Adult ADHD Review Results

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Rating Scale and Diagnostic Interviews

Study	Diagnostic Measure	Sensitivity	Specificity	Diagnostic Accuracy	Notes
Vizgaitis et al. (2023)	CAARS-S:L (ADHD Index)	0.556	0.621	Weak accuracy	False positives most frequently diagnosed with anxiety disorders (33.3%) or depressive disorders (33.3%). All CAARS-S:L scales demonstrated very low PPV.
Vizgaitis et al. (2023)	CAARS-S:L (DSM-IV Inattentive Symptoms)	1	0.2	Low	Highest sensitivity and NPV among all CAARS-S:L scales
Vizgaitis et al. (2023)	CAARS-S:L (DSM-IV Hyperactive/Impulsive Symptoms)	0.63	0.653	Low	Better specificity than inattentive symptoms scale
Vizgaitis et al. (2023)	CAARS-S:L (DSM-IV ADHD Total Symptoms)	0.889	0.305	Low	High sensitivity but low specificity
Harrison et al. (2016)	CAARS-S (Self-Report)	NA	NA	Weak	High false positive and false negative rate, suggesting CAARS should not be the main method for diagnosing ADHD

Study	Diagnostic Measure	Sensitivity	Specificity	Diagnostic Accuracy	Notes
Kwan et al. (2024)	CAARS-S:SV	NA	NA	Good for ruling out ADHD	Study focused on determining cutoff scores to rule out ADHD; found CAARS scales have excellent negative predictive value but poor positive predictive value
Van Voorhees et al. (2011)	CAARS-S:SV and CAARS-O (Observer)	NA	NA	Not reported	Rating scales do not effectively distinguish between ADHD and other adult psychiatric disorders; sample included 349 adults ages 18-70
van de Glind et al. (2013)	ASRS	0.84	0.66	Good	The ASRS is sensitive in detecting ADHD, but not in detecting other externalizing disorders
Bastiaens & Galus (2018)	ASRS-IV (categorical scoring	Poor	0.36	4+ threshold)	0.83
Bastiaens & Galus (2018)	ASRS-5 (categorical scoring	Poor	0.36	4+ threshold)	0.86
Bastiaens & Galus (2018)	ASRS-IV (dimensional scoring	Good	0.83	12 threshold)	0.78
Bastiaens & Galus (2018)	ASRS-5 (dimensional scoring	Good	0.81	12 threshold)	0.74

Study	Diagnostic Measure	Sensitivity	Specificity	Diagnostic Accuracy	Notes
Dakwar et al. (2012)	ASRS-V1.1	0.67	NA	Not reported	Lower sensitivity compared to Conners' Adult ADHD Rating Scale
Bakare & Jordanova (2020)	WURS-brief	0.897 (vs DIVA or CAADID)	0.133 (vs DIVA or CAADID)	Respectable	Sample consisted of 69 adults referred to a specialist adult ADHD outpatients clinic
Gift et al. (2021)	WURS-25 (vs clinical controls)	0.62	0.86	Moderate	Study also evaluated full WURS against abbreviated WURS-25
Gift et al. (2021)	WURS-25 (vs non-clinical controls)	0.91	0.92	Excellent	Much better performance when comparing with non-clinical controls
Gift et al. (2021)	WURS full scale (vs clinical controls)	0.84	0.94	Good	Full WURS outperformed WURS-25 in distinguishing ADHD from anxiety and depression
Gift et al. (2021)	WURS full scale (vs non-clinical controls)	0.95	0.94	Excellent	Both full WURS and WURS-25 performed well vs. non-clinical controls
Grogan et al. (2017)	CAARS (Inattention/Memory Problems)	0.82	0.81 (vs non-clinical controls); 0.50 (vs clinical controls)	Moderate	Specificity drops substantially when comparing with clinical controls vs. non-clinical controls
Grogan et al. (2017)	CAARS (DSM Inattentive Symptoms)	0.95	0.74 (vs non-clinical controls); 0.43 (vs clinical controls)	Moderate	Specificity drops substantially when comparing with clinical controls vs. non-clinical controls

Study	Diagnostic Measure	Sensitivity	Specificity	Diagnostic Accuracy	Notes
Grogan et al. (2017)	CAARS (DSM Total Symptoms)	0.76	0.78 (vs non-clinical controls); 0.36 (vs clinical controls)	Moderate	Specificity drops substantially when comparing with clinical controls vs. non-clinical controls
Mehringer et al. (2022)	Assessment of Hyperactivity and Attention (AHA)	0.8	0.6	Good	AUC = 0.79; Total predictive value = 0.70; Useful as screening tool but requires further evaluation for diagnosis
Palma-Álvarez et al. (2023)	MINI-Plus ADHD module	0.75	0.91	Good	Kappa = 0.60; Validated in adults with substance use disorders
Eich et al. (2012)	SCL-90-R based ADHD scale	0.75	0.54	Moderate	New scale derived from SCL-90-R items; showed internal consistency over 0.8
Houston et al. (2015)	PSA (Patient Self-Assessment)	Not reported	Not reported	Not reported	Screening instrument for multiple disorders including ADHD for primary care
Young et al. (2016)	BAARS-IV	0.379	0.963	Poor	Original BAARS-IV performed poorly in prison population
Young et al. (2016)	BAARS-IV Brief (6 items)	0.82	0.84	Good	Brief version developed specifically for prison population showed much better performance

Neuroimaging

Study	Sample Size	Age (Mean ± SD)	Gender	ADHD Subtypes	Imaging Modality	Key Demographic Notes
Alves (2024)	30 ADHD, 30 controls	Not fully extracted	Not fully extracted	Not fully extracted	fMRI	Analysis used blood oxygenation level-dependent (BOLD) time series data
Amen (2021)	1,006 ADHD, 129 controls	Not fully extracted	Not fully extracted	Combined, Inattentive, and Hyperactive	SPECT	Large retrospective analysis; ADHD patients with no comorbidities; Controls had no psychiatric diagnosis, brain injury, or substance use
Chaim-Avancini (2017)	67 ADHD, 58 controls	27.0 ± 6.0 (ADHD)	52 males/15 females (ADHD)	36 Inattentive, 31 Combined	MRI	Education: 13.5 ± 2.6 years; Male-only subgroup (n=52) also analyzed
Schneider (2014)	N=427, 40% ADHD, 60% Other Psych	40.9 years ± 15.7	Not fully extracted	DSM-IV criteria	DTI	Pediatric population (younger than 18 years); Focus on white matter tracts
Wang (2023)	50 ADHD, 50 controls	Not fully extracted	Not fully extracted	Inattentive, Hyperactive/ Impulsive, Combined	fMRI	Used ADHD-200 dataset; analysis using convolutional neural networks

Study	Sample Size	Age (Mean ± SD)	Gender	ADHD Subtypes	Imaging Modality	Key Demographic Notes
Wang (2013)	23 ADHD, 23 controls	35.14 ± 9.75 (ADHD), 32.04 ± 9.23 (Controls)	18 males/5 females in both groups	All Combined Type	MRI	Focus on resting-state fMRI; All patients met lifetime criteria for Combined Type ADHD
Wolfers (2016)	184 ADHD, 103 unaffected siblings, 128 controls	Not fully extracted	Not fully extracted	Not fully extracted	fMRI	Used Stop-Signal Task paradigm to assess response inhibition; included unaffected siblings as comparison group
Yao (2018)	112 ADHD, 77 controls (adults); 34 ADHD, 28 controls (children)	Adults: 25.93±4.86 (ADHD), 26.04±3.94 (controls); Children: 9.79±1.86 (ADHD), 10.29±1.67 (controls)	Adults: 37F/75M (ADHD), 34F/43M (controls); Children: All male	Not fully extracted	fMRI	Used two separate datasets (adults and children); Focus on default mode network

Neuropsychological and Cognitive Tests

Overview of Current Research Findings

The research available in your collection provides substantial evidence regarding the effectiveness and limitations of neuropsychological tests for diagnosing ADHD in adults. The evidence points to several consistent findings:

Limited Standalone Diagnostic Value

Most studies indicate that neuropsychological tests alone have poor discriminative validity when used as standalone diagnostic tools for adult ADHD. Pettersson et al. (2018) found that "neuropsychological tests have a poor ability to discriminate between patients diagnosed with ADHD and patients not diagnosed with ADHD." Similarly, research by Nikolas et al. (2019) found that "single test measures provided performed poorly in identifying ADHD participants."

Better Results in Combination with Other Measures

The research consistently shows that neuropsychological tests provide the most value when used as part of a comprehensive assessment approach. Nikolas et al. (2019) reported that "a combined approach using self and informant symptom ratings, positive family history of ADHD, and a reaction time (RT) variability measure correctly classified 87% of cases." This suggests that while

neuropsychological tests have limitations as standalone measures, they can contribute meaningfully to diagnostic accuracy when used as part of a more comprehensive evaluation protocol.

Specific Findings on Test Performance

Most Promising Measures

Several specific neuropsychological domains have shown more utility than others:

1. **Reaction Time Variability**: Multiple studies identified RT variability as one of the most sensitive measures. Nikolas et al. (2019) found that "measures of working memory, sustained attention, response speed, and variability best discriminated ADHD and non-ADHD participants."
2. **Sustained Attention Measures**: Tests that assess sustained attention, particularly computerized continuous performance tests (CPTs), showed better discrimination capabilities than other measures.
3. **Working Memory Tasks**: Measures of working memory were consistently identified as having some utility in distinguishing adults with ADHD.

QbTest Performance

The QbTest, a computerized test designed to measure all three core ADHD symptoms (inattention, hyperactivity, and impulsivity), showed mixed results:

1. **Brunkhorst-Kanaan (2020)** found that the QbTest has "low discriminative power" with an AUC (Area Under the Curve) of only 0.65, sensitivity of 76%, and specificity of 40%. They concluded that "the QbTest is not able to discriminate between ADHD patients and non-ADHD patients in an outpatient clinic."
2. **Edebol et al. (2013)** reported more positive findings, with sensitivity of 86% and specificity of 83%. However, they noted that sensitivity dropped substantially when trying to differentiate between individuals with ADHD and other clinical groups.
3. **Adamou et al. (2022)** advised "caution when interpreting QbTest+ results in clinical populations," as their study found that QbTest+ scores failed to differentiate between patients diagnosed with ADHD and those without the diagnosis.
4. **Söderström et al. (2014)** found that "the self-rating scales exhibited high sensitivity values but very low specificity values" while "the QBImpulsivity and QBInattention variables [showed] high specificity values and low sensitivity values."

Challenges and Limitations

1. Overlap with Other Clinical Conditions

A significant challenge in using neuropsychological tests for ADHD diagnosis is the overlap of cognitive deficits with other psychiatric conditions:

- Pettersson et al. (2018) noted that "when adults with ADHD are compared with other psychiatric patients, the results are more inconsistent."

- Nikolas et al. (2019) highlighted the "substantial overlap between ADHD symptoms and cognitive symptoms of other mental health conditions, such as depression and anxiety."

2. Heterogeneity of ADHD Presentation
The neuropsychological profile of adults with ADHD is heterogeneous:

- Nikolas et al. (2019) found that "adults with above average global cognitive abilities may underperform on some of these tasks relative to their IQ, even though their performance may be within an average range when compared with a broader population of adults."
- This suggests that using standard cutoff scores may not be appropriate, particularly for high-functioning adults or those with higher education levels.

3. Test Sensitivity and Ecological Validity
- Sensitivity and specificity issues persist across most tests, with no single measure providing both high sensitivity and specificity.
- Ecological validity remains a concern, as performance in structured testing environments may not reflect real-world functioning.

Optimal Assessment Approach

Based on the research findings, the optimal approach for diagnosing adult ADHD appears to involve:

1. **Comprehensive Clinical Interview**: All studies emphasized the importance of a thorough clinical interview as the foundation of assessment.
2. **Structured Rating Scales**: Both self-report and informant-report scales provide valuable information about symptom presentation.
3. **Selective Neuropsychological Testing**: Rather than extensive batteries, focused testing of sustained attention, working memory, and reaction time variability appears most useful.
4. **Performance Validity Testing**: Including performance validity measures is essential, particularly given concerns about symptom exaggeration in adult ADHD assessment.
5. **Family History Assessment**: Several studies found that including family history information significantly improved diagnostic accuracy.

Conclusion

The research suggests that neuropsychological tests have a limited but valuable role in adult ADHD assessment. While they should not be relied upon as standalone diagnostic tools, selective neuropsychological tests focusing on sustained attention, reaction time variability, and working memory can contribute to diagnostic accuracy when used as part of a comprehensive assessment approach that includes clinical interviews, rating scales, and family history.

The QbTest specifically appears to have some utility in quantifying ADHD symptoms, but its diagnostic accuracy is insufficient to serve as a primary diagnostic tool, particularly when attempting to differentiate ADHD from other psychiatric conditions. The test may be most useful for tracking treatment response or quantifying symptom severity rather than establishing diagnosis.

These findings align with the broader consensus in the field that adult ADHD diagnosis should involve multiple assessment methods, with a structured clinical interview remaining the cornerstone of the diagnostic process.

Study	Assessment Measure	Sensitivity (%)	Specificity (%)	Sample Size (ADHD/Control)	Notes
Edebol et al. (2013)	QbTest+ (Hyperactivity)	86	83	55/202	Motion tracking combined with CPT
Edebol et al. (2013)	QbTest+ (vs. Bipolar II)	36	-	-	Reduced sensitivity with comorbidity
Edebol et al. (2013)	QbTest+ (vs. Borderline PD)	41	-	-	Reduced sensitivity with comorbidity
Hirsch & Christiansen (2017)	QbTest+	90	45	773 patients total	High sensitivity but low specificity
Adamou et al. (2022)	QbTest+	47-67	72-84	Not specified	Range indicates variable performance
Lovejoy et al. (1999)	Controlled Oral Word Association	58	92	26/26	Verbal fluency measure
Lovejoy et al. (1999)	California Verbal Learning Test	38	92	26/26	Verbal memory assessment
Lovejoy et al. (1999)	Stroop Neuropsychological Test	23	100	26/26	Inhibition measure
Lovejoy et al. (1999)	Trail Making Test Part A	19	100	26/26	Processing speed measure
Lovejoy et al. (1999)	Trail Making Test Part B	23	96	26/26	Set-shifting measure

Study	Assessment Measure	Sensitivity (%)	Specificity (%)	Sample Size (ADHD/Control)	Notes
Lovejoy et al. (1999)	WAIS-R Freedom from Distractibility	38	100	26/26	Attention/ concentration index
Lovejoy et al. (1999)	Composite (1+ impaired tests)	96	85	26/26	Battery approach with high sensitivity
Lovejoy et al. (1999)	Composite (2+ impaired tests)	69	96	26/26	Better balanced sensitivity/specificity
Nielsen & Wiig (2011)	AQT Color	43	97	30/30	Simple naming task
Nielsen & Wiig (2011)	AQT Form	43	100	30/30	Simple naming task
Nielsen & Wiig (2011)	AQT Color-Form	73	100	30/30	Dual naming task
Nielsen & Wiig (2011)	AQT Overhead	87	87	30/30	Processing efficiency measure
Nielsen & Wiig (2011)	AQT Color-Form or Overhead	93	100	30/30	Combined approach
Grodzinsky & Barkley (1997)	COWAT-FAS	Not specified	Not specified	Not specified	Verbal fluency measure
Epstein & Kollins (2006)	CAADID	Reported as “high”	Reported as “good”	Not fully specified	Structured diagnostic interview
Gorlin et al. (2016)	Semi-structured DSM-based interview	Reported as “reliable”	Reported as “valid”	Not specified	Test-retest reliability mentioned

Study	Assessment Measure	Sensitivity (%)	Specificity (%)	Sample Size (ADHD/Control)	Notes
Adler et al. (2008)	Self vs. Investigator ratings	Variable reliability	Variable validity	Not specified	Examines concordance between raters
Emser et al. (2018)	Objective measures only	80	77	30/30 (children)	Cognitive performance tests only
Emser et al. (2018)	Objective measures only	82	76	38/38 (adults)	Cognitive performance tests only
Emser et al. (2018)	Combined subjective & objective	83	90	30/30 (children)	Multimethod assessment
Emser et al. (2018)	Combined subjective & objective	90	90	38/38 (adults)	Multimethod assessment
Pagán et al. (2023)	Conner's CPT	Variable (not specified)	Variable (not specified)	Systematic review	Sensitivity/specificity varies by sample
Varela et al. (2024)	Various CPTs	Variable (not specified)	Variable (not specified)	Systematic review	Limited utility reported as sole measure
Taylor et al. (2011)	Various adult ADHD scales	Variable (not specified)	Variable (not specified)	Systematic review	Reviewed identification scales

The document mentions several other assessment tools that are commonly used in adult ADHD diagnosis, though without specific sensitivity/specificity data:

1. **Structured Interviews:**
   - Diagnostic Interview for ADHD in Adults (DIVA 2.0)
   - Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL) adapted for adults
   - Wender Reimherr Interview (WRI)
2. **Self-Report Rating Scales:**

- Adult ADHD Self-Report Scale (ASRS-V1.1)
- Conners' Adult ADHD Rating Scales (CAARS) - both self and observer versions
- Wender Utah Rating Scale (WURS)
- Brown Attention-Deficit Disorder Scales

3. **Additional Neuropsychological Tests:**
   - Wisconsin Card Sorting Test
   - Digit Span (WAIS)
   - Sustained Attention to Response Task (SART)
   - D-KEFS (Delis-Kaplan Executive Function System)

Research Findings on Assessment Approaches

The document emphasizes several key points about neuropsychological assessment of adult ADHD:

1. **Single tests have limited utility:** Individual neuropsychological measures typically show moderate to low sensitivity (19-58%) with higher specificity (72-100%), making them better at ruling in rather than ruling out ADHD.

2. **Battery approaches are superior:** Using multiple tests or composite measures substantially improves diagnostic accuracy, with sensitivity and specificity both potentially reaching 90%.

3. **Combined methods are most effective:** Integrating subjective measures (rating scales, interviews) with objective neuropsychological tests provides the highest diagnostic accuracy.

4. **Reaction time variability (RTV)** emerges as one of the most consistent neuropsychological markers in adult ADHD across studies.

5. **Comorbidities reduce diagnostic accuracy:** The presence of other conditions like bipolar disorder or borderline personality disorder significantly decreases the sensitivity of neuropsychological measures.