

# Psychometric Properties of the Parent Version of the Revised Child Anxiety and Depression Scale in a Clinical Sample of Turkish Children and Adolescents

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**Abstract** The Revised Child Anxiety and Depression Scale-Parent version (RCADS-P) is a self-report questionnaire that assesses dimensions of DSM-based anxiety and depressive disorders in children and adolescents. The present study examined the psychometric properties of the Turkish version in a clinical sample of 483 children and adolescents. The child and parent versions of the RCADS, parent versions of the Screen for Child Anxiety Related Emotional Disorders, the Strengths and Difficulties Questionnaire and Adolescent Symptom Inventory-Depression Scale were administered. Current psychiatric diagnoses were assessed via the Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present Version. The RCADS-P demonstrated high internal consistency and test–retest reliability, and good convergent, divergent, and discriminant validity. Confirmatory factor analysis supported the DSM-related six-factor structure. With its

demonstrated favorable psychometric properties, the Turkish RCADS-P is currently the only validated parent-report instrument that assesses DSM-based anxiety and depressive disorders in children and adolescents in Turkey.

**Keywords** Parent-report · Anxiety · Depression · Reliability · Validity · Turkish translation

## Introduction

Anxiety and depressive disorders are among the most common forms of psychopathology in children and adolescents [1]. They often have a chronic and recurring course, negatively impacting academic and social functioning, and are associated with secondary conditions such as suicidality and substance abuse [2]. Anxiety disorders are highly comorbid with each other as well as with depression [3].

Clinical guidelines consistently emphasize the importance of early identification and treatment of anxiety and depressive disorders to reduce the negative impact and persistence into adulthood [4, 5]. Evidence-based assessments promote the routine use of standardized instruments for screening, diagnosing, treatment monitoring and treatment evaluation for anxiety and depressive symptoms in youth [6]. Self-report questionnaires, which allow children to report their feelings such as fears, worries and thoughts, have become an important source of information. A recent review investigated self-report scales in their suitability for evidence-based assessment (e.g., with established reliability and validity metrics, free or low cost, brief, and easy to use; [7]). Three instruments were identified as meeting their criteria for assessing youth anxiety: The Revised Children's Anxiety and Depression Scale, Youth and Parent Versions [RCADS; (8)], The Screen for Child Anxiety

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Related Emotion Disorders [SCARED; (9)], and The Spence Children's Anxiety Scale [SCAS; (10)]. All three scales appeared to be appropriate tools for screening, treatment monitoring and treatment evaluation purposes. In addition, the RCADS and SCAS were supported to be used to aid in diagnostic assessment.

The RCADS is a revision of the SCAS, adapted to correspond more closely to selected DSM-IV [11] anxiety disorders (i.e., separation anxiety disorder; (SAD), social phobia (SoP), generalized anxiety disorder (GAD), obsessive–compulsive disorder (OCD) and panic disorder (PD)). The RCADS also includes a scale for major depression [MDD; (12)] and also yields an Anxiety Total score and Total score, which may be useful for practitioners assessing broad problem categories instead of specific diagnoses. Psychometric properties of the English [8, 12, 13], Dutch [14], Danish [15] and Turkish [16] versions of the child-report RCADS (RCADS-C) were investigated in community and clinical samples. All of these studies supported the reliability and validity of the RCADS-C scores for assessing anxiety and depression in youth. A recent study examined the longitudinal measurement stability of the RCADS-C in adolescents and found that measurement changes in anxiety symptoms appear to reflect true changes in anxiety levels in youth [17]. The strong psychometric support for the RCADS-C has led to it being increasingly used for clinical and research purposes [18–20].

Research emphasizes the importance of a multi-informant approach in the evaluation of childhood emotional disorders [21]. Children may be more aware of their inner distress and better able to describe the severity/impact of the symptoms on themselves. However, parents might be better at reporting the outward behavioral expressions such as avoidance behavior, asking for reassurance and clinging, and the impact on family and school functioning [5, 22]. Anxiety may lead children to socially desirable answers, impair memory retrieval accuracy, and they may lack the ability to accurately understand and convey their symptoms [23]. Thus, accompanying parental information is critical to appreciate the range and depth of a child's anxiety and depressive symptoms.

The parent version of the RCADS (the RCADS-P) was developed to complement the child version. This measure has demonstrated clinical utility and strong psychometric properties in both clinic- and school-based populations [24, 25]. A recent study also supported its use for children as young as 3 years old [26]. In addition, a Spanish version was developed and demonstrated supportive psychometric properties as a parent-report measure of youths' anxiety and depressive symptoms [27]. Since its development, the RCADS-P has been used in several clinical studies in combination with the RCADS-C [28–30].

The psychometric properties of the Turkish versions of the child-report RCADS and child-report SCARED have been investigated in clinic-referred children and adolescents [16, 31]. However, there is no standardized Turkish instrument to assess anxiety and depressive symptoms in accordance with DSM nosology based on parent report. The adequacy of a diagnostic instrument in a given culture does not guarantee its reliability or validity in another [32]. Symptomatic expression, interpretation and social response to anxiety and depressive syndromes vary widely among cultures [33]. For example, Latino, Black and Asian populations with depression have a higher tendency to emphasize somatic symptoms [34]. Deisenhammer et al. [35] found that Turkish female patients, either living in Turkey or had migrated to Austria, had significantly higher somatic symptom scores than Austrian female patients living in Austria [35]. Besides, despite reporting similar symptom levels, Turkish immigrant parents living in Netherlands were less likely to identify their children's internalizing problems and use mental health services than native Dutch parents [36]. Further studies are required to investigate whether lower level of emotional problem identification is related to culture or migration. However, the presence of cultural differences requires the use of culturally compatible measures when assessing the symptoms.

The purpose of the present study was to examine the psychometric properties of the parent-reported Turkish RCADS-P in a clinical sample of youth aged between 8 and 17 years. Based on previous research, we hypothesized that the findings of this study would support the reliability and validity of the six-factor Turkish RCADS-P in this population. Some studies report that Turkish children and adults, who lived in Turkey or had migrated to European countries, had higher anxious-depressive, somatization or internalizing scores than native population of that country [37, 38]. So, higher cut points may be expected for some scales of the Turkish RCADS-P.

## Methods

### Participants and Procedure

A total of 483 children and adolescents were recruited from four outpatient Child and Adolescent Psychiatry Clinics (Bezmialem University, 55.7%; Istanbul University, 16.7%; Sakarya University, 12.2%; Kutahya State Hospital; 17.4%). Children between 8 and 17 years old who could provide assent and whose parents provided informed consent to participate were included in the study. The child and his/her parent were required to complete the scales in Turkish. Children with autism spectrum disorders, intellectual

disability and an active episode of mania or psychosis were excluded.

In accordance with the original study [24], only adequately filled RCADS-P forms were included in the psychometric analysis. Twenty-three (4.8%) forms were excluded for having more than 5 missing items (i.e., more than 10% missing items). These 23 participants did not differ from the remaining 460, with respect to sociodemographic variables (i.e., child age,  $p = .36$ ; gender,  $p = .65$ ); maternal and paternal education level ( $p = .70$ ,  $0.95$ , respectively) and family monthly income ( $p = .65$ ). In the confirmatory factor analysis (CFA), in order to use all available RCADS-P data, we excluded only the forms with all RCADS-P items missing (7 cases), leaving a CFA sample size of 476 participants. All other forms in the study also had to have 90% or more completed data to be included in the analysis.

The study was approved by the Research Ethics Committee at the Bezmialem Vakif University (Approval No.: 71306642-050.01.04). Following child's assent and parental consent, all children underwent a comprehensive psychiatric assessment using a semi-structured diagnostic assessment and relevant questionnaires were completed by the parents and children involved in the study.

The Turkish translation of the RCADS-P was conducted in accordance with the translation procedure described in the RCADS-C study [16]. Items on the RCADS-P were separately translated into Turkish by the study team members (VG and AK) who are competent in English. The translated form was inspected for differences in a meeting, and the final version was formed after consulting with an expert in English language. The Turkish translation was backward translated into English by a bilingual medical student, and the backward translation was accepted by the coauthor who developed the original RCADS-P (BFC).

## Measures

### *Revised Child Anxiety and Depression Scales, Child and Parent Version (RCADS-C, RCADS-P)*

Both the RCADS-C and RCADS-P are 47-item questionnaires, designed to assess DSM-IV depression and anxiety disorders in children and adolescents. Response options are based on a 4-point Likert-type scales (0=never, 1=sometimes, 2=often and 3=always). Both versions yield six subscales (i.e., SAD, SoP, GAD, OCD, PD, MDD) as well as an Anxiety Total Score (sum of all five anxiety scales) and a Total (Internalizing) Score (sum of all six subscales). The RCADS-C [8, 12] was found to produce reliable and valid scores in the assessment of children and adolescents across different languages, including Turkish [16]. Strong psychometric properties of the six-factor RCADS-P were

demonstrated in a large clinical [24] and school-based sample of youth [25, 27].

### *Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present Version (K-SADS-P)*

The KSADS-P is a semi-structured interview schedule used to assess psychiatric disorders in children and adolescents on the basis of DSM-IV criteria [39]. Children and their parents were interviewed for current anxiety, depressive and other psychiatric disorders and the diagnoses were decided upon child or parent report. The reliability and validity of the Turkish version of this semi-structured interview has been demonstrated [40]. In the current study, the K-SADS-P was administered by certified child and adolescent psychiatrists, experienced in the assessment of childhood psychiatric disorders.

### *Screen for Child Anxiety Related Emotional Disorders (SCARED)*

The SCARED is a 41-item questionnaire, based on a 3-point Likert-type scale that yields a Total score ranging from 0 to 82 points. It was designed to screen for DSM-IV anxiety disorders and includes five factors (i.e., SAD, GAD, SoP, PD and school refusal) and an Anxiety Total score [9]. The scale has child-report and parent-report versions (SCARED-C and SCARED-P), which differ only in the wording of the items (e.g., "I am afraid to be alone in the house." vs. "My child is afraid to be alone in the house"). Language adaptation, reliability and validity of the Turkish SCARED-C have been examined and supported [31]. In the current study, SCARED-P was used, and Cronbach  $\alpha$  values were as follows: Total score: 0.92, SAD: 0.75, GAD: 0.83, SoP: 0.84, PD: 0.85. Confirmatory factor analysis also supported the five-factor model fit (e.g., RMSEA=0.047, CFI=0.91, TLI=0.91).

### *Strengths and Difficulties Questionnaire - Parent version (SDQ-P)*

The SDQ-P [41] is a 25-item scale that asks parents to rate their children's emotional and behavioral difficulties on a 3-point Likert scale, ranging from 0=not true to 2=very true. The questionnaire is composed of five subscales: Emotional Symptoms, Conduct Problems, Hyperactivity-Inattention, Peer Problems and Prosocial. In addition, the SDQ-P yields Internalizing Difficulties, Externalizing Difficulties and Total Difficulties scale scores. SDQ-P was demonstrated to be a valid and reliable scale for use in Turkish children and adolescents. Its five-factor structure was confirmed, and Cronbach  $\alpha$

values were reported as: Total score: 0.80, Emotional: 0.70, Conduct: 0.61, Hyperactivity: 0.73, Prosocial: 0.72, and Peer problems: 0.29 [42].

In this study, similar Cronbach  $\alpha$  values were found: Total score: 0.73, Emotional: 0.69, Conduct: 0.63, Hyperactivity: 0.61, Prosocial: 0.72, and Peer problems: 0.30.

#### *Adolescent Symptom Inventory (ASI-4) Parent Checklist-Depression Score*

The ASI-4 is a 120-item questionnaire for screening adolescents for emotional and behavioral problems. Items on the ASI-4 are based on the diagnostic criteria specified in the DSM-IV [43]. In this study, the parents were required to rate only nine statements related to major depression. Items asking about changes in appetite, sleep, psychomotor activity and concentration are answered as “Yes” or “No” and the remaining five items are answered as “Never”, “Sometimes”, “Often” or “Very Often.” Symptom severity scores, used in this study, are calculated by summing the 9 item scores. The yes–no rated items are assigned weights to make them comparable to items rated on a 4-point scale (never=0; very often=3; no=0.5; yes=2.5) [44]. The Turkish version of the instrument was successfully utilized in previous studies [45, 46]. In this study, the Cronbach  $\alpha$  value of the depression subscale was 0.73, and factor analysis revealed that the one-factor depression model adequately fit the data (RMSEA=0.089, CFI=0.90, TLI=0.87).

#### **Data Analysis**

The SPSS 23.0 statistical software [47] and Mplus version 7.11 [48] were used to perform the statistical analysis to assess the psychometric properties of the Turkish RCADS-P.

#### *Descriptive Statistics*

Data are presented as means and standard deviations (Mean (SD)) for continuous variables, and as numbers and percentages (N (%)) for categorical variables. A two-tailed  $p$ -value of 0.05 was used to determine significance in analyses. The comparison between groups was conducted via Chi square (for categorical variables) and independent sample  $t$  tests or the Mann–Whitney U tests (for continuous variables). Pearson or Spearman correlation coefficients were used to examine the relationship between parameters, and effect sizes were calculated when relevant.

#### *Reliability*

Reliability of the RCADS-P scores was assessed via examination of Cronbach’s alpha coefficients, item-total correlations, and alpha-if-item-deleted values. We used 0.80 as the cut-off for acceptable reliability and 0.30 as the general cut-off for adequate item-total correlation values [49]. Test–retest reliability was estimated using a three-week test–retest paradigm using a total of 30 participants randomly selected from the sample. We used 0.80 as the cut-off for acceptable reliability for our clinical sample [49].

#### *Confirmatory Factor Analysis (CFA)*

We used Mplus in order to test how well the hypothesized six-factor structure fit our sample, and compare this model to the following alternate models suggested in previous studies [24, 27, 50]: (a) a five-factor model combining GAD and MDD into a single “distress” factor; (b) a two-factor model (i.e., an anxiety and depression model), collapsing the five anxiety scales into a single anxiety factor, and (c) a single factor model (i.e., collapsing all items into a single internalizing total factor). A significant Chi square difference test would suggest that the six-factor structure fits the data significantly better than the alternate models.

Given that Likert scale data are ordinal in nature, we treated our data as ordinal and used polychoric correlations [51, 52]. We also used the robust weighted least-squares with mean and variance adjustment (WLSMV) estimator, which has been recommended when dealing with ordinal data [53]. All available information was also used to estimate the model through pairwise correlations within Mplus. The following fit indices were used to evaluate model fit: Root Mean Square Error of Approximation (RMSEA; [54]), Comparative Fit Index (CFI; [55]), and Tucker-Lewis Index (TLI; [56]). RMSEA values lower than 0.08 and lower than 0.05 were used as the cut-offs for adequate and good fit, respectively [57]. Hu and Bentler (1999) regard CFI and TLI values close to 0.90 [55] and 0.95 [58] or higher as reasonable indications of adequate and good model fit, respectively.

#### *Convergent Validity*

We examined correlations between the RCADS-P scores (including the specific anxiety subscales, depression, and anxiety total subscales) and the scores of other corresponding parent-report measures of anxiety, depression, and internalizing problems (i.e., the SCARED subscales, SCARED Total score, ASI-4 Depression severity score, SDQ emotional problems score and SDQ internalizing score). We expected that the correlations would be positive and significant.



**Parent–Child Agreement.** We examined parent–child agreement (a type of convergent validity) of the RCADS scores. Notably, although each pair of scales targeted the same construct, they were provided by different informants. Since correlations between child and parent reports are known to fall in the low to moderate range [59], we expected our parent–child agreement coefficients to be significant, in the moderate range (e.g., 0.30–0.40).

### Divergent Validity

Previous studies have demonstrated that the scores of internalizing and externalizing scales often show significant positive correlations to a moderate degree [60]. We therefore did not expect divergent validity coefficients (i.e., correlations of RCADS-P scales with externalizing criterion scales) to be zero or negative. In order to evaluate divergence, we tested whether the correlation between RCADS-P scale and the divergent criterion measure was significantly smaller than the correlation between the RCADS-P scale and its convergent criterion measure. Steiger's Z-tests [61] were employed to determine whether the difference between correlations were statistically significant and z-scores were calculated.

The comparisons included the following RCADS-P scales and corresponding diverging and converging scales: (a) the RCADS-P Anxiety Total scale with SDQ Conduct Problems scale and SDQ Emotional problems scale; (b) the RCADS-P depression scale with SDQ Conduct Problems scale and SDQ Emotional problems scale; and (c) the RCADS-P total scale with SDQ Externalizing Problems scale and SDQ Internalizing problems scale. We expected that the lower correlation coefficients between RCADS-P scores and diverging scales would be significantly lower than the correlation between RCADS-P scores and converging scales.

### Discriminative Validity

We then assessed the ability of the Turkish RCADS-P scale scores to discriminate participants with and without a specific relevant KSADS diagnosis (e.g., GAD, MDD). Significant univariate tests would provide support for the discriminant validity of the Turkish RCADS-C.

Sensitivity refers to the ability of a test to detect individuals who actually have the disorder. Whereas specificity means that the test is specific to the disorder being assessed, and it does not give positive result because of other conditions [62]. The Receiver Operator Characteristic (ROC) analysis is used to select the optimal cut point(s) to discriminate individuals with and without given disorder. We conducted ROC analysis to identify

the sensitivity, specificity and cut points of the scale that maximized diagnostic group classification.

## Results

### Sociodemographic and Clinical Findings

Sociodemographic information and the K-SADS-P diagnoses of the participants are presented in Tables 1 and 2, respectively. Three groups in Table 2 (No-diagnosis, Diagnosis and Missing diagnosis groups) did not differ with respect to child and parent mean ages, child gender, mother education and monthly income. However, fathers in the no-diagnosis group had lower education than the diagnosis group ( $p = .017$ ). The groups differed with respect to all RCADS-P scores, ( $p$  SoF =  $p$  PD = 0.001, remaining  $p$ 's < 0.001). Post hoc comparison revealed that for all scale and subscale scores Diagnosis group = Missing diagnosis group > No-diagnosis group.

Significant gender differences were found for RCADS-P scores, with girls displaying higher levels of anxiety and depression symptoms than boys. Mean Anxiety total scores were 32.97 ( $SD = 19.56$ ) and 26.61 ( $SD = 17.86$ ) ( $p < .001$ ), and mean depression scores were 9.58 ( $SD = 6.19$ ) and 8.33 ( $SD = 5.88$ ) ( $p = .03$ ). Girls also scored significantly higher in all anxiety subscales except SAD and OCD. Furthermore, small but significant correlations between age and the following RCADS-P scale scores were observed: PD scale ( $r = .14$ ;  $p < .05$ ), MDD scale ( $r = .14$ ;  $p < 0.05$ ); SAD scale ( $r = -.31$ ;  $p < 0.05$ ).

**Table 1** Sociodemographic information of the sample (N = 483)

Child age (mean $\pm$ SD; range)	12.25 $\pm$ 2.69; 8–17 years
Child grade (median; range)	7; 3rd–12th grades
Male sex N (%)	293 (60.7%)
Mother education, year, mean $\pm$ SD (range)	8.24 $\pm$ 3.61; 0–15 years
Father education, mean $\pm$ SD (range)	9.38 $\pm$ 3.72; 0–15 years
Two-parent home N (%)	438 (90.7%)
Monthly family income (TL)	
0–1000	73 (15.1%)
1000–2000	150 (31.2%)
2000–3000	120 (24.8%)
3000–5000	60 (12.4%)
5000 and over	30 (6.2%)
Missing	50 (10.4%)

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**Table 2** K-SADS-P Diagnoses of the participants (N=483)

Diagnosis	N (%)
No diagnosis	87 (18%)
Separation anxiety disorder	60 (12.4%)
Social phobia	69 (14.3%)
Specific phobia	92 (19.0%)
Obsessive–compulsive disorder	48 (9.9%)
Panic disorder	23 (4.8%)
Generalized anxiety disorder	81 (16.8%)
Anxiety disorder NOS	22 (4.5%)
Major depressive disorder	67 (13.9%)
Dysthymic disorder	12 (2.5%)
Depressive disorder NOS	9 (1.9%)
ADHD	117 (24.2%)
ADHD-NOS	27 (5.6%)
ODD	35 (7.2%)
Conduct disorder	61 (12.6%)
Tic disorder	23 (4.7%)
Adjustment disorder	5 (1.0%)
Other K-SADS diagnoses	37 (7.6%)
Other DSM-IV diagnoses	57 (11.8%)
Missing diagnostic information	39 (8.1%)

Other K-SADS diagnoses includes Elimination disorders, Sleep disorders, Eating disorders, Post-traumatic stress disorder and Acute stress disorder; Other DSM-IV diagnoses include Specific learning disorders, Dissociative disorders, etc.

**Reliability**

Inter-scale reliability (i.e., Cronbach’s alpha) of Turkish RCADS-P was 0.95. Cronbach’s alpha coefficients for the RACDS subscales all fell above the 0.70 criterion, demonstrating good internal consistency for all subscales (SAD=0.79, SoP=.86, OCD=0.76, PD=0.85, GAD=0.85, MDD=0.84, Anxiety total=0.93). Three items (item 15: “has problems with appetite,” item 18: “has trouble going to school in the mornings because of feeling nervous or afraid,” and item 33: “afraid of being in crowded places”) had item-total correlations near 0.30. Item-total correlation values for the remaining items were

between 0.40 and 0.78. Corrected item-total correlation and Cronbach’s alpha if item deleted values may be seen in the Supplementary Table.

The participants who underwent retest paradigm after three weeks did not differ from the whole sample with respect to age, gender, and baseline RCADS-P scores. The test–retest correlation coefficients supported the reliability of the scale scores, as follows: SAD ( $r=.77, p<.001$ ), SoP ( $r=.88, p<.001$ ), OCD ( $r=.77, p<.001$ ), PD ( $r=.89, p<.001$ ), GAD ( $r=.89, p<.001$ ), MDD ( $r=.92, p<.001$ ), Anxiety Total ( $r=.95, p<.001$ ) and Total score ( $r=.95, p<.001$ ).

**Confirmatory Factor Analysis**

The six-factor Turkish RCADS-P model fit the data acceptably well (e.g., RMSEA=0.055, TLI=0.89, CFI=0.90). All factor loadings were positive and significant ( $p<.001$ ) with a range for SAD from 0.58 to 0.85, for SoP from 0.51 to 0.80, for OCD from 0.47 to 0.85, for PD from 0.68 to 0.84, for GAD from 0.65 to 0.89, and for MDD from 0.31 to 0.84.

When compared with the alternate models, the six-factor model fit significantly better than the five-, two- and one-factor models. Results of the Chi square difference tests can be seen in Table 3. These results support both the hypothesized six-factor structure as well as the distinction between the MDD and GAD factors.

**Convergent Validity**

All RCADS-P scores showed moderate to large correlations with the scores of their corresponding convergent validity criterion subscales (all  $p$ ’s<0.001; Table 4). More specifically, (a) the RCADS-P MDD score correlated significantly with the ASI-4 depression score, (b) the RCADS-P GAD, SAD, PD and SoP scores correlated significantly with their corresponding SDQ subscale scores, (c) the RCADS-P Anxiety Total score correlated significantly with the SCARED Total score, and (d) the RCADS-P Total scores correlated significantly with the

**Table 3** Fit statistics for the confirmatory factor analytic models based on the full sample

Model	Fit statistics						Model comparison statistics		
	$\chi^2$	df	P	RMSEA	CFI	TLI	$\Delta$ df	$\Delta \chi^2$	$P_{diff-test}$
6 factor	2474.96	1019	<0.001	0.055	0.90	0.89	–	–	–
5 factor	2833.46	1024	<0.001	0.061	0.87	0.87	5	176.84	<0.001
2 factor	3703.73	1033	<0.001	0.074	0.81	0.81	14	587.52	<0.001
1 factor	4130.79	1034	<0.001	0.079	0.78	0.77	15	766.23	<0.001

*N*=476. RCADS-P Revised Child Anxiety and Depression Scale-Parent version (Turkish); RMSEA Root Mean Square Error of Approximation, CFI Comparative Fit Index, TLI Tucker Lewis Index

**Table 4** Agreement between corresponding Turkish RCADS-P with other parent-report scales

RCADS-P Sub/scales	ASI-4 MDD	SCARED GAD	SCARED SAD	SCARED PD	SCARED SoP	SCARED total	SDQ Emot	SDQ Int
MDD	0.70	0.56	0.28	0.48	0.32	0.53	0.60	0.59
GAD	0.38	0.60	0.52	0.48	0.36	0.62	0.57	0.49
SAD	0.16	0.36	0.67	0.40	0.32	0.55	0.43	0.34
PD	0.47	0.51	0.37	0.64	0.27	0.57	0.59	0.49
SoP	0.36	0.61	0.33	0.39	0.49	0.58	0.57	0.52
OCD	0.34	0.48	0.44	0.45	0.31	0.52	0.43	0.43
Anxiety total score	0.43	0.66	0.59	0.59	0.47	0.73	0.67	0.59
Total score	0.53	0.69	0.55	0.60	0.46	0.73	0.70	0.63

ASI-4 Adolescent Symptom Inventory-4 SCARED-P Screen for Child Anxiety-Related Emotional Disorders, Parental version, SDQ-P Strengths and Difficulties Questionnaire Parental version, Int Internalizing Emot Emotional symptoms score, MDD Major Depressive Disorder, GAD Generalized Anxiety Disorder, SAD Separation Anxiety Disorder, PD Panic Disorder, SoP Social Phobia, OCD Obsessive–Compulsive Disorder

\*All but one correlation (between SAD and ASI-4 MDD) in the table are significant at  $p < 0.001$ . The correlation between SAD and ASI-4 MDD is 0.002

SDQ emotional problems and internalizing scores. These results provide evidence for the convergent validity of the Turkish RCADS-P scale scores. Although we had no measure against which to specifically assess the RCADS OCD subscale's convergent validity, the RCADS OCD scale scores were significantly and positively correlated with the SDQ emotional and internalizing scores and the SCARED total scores. The strength of correlations was generally retained after controlling for age, only the coefficient  $r$  between RCADS-P SAD and SCARED-P SAD scores dropped from 0.67 to 0.42.

Parent–child agreement correlation coefficients can be seen in Table 5. All correlations between corresponding subscales were significant ( $r$  between 0.39 and 0.60), even after controlling for age ( $r$  between 0.41 and 0.56), providing additional support for the convergent validity of the Turkish RCADS-P scale scores.

### Divergent Validity

As predicted, the RCADS-P Anxiety and Depression scale scores were significantly less correlated with the SDQ Conduct Problems scale than with the SDQ Emotional Problems scale. Specifically, the correlation between RCADS-P Anxiety Total score and SDQ Conduct Problems score ( $r = .12$ ,  $p = .014$ ) was significantly smaller than the correlation between the RCADS-P Anxiety Total score and the SDQ Emotional Problems score ( $r = .67$ ,  $p < .001$ ),  $z = 11.47$ ,  $p < .001$ . Similarly, the correlation between the RCADS-P Depression score and the SDQ Conduct Problems score ( $r = .38$ ,  $p < .001$ ) was significantly smaller than the correlation between the RCADS-P Depression score and SDQ Emotional Problems score ( $r = .60$ ,  $p < .001$ ),  $z = 4.86$ ,  $p < .001$ .

Further, the correlation between the RCADS-P internalizing and the SDQ externalizing problems scores ( $r = .18$ ,  $p < .001$ ), was significantly smaller than the correlation

**Table 5** Agreement between corresponding RCADS-P and RCADS-C scales

RCADS subscales*	MDD-C	GAD-C	SAD-C	PD-C	SoP-C	OCD-C	Total anxiety-C	Total score-C
MDD-P	0.56	0.39	0.25	0.44	0.36	0.28	0.43	0.49
GAD-P	0.32	0.47	0.26	0.36	0.31	0.38	0.44	0.43
SAD-P	0.16	0.25	0.60	0.21	0.17	0.24	0.35	0.32
PD-P	0.41	0.42	0.30	0.52	0.37	0.35	0.48	0.48
SoP-P	0.32	0.42	0.24	0.34	0.49	0.33	0.46	0.45
OCD-P	0.27	0.32	0.23	0.30	0.22	0.39	0.35	0.35
Total anxiety-P	0.37	0.48	0.41	0.43	0.42	0.43	0.53	0.52
Total score-P	0.45	0.49	0.40	0.46	0.44	0.42	0.55	0.55

\*All correlations significant at  $p < .001$ ; P Parent, C Child, MDD Major Depressive Disorder, GAD Generalized Anxiety Disorder, SAD Separation Anxiety Disorder, PD Panic Disorder, SoP Social Phobia, OCD Obsessive–Compulsive Disorder

between the RCADS-P internalizing score and SDQ internalizing scores ( $r = .63, p < .001$ ),  $z = 9.57, p < .001$ .

These results support that the RCADS-P scale scores diverge with measures that target different constructs.

**Discriminative Validity**

Table 6 demonstrates that the Turkish RCADS-P subscales were able to discriminate participants with a relevant diagnosis from those without that diagnosis. For example, those with a K-SADS diagnosis of MDD had significantly higher RCADS-P MDD scale scores ( $M = 13.26; SD = 5.95$ ) than those without MDD diagnosis ( $M = 8.08; SD = 5.76$ ),  $F = 44.08, p < .001$ . Similar results were found for all other Turkish RCADS-P subscales, except for social phobia.

ROC analyses identified the cut points and corresponding sensitivity and specificity values of the RCADS-P scales. The cut points, sensitivity and specificity values were as follows. Major Depressive Disorder: 9.5, 0.71 and 0.67; Social Phobia: 7.5, 0.71 and 0.43; Separation Anxiety Disorder: 5.5, 0.67 and 0.38; Generalized Anxiety Disorder: 5.5, 0.65 and 0.66; Panic Disorder: 4.5, 0.70 and 0.68; Obsessive Compulsive Disorder: 4.5, 0.63 and 0.60;

Anxiety Total score: 26.5, 0.68 and 0.62 and Total score: 32.5, 0.72 and 0.62.

**Discussion**

The Turkish version of the RCADS-P demonstrated favorable psychometric properties in a sample of clinically referred Turkish youth. First, reliability (estimated via internal consistency and test–retest correlations) was satisfactory. Second, the six-factor RCADS-P fit the data well, and it fit the data significantly better than the alternative models tested. Third, strong correlations were evidenced between the RCADS-P and other parent-report anxiety and depression measures. Moderate to large correlations between parent-report and child-report scores on the RCADS also supported convergent validity of the RCADS-P Turkish version. Fourth, expected age and gender associations with RCADS-P anxiety and depression scores provided further evidence for validity of the RCADS-P scales. Fifth, support was found for the divergent validity given that the correlations between RCADS-P scores and externalizing symptoms were significantly lower than that of internalizing symptoms. Lastly, the RCADS-P scores

**Table 6** Parent-report RCADS means and standard deviations of subjects with and without KSADS diagnoses

Scale	K-SADS diagnosis	M	SD	T	N	F	p	Partial-eta squared
RCADS	MDD present	13.26	5.95	57.35	65	44.08	<0.001	0.09
MDD	MDD absent	8.08	5.76	48.78	362			
ASI-4 MDD	MDD present	13.07	4.45	58.22	54	46.78	<0.001	0.14
	MDD absent	8.78	4.12	48.63	248			
RCADS GAD	GAD present	7.78	4.51	56.07	80	36.57	<0.001	0.08
	GAD absent	4.79	3.82	48.93	348			
SCARED	GAD present	8.09	4.29	54.86	79	23.51	<0.001	0.05
GAD	GAD absent	5.53	4.22	48.89	339			
RCADS SAD	SAD present	8.09	4.75	55.31	57	18.68	<0.001	0.04
	SAD absent	5.26	4.57	49.27	370			
SCARED	SAD present	7.51	3.84	53.30	57	6.30	0.012	0.02
SAD	SAD absent	5.34	6.34	49.67	360			
RCADS PD	PD present	8.39	6.34	58.44	23	19.72	<0.001	0.04
	PD absent	3.97	4.53	49.53	405			
SCARED PD	PD present	7.65	5.79	55.62	23	6.93	0.009	0.02
	PD absent	4.78	5.05	49.94	394			
RCADS SoP	SoP present	10.78	5.37	52.22	69	3.79	0.052	0.01
	SoP absent	9.25	6.10	49.59	359			
SCARED SoP	SoP present	7.51	4.00	52.71	68	5.81	0.016	0.01
	SoP absent	6.27	3.90	49.54	350			
RCADS OCD	OCD present	6.77	4.60	55.25	48	16.95	<0.001	0.04
	OCD absent	4.33	3.76	49.34	380			

*MDD* Major Depressive Disorder, *GAD* Generalized Anxiety Disorder, *SAD* Separation Anxiety Disorder, *PD* Panic Disorder, *SoP* Social Phobia, *OCD* Obsessive–Compulsive Disorder



discriminated significantly between target and non-target diagnostic groups. These results are consistent with previous research, which demonstrated support for the six-factor model, good reliability, and acceptable convergent, divergent, factorial and discriminative validity for the English and Spanish versions of the RCADS-P [24–27].

The findings of the present study confirmed the six-factor structure in the Turkish population and provided further support for the previous studies of the RCADS-P [24, 27]. Three items in this study showed relatively low item-total correlation values (0.27–0.31). One of them was item 15 (“My child has problems with his/her appetite”), which loaded on the MDD factor. The others were item 18 (“My child has trouble going to school in the mornings because of feeling nervous or afraid”) and item 33 (“My child is afraid of being in crowded places, like shopping centers, the movies, buses, busy playgrounds”), which loaded on the SAD factor. Low factor loadings for items 18 and 33 were reported in the school-based standardization study of the RCADS-P based on US youth [25] but not in the clinic-based sample based on US youth [24]. A somewhat low factor loading was also reported for item 18 in the Spanish RCADS-P study [27]. In this study, factor loadings of items 18 and 33 appeared adequate (i.e., 0.58 and 0.69). However, item 15 had a relatively low loading (i.e., 0.31). Therefore, continued use of these items should be examined more carefully in future studies.

Regarding the convergent validity of the Turkish RCADS-P, except for the SoP scale, all anxiety-related scales showed large correlations with the corresponding SCARED-P scales. We were not able to directly assess the convergent validity of the OCD subscale due to a lack of a separate measure for OCD. However, moderate to large correlations between the RCADS-P OCD scale and the SCARED total, SDQ emotional problems and SDQ total scores supported the convergent validity of the OCD subscale, given the known associations of OCD with anxiety and internalizing problems [63]. In addition, the RCADS-P MDD scale also showed a strong correlation with the ASI-4 MDD scale, supporting the convergent validity of the RCADS-P depression scale.

The parent–child agreement in the present study was higher than expected. Previous studies reported low to moderate agreement on emotional and behavioral problems between children and their parents. For example, a recent meta-analysis reported mean correlation coefficient of 0.25 for internalizing problems [59]. Additionally, statistically significant but low to moderate levels of agreement was reported (between 0.14 and 0.40 for subscales) in studies using the RCADS-P in US samples [24, 25]. In this study, parent–child agreement ranged from 0.39 to 0.60, and the highest correlation was detected for SAD, which was consistent with the previous RCADS studies.

The Turkish RCADS-P significantly discriminated between youth with and without a relevant diagnosis (except for SoP). However, effect sizes were lower (moderate for MDD and GAD and small for SAD, OCD and PD; [64] compared to previous studies. In the Spanish RCADS-P study [27], the instrument’s discriminative validity was evaluated with reference to having the parent-report specific top problem (e.g., GAD, MDD) or not. They found significant discriminative validity for all subscales except PD, with associated effect sizes being high for MDD and moderate for the SAD and GAD scales. Ebessutani and colleagues (2010) used a parent-report semi-structured diagnostic interview (Children’s Interview for Psychiatric Syndromes, Parent Version) to examine the discriminating properties of the RCADS-P with respect to classifying youth with and without MDD and anxiety diagnoses. Divergent validity was demonstrated for all subscales with very high effect sizes. Differences between the present findings and that of the previous RCADS-P studies may lie in the method of discriminating cases from non-cases (i.e., the clinical diagnostic process). In the present study, diagnostic assessments were based on the administration of the K-SADS, which involved the evaluation of the relevant data provided by both the child and parents together. In such an approach, each informant is viewed as providing a distinct, but nonetheless insightful, perspective on the youth’s psychopathology [65]. The RCADS-P, on the other hand, provides only parent-report information, and thus may not have discriminated some cases that were identified using a semi-structured interview involving both the child and parent. Reliability and validity values of the Turkish RCADS-P were found lower than those of the original scale [24], which may again be related to the clinical diagnostic process. In addition, cut points were somewhat higher for some subscales (e.g., MDD, SAD) as expected.

Our findings regarding the association of gender with levels of anxiety and depression are generally in line with that of previous research [4, 66]. Specifically, girls reported significantly higher scores than boys on anxiety [13, 15] and depressive disorders [14, 15]. Further, in the present study, symptoms of depression and PD increased with age, whereas symptoms of SAD decreased with age. Similar patterns were observed in previous studies [67, 68]. Findings concerning age and gender relations in the present study provide additional evidence for the construct validity of the Turkish RCADS-P.

Despite the strength of the current study, there are limitations worth noting. First, this study was conducted in a clinical population, thereby limiting our understanding of the psychometric properties of this measure in non-referred youth samples (such as students in school settings). Future studies using additional (non-clinical) samples may inform the use of the Turkish RCADS-P as a screening measure

in more diverse settings. Secondly, the convergent validity analyses of the OCD subscale were not tested using an OCD construct-specific scale. The availability of more construct-specific external criterion measures would have increased the specificity of these analyses. In addition, using parent-report measures for investigating the convergent validity of the RCADS-P might be considered as a limitation, as shared method variance might have played some role. However, significant, and moderate to large parent–child agreement correlation coefficients supported the convergent validity of the scale. Thirdly, inter-rater reliability of the semi-structured K-SADS interviews were not conducted at the four different centers. Last, Cronbach alpha values of many SDQ-P scores were low (<0.70). However, low internal consistency coefficients have also been observed in previous studies (e.g., 41).

## Summary

The revised child anxiety and depression scale- parent version (RCADS-P) is a parent-report questionnaire that assesses dimensions of DSM-based anxiety and depressive disorders in children and adolescents. Previous studies demonstrated strong psychometric properties of the English and Spanish versions. The aim of this study is to examine the psychometric properties of the Turkish version of the RCADS-P in a clinical sample. The study sample consisted of 483 children and adolescents (age range 8–17 years, mean 12.25 SD=2.69) recruited from four outpatient Psychiatry Clinics. The child and parent versions of the RCADS, parent versions of the Screen for Child Anxiety Related Emotional Disorders, the Strengths and Difficulties Questionnaire and Adolescent Symptom Inventory-Depression Scale were administered. All children underwent the Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present Version (K-SADS-P) to identify current psychiatric diagnoses. The RCADS-P demonstrated high internal consistency and test–retest reliability, and good convergent, divergent, and discriminant validity. Confirmatory factor analysis supported a six-factor model consistent with the measure's six subscales: separation anxiety disorder, social phobia, generalized anxiety disorder, panic disorder, obsessive–compulsive disorder, and major depressive disorder. The present findings support the Turkish RCADS-P as a practical parent-report tool, able to concurrently assess three prevalent and highly comorbid conditions (anxiety, depression, and OCD) in accordance with DSM-IV nosology. Since parent reports are integral to youth assessments, the Turkish RCADS-P can be used to complement the well-supported child-report version for more comprehensive and thorough assessment.

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