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Psychometric Properties of the Conners-3 Parent Short Form and Self-Report in Farsi-Speaking Adolescents with ADHD

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Abstract

Background

Accurate ADHD assessment relies on psychometrically sound, culturally adapted instruments, yet the Conners 3rd Parent Short Form and Self-Report remain unvalidated in Iranian adolescents. This study evaluated their psychometric properties in an Iranian clinical adolescent sample.

Methods

In this cross-sectional study, 152 adolescents aged 12–18 years, including 60 with clinically diagnosed ADHD and 92 typically developing peers, completed the Conners 3 Parent and Self-Report forms alongside the ADHD Rating Scale-IV. Internal consistency, test-retest reliability, concurrent validity, discriminant validity, and ROC analyses were performed.

Results

Internal consistency was acceptable for the Parent form (Cronbach's alpha = 0.71–0.74; 0.87 overall) but lower for the Self-Report form, especially among TD adolescents (alpha = 0.58–0.67; 0.75 overall). Test-retest correlations were moderate for Total scores (Parent r = 0.58; Self-Report r = 0.45). Concurrent validity with matching ADHD Rating Scale-IV subscales was strong for the Parent form (rho = 0.65–0.83) and moderate for Self-Report (rho = 0.55–0.68). All subscales and Total scores differentiated ADHD from TD groups ($p < .001$). Diagnostic accuracy was excellent for the Parent Total score (AUC = 0.95; sensitivity 86.7%, specificity 90.2%) and good for the Self-Report Total score (AUC = 0.89; sensitivity 80.0%, specificity 87.0%), with Inattention subscales performing comparably.

Conclusions

The Persian Conners 3 Parent Short Form shows strong reliability, validity, and diagnostic accuracy, supporting its use for adolescent ADHD assessment in Iran. The Self-Report form shows adequate validity but weaker internal consistency, best used as a complementary rather than stand-alone measure.

1. Introduction

Attention-deficit/hyperactivity disorder (ADHD) is one of the most common and well-studied neurodevelopmental disorders, characterized by persistent patterns of inattention, hyperactivity, and impulsivity that interfere with functioning and development (1, 2). The global prevalence of ADHD in children and adolescents has been estimated at approximately 7.6% in children under 12 and 5.6% in adolescents aged 12–18 years, based on a recent systematic review and meta-analysis of 61 cross-

sectional studies (3). An umbrella review of meta-analyses further confirmed this range, reporting an overall global prevalence of 8.0% with males twice as likely to be affected as females (4). In Iran, a national epidemiological study conducted across five major cities found ADHD to be the most prevalent psychiatric disorder in boys (5.03%), with an overall combined prevalence of approximately 3.97% in school-age children (5).

ADHD is associated with significant impairment across academic, social, and occupational domains. Without timely identification and intervention, individuals with ADHD face elevated risks of academic underachievement, relationship difficulties, comorbid psychiatric disorders, substance misuse, and persistence of impairment into adolescence and adulthood for many affected individuals (6, 7).

Psychometrically sound rating scales are essential to clinical practice and research in ADHD because accurate case identification and dimensional assessment are critical for treatment planning and outcome monitoring. Therefore, the accurate and early identification of ADHD necessitates the use of standardized, reliable, and culturally appropriate psychometric instruments. The Conners 3rd Edition (Conners 3) is a widely used multi-informant assessment system designed for children and adolescents aged 6 to 18 years. Its parent and self-report forms assess core ADHD symptoms as well as related domains relevant to clinical formulation, including learning problems, executive functioning, aggression/defiance, and interpersonal difficulties (8, 9). Instruments of this type are particularly valuable in ADHD because symptom expression varies across contexts and informants, and adolescent self-report can complement parent report by capturing the young person’s perspective on impairment and associated difficulties (10).

However, the usefulness of any rating scale depends on evidence that it performs adequately in the language, age group, and cultural context in which it is applied (11). Cross-cultural psychometric evaluation is especially important for ADHD measures because patterns of symptom reporting and interpretation of questionnaire items may differ across populations (12). Research has demonstrated that cultural context influences the expression of ADHD symptoms, parental reporting styles, and the performance of assessment tools (13, 14). The original Conners-3 was standardized in a North American sample of 1,951 children and adolescents aged 6–18 years, yielding Cronbach's alpha values ranging from 0.85 to 0.97 across subscales (8). Subsequent validations have been conducted in Australia (15), Spain (16), Sweden (14), Mexico (17), and among Turkish immigrant populations in Germany (13).

Evidence supporting use of the Conners 3 in Persian-speaking adolescents remains limited, particularly for combined use of the parent and self-report forms. Mehrzad and colleagues validated the Conners-3 Parent Short Form in children aged 6–12 years, confirming acceptable reliability and validity for this pediatric age group (18). However, no published study had examined the Conners-3's psychometric properties in Iranian adolescents (12–18 years), a developmental period during which ADHD presentation changes significantly, as hyperactivity declines while inattention and impulsivity often persist or intensify (19, 20), or evaluated the Self-Report form in Iranian youth at any age.

The present study aimed to address these gaps by evaluating the psychometric properties of the Persian Conners 3 Parent Short Form and Conners 3 Self-Report in an Iranian clinical sample of adolescents with ADHD, compared to typically developing peers. Specifically, the study evaluated internal consistency, test-retest reliability, concurrent validity, discriminant validity, and diagnostic performance, with the aim of determining whether these instruments provide valid and reliable scores for use in adolescent ADHD clinical assessment in Iran.

2. Method

2.1 Study Design and Setting

This was a cross-sectional psychometric validation study conducted at the outpatient clinics of Roozbeh Hospital and a subspecialty child and adolescent psychiatry clinic affiliated with Tehran University of Medical Sciences, Tehran, Iran, in 2024 (Ethics code: IR.TUMS.MEDICINE.REC.1403.321).

2.2 Participants

A total number of 152 adolescents aged 12–18 years was recruited, comprising 60 adolescents clinically diagnosed with ADHD (ADHD group) and 92 typically developing controls (TD group). The ADHD group consisted of consecutive attendees at the hospital outpatient clinic. Diagnoses were made by a subspecialty child and adolescent psychiatrist and confirmed using the Kiddie Schedule for Affective Disorders and Schizophrenia – Present and Lifetime Version for DSM-5 (K-SADS-PL-5), administered by a trained child and adolescent psychiatry fellow. Participants were excluded if they had a comorbid major psychiatric disorder (e.g., psychosis, major depressive disorder, bipolar disorder) or intellectual disability that could confound symptom reporting.

The TD group was recruited from five public middle and high schools in Districts 10 and 11 of Tehran. Students were eligible if they had no known history of a major psychiatric disorder based on interviewing with the parents and adolescents and were willing to participate. Those with SDQ scores above the clinical cutoff point (13 points) were excluded from the TD group. No participants dropped out from either group during the study. Written informed consent was obtained from parents/guardians, and adolescents provided assent. Participation was voluntary, and withdrawal did not affect clinical care.

2.3 Measures

Conners-3 Parent Short Form (Conners-3-P)

A 43-item, parent-rated questionnaire assessing adolescent behavior over the past month on a 4-point scale (0 = never/rarely to 3 = often/always). Subscales include inattention, hyperactivity/impulsivity, learning problems, executive functioning, aggression, peer relations, and positive/negative impression indices, with higher scores indicating greater symptom severity (18).

Conners-3 Self-Report (Conners-3-SR)

A 41-item, self-administered version for adolescents aged 8–18 years, using the same 4-point scale. Subscales include inattention, hyperactivity/impulsivity, learning problems, aggression, family relations, and positive/negative impression indices (8).

ADHD Rating Scale-IV (ADHD-RS)

An 18-item scale assessing inattention and hyperactivity/impulsivity over the past six months in children and adolescents aged 5–18 years (21), with acceptable reliability and validity (22). The Persian version showed Cronbach's alphas of 0.81 (inattention), 0.85 (hyperactivity/impulsivity), and 0.83 (overall) (23). This scale served as the criterion for concurrent validity.

Kiddie Schedule for Affective Disorders and Schizophrenia: present and lifetime versions of the DSM-5 (K-SADS-PL_5): A semi-structured DSM-5 diagnostic interview evaluating 32 psychiatric diagnoses, administered to adolescents and parents/guardians. The Farsi translation demonstrated good to excellent sensitivity, specificity, and predictive values (24, 25).

Strengths and Difficulties Questionnaire (SDQ)

A 25-item behavioral screening tool with parent and self-report versions, comprising five subscales (emotional symptoms, conduct problems, hyperactivity/inattention, peer problems, prosocial behavior) (26). The Persian parent version has a Cronbach's alpha of 0.73, with cutoffs of 0–13 (normal), 14–16 (borderline), and ≥ 17 (clinical concern) (27, 28). SDQ scores were used for concurrent validation with the Conners-3 and to exclude psychiatric disorders in the TD group. The SDQ is an open-access instrument freely available for non-commercial academic use, and the validated Farsi version employed in this study is publicly accessible and does not require additional licensing.

2.4 Procedure

After obtaining informed consent, participants in the ADHD group were assessed via K-SADS-PL-5 to confirm diagnosis and rule out major comorbidities. Both ADHD and TD groups completed the Conners-3-P (via parents), Conners-3-SR, ADHD-RS (via parents), SDQ parent form, and SDQ self-report simultaneously during the same visit. For test-retest reliability, 21 participants from the ADHD group and their parents were asked to re-complete the Conners-3-P and Conners-3-SR after 3–4 weeks without clinical changes in the interval.

2.5 Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, NY). Internal consistency was assessed using Cronbach's alpha and the Guttman split-half coefficient, and test-retest reliability using the intraclass correlation coefficient (two-way mixed model). Given normality violations confirmed by the Shapiro-Wilk test, concurrent validity between Conners-3 subscales and the ADHD-RS was examined using Spearman correlation within a Multi-Trait Multi-Method matrix framework (29), and discriminant validity using the Mann-Whitney U test to compare ADHD and TD groups across all

subscales. ROC curve analysis determined the area under the curve (AUC) and optimal cut-off scores balancing sensitivity and specificity (Youden's index). Statistical significance was set at $p < 0.05$.

3. Results

3.1 Sample Characteristics

The final sample consisted of 152 adolescents: 60 with ADHD (mean age: 14.53 ± 1.86 years) and 92 TD group (mean age: 15.29 ± 1.63 years). Males constituted 65.8% (n = 100) and females 34.2% (n = 52) of the total sample. No participants withdrew from either group.

3.2 Discriminant Validity

Normality of subscale distributions was assessed using the Shapiro-Wilk test. Most Conners 3-Parent and Conners 3-Self-Report subscales, particularly within the TD group, deviated significantly from a normal distribution ($p < .05$), indicating that parametric assumptions were not met. Therefore, between-group comparisons (ADHD vs. TD) were conducted using the non-parametric Mann-Whitney U test, and results are reported as mean rank and p-value for consistency across all subscales. Across both forms, all clinical/symptom subscales and Total scores differentiated ADHD from TD groups significantly ($p < .001$), supporting known-groups (discriminant) validity. The Positive Impression and Negative Impression validity scales did not significantly differ between groups on either form (all $p > .05$) (Table 1).

Table 1
Group Comparison (ADHD vs. TD) Across Conners 3-Parent and Conners 3-Self-Report Subscales

Subscale	Informant	Mean Rank (ADHD, n = 60)	Mean Rank (TD, n = 92)	U	Z	p-value
Inattention	Parent	118.15	49.34	261.000	−9.446	< .001
	Self-Report	113.93	52.09	514.500	−8.490	< .001
Hyperactivity/Impulsivity	Parent	110.53	54.31	718.500	−7.736	< .001
	Self-Report	105.07	57.87	1046.000	−6.485	< .001
Learning Problems	Parent	113.38	52.45	547.500	−8.426	< .001
	Self-Report	105.52	57.58	1019.000	−6.637	< .001
Executive Functioning	Parent	113.68	52.26	529.500	−8.451	< .001
Aggression	Parent	104.03	58.55	1108.500	−6.370	< .001
	Self-Report	98.93	61.87	1414.000	−5.215	< .001
Peer Relations	Parent	110.67	54.22	710.000	−7.849	< .001
Family Relations	Self-Report	100.90	60.59	1296.000	−5.552	< .001
Positive Impression	Parent	80.88	73.64	2497.000	−0.998	.318
	Self-Report	81.47	73.26	2462.000	−1.133	.257
Negative Impression	Parent	88.48	68.69	2041.500	−2.740	.006
	Self-Report	74.03	78.11	2611.500	−0.564	.573
Total Score	**Parent**	**118.23**	**49.29**	**256.500**	**−9.439**	**< .001**
	Self-Report	**111.93**	**53.40**	**634.500**	**−8.016**	**< .001**

Across both the SDQ and ADHD-RS, the ADHD group scored significantly higher on all pathological subscales ($p < .001$), providing additional criterion-related support.

3.3 Concurrent Validity

Concurrent validity of the Conners 3 subscale raw scores was examined against the ADHD Rating Scale (ADHD-RS) Inattention, Hyperactivity/Impulsivity, and Total scores using Spearman's ρ. For the parent-

report form, convergent correlations between matching constructs were strong: Conners 3-Parent Inattention correlated with ADHD-RS Inattention (ρ = 0.829, p < .001) and ADHD-RS Total (ρ = 0.832, p < .001), while Conners 3-Parent Hyperactivity/Impulsivity correlated with ADHD-RS Hyperactivity/Impulsivity (ρ = 0.742, p < .001) and ADHD-RS Total (ρ = 0.716, p < .001). Executive Functioning and Learning Problems also showed strong associations with ADHD-RS scores (ρ = 0.662–0.804, p < .001), reflecting shared attention-related content (Table 2).

Table 2
Concurrent validity: Conners 3-Parent with ADHD-RS

Conners 3-Parent Subscale	ADHD-RS Inattention	ADHD-RS Hyperactivity	ADHD-RS Total
Inattention	**.829****	.777**	.832**
Hyperactivity/Impulsivity	.659**	**.742****	.716**
Learning Problems	.769**	.662**	.747**
Executive Functioning	.804**	.699**	.789**
Aggression	.692**	.654**	.704**
Peer Relations	.700**	.662**	.715**
Positive Impression	.166*	.074	.132
Negative Impression	.357**	.276**	.337**
Parent-Report Conners 3 Total	.871**	.816**	.880**

Note. Bold = matching-construct (convergent) correlation. *p < .05, **p < .01 (2-tailed).

For the self-report form, convergent correlations were more moderate: Conners 3-SR Inattention correlated with ADHD-RS Inattention (ρ = 0.656, p < .001) and ADHD-RS Total (ρ = 0.681, p < .001), and Conners 3-SR Hyperactivity/Impulsivity correlated with ADHD-RS Hyperactivity/Impulsivity (ρ = 0.551, p < .001) and ADHD-RS Total (ρ = 0.587, p < .001). Total scale scores correlated strongly with ADHD-RS Total (Parent: ρ = 0.880; Self-report: ρ = 0.623, both p < .001), and parent-reported correlations were consistently higher than self-reported correlations, consistent with typical informant discrepancy in ADHD symptom rating scales

(Table 3).

Table 3
Concurrent validity: Conners 3-Self-Report with ADHD-RS

Conners 3-SR Subscale	ADHD-RS Inattention	ADHD-RS Hyperactivity	ADHD-RS Total
Inattention	**.656****	.644**	.681**
Hyperactivity/Impulsivity	.551**	**.573****	.587**
Learning Problems	.578**	.509**	.572**
Aggression	.465**	.479**	.493**
Family Relations	.469**	.407**	.466**
Positive Impression	−.051	−.022	−.036
Negative Impression	−.196*	−.165*	−.195*
Self-Report Conners 3 Total	.606**	.583**	.623**

Note. Bold = matching-construct (convergent) correlation. *p < .05, **p < .01 (2-tailed).

3.4 Internal Consistency Reliability

Internal consistency of the Conners 3-Parent (8 subscales) and Conners 3-Self-Report (7 subscales) forms was evaluated using Cronbach's alpha for the full sample and separately for the ADHD and TD groups. Split-half reliability (Spearman-Brown and Guttman coefficients) was additionally examined within each diagnostic group. The Conners 3-Parent form showed acceptable internal consistency in both groups (α = 0.713 [ADHD], 0.743 [TD]). However, alpha values were somewhat lower for both groups in the Conners 3-Self-Report (α = 0.668 [ADHD], 0.578 [TD]) (Table 4). Split-half reliability was moderate for the Conners 3-Parent form in both groups (Spearman-Brown = 0.691 [ADHD], 0.670 [TD]). For the Conners 3-Self-Report form, split-half reliability was weaker, particularly in the TD group (Spearman-Brown = 0.094), reflecting a very low correlation between the two halves of the scale (r = 0.049) and suggesting a possible floor effect, given the low symptom endorsement typical of a non-clinical sample. The ADHD group showed a moderate split-half correlation for the Self-Report form (Spearman-Brown = 0.521) (Table 5).

Table 4
Internal Consistency (Cronbach's α) of Conners 3-Parent and Conners 3-Self-Report Forms

Form	Sample	N	Cronbach's α	Standardized α
Conners 3-Parent	Full Sample	152	.867	—
	ADHD	60	.713	—
	TD	92	.743	—
Conners 3-Self-Report	Full Sample	152	.751	.730
	ADHD	60	.668	.659
	TD	92	.578	.581

Table 5
Split-Half Reliability of Conners 3-Parent and Conners 3-Self-Report Forms, by Group

Form	Group	Part 1 α (n items)	Part 2 α (n items)	Correlation Between Forms	Spearman-Brown Coefficient	Guttman Split-Half
Conners 3-Parent	ADHD	.611 (4)	.515 (4)	.528	.691	.680
	TD	.715 (4)	.507 (4)	.504	.670	.645
Conners 3-Self-Report	ADHD	.672 (4)	.386 (3)	.353	.521	.473
	TD	.767 (4)	.394 (3)	.049	.094	.088

3.5 ROC Curve Analysis and Optimal Cut-Off Scores

ROC analyses assessed the diagnostic accuracy of Conners 3-P and Conners 3-SR total and subscale raw scores in distinguishing ADHD from TD peers. The Conners 3-P Total score showed excellent discrimination (AUC = 0.95; sensitivity 86.7%, specificity 90.2%), and the Inattention score performed comparably (AUC = 0.95; sensitivity 83.3%, specificity 90.2%), indicating that inattentive symptoms alone accounted for nearly all the discriminative power of the parent-report total score. As expected, the parent-report validity indices showed poor utility as discriminators: Negative Impression was weak (AUC = 0.63) and Positive Impression performed at chance level (AUC = 0.55), consistent with their role as impression-management rather than symptom measures.

The Conners 3-SR Total score similarly showed good discrimination (AUC = 0.89; sensitivity 80.0%, specificity 87.0%), with Inattention again the strongest single subscale discriminator (AUC = 0.91; sensitivity 81.7%, specificity 88.0%). As with the parent-report form, the self-report validity scales showed poor-to-no discrimination (Positive Impression AUC = 0.55; Negative Impression AUC = 0.47,

essentially non-informative), supporting the specificity of symptom scales relative to validity indices across informants. Full diagnostic indices are summarized in Fig. 1, 2, and Table 6.

Table 6
ROC Analysis of Conners 3 Subscales: AUC and Optimal Cutoff Diagnostic Indices by Informant

Conners 3 Subscale	Informant	AUC	Optimal Cutoff (≥)	Sensitivity	Specificity
Inattention	Parent	.953	8	.833	.902
	Self	.907	8	.817	.880
Hyperactivity/Impulsivity	Parent	.870	5	.833	.804
	Self	.811	7	.650	.870
Learning Problems	Parent	.901	3	.867	.804
	Self	.815	4	.667	.815
Executive Functioning	Parent	.904	5	.883	.804
	Self	—	—	—	—
Aggression	Parent	.799	3	.617	.891
	Self	.744	2	.717	.728
Peer Relations / Family Relations	Parent	.871	4	.783	.848
	Self	.765	6	.733	.707
Positive Impression	Parent	.548	7	.767	.359
	Self	.554	6	.683	.359
Negative Impression	Parent	.630	7	.650	.663
	Self	.473	—	—	—
Total Score	**Parent**	**.954**	**45**	**.867**	**.902**
	Self	**.885**	**42**	**.800**	**.870**

Note. AUC = area under the curve. Cutoffs derived by maximizing the Youden index (sensitivity + specificity − 1) from SPSS coordinate tables; reported cutoff is the lowest raw score classified as positive. Dashes indicate the scale is not available for that informant (Executive Functioning has no Conners 3-SR equivalent) or the AUC did not exceed chance level, so no meaningful cutoff is reported (Negative Impression, Self-report; AUC = .473).

3.6 Test-Retest Reliability

Test-retest reliability, evaluated using Pearson correlations in 21 adolescents with ADHD and their parents over a 3–4-week interval, showed moderate stability for the Total score on both the Conners 3-

Parent (r = 0.578, p < .05) and Conners 3-Self-Report forms (r = 0.448, p < .05). Most subscales showed moderate-to-strong, significant correlations (r = 0.59–0.77, p < .05), ranging from Conners 3-P Peer Relations (r = 0.770, p < .001) to Conners 3-SR Family Relations (r = 0.459, p = .036). Three subscales did not reach significance: Conners 3-P Inattention (r = 0.360, p = .109) and the Conners 3-SR Positive and Negative Impression scales (r = 0.415, p = .061; r = 0.172, p = .457), though wide confidence intervals reflect the small retest sample. The validity indices showed weaker stability than the symptom subscales overall, possibly reflecting sensitivity to situational or mood-related factors at the time of rating (Table 7).

Table 7
Test–Retest Reliability of Conners 3 Subscales

Subscale	**Informant**	**r (95% CI)**	**p-value**
Inattention	Parent	.360 (− .085, .685)	.109
	Self-Report	.631 (.274, .835)	.002
Hyperactivity/Impulsivity	Parent	.639 (.286, .839)	.002
	Self-Report	.628 (.269, .834)	.002
Learning Problems	Parent	.593 (.217, .816)	.005
	Self-Report	.676 (.345, .858)	.001
Executive Functioning	Parent	.679 (.350, .859)	.001
Aggression	Parent	.631 (.274, .835)	.002
	Self-Report	.726 (.429, .882)	< .001
Peer Relations	Parent	.770 (.507, .902)	< .001
Family Relations	Self-Report	.459 (.034, .743)	.036
Positive Impression	Parent	.596 (.221, .817)	.004
	Self-Report	.415 (− .021, .718)	.061
Negative Impression	Parent	.502 (.090, .767)	.021
	Self-Report	.172 (− .280, .562)	.457
Total Score	**Parent**	**.578 (.195, .808)**	**.006**
	Self-Report	**.448 (.020, .737)**	**.042**

4. Discussion

This study provides the first psychometric evaluation of the Conners 3 Parent Short Form and Self-Report form in a Persian-speaking adolescent sample, addressing a gap noted in the introduction: the

Parent form had previously been validated only in Iranian children aged 6–12 (18), with no prior data on its performance in adolescents or on the Self-Report form in any Iranian age group. Both forms reliably distinguished adolescents with ADHD from typically developing peers and correlated meaningfully with an independent, previously validated Persian ADHD measure, supporting their discriminant and concurrent validity. However, reliability findings, particularly for the Self-Report form and for several subscales on retest, were less consistent, indicating that the two forms are not equally ready for the same clinical applications.

All subscales and both Total scores differentiated the ADHD and TD groups with large effect sizes ($p < .001$), and ROC analyses converged on the same conclusion: the Total and Inattention scores were the strongest discriminators on both forms, with sensitivity and specificity in the 80–90% range at optimal cutoffs. That Inattention alone performed nearly as well as the full Total score is consistent with developmental literature indicating that inattentive symptoms, rather than hyperactivity, tend to dominate the clinical picture in adolescence (19, 20), suggesting these items carry most of the between-group signal in this age range. Hyperactivity/impulsivity, aggression, and peer/family relations items remained significant discriminators but appeared comparatively less efficient once inattention was considered. As expected, the Positive and Negative Impression validity scales did not differentiate the groups on either form, except for parent-rated Negative Impression. This isolated finding is difficult to interpret with confidence, it may reflect genuine caregiver burden rather than response distortion (30–32), but given its weak AUC (0.63) and the absence of an equivalent effect for parent Positive Impression or either self-report validity scale, it should be treated as exploratory rather than firm evidence of informant bias.

Concurrent validity was well-established. Strong, significant correlations between the Conners-3's core inattention and hyperactivity subscales and the corresponding ADHD-RS subscales

($r = 0.65–0.83$) are comparable to findings reported in Mexico (17) and Australia (15). Convergent correlations between matching Conners 3 and ADHD-RS constructs were strong for the parent form and moderate for the self-report form, with parent-report correlations consistently exceeding self-report correlations across every matched construct. This pattern replicates the well-documented tendency for parent and adolescent ratings of the same underlying symptoms to diverge more than same-informant ratings across instruments (33–35). This is consistent with the broader literature reviewed in the introduction on cultural and informant effects on ADHD symptom reporting (13, 14). Because both the Conners 3-P and the ADHD-RS were completed by the same parent at the same visit, shared method variance likely inflated the parent-report correlations to some degree; the comparatively lower but still significant self-report correlations, obtained from a different informant, arguably provide a more conservative and perhaps more meaningful estimate of the scales' true convergent validity.

Internal consistency for the Parent form was acceptable across both diagnostic groups ($\alpha = 0.71–0.74$), though numerically lower than the North American standardization sample ($\alpha = 0.85–0.97$) (8) and Swedish validation study (0.81–0.90). In the full sample, the Conners 3-P alpha (0.867) closely aligned with the Spanish validation ($\alpha = 0.71–0.96$) (16) and the Southeast Asian study by Gomez et al. (2020; α

= 0.66–0.99) (15). Internal consistency was somewhat lower for the Conners-3-SR overall (α = 0.751), consistent with cross-cultural studies showing greater variability in adolescent self-report measures due to developmental factors, insight limitations, and contextual influences on self-perception (36). This reduced reliability was considerably more pronounced within the TD group (α = 0.58; split-half correlation = 0.049), a near-zero value suggesting a floor effect (37): typically developing adolescents likely endorsed few symptoms, restricting variance and attenuating inter-item correlations rather than reflecting poor item coherence.

Test-retest reliability was moderate for both Total scores and most subscales, but the Parent Inattention subscale, despite being the strongest discriminator and diagnostic indicator overall, did not reach significance on retest, nor did either self-report validity scale. Given the small retest subsample and correspondingly wide confidence intervals, these null results likely reflect limited statistical power rather than genuine instability, and should not be interpreted as evidence against the Inattention subscale's validity established in the discriminant, concurrent, and ROC analyses. This inconsistency is itself notable: it illustrates that a scale can show excellent group discrimination and criterion validity in a single assessment while its short-term temporal stability remains unconfirmed, underscoring that these are conceptually distinct psychometric properties that should not be assumed to move together.

Clinically, these findings support the use of the Persian Conners 3-P as a primary quantitative aid for ADHD assessment in Farsi language adolescents, with the Total score and, notably, the Inattention subscale alone offering strong discrimination that may be useful for efficient screening. The Self-Report form appears valuable for capturing the adolescent's own perspective and showed adequate discriminant and concurrent validity, but its lower internal consistency, especially among typically developing adolescents, suggests that it can be better used as a complementary source of information alongside parent report than as a stand-alone diagnostic instrument. Theoretically, the pattern of stronger parent-report than self-report associations, replicated here in a Farsi-speaking sample, extends cross-cultural evidence that informant discrepancy in ADHD rating scales is not specific to Western samples but appears to generalize across cultural and linguistic contexts

(14, 38, 39).

Several design features constrain interpretation. The ADHD and TD groups were recruited through different channels (hospital clinic versus public schools), which may have introduced systematic differences beyond ADHD status. Excluding adolescents with major psychiatric comorbidities, though methodologically necessary for a clean known-groups comparison, limits generalizability to the many adolescents with ADHD who present with comorbid conditions in routine practice. The small retest subsample limited precision for temporal stability estimates and likely contributed to the non-significant retest correlations noted above. Finally, the factor structure of the Conners 3 was not independently examined, so structural validity in this population remains untested.

Future work should prioritize: (1) a larger, adequately powered test-retest sample for more precise stability estimates of the Inattention subscale and validity indices, given that present null results likely

reflect underpowering rather than genuine instability; (2) confirmatory factor analysis of the Conners 3-P and Conners 3-SR to establish structural validity; (3) item-level analysis of the Self-Report form, particularly in non-clinical samples, to identify items driving its low internal consistency in the TD group; and (4) inclusion of adolescents with comorbid psychiatric conditions to evaluate performance in more clinically representative, heterogeneous samples.

5. Conclusion

This study provides the first psychometric evaluation of the Conners 3 Parent Short Form and Self-Report form in Iranian adolescents with ADHD, extending prior Iranian work that had been limited to children and to the parent form alone. Both forms significantly discriminated adolescents with ADHD from typically developing peers and converged meaningfully with an established Persian ADHD measure, with the Total score and Inattention subscale emerging as the strongest and most consistent indicators across analyses. Reliability was acceptable for the Parent form but more limited for the Self-Report form, particularly among typically developing adolescents, and short-term temporal stability could not be firmly established for several subscales given the small retest subsample. These findings support the Persian Conners 3-P as a psychometrically sound instrument for adolescent ADHD assessment in Iranian clinical settings, while indicating that the Self-Report form is best used as a complementary measure until its reliability is further established. More broadly, this study extends cross-cultural evidence that inattention-related content drives discrimination and that parent-report converges more strongly than self-report with independent criteria, generalizing beyond the North American and European samples in which the Conners 3 was originally validated.

Declarations

Ethics Approval and Consent to Participate

This study was approved by the Research Ethics Committee of Tehran University of Medical Sciences (code: IR .TUMS.MEDICINE.REC.1403.321) and conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from the legal guardians of all participants with assent obtained from the adolescents themselves.

Consent to Publication

Written informed consent for publication of anonymized, aggregated study data was obtained from the legal guardians of all participating adolescents, No individually identifiable data, images, or case details are included in this manuscript (Not Applicable). All the authors agree to submit this manuscript for consideration for publication in BMC Psychiatry Journal.

Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Author Contributions

AK: Investigation, Writing – Review & Editing

MT: Conceptualization, Supervision, Writing – Review & Editing

NF: Formal analysis, writing – original draft preparation, writing – review & editing

ZS: Methodology, Supervision, Writing – Review & Editing

NT: Formal analysis, writing – review & editing

AT: Formal analysis, writing – review & editing

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Figures

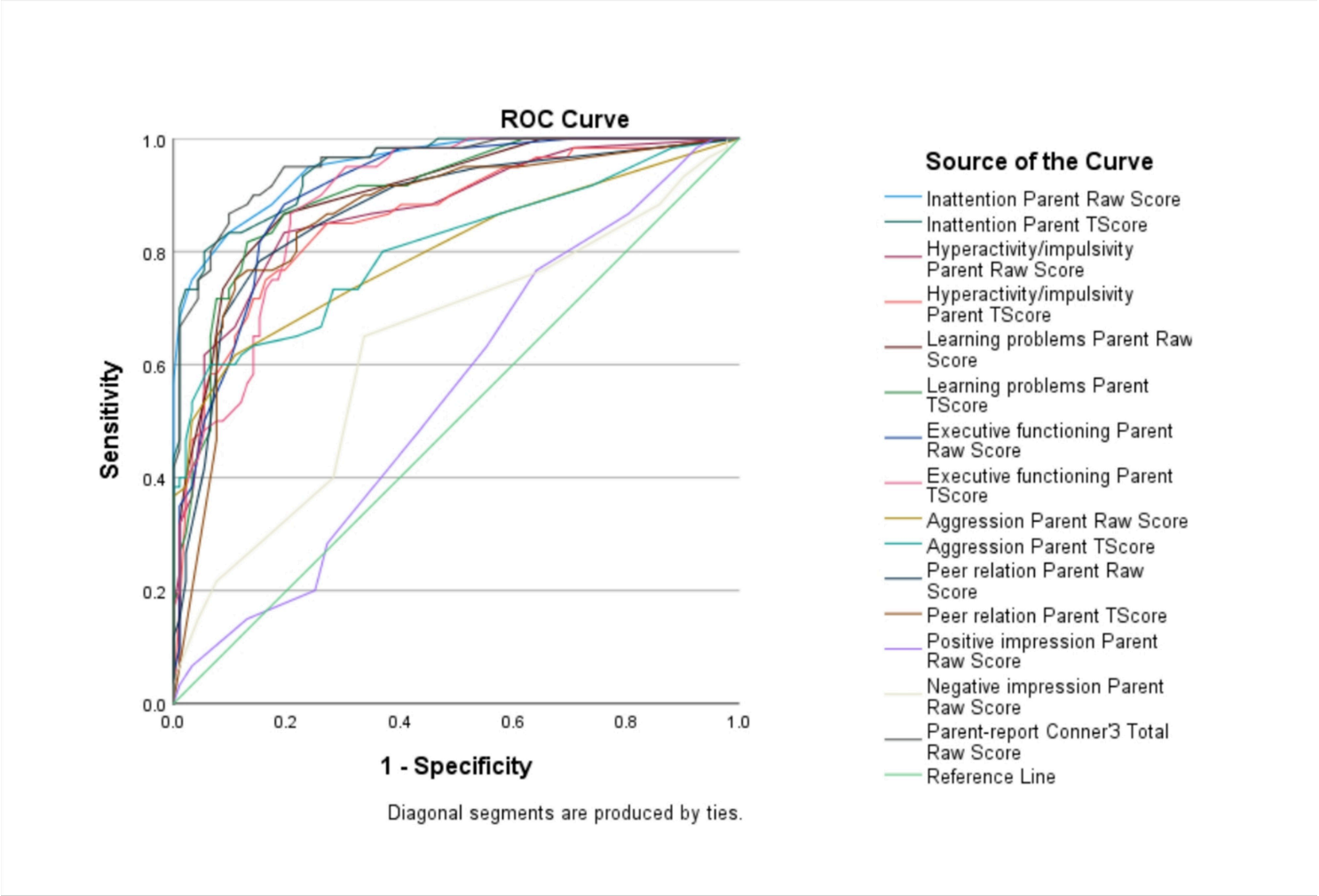


Figure 1

ROC Curve for Conners-3-P

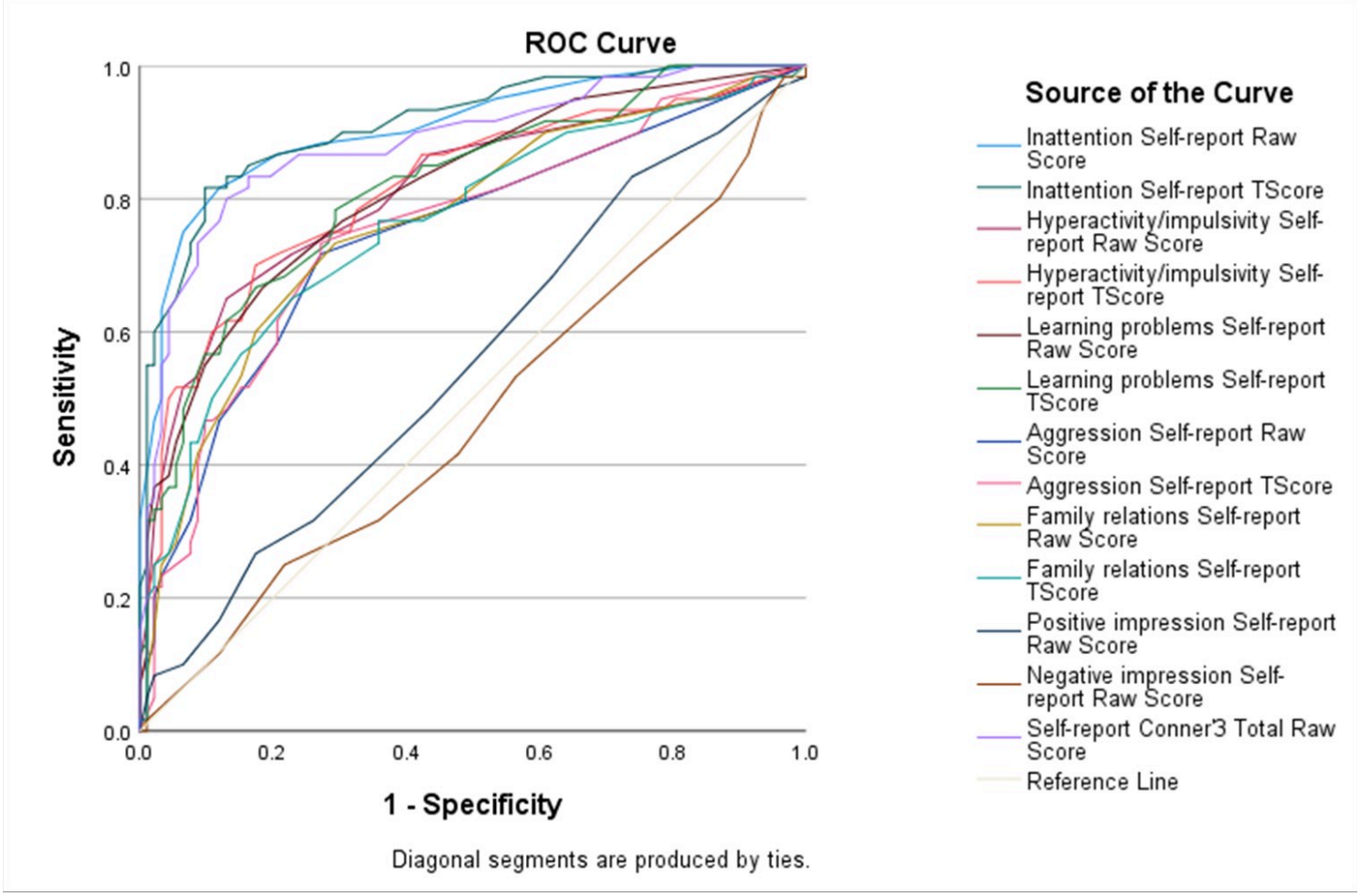


Figure 2

ROC Curve for Conners-3-SR