of family wealth: low, medium, and high levels. It has been shown adequate criterion and construct validity in previous studies involving adolescents (Boyce et al., 2006).

*DetectaWeb-Distress Scale* (García-Olcina, Piqueras, & Martínez-Rodríguez, 2014). This web-based detection questionnaire for emotional mental disorders in children and adolescents consists of 30 items that evaluate anxiety disorder symptoms: Separation anxiety (SAD), specific phobia (SpP), social phobia (SF), generalised anxiety disorder (GAD), panic disorder and/or agoraphobia (PD/A), post-traumatic stress disorder (PTSD), obsessive-compulsive disorder (OCD), major depressive disorder (MDD), and dysthymic disorder (DD), as well as suicidal tendencies (ideation, plans, and attempts). It follows a Likert-type response format (0 = never, 1 = sometimes, 2 = often, and 3 = always). Scale's validity and reliability to assess anxiety, depression, and potential suicide have been shown for both community/school (García-Olcina et al., 2014) and clinical samples (García-Olcina, Rivera-Riquelme, Cantó-Diez, Tomás-Berenguer, Bustamante, & Piqueras, 2017), with alpha values ranging between .87 and .91 (total scores) and between .67 and .94 (for the subscales) (García-Olcina et al., 2014; 2017).

*Spence Children's Anxiety Scale* (SCAS; Orgilés, Méndez, Spence, Huedo-Medina, & Espada, 2012). We used the specific phobia subscale (physical injury fears) consisting of five items with 4 response alternatives (0 = never, 1 = sometimes, 2 = often, and 3 = always). It has shown an average internal consistency value of .64, according to a review of 32 studies (Orgilés, Fernández-Martínez, Guillén-Riquelme, Espada, & Essau, 2016).

*Children's Revised Impact of Event Scale* (CRIES; Perrin, Meiser-Stedman, & Smith, 2005). This screening scale is used to measure PTSD in children aged over 8 years. It consists of 8 items with 4 Likert-type response alternatives (never, rarely, sometimes, frequently), with alphas ranging between .75 and .84 (Lau et al., 2013). It provides two subscales of four items each one: intrusion and avoidance.

*Self-reported Strengths and Difficulties Questionnaire* for 11-17 year olds (SDQ; Goodman, 1997). It assesses both emotional and behavioural problems in children and adolescents through the use of five subscales: emotional symptoms, behavioural problems, hyperactivity, peer relationship problems, and prosocial behaviour (see www.sdqinfo.org). The score on each subscale ranges between 0 and 10. The first four subscales provide a total score of difficulties. The SDQ has shown sound psychometric properties for the Spanish population (Cronbach alphas

Table 2. Frequency and percentage (in parenthesis) of diagnosed participants

Clinical diagnoses	Clinical sample <sup>a</sup>	School sample <sup>b</sup>	Total sample
No clinical diagnosis	—	162 (83.9%)	162 (66.7%)
Clinical problems without specific diagnosis	4 (8%)	0	4 (1.7%)
Adjustment disorders	3 (6%)	0	3 (1.2%)
Post-traumatic stress disorder	1 (2%)	2 (1.1%) <sup>c</sup>	3 (1.2%)
Relationship problems	1 (2%)	0	1 (0.4%)
Anxiety disorders	5 (10%)	22 (11.4%) <sup>d</sup>	27 (11.1%)
Mood disorders (Unipolar depression)	0 (0%)	5 (2.6%) <sup>e</sup>	5 (2.1%)
Mood disorders (bipolar)	1 (2%)	—	1 (0.4%)
Obsessive-compulsive disorder	1 (2%)	2 (1.1%) <sup>f</sup>	3 (1.2%)
Attention deficit hyperactivity disorders (ADHD)	10 (20%)	—	10 (4.1%)
Conduct disorder (CD)	8 (16%)	—	8 (3.3%)
ADHD and CD	6 (12%)	—	6 (2.5%)
Tic disorders	1 (2%)	—	1 (0.4%)
Pervasive developmental disorders and autism spectrum	1 (2%)	—	1 (0.4%)
Eating disorders	2 (4%)	—	2 (0.8%)
Obesity/overweight related problems	2 (4%)	—	2 (0.8%)
Gender identity disorders	2 (4%)	—	2 (0.8%)
Enuresis	1 (2%)	—	1 (0.4%)
Mild mental retardation	1 (2%)	—	1 (0.4%)
Total	50	193	243

*Note.* <sup>a</sup> Clinical diagnoses assigned by mental health specialists from USMI-As (Child and Adolescents Mental Health Units) (according ICD-9 codes: mental disorders); <sup>b</sup> Clinical diagnoses assigned by research assistants with master's degree level (according DSM-IV-TR criteria assessed with ADIS-IV-C); <sup>c</sup> One (0.52%) participant with two comorbid anxiety disorders; <sup>d</sup> Fifteen (7.77%) participants with only one anxiety disorder; seven (3.63%) participants with comorbid anxiety/depressive disorders (anxiety: 4, 2.07%; depression: 2, 1.04%; both anxiety and depression: 1, 0.52%); <sup>e</sup> Four (2.07%) participants with only major depression and one (0.52%) participant with both major depression and dysthymia.

ranged between .69 and .78) (Ortuño-Sierra, Fonseca-Pedrero, Paino, Sastre i Riba, & Muñoz, 2015).

*Mental Health Inventory* (MHI-5; Berwick et al., 1991). The MHI-5 is a short version of the MHI (38 items) developed for both general and clinical population use. It consists of five items on mood experienced during the past month, which measure the presence of psychological well-being and the absence of distress. It uses a 6-point response format. In this study, the response format was adapted to a Likert-type 4-point format (0 = never, 1 = sometimes, 2 = often, and 3 = always), such that a higher score indicates better mental health. Reliability estimates for Spanish children and adolescent have indicated an alpha of .80 (García-Olcina et al., 2017).

*WHO-5* (WHO, 1998). It is a short and generic global rating scale measuring subjective well-being. The five items devising the WHO-5 assess aspects such as positive mood, calm/relaxation, activity/vigorousness and general interest, among others. It uses a rating scale from 3 (always) to 0 (never). A higher score indicates greater well-being.

All Cronbach's alphas coefficients in this study for the former instruments can be seen in table 4.

*Anxiety Disorders Interview Schedule for DSM-IV: Child Version* (ADIS-IV-C; Silverman, Albano, & Sandín, 2003). This is the Spanish version of the adaptation for children and adolescents of the interview for the diagnosis of emotional disorders according to the DSM-IV. Although it has been designed to diagnose anxiety disorders, it also assesses mood and externalising disorders. It allows for a screening of substances abuse, schizophrenia, selective mutism, and eating and somatoform disorders. For this study, we used the section of the interview that assesses anxiety (separation anxiety, social phobia, specific phobia, generalised anxiety, obsessive-compulsive disorder, post-traumatic stress disorder) and mood disorders (major depressive and dysthymic disorder). The reliability of the evaluators of anxiety and depression diagnoses was excellent ( $\alpha = .90$ ). In the present study, the interrater agreement based on the 20% of the interviews was excellent ( $\kappa = .90$ ).

#### *Procedure*

This is a multi-centre and cross-sectional study with children and adolescents from three clinical centres and six primary and middle schools from the province of



Alicante (Spain) (see Table 1). Participants were evaluated between 2014 and 2017 through the DetectaWeb-Distress online program. Subsequently, research assistants with master's degree level were trained in the ADIS-IV-C application. They conducted the diagnostic assessment based on the clinical interview, which was applied to all participants. The clinical sample ( $n = 50$ ) first received a clinical diagnosis based on a standard procedure (professional's clinical judgment) at the mental health units following the ICD-9 criteria (see Table 2). The school sample ( $n = 193$ ) was chosen at random from a general sample used in the DetectaWeb project described in Piqueras, García-Olcina et al., (2017).

The study was approved by the Research Ethics Committee of the Miguel Hernández University at Elche (Spain). The RCADS-30 was administered independently and privately by trained psychologists and psychiatrists. All parents and legal guardians of the participants signed an informed consent form for their participation in the study. Moreover, all schools and clinical centres voluntarily participated in this study after obtaining the corresponding authorisation from the psychology department in the case of schools, and from the managers of the clinical centres.

### *Data Analysis*

The statistical analyses of data were conducted using the SPSS 24 (for descriptive analyses, correlations, and internal consistency), the R statistical program (R Core Team, 2016), the MVN (Korkmaz, Goksuluk, & Zararsiz, 2014) and Lavaan packages (Rosseel, 2012) for factorial analysis, McDonald standardised alpha and omega internal consistency values, sensitivity, specificity, and ROC curves.

In order to identify abnormal cases and missing values, an initial exploratory analysis was conducted assessing the univariate and multivariate normal distribution of data through a matrix of polychoric correlations. Since the items of the RCADS were rated in an ordinal scale, we used to diagonally-weight least squares as an estimation parameter method. This method showed to have lesser bias and higher accuracy in several simulation works compared to other methods (Li, 2016). We used the following fit indexes: chi-square ( $\chi^2$ ), the fraction chi-square ( $\chi^2$  divided by the degrees of freedom ( $\chi^2/df$ ; Chau, 1997), root mean square error of approximation (RMSEA; Browne & Cudeck, 1993;), comparative fit index (CFI; Bentler, 1990), standardised root mean square residual (SRMR; Bentler, 1990), and Tucker-Lewis index (TLI; Tucker & Lewis, 1973).

Reliability was calculated by Cronbach's alpha and McDonald's omega (McDonald, 1999) coefficients; both were based on the polychoric correlations matrix. Omega coefficient is considered to be a more precise estimator of reliability of ordinal scales (Dunn, Baguley, & Brunnsden, 2014). Convergent and discriminant validity were examined by means of Pearson correlations. To examine the RCADS subscales' ability to discriminate between clinical and non-clinical subjects, MANOVA,  $t$  test and ROC curve analysis were computed. We applied the classification described by Metz (1978), according to which the diagnostic accuracy of a measure focuses on the ROC curve: .90–1.00 = excellent, .80-.90 = good, .70-.80 = fair, .60-.70 = poor, < .60 = bad (Metz, 1978).

We also calculated the sensitivity to determine the likelihood of the RCADS-30 identifying specific symptoms in a child diagnosed with the disorder. Similarly, the specificity was calculated, or the scale's ability to not identify symptoms in children who have not been diagnosed with the disorder. We also calculated the Youden index (Youden, 1950), whose value identifies the point that maximises the difference between true positives and false positives, being a good cut-off point candidate.

## **Results**

### *Confirmatory Factor Analysis*

We tested the 6-factor structure model developed by Sandín et al. (2010), which had 5 items per factor. The values of the fit indexes obtained were as following:  $\chi^2$  (390) = 477.90;  $\chi^2/df = 1.23$ ; RMSEA = .031; SRMR = .071; CFI = .996; and TLI = .996. These values confirm the model fits the data well, taking into consideration the sample size.

We also examined the factor loadings for each item with their corresponding factor. Table 3 shows the results obtained. The lowest values were found for the OCD (items 12 and 30) and MDD (items 7 and 13) scales. Values were above .40 (their ranged from .60 to .93) in all cases.

### *Reliability*

The standardised Cronbach' alpha obtained for the total score of the RCADS-30 was .96. Values for the rest of the subscales ranged between .80 and .89. The scale with a lower internal consistency was OCD (.80); the rest had values equal to or greater than .87 (see Table 3). Concerning omega values, the RCADS-30 total had a coefficient of .97, with subscale values ranging between .77 and .91. Again, the subscale OCD had the lowest coefficient (.77).

Table 3. Loadings of the confirmatory factor analysis for the correlated 6-factor model of the RCADS-30. Reliability alpha ( $\alpha$ ) and omega ( $\omega$ ) coefficients were based on the polychoric correlation matrix ( $N = 243$ )<sup>+</sup>

Item RCADS <sup>a</sup>	Factor loading
<i>Factor 1. Major depressive disorder (MDD) (<math>\alpha = 0.87</math>, <math>\omega = .81</math>)</i>	
1. I feel sad or empty	.74
7. Nothing is much fun anymore	.67
13. I have no energy for things	.66
19. I cannot think clearly	.88
25. I feel worthless	.81
<i>Factor 2. Panic disorder (PD) (<math>\alpha = 0.88</math>, <math>\omega = .84</math>)</i>	
2. I suddenly feel as if I can't breathe when there is no reason for this	.69
8. I suddenly start to tremble or shake when there is no reason for this	.85
14. All of a sudden I feel really scared for no reason at all	.88
20. My heart suddenly starts to beat too quickly for no reason	.75
26. I worry that I will suddenly get a scared feeling when there is nothing to be afraid of	.76
<i>Factor 3. Social phobia (SF) (<math>\alpha = 0.87</math>, <math>\omega = .82</math>)</i>	
3. I worry I might look foolish	.75
9. I worry about making mistakes	.82
15. I worry what other people think of me	.75
21. I feel afraid if I have to talk in front of my class	.72
27. I feel afraid that I will make a fool of myself in front of people	.83
<i>Factor 4. Separation anxiety disorder (SAD) (<math>\alpha = 0.88</math>, <math>\omega = .83</math>)</i>	
4. I would feel afraid of being on my own at home	.82
10. I worry about being away from my parents	.79
16. I feel scared if I have to sleep on my own	.69
22. I have trouble going to school in the morning because I feel nervous or afraid	.88
28. I would feel scared if I had to stay away from home overnight	.76
<i>Factor 5. Generalized anxiety disorder (GAD) (<math>\alpha = 0.89</math>, <math>\omega = .91</math>)</i>	
5. I worry about things	.71
11. I worry that something awful will happen to someone of my family	.71
17. I worry that bad things will happen to me	.91
23. I worry that something bad will happen to me	.93
29. I worry about what is going to happen	.83
<i>Factor 6. Obsessive-compulsive disorder (OCD) (<math>\alpha = 0.80</math>, <math>\omega = .77</math>)</i>	
6. I get bothered by bad or silly thoughts or pictures in my mind	.77
12. I have to keep checking that I have done things right (like the switch is off, or the door is locked)	.60
18. I can't seem to get bad or silly thoughts out of my head	.77
24. I have to think of special thoughts (like numbers or words) to stop bad things from happening	.68
30. I have to do some things over and over again (like washing my hands, clearing or putting things in a certain order)	.63

Note. Reliability for the RCADS-30 total score:  $\alpha = 0.96$ ,  $\omega = .97$ .

### Convergent Validity

We found positive correlations between the RCADS-30 total score and the anxiety (.79) and depression (.64) scales of the DetectaWeb-Distress, being above .50 and with a large effect size. The subscales which showed a higher correlation were panic disorder (.68), depression disorder (.69), social phobia (.69), and obsessive-compulsive disorder (.70).

With regard to the correlations found between the RCADS-30 subscales and the rest of variables, the

MDD subscale may be highlighted, which strongly correlated with other depression subscales such as MDD (DetectaWeb-Distress) (.72), intrusion (CRIES) (.44), and emotional problems (SDQ) (.64). Likewise, SAD was positively correlated with the SAD subscale (.78) and anxiety disorders (.67) of DetectaWeb-Distress, and the SCAS total score (.56). We also found negative correlations between RCADS-30 total score and the MHI-5 and WHO-5 total scores (indicators of mental health and well-being, respectively), showing a large effect size.

Table 4. Correlation between the RCADS-30 scores and other measures

		<i>N</i>	$\alpha^a$	MDD	PD	SF	SAD	GAD	OCD	RCADS-30 Total Score
<b>Distress</b>										
DetectaWeb-Distress	MDD	243	.71	.72	.50	.48	.28	.34	.48	.58
	Disthymia		.68	.72	.47	.48	.29	.33	.42	.57
	Suicidality		.84	.31	.44	.19	.14	.10	.23	.28
	SAD		.64	.28	.40	.40	.68	.53	.46	.59
	SF		.75	.52	.42	.71	.41	.49	.47	.66
	SpP		.64	.35	.39	.37	.51	.32	.38	.49
	PD		.75	.41	.58	.41	.52	.41	.51	.59
	GAD		.68	.41	.32	.49	.30	.69	.44	.59
	OCD		.55	.49	.51	.45	.49	.51	.69	.66
	PTSD		.68	.44	.61	.48	.53	.41	.58	.64
	Depressive Disorders		.80	.80	.54	.54	.32	.38	.50	.64
	Depressive Disorders + Suicidality		.82	.76	.58	.51	.31	.35	.49	.62
	Anxiety Disorders		.86	.54	.56	.65	.64	.67	.61	.79
	Anxiety Disorders+OCD+PTSD		.89	.58	.63	.67	.68	.68	.69	.84
Total score	.91	.69	.68	.69	.63	.64	.70	.86		
SCAS	Specific phobia	243	.65	.35	.41	.39	.56	.34	.36	.51
CRIES	Intrusion	243	.88	.44	.47	.47	.28	.39	.50	.54
	Avoidance		.88	.33	.43	.46	.30	.39	.45	.51
	Total score		.93	.40	.47	.49	.31	.41	.50	.55
SDQ	Emotional problems	49	.70	.64	.61	.49	.23	.49	.49	.64
	Behavioral problems	49	.42	.30	.28	.07	.27	.28	.35	.33
	Hyperactivity	49	.70	.37	.24	.03	-.01	.06	.28	.19
	Peer relationship problems	49	.46	.39	.18	.29	.03	.13	.22	.27
	Total score	49	.77	.62	.48	.32	.18	.35	.48	.52
	Prosocial behaviour	49	.53	.27	.14	.29	.13	.40	.35	.36
<b>Wellbeing and mental health</b>										
MHI-5	Mental health	243	.70	-.65	-.47	-.40	-.17	-.25	-.40	-.48
WHO-5	Well-being	50	.86	-.56	-.25	.03	.19	-.01	-.31	-.17

Note. MDD= Major Depressive Disorder; SAD= Separation Anxiety Disorder; SF= Social Phobia; SpP= Specific Phobia; PD=Panic Disorder; GAD=Generalized Anxiety Disorder; OCD= Obsessive-Compulsive Disorder; PTSD= Post-traumatic Stress Disorder; CRIES= Children's Revised Impact of Event Scale. <sup>a</sup> Cronbach's alpha coefficients. For  $N = 243$ , all correlations were statistically significant ( $p < .01$ ). For  $n = 49/50$ : correlations  $\geq .37$ ,  $p < .01$ ; correlations  $\geq .28$ ,  $p < .05$ .

#### Ability of the RCADS-30 to discriminate between the clinical and community groups

We first conducted a MANOVA, being RCADS-30 subscales the dependent variables and the groups (community vs. clinical) the independent variable. We found a tendency for a global effect of groups on the anxiety and depression subscale variables (Wilks' Lambda = 0.95,  $F(6, 236) = 2.109$ ,  $p = .05$ ;  $\eta^2 = .05$ ). No interaction effects were found between groups  $\times$  sex (male vs. female)  $\times$  age (8-11 vs. 12-18 years)  $\times$  socioeconomic status (low, medium, high) (Wilks' Lambda = 0.99,  $F(6, 216) = 0.50$ ,  $p = .81$ ;  $\eta^2 = .014$ ). There were no significant effects for any of the interactions analysed separately (groups  $\times$  sex; groups  $\times$  age, or groups  $\times$  socioeconomic

status).

In addition,  $t$  test and the effect sizes (Cohen, 1988) were computed to examine the efficacy of the RCADS-30 to differentiate between the subjects who received a diagnosis and those who did not (see Table 5). As can be seen, all subscales significantly discriminated between the two groups, showing that the clinical group exhibited higher scores on all of the subscales. Large effect sizes were found on all subscales ( $d$ s ranged from .80 to 1.25), except on SF that was medium.

#### Sensitivity, specificity, and cut-off point for the RCADS-30 subscales according to the diagnosis

Appendix I shows the sensitivity, specificity, and cut-

Table 5. Means and *SDs* on RCADS-30 for clinical and community participants

Escala	Clinical <i>n</i> = 50	Community <i>n</i> = 193	<i>t</i>	<i>d</i>
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )		
MDD	5.63 (2.01)	3.26 (2.41)	4.84***	1.07
SAD	6.71 (2.26)	3.71 (2.56)	5.57***	1.24
SF	5.98 (2.17)	4.64 (2.77)	2.44*	.54
PD	4.60 (1.52)	2.87 (2.63)	3.79***	.80
GAD	7.42 (2.31)	4.97 (2.47)	4.56***	1.02
OCD	4.77 (1.76)	2.32 (2.15)	5.64***	1.25
Total score	53.71 (11.65)	31.61 (16.06)	7.24***	1.57

Note. MDD= Major Depressive Disorder; SAD= Separation Anxiety Disorder; SF= Social Phobia; PD=Panic Disorder; GAD=Generalized Anxiety Disorder; OCD= Obsessive-Compulsive Disorder.

\* $p < .05$ ; \*\*\* $p < .001$ .

off point values for the clinical sample. For a diagnosis of a depressive disorder, a score of 29 on the RCADS-30 seems to have the best combination of sensitivity (.73), specificity (.78), and Youden index (.50). For a diagnosis of an anxiety disorder, the cut-off score was 24 (sensitivity = .73; specificity = .71; Youden = .44). The highest score obtained for an ADIS diagnosis was for depression, with a direct RCADS score of 39 (sensitivity = .75; specificity = .89; Youden = .64).

Similarly, the cut-off score assigned to each RCADS-30 subscale was calculated against the ADIS interview (see Table 6). As shown in this table, the best cut-off scores were as following: 5 (SF), 5 (PD), 8 (SAD), 7 (GAD), 4 (OCD), and 4 (MDD).

## Discussion

The main objective of this study was to examine the construct validity and reliability of the RCADS-30. Also, we aimed to provide additional data concerning the factor structure of the scale and evidence for discriminant and concurrent validity. More specifically, we examined the accuracy of the scale to distinguish between subjects having an emotional disorder and those without it.

Results of confirmatory factor analysis showed good fit indexes (Schermelleh, Moobrunner, & Muller, 2003) for the 6-factor model, which corresponds to the original structure of the scale reported previously by Sandín et al. (2010). We also found high factor loadings (ranged from .60 to .93) that suggest a robust 6-factor structure of the RCADS-30. These results are consistent with other studies that examined the structure of the RCADS-30 (Batista & Sanz, 2013; Ferrer et al., 2017; Pineda et

al., in press), as well as past with research on the factor structure of the RCADS (Chorpita et al., 2005; Gormez et al., 2017; Kösters, Chinapaw, & Zwaanswijk, 2015; Sandín, Valiente, & Chorot, 2009). The lowest factor loadings were associated with the OCD subscale, a pattern that have also been reported in previous studies based on both, the 30-item version (Batista & Sanz, 2013; Sandín et al., 2010) and the long version of the scale (Chorpita et al., 2005; Gormez et al., 2017; Kösters et al., 2015).

Internal consistency data suggest appropriate values based on both Cronbach's alpha and McDonald's omega coefficients criteria. We found values above .77 for both kinds of coefficient in all subscales, and suggest, according to a recent meta-analysis (Piqueras, Martín-Vivar et al., 2017), a pattern of reliability similar to the one reported in different studies with different versions of the RCADS.

The positive correlations of the RCADS-30 with strengths and difficulties (SDQ), both with the total score and the emotional problems subscale, are consistent with similar data reported by Gormez et al. (2017) in a study based on the RCADS-47. Likewise, positive correlations were found between the RCADS-30 subscales (more specifically the subscale of SAD) and the specific phobia subscale of the SCAS. As was expected, the MDD subscale correlated significantly (a large effect size) with other depression subscales, such as MDD (DetectaWeb-Distress), Intrusion (CRIES), and Emotional Problems (SDQ). Also, anxiety subscales of the RCADS-30 correlated positively with anxiety variables of DetectaWeb-Distress. Overall, this positive and moderate to high correlations provide consistent evidence of convergent validity of the RCADS-30.

We did not find relevant correlations between the RCADS-30 and the remaining subscales of the strengths and difficulties questionnaire (SDQ). The low correlations of the RCADS-30 with the SDQ subscales of behavioural problems, inattention/hyperactivity and peer relationship problems contribute to support the discriminant validity of the scale. These results are in line with findings reported in previous studies based on the 47-item version of the scale (Chorpita et al., 2005; Gormez et al., 2017).

Concerning the correlations of RCADS-30 with measures of mental health and well-being (MHI-5 and WHO-5), they were significant, negative and of large effect size. Consequently, it can be seen as an evidence of construct validity of the RCADS-30. This result is consistent with findings reported with other measures of emotional problems, such as DetectaWeb-Distress Scale



Table 6. Optimal cut-off scores on RCADS-30 subscales for ADIS-IV-C diagnosis of specific anxiety and major depressive disorders ( $N = 243$ )

Raw score	Social Phobia			Panic Disorder			Separation Anxiety Disorder		
	Sen	Spe	You	Sen	Spe	You	Sen	Spe	You
1	1.00	.16	.16	.75	.45	.20	.86	.46	.31
2	1.00	.28	.28	.75	.65	.40	.86	.62	.48
3	1.00	.42	.42	.75	.73	.48	.86	.74	.60
4	.92	.52	.45	.75	.81	.56	.71	.83	.54
5	<b>.85</b>	<b>.63</b>	<b>.48</b>	<b>.75</b>	<b>.86</b>	<b>.61</b>	.71	.86	.58
6	.69	.74	.43	.50	.90	.40	.71	.90	.61
7	.62	.80	.42	.50	.95	.45	.71	.92	.63
8	<b>.62</b>	<b>.85</b>	<b>.46</b>	-	-	-	<b>.71</b>	<b>.96</b>	<b>.67</b>
9	.46	.87	.34	.50	.97	.47	.29	.96	.25
10	.39	.91	.29	.25	.98	.23	.14	.98	.12
11	.39	.94	.32	.25	.99	.24	.14	.99	.13
12	.31	.95	.26	—	—	—	—	—	-
13	.31	.98	.28	—	—	—	.14	1.00	.14
14	.31	.99	.30	.00	1.00	-.01	—	—	—
15	.31	1.00	.30	—	—	—	.00	1.00	-.01

  

Raw score	Generalized Anxiety Disorder			Obsessive-Compulsive Disorder			Major Depressive Disorder		
	Sen	Spe	You	Sen	Spe	You	Sen	Spe	You
1	1.00	.10	.10	1.00	.27	.27	1.00	.25	.25
2	1.00	.14	.14	1.00	.44	.44	1.00	.42	.42
3	1.00	.20	.20	.75	.59	.34	1.00	.55	.55
4	.92	.28	.21	<b>.75</b>	<b>.70</b>	<b>.45</b>	<b>1.00</b>	<b>.71</b>	<b>.71</b>
5	.77	.35	.12	.50	.79	.29	<b>.73</b>	<b>.80</b>	<b>.53</b>
6	.77	.50	.27	.50	.84	.34	.55	.88	.43
7	<b>.69</b>	<b>.62</b>	<b>.31</b>	.50	.89	.39	.55	.91	.46
8	.62	.68	.30	.00	.94	-.06	.46	.94	.40
9	.54	.72	.26	.00	.97	-.03	.36	.96	.33
10	.46	.80	.26	.00	.98	-.02	.27	.98	.25
11	.46	.84	.31	.00	.99	-.01	.27	.99	.26
12	.46	.89	.35	—	—	—	.09	.99	.08
13	.39	.92	.30	.00	.99	-.01	.00	1.00	.00
14	.23	.96	.19	.00	1.00	-.01	—	—	—
15	.15	.98	.13	—	—	—	—	—	—

Note. a= diagnosis according semi-structured interview ADIS-IV-C/P (Silverman et al. 2003); Raw score = original datum not transformed in the correspondent subscale of RCADS-30; Sen= sensibility; Spe= specificity; You= Youden index. In bold those values of Sen, Spe, and You considered as the more adequate.

(García-Olcina et al., 2017).

Overall, there were no differences between the clinical and school source groups in the RCADS-30 subscale set (MANOVA comparison). Nevertheless, when analysing the differences for each scale, and for the total RCADS-30 scores, higher scores were obtained in the clinical sample than in the normal sample. The largest differences were found in the SAD, GAD, and OCD scores, while the SF and PD scales showed the smallest differences.

A specific objective of the present study was to identify the cut-off scores on the RCADS-30 relevant

to differentiate between clinical and non-clinical individuals. Although this psychometric parameter has been established previously for the original 47-item version (Chorpita et al., 2005; Gormez et al., 2017), as far as we know, cut-off scores of the RCADS-30 had not been reported before the present study.

Assuming values equal to or greater than .70 as adequate, the optimal scores were selected as the recommended cut-off points. In general, it could be useful to indicate that a total score of 24 suggest the presence of some kind of anxiety disorder, while a total score of 29 suggest a probable major depressive disorder. Results

also provide relevant cut-off values for the subscales of the RCADS-30, as predictors of the probability of occurrence of a specific anxiety or depressive disorder.

A main contribution of the present study was to extend the evidence on the psychometric properties of the RCADS-30 reported in previous studies (Batista & Sanz, 2013; Ferrer et al., 2017; Piqueras, Martín-Vivar et al., 2017; Sandín et al., 2010). Based on its current sound psychometric properties, we may conclude that the RCADS-30 have demonstrated to be an evidence-based self-report instrument. Thus, assuming the high level of comorbidity between anxiety disorders and depression, the RCADS-30 is a recommended self-report instrument for the assessment of anxiety and depressive disorder symptoms in children and adolescents, for example in transdiagnostic and preventive studies (García-Escalera, Chorot, Valiente, Reales, & Sandín, 2016; Navarro & Villamizar, 2014).

To our knowledge, this is the first study on the psychometric properties of the RCADS-30 based in a clinical sample of children and adolescents, as well as in community participants with a diagnosis of anxiety and/or depressive disorder. However, a limitation of this study was the small sample size of the clinical group. A second limitation was the cross-sectional nature of the design. Future cross-sectional and prospective research could determine the usefulness of the scale as a screening instrument, and as a measure of the intensity and severity of the anxiety disorder symptoms (including the symptoms of the OCD) and depression in children and adolescents, in different settings (clinical, school) and with different purposes (prevention, treatment).

### Conflict of interest

The authors declared that there is no conflict of interest.

### References

- Al-Asadi, A. M., Klein, B. and Meyer, D. (2015). Multiple comorbidities of 21 psychological disorders & relationships with psychosocial variables: a study of the online assessment and diagnostic system within a web-based population. *Journal of Medical Internet Research*, 17, e55. doi:10.2196/jmir.4143.
- Batista, G. S. y Sanz, Y. (2013). La RCADS-30: una técnica psicológica para evaluar conjuntamente la ansiedad y depresión en niños y adolescentes. Valoración de las propiedades psicométricas. *Atalante, Cuadernos de educación y desarrollo*, 38. Recuperado el 30 de Abril de 2017 de <http://atalante.eumed.net/rcads/>.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238-246. doi:10.1037/0033-2909.107.2.238
- Berwick, D. M., Murphy, J. M., Goldman, P. A., Ware, J. E., Barsky, A. J. y Weinstein, M. C. (1991). Performance of a five-item mental health screening test. *Medicinal Care*, 29, 169-176.
- Boyce, W., Torsheim, T., Currie, C. y Zambon, A. (2006). The family affluence scale as a measure of national wealth: validation of an adolescent self-report measure. *Social Indicators Research*, 78, 473-487. doi:10.1007/s11205-005-1607-6
- Browne, M. W. y Cudeck, R. (1993). *Alternative ways of assessing model fit*. En K. A. Bollen y J. Scott (Eds). *Testing structural equation models*. California: SAGE Publications.
- Chau, P. Y. K. (1997) Reexamining a model for evaluating information center success using a structural equation modeling approach. *Decision Sciences*, 28, 309-334. doi:10.1111/j.1540-5915.1997.tb01313.x
- Chorpita, B. F., Moffitt, C. E. y Gray, J. (2005). Psychometric properties of the Revised Child Anxiety and Depression Scale in a clinical sample. *Behaviour Research and Therapy*, 43, 309-322. doi:10.1016/j.brat.2004.02.004
- Chorpita, B. F., Yim, L., Moffitt, C. E., Unemoto, L. A. y Francis, S. E. (2000). Assessment of symptoms of DSM-IV anxiety and depression in children: a Revised Child Anxiety and Depression Scale. *Behaviour Change*, 19, 90-101.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale: Lawrence Earlbaum Associates.
- Cummings, C. M., Caporino, N. E. y Kendall, P. C. (2014). Comorbidity of anxiety and depression in children and adolescents: 20 years after. *Psychological Bulletin*, 14, 816-845. doi:10.1037/a0034733  
doi:10.1016/S0005-7967(99)00130-8
- Dunn, T. J., Baguley, T. y Brunson, V. (2014). From alpha to omega: a practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, 105, 399-412. doi:10.1111/bjop.12046
- Ferrer, L., Martín-Vivar, M., Pineda, D., Sandín, B. y Piqueras, J. A. (in press). Relación de la ansiedad y la depresión en adolescentes con dos mecanismos transdiagnósticos: el perfeccionismo y la rumiación. *Psicología Conductual*.
- García-Escalera, J., Chorot, P., Valiente, R. M., y Sandín, B. (2017). *Prevención de la ansiedad y la depresión en población adolescente desde el modelo transdiagnóstico: Descripción y resultados del primer estudio preventivo aplicando el UP-A*. X Congreso de la Asociación Española de Psicología Clínica y Psicopatología. Albacete, 26-28 de octubre.
- García-Escalera, J., Chorot, P., Valiente, R., Reales, J. M., & Sandín, B. (2016). Efficacy of transdiagnostic cognitive-behavioral therapy for anxiety and depression in adults, children and adolescents: A meta-analysis. *Revista de Psicopatología y Psicología Clínica*, 21, 147-175. doi: 10.5944/rppc.vol.21.num.3.2016.17811
- García-Olcina, M., Piqueras, J. A. y Martínez-González, A. E. (2014). Datos preliminares de la validación del Cuestionario de Detección vía Web para los trastornos emocionales (DETECTA-WEB) en adolescentes españoles. *Revista de Psicología Clínica con Niños y Adolescentes*, 1, 69-77.
- García-Olcina, M., Rivera-Riquelme, M., Cantó-Diez, T. J., Tomás-Berenguer, M. R., Bustamante, R. y Piqueras, J. A. (2017). Detección online de trastornos emocionales en población clínica de niños y adolescentes: Escala Detect-

- aWeb-Malestar. *Revista de Psicología Clínica con Niños y Adolescentes*, 4, 1-21.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: a research note. *Journal of Child Psychology and Psychiatry*, 38, 581-586. doi:10.1111/j.1469-7610.1997.tb01545.x
- Gomez, V., Kilincasian, A., Ebesutani, C., Oregul, A. C., Haya, I., Ceri, V., Nasiroglu, S., Filiz, M. y Chorpita, B. F. (2017). Psychometric properties of the Parent Version of the Revised Child Anxiety and Depression Scale in clinical sample of Turkish Children and Adolescents. *Child Psychiatry Human Development*, 1, doi:10.1007/s10578-017-0716-1.
- Korkmaz, S., Goksuluk, D. y Zarasiz, G. (2014). MVN: An R package for assessing multivariate normality. *The R Journal*, 6, 151-162.
- Kösters, M. P., Chinapaw, M. J. y Zwaanswijk, M. (2015). Structure, reliability, and validity of the Revised Child Anxiety and Depression Scale (RCADS) in a multi-ethnic urban sample of Dutch children. *BMC Psychiatry*, 15, 132-138. doi:10.1186/s12888-015-0509-7
- Lau, J. T., Yeung, N. C., Yu, X. N., Zhang, J., Mak, W. W., Lui, W. W.,...Zhang, J.F. (2013). Validation of the Chinese version of the Children's Revised Impact of Event Scale (CRIES) among Chinese adolescents in the aftermath of the Sichuan Earthquake in 2008. *Comprehensive Psychiatry*, 54, 83-90. doi:10.1016/j.comppsy.2012.06.007
- Li, C.H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods*, 48, 936-949. doi:10.3758/s13428-015-0619-7
- Magaz, A., Chorot, P., Santed, M.A., Valiente, R.M., y Sandín, B. (2016). Evaluación del bullying como victimización: Estructura, fiabilidad y validez del Cuestionario de Acoso entre Iguales (CAI). *Revista de Psicopatología y Psicología Clínica*, 21, 77-95. doi: 10.5944/rppc.vol.21.num.2.2016.16990.
- McDonald, R. P. (1999). *Test theory: A unified treatment*. Mahwah: Erlbaum Associates.
- Melton, T. H., Croarkin, P. E., Strawn, J. R. y McClintock, S. M. (2016). Comorbid Anxiety and Depressive Symptoms in Children and Adolescents: A systematic review and analysis. *Journal of Psychiatric Practice*, 22, 84-98. doi:10.1097/PRA.0000000000000132
- Metz, C. E. (1978). Basic principles of ROC analysis. *Seminars in Nuclear Medicine*, 8, 283-298.
- Navarro, I., y García-Villamizar, D. A. (2014). Análisis de la emotividad negativa en mujeres víctimas de violencia de pareja: La culpa y la ira. *Revista de Psicopatología y Psicología Clínica*, 19, 129-140. doi: 10.5944/rppc.vol.19.num.2.2014.13063.
- Orgilés, M., Fernández-Martínez, I., Guillén-Riquelme, A., Espada, J. P., y Essau, C. A. (2016). A systematic review of the factor structure and reliability of the Spence Children's Anxiety Scale. *Journal of Affective Disorders*, 19, 333-340. doi:10.1016/j.jad.2015.09.055
- Orgilés, M., Méndez, X., Spence, S. H., Huedo-Medina, T. B. y Espada, J. P. (2012). Spanish validation of the Spence Children's Anxiety Scale. *Child Psychiatric Human Development*, 43, 271-281. doi:10.1007/s10578-011-0265-y
- Ortuño-Sierra, J., Fonseca-Pedrero, E., Paino, M., Sastre Riba, S., & Muñoz, J. (2015). Screening mental health problems during adolescence: Psychometric properties of the Spanish version of the Strengths and Difficulties Questionnaire. *Journal of Adolescence*, 38, 49-56. doi:10.1016/j.adolescence.2014.11.001
- Perrin, S., Meiser-Stedman, R. y Smith, P. (2005). The Children's Revised Impact of Event Scale (CRIES): validity as a screening instrument for PTSD. *Behavioural and Cognitive Psychotherapy*, 33, 487-498. doi:10.1017/S1352465805002419
- Pineda, D., Martín-Vivar, M., Sandín, B., & Piqueras, J. A. (2018). Factorial invariance and norms of the 30-item shortened-version of the Revised Child Anxiety and Depression Scale (RCADS-30). *Psicothema*.
- Piqueras, J. A., Garcia-Olcina, M., Rivera-Riquelme, M., Rodriguez-Jimenez, T., Martinez-Gonzalez, A. E., & Cuijpers, P. (2017). DetectaWeb Project: study protocol of a web-based detection of mental health of children and adolescents. *BMJ open*, 7, e017218. doi:10.1136/bmjopen-2017-017218
- Piqueras, J. A., Martín-Vivar, M., Sandín, B., San Luis, C., & Pineda, D. (2017). The Revised Child Anxiety and Depression Scale: A systematic review and reliability generalization meta-analysis. *Journal of Affective Disorders*, 218, 153-169. doi:10.1016/j.jad.2017.04.022
- Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A. y Rohde, L. A. (2015). Annual Research Review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry*, 56, 345-365. doi:10.1111/jcpp.12381
- R Core Team. (2016). *R: A language and environment for statistical computing*. Viena: R Foundation for Statistical Computing.
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48, 1-36. doi:10.18637/jss.v048.i02.
- Sánchez-Hernández, O., Méndez, X., y Garber, (2014). Prevención de la depresión en niños y adolescentes: Revisión y reflexión. *Revista de Psicopatología y Psicología Clínica*, 19, 63-76. doi:10.5944/rppc.vol.19.num.1.2014.12983
- Sandín, B., Chorot, P., Valiente, R. M. y Chorpita, B. F. (2010). Development of a 30-item version of the Revised Child Anxiety and Depression Scale. *Revista de Psicopatología y Psicología Clínica*, 15, 165-178. doi:10.5944/rppc.vol.15.num.3.2010.4095
- Sandín, B., Valiente, R. M. y Chorot, P. (2009). RCADS: evaluación de los síntomas de los trastornos de ansiedad y depresión en niños y adolescentes. *Revista de Psicopatología Y Psicología Clínica*, 14, 193-206. doi:10.5944/rppc.vol.14.num.3.2009.4078
- Schermelleh-Engel, K., Moosbrugger, H. y Müller, H. (2003). Evaluating the Fit of Structural Equation Models: Tests of Significance and Descriptive Goodness-of-Fit Measures. *Methods of Psychological Research Online*, 8 (2), 23-74.
- Silverman, W. K., Albano, A. M. y Sandín, B. (2003). *Entrevista para el Diagnóstico de los Trastornos de Ansiedad en Niños (ADIS-IV:C/P)*. Entrevistas para el niño y para los padres (2 volúmenes). Madrid: Klinik.
- Tucker, L. R. y Lewis, C. (1973). The reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1-10. doi:10.1007/BF02291170

- Walter, J. G., Kahn, S. A., Noe, J. D., Schurman, J. V., Miller, S. A. y Greenley, R. N. (2016). Feeling fine: anxiety and depressive symptoms in youth with established IBD. *Inflammatory Bowel Disease*, 22, 402-409. doi:10.1097/MIB.0000000000000657
- World Health Organization (2014). *Health for the world's adolescents*. Recuperado el 30 de Abril de <http://www.who.int/mediacentre/news/releases/2014/focus>
- World Health Organization (WHO) (1998). *Well-being measures in primary health care: the DepCare project*. Copenhagen: Denmark WHO Reg Off Eur:b32.
- Youden, W. J. (1950). Index for Rating Diagnostic Tests. *Cancer*, 3(1), 32-35. doi:10.1002/1097-0142(1950)3:1<32::AID-CN-CR2820030106>3.0.CO;2-3

Appendix I. Optimal cut-off scores on RCADS-30 (total score) for ADIS-IV-C diagnosis of emotional disorders ( $N = 243$ )

Raw score	RCADS-30 / ADIS-DEP			RCADS-30 / ADIS-ANX			RCADS-30 / ADIS-EMO			RCADS-30 / ADIS-INT		
	Sen	Sp	You	Sen	Spe	You	Sen	Spe	You	Sen	Spe	You
22	.82	.63	.44	.79	.67	.45	.76	.67	.44	.79	.69	.47
23	.73	.66	.39	.73	.70	.43	.68	.71	.39	.71	.72	.44
24	.73	.67	.40	<b>.73</b>	<b>.71</b>	<b>.44</b>	.68	.71	.40	.71	.73	.44
25	.73	.69	.42	.73	.73	.46	.68	.74	.42	.71	.75	.47
26	.73	.71	.44	.70	.75	.45	.66	.76	.41	.69	.77	.46
27	.73	.73	.46	.67	.77	.44	.63	.78	.41	.67	.79	.46
28	.73	.76	.49	.67	.80	.47	.63	.80	.44	.67	.82	.49
29	<b>.73</b>	<b>.78</b>	<b>.50</b>	.67	.82	.49	<b>.63</b>	<b>.82</b>	<b>.46</b>	<b>.67</b>	<b>.84</b>	<b>.51</b>
31	.64	.79	.43	.64	.83	.47	.58	.83	.41	.62	.85	.47
32	.64	.81	.44	.61	.85	.45	.55	.85	.40	.60	.87	.46
33	.64	.83	.46	.61	.87	.48	.55	.87	.43	.57	.89	.46
34	.64	.84	.48	.55	.88	.42	.50	.88	.38	.52	.89	.41
35	.64	.85	.49	.55	.89	.43	.50	.89	.39	.50	.90	.40
36	.55	.85	.40	.52	.89	.41	.47	.89	.37	.48	.90	.38
37	.55	.88	.42	.48	.91	.39	.45	.91	.36	.45	.92	.37
38	.55	.88	.43	.45	.91	.37	.42	.92	.34	.43	.93	.35
39	.55	.90	.44	.42	.92	.35	.39	.93	.32	.38	.93	.31
40	.36	.90	.26	.36	.93	.29	.34	.93	.27	.33	.94	.27
41	.27	.93	.20	.21	.94	.15	.21	.94	.15	.21	.95	.16
42	.27	.93	.20	.21	.94	.15	.21	.95	.16	.21	.95	.16
43	.27	.94	.21	.18	.95	.13	.18	.95	.14	.19	.96	.15
44	.18	.94	.13	.18	.96	.14	.16	.96	.11	.17	.96	.13
45	.18	.95	.13	.18	.97	.15	.16	.97	.12	.17	.97	.14
46	.18	.96	.14	.18	.97	.15	.16	.97	.13	.17	.98	.14
49	.18	.96	.14	.18	.98	.16	.16	.98	.13	.17	.98	.15
52	.18	.97	.15	.18	.98	.16	.16	.98	.14	.17	.99	.15
53	-	-	-	-	-	-	-	-	-	-	-	-
54	.18	.97	.16	.18	.99	.17	.16	.99	.15	.17	1.00	.16
56	.18	.98	.16	.12	.99	.11	.11	.99	.10	.12	1.00	.11
58	.18	.99	.17	.12	1.00	.12	.11	1.00	.10	.12	1.00	.12
61	.09	.99	.08	.09	1.00	.09	.08	1.00	.07	.10	1.00	.10
63	.09	.99	.08	.09	1.00	.09	.08	1.00	.08	.07	1.00	.07
66	.09	1.00	.09	.06	1.00	.06	.05	1.00	.05	.05	1.00	.05
75	.00	1.00	.00	.03	1.00	.03	.03	1.00	.03	.02	1.00	.02



## Appendix I. Continuación

Raw score	RCADS-30 / ADIS-DISTHYMIA			RCADS-30 / ADIS-MDD			RCADS-30 / ADIS-SpP			RCADS-30 / ADIS-SF			RCADS-30 / ADIS-PD		
	Sen	Spe	You	Sen	Spe	You	Sen	Spe	You	Sen	Spe	You	Sen	Spe	You
22	.82	.65	.47	.75	.64	.39	.67	.64	.30	.92	.66	.59	.75	.64	.39
23	.73	.69	.41	.75	.67	.42	.67	.67	.34	.77	.69	.46	.75	.67	.42
24	.73	.69	.42	.75	.68	.43	.67	.68	.35	.77	.70	.47	.75	.68	.43
25	.73	.71	.44	.75	.70	.45	.67	.70	.36	.77	.72	.49	.75	.70	.45
26	.73	.72	.45	.75	.71	.46	<b>.67</b>	<b>.71</b>	<b>.38</b>	<b>.77</b>	<b>.73</b>	<b>.50</b>	.75	.71	.46
27	.73	.75	.48	.75	.73	.48	.50	.73	.23	.69	.75	.44	.75	.73	.48
28	.73	.77	.50	.75	.76	.51	.50	.75	.25	.69	.78	.47	.75	.76	.51
29	<b>.73</b>	<b>.79</b>	<b>.52</b>	.75	.78	.53	.50	.77	.27	.69	.80	.49	.75	.78	.53
31	.64	.81	.44	.75	.80	.55	.50	.79	.29	.62	.81	.43	.75	.79	.54
32	.64	.82	.45	.75	.80	.55	.50	.80	.30	.62	.82	.43	.75	.80	.55
33	.64	.84	.48	.75	.83	.58	.50	.83	.33	.62	.84	.46	.75	.83	.58
34	.64	.85	.49	.75	.84	.59	.33	.83	.16	.46	.84	.31	.75	.84	.59
35	.64	.86	.50	.75	.85	.60	.33	.84	.17	.46	.85	.32	<b>.75</b>	<b>.85</b>	<b>.60</b>
36	.55	.86	.41	.75	.86	.61	.33	.85	.18	.46	.86	.32	.50	.85	.35
37	.55	.88	.42	.75	.87	.62	.33	.86	.20	.46	.88	.34	.50	.86	.36
38	.55	.88	.43	.75	.87	.62	.33	.87	.20	.46	.88	.34	.50	.87	.37
39	.55	.90	.44	<b>.75</b>	<b>.89</b>	<b>.64</b>	.33	.88	.22	.38	.89	.28	.50	.88	.38
40	.36	.90	.27	.25	.89	.14	.33	.90	.23	.38	.91	.29	.50	.90	.40
41	.27	.93	.21	.25	.93	.18	.17	.92	.09	.31	.94	.24	.25	.93	.18
42	.27	.94	.21	.25	.93	.18	.17	.93	.10	.31	.94	.25	.25	.93	.18
43	.27	.94	.21	.25	.93	.18	.17	.93	.10	.31	.95	.25	.25	.93	.18
44	.18	.95	.13	.00	.94	-.06	.17	.94	.11	.31	.96	.26	.25	.94	.19
45	.18	.96	.14	.00	.95	-.05	.17	.95	.12	.31	.97	.27	.25	.95	.20
46	.18	.96	.14	.00	.95	-.05	.17	.96	.12	.31	.97	.28	.25	.96	.21
49	.18	.97	.15	.00	.96	-.04	.17	.96	.13	.31	.98	.28	.25	.96	.21
52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	.18	.97	.15	.00	.96	-.04	.17	.97	.13	.31	.98	.29	.25	.97	.22
54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	.18	.98	.16	.00	.97	-.03	.00	.97	-.03	.23	.99	.22	.00	.97	-.03
58	.18	.99	.17	.00	.98	-.02	.00	.98	-.02	.23	.99	.22	.00	.98	-.02
61	.09	.99	.08	.00	.98	-.02	.00	.98	-.02	.15	.99	.14	.00	.98	-.02
63	.09	.99	.08	.00	.99	-.01	.00	.99	-.01	.15	1.00	.15	.00	.99	-.01
66	.09	1.00	.09	.00	.99	-.01	.00	.99	-.01	.08	1.00	.07	.00	.99	-.01
75	.00	1.00	.00	.00	1.00	-.01	.00	1.00	.00	.08	1.00	.08	.00	1.00	-.01

## Appendix I. Continuación

Raw score	RCADS-30 / ADIS-GAD			RCADS-30 / ADIS-SAD			RCADS-30 / ADIS-PTSD			RCADS-30 / ADIS-OCD		
	Sen	Spe	You	Sen	Spe	You	Sen	Spe	You	Sen	Spe	You
22	.77	.65	.42	.86	.64	.50	.67	.63	.30	.75	.64	.39
23	.77	.69	.46	.86	.68	.54	.67	.67	.34	.75	.67	.42
24	.77	.70	.47	.86	.69	.54	.67	.67	.34	.75	.68	.43
25	<b>.77</b>	<b>.72</b>	<b>.49</b>	.86	.71	.56	.67	.69	.36	.75	.70	.45
26	.69	.73	.42	<b>.86</b>	<b>.72</b>	<b>.58</b>	.67	.71	.37	.75	.71	.46
27	.69	.75	.44	.71	.74	.45	.67	.73	.40	.75	.73	.48
28	.69	.78	.47	.71	.76	.48	.67	.75	.42	.75	.76	.51
29	.69	.80	.49	.71	.78	.50	.67	.77	.44	.75	.78	.53
31	.69	.81	.51	.71	.80	.52	.67	.79	.46	.75	.79	.54
32	.62	.82	.43	.57	.81	.38	<b>.67</b>	<b>.80</b>	<b>.47</b>	.75	.80	.55
33	.62	.84	.46	.57	.83	.40	.33	.82	.15	<b>.75</b>	<b>.83</b>	<b>.58</b>
34	.62	.85	.47	.57	.84	.41	.33	.83	.16	.75	.84	.59
35	.62	.86	.48	.57	.85	.42	.33	.84	.17	.50	.84	.34
36	.62	.87	.49	.43	.85	.28	.33	.85	.18	.50	.85	.35
37	.54	.88	.42	.43	.87	.30	.33	.86	.19	.50	.86	.36
38	.46	.88	.34	.43	.87	.30	.33	.87	.20	.50	.87	.37
39	.46	.90	.36	.43	.89	.31	.33	.88	.21	.25	.88	.13
40	.31	.90	.21	.43	.90	.33	.33	.89	.23	.25	.89	.14
41	.15	.93	.08	.29	.93	.21	.33	.93	.26	.00	.92	-.08
42	.15	.93	.09	.29	.93	.22	.33	.93	.26	.00	.93	-.07
43	.15	.94	.09	.29	.94	.22	.33	.93	.27	.00	.93	-.07
44	.15	.95	.10	.29	.95	.23	.33	.94	.28	.00	.94	-.06
45	.15	.96	.11	.29	.96	.24	.33	.95	.29	.00	.95	-.05
46	.15	.96	.11	.29	.96	.25	.33	.96	.29	.00	.95	-.05
49	.15	.97	.12	.29	.97	.25	.33	.96	.30	.00	.96	-.04
53	.15	.97	.12	.29	.97	.26	.33	.97	.30	.00	.96	-.04
56	.08	.98	.05	.29	.98	.27	.33	.98	.31	.00	.97	-.03
58	.08	.98	.06	.29	.99	.27	.33	.98	.31	.00	.98	-.02
61	.08	.99	.06	.14	.99	.13	.33	.99	.32	.00	.98	-.02
63	.08	.99	.07	.14	.99	.13	.00	.99	-.01	.00	.99	-.01
66	.08	1.00	.07	.14	1.00	.14	.00	.99	-.01	.00	.99	-.01
75	.00	1.00	.00	.14	1.00	.14	.00	1.00	.00	.00	1.00	.00

*Note.* Raw Score = total score on the RCADS-30; Sen = sensitivity; Spe = Specificity; You = Youden Index; DEP = Any unipolar depressive disorder (major depressive disorder or dysthymia); ANX= any anxiety disorder (GAD, SAD, SpP, SF, PD); EMO: any depressive (DEP) and/or anxiety (ANX) disorder; INT: any internalizing disorder (DEP, ANX, OCD and/or PTSD); MDD: major depressive disorder; SpP = specific phobia; SF = social phobia; PD = panic disorder or agoraphobic; GAD = geneaalized anxiety disorder; SAD = separation anxiety disorder; PTSD= Post-traumatic Stress Disorder; OCD=Obsessive-Compulsive Disorder. In bold those values of Sen, Spe, and You considered as the more adequate