

WAIS-R VERBAL RANGE AS A POTENTIAL SCREENING TOOL FOR BROAD AUTISM PHENOTYPE IN PARENTS OF CHILDREN WITH AUTISM SPECTRUM DISORDER

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BACKGROUND AND AIM: Social cognition—the capacity to perceive, interpret, and respond appropriately to social cues—is central to psychosocial functioning. Autism Spectrum Disorder (ASD) is characterized by marked impairments in social skills, and its subclinical manifestations in relatives are described as the Broad Autism Phenotype (BAP). Although several assessment tools (e.g., the Autism Diagnostic Interview-Revised) are available for ASD, their administration can be time consuming. In Türkiye, the Wechsler Adult Intelligence Scale-Revised (WAIS-R) is routinely used for cognitive assessment. Previous research has examined WAIS-R profiles in ASD populations; however, no study has specifically addressed whether the discrepancy between the highest and lowest WAIS-R subtest scores—here defined as the “range”—can serve as a proxy for social skill deficits associated with BAP. Moreover, gender differences may be key, as literature suggests that women are more likely to camouflage autistic traits. The present study aims to determine whether the verbal-performance discrepancy—and particularly the verbal range score—predicts social skills deficits in parents of children with ASD, with analyses performed separately for mothers and fathers.

METHODS: This case-control study included 24 parents of children with ASD (BAP group) and 28 healthy controls matched for age, gender, education, and IQ (all participants had WAIS-R IQ scores >80). Parents were recruited from the Department of Child and Adolescent Psychiatry at Selçuk University and from the Selçuklu Foundation for the Education of Individuals with Autism through an established collaboration, while controls were recruited via public advertisement. All participants were between 18 and 65 years old and literate. Exclusion criteria included any psychiatric disorder (as determined by the Structured Clinical Interview for DSM-5—Clinician Version), neurological or systemic illnesses, sensory impairments, or a history of substance use disorder. Each participant underwent a diagnostic interview using the SCID-5-CV and completed the Autism Spectrum Quotient (AQ) to assess autistic traits. The WAIS-R was administered by the same clinical psychologist for consistency. For each participant, the “total range” was calculated as the difference between the highest and lowest subtest scores; the same procedure was applied separately for the verbal and performance scales, yielding “verbal range” and “performance

range” scores. Statistical analyses included Student’s t-tests (both overall and stratified by gender), effect size estimation using Cohen’s d, logistic regression analysis (controlling for age and years of education), and receiver operating characteristic (ROC) analysis to identify an optimal cutoff for the verbal range. A post hoc power analysis confirmed an adequate sample size (power = 0.80) for the verbal range comparisons. Ethical approval was obtained from Selçuk University Local Ethics Committee, Decision Number: 2025/91

RESULTS: AQ data revealed that parents of children with ASD scored significantly higher on both the AQ social skills subscale and the total AQ scores compared with healthy controls ($p < .05$). When the results were stratified by gender, a marked difference emerged: while no significant differences in WAIS-R verbal range scores were observed among mothers, the subgroup of fathers of children with ASD exhibited significantly higher verbal range scores than their counterparts in the control group ($p < .05$). Further statistical examination using logistic regression analysis—adjusting for age and years of education—provided additional insight into the relationship between WAIS-R performance and autism spectrum features. It was also found that each 1-point increase in verbal range was associated with a 1.55-fold increased likelihood of being in the fathers of children with ASD group ($p = .032$, Beta = 0.443, OR = 1.557, 95% CI: 1.039–2.333). In addition, ROC analysis was conducted specifically for the fathers’ subgroup to assess the discriminative power of the verbal range score. The analysis yielded an area under the curve (AUC) value of 0.74 (95% CI: 0.554–0.934), indicating a good level of discrimination. The optimal cutoff point for the WAIS-R verbal range was determined to be 7.5, which provided a sensitivity of 58.3% and a specificity of 71.4% for distinguishing fathers of children with ASD from those in the healthy control group. These detailed findings support the hypothesis that an elevated discrepancy in WAIS-R verbal subtest performance—reflected by a higher verbal range score—is associated with greater autism spectrum features, particularly in fathers of children with ASD. This observation underscores the potential of the WAIS-R verbal range as a useful cognitive marker for identifying individuals who may benefit from further evaluation of social skills deficits and autism spectrum characteristics.

CONCLUSIONS: The present findings suggest that the WAIS-R verbal range score may serve as a practical, cost-effective cognitive marker for flagging potential social skills deficits and autism spectrum features in individuals undergoing the WAIS-R for any reason. Although our study initially sampled parents of children with ASD, the underlying principle—that an unusually wide discrepancy between the highest and lowest verbal subtest scores may reflect subtle impairments in social cognition—could have broader clinical applications. In routine cognitive assessments, a verbal range exceeding 7.5 may prompt clinicians to conduct a more detailed evaluation of social communication abilities and related autism spectrum features. A plausible neurobiological explanation for this observation is that the verbal subtests of the WAIS-R predominantly engage left hemisphere functions, which are critically involved in language processing and social cognition. Previous neuroimaging studies have documented left-hemisphere dysfunction in individuals with ASD, supporting the “left hemisphere dysfunction theory.” Therefore, an

expanded verbal range might reflect underlying neurocognitive differences that contribute to social communication difficulties. Although gender differences emerged—with male participants exhibiting more pronounced verbal range discrepancies—the potential utility of this screening measure should be explored in more diverse samples, irrespective of gender or clinical referral reason. This study has several strengths, including standardized administration of the WAIS-R and thorough diagnostic assessments. However, limitations such as the modest sample size and cross-sectional design warrant caution. Future research should replicate these findings in larger, more heterogeneous samples and ideally incorporate neurobiological measures (e.g., functional neuroimaging) to further elucidate the relationship between verbal range and social cognitive functioning. Moreover, while our results indicate that a verbal range threshold of 7.5 could serve as a preliminary screening tool, prospective studies are needed to determine its predictive validity in various clinical populations.

Table 1. Comparison of demographic data, scores of AQ and WAIS-R

Variables	Total Sample BAP (n=24) M (SD)	Total Sample HC (n=28) M (SD)	Total Sample t	Total Sample p	Total Sample d	Male BAP (n=12) M (SD)	Male HC (n=14) M (SD)	Male t	Male p	Male d	Female BAP (n=12) M (SD)	Female HC (n=14) M (SD)	Female t	Female p	Female d
Age	39.83 (6.81)	37.67 (9.08)	0.954	.345	.265	41.83 (7.14)	38.14 (10.76)	1.010	.322	.397	37.83 (6.11)	37.21 (7.41)	.230	.820	.090
Years of Education	14.3 (2.68)	14.57 (3.44)	-.274	.785	.076	15.16 (1.99)	14.85 (3.73)	.257	.800	.101	13.50 (3.08)	14.28 (3.24)	-.629	.535	.248
Autism Spectrum Quotient Scores															
Social Skills	2.87 (1.80)	1.82 (1.51)	2.290	.026*	.637*	3.33 (1.87)	1.57 (1.69)	2.515	.019*	.989*	2.41 (1.67)	2.07 (1.32)	.586	.563	.230
Attention Switching	4.45 (2.04)	4.71 (1.82)	-0.477	.635	.133	4.75 (2.26)	4.71 (2.23)	.040	.968	.016	4.16 (1.85)	4.71 (1.38)	-.867	.397	.330
Attention to Detail	5.58 (1.97)	4.96 (1.66)	1.226	.226	.341	6.00 (1.75)	4.85 (1.74)	1.658	.110	.652	5.16 (2.16)	5.07 (1.63)	.127	.900	.050
Communication	2.79 (1.91)	2.25 (1.69)	1.084	.283	.302	2.66 (1.72)	2.14 (1.35)	.869	.394	.342	2.91 (2.15)	2.35 (2.02)	.683	.501	.269
Imagination	3.3 (1.83)	2.53 (1.59)	1.676	.100	.446	3.41 (1.92)	2.78 (1.76)	.872	.392	.343	3.15 (1.81)	2.28 (1.43)	.516	.144	.595
AQ Total Scores	19.04 (5.99)	16.28 (5.38)	1.747	.043*	.486*	20.16 (5.81)	16.07 (6.09)	1.745	.047*	.686*	17.91 (6.21)	16.50 (4.78)	.656	.518	.258
WAIS-R Scores															
Verbal Scale	103.73 (15.38)	109.25 (13.29)	-1.383	.173	.385	110.08 (12.78)	114.86 (12.04)	-.980	.337	.385	97.42 (15.62)	103.64 (12.41)	-1.132	.269	.445
Performance Scale	102.75 (15.23)	102.25 (13.65)	.125	.901	.035	108.50 (15.47)	104.57 (14.49)	.668	.511	.263	97.00 (13.17)	99.93 (12.86)	-.572	.573	.225
Total Score	103.54 (15.35)	106.32 (12.73)	-.714	.479	.199	110.00 (14.12)	110.50 (12.29)	-.097	.924	.038	97.08 (14.21)	102.14 (12.17)	-.978	.338	.385
Verbal Range	9.87 (3.40)	7.78 (3.22)	2.279	.028*	.631*	9.91 (3.70)	6.57 (2.92)	2.572*	.017*	1.012*	9.83 (3.24)	9.00 (3.13)	.665	.513	.262
Performance Range	5.50 (1.95)	5.28 (2.81)	.314	.755	.087	5.91 (2.23)	6.00 (3.11)	-.077	.939	.30	5.08 (1.62)	4.57 (2.37)	.630	.535	.248
Total Range	11.20 (2.70)	11.25 (3.09)	-.051	.959	.014	11.83 (2.48)	11.50 (2.82)	.317	.754*	.125	10.58 (2.87)	11.00 (3.44)	-.332	.743	.130

AQ: Autism Spectrum Quotient; WAIS-R: Wechsler Adult Intelligence Scale-Revised; BAP: Broad Autism Phenotype; HC: Healthy Controls; d: Cohen's d effect size.
* Indicates statistical significance at $p < .05$. Student's t-test was performed.

Table 2. Logistic Regression and ROC Analysis of Verbal Range in Males

WAIS-R Variable	Beta (Coef.)	Standard Error	Wald Z	p	OR	95% CI Lower	95% CI Upper	Closest Cutoff	Sensitivity	Specificity	AUC (95% CI)
Verbal Range	.443	.206	4.609	.032*	1.557	1.039	2.333	7.50	.583	.714	.744 (.554 to.934)

OR = Odds Ratio; CI = Confidence Interval;
Covariates: Age, Years of Education.
An odds ratio > 1 indicates that individuals are more likely to belong to the Broad Autism Phenotype group.
WAIS-R = Wechsler Adult Intelligence Scale-Revised;
AUC = Area Under the ROC Curve.
* Indicates statistical significance at $p < .05$.

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Keywords: Autism spectrum disorder, broad autism phenotype, social skills, WAIS-R, verbal IQ range