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A CULTURALLY ADAPTED VERBAL BEHAVIOR ASSESSMENT FOR ARABIC-SPEAKING PRESCHOOLERS WITH ASD: PRELIMINARY VALIDATION IN ALGERIA

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Abstract. This study presents the development and preliminary validation of the Algerian Verbal Behavior Assessment Tool for Autism Spectrum Disorder (AVBAT ASD), a culturally grounded instrument designed to assess core verbal operants, mands, tacts, echoics, and intraverbals in Algerian Arabic-speaking children aged 3 to 5 years with autism spectrum disorder (ASD). The tool comprises 20 items rated on a 3-point scale and can be administered in under 30 minutes, making it particularly suitable for use in low-resource or time-constrained settings. A total of 63 children diagnosed with ASD participated in the study, with 31 undergoing a second evaluation two weeks later to assess test-retest reliability. Exploratory factor analysis supported a two-factor structure, Functional Communication and Echoic, accounting for 84.68% of total variance ($KMO = 0.916$; Bartlett's $\chi^2 = 2121.62$, $p < .001$). All items showed strong communalities (0.601–0.936) and aligned with theoretical domains. Internal consistency was high (Cronbach's $\alpha = .976$), and all item-total correlations were significant ($p = .743-.941$, $p < .001$). Split-half reliability coefficients (Spearman–Brown and Guttman = .933) and test–

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retest reliability ($\rho = .981, p < .01$) confirmed the tool's stability and coherence. Item difficulty indices ranged from 0.70 to 1.02, capturing a broad spectrum of language abilities. The AVBAT ASD demonstrated strong content validity, informed by expert and caregiver feedback, and reflected Algerian linguistic and cultural norms, enhancing ecological validity. By emphasizing the functional use of language rather than its form, the tool aligns with Skinner's behavioral framework and is compatible with intervention models like Pivotal Response Treatment. Its simplicity, cultural relevance, and psychometric strength make it a promising tool for clinicians, educators, and caregivers engaged in early identification and intervention planning for children with ASD in Arabic-speaking North African contexts.

Keywords: Autism Spectrum Disorder (ASD), Verbal Behavior Assessment, Arabic-Speaking Children, Cultural Adaptation

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КУЛЬТУРНО АДАПТИРОВАННАЯ ОЦЕНКА ВЕРБАЛЬНОГО ПОВЕДЕНИЯ ДЛЯ ДОШКОЛЬНИКОВ, ГОВОРЯЩИХ НА АРАБСКОМ ЯЗЫКЕ, С РАС: ПРЕДВАРИТЕЛЬНАЯ ВАЛИДАЦИЯ В АЛЖИРЕ

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Абстракт. Данное исследование представляет разработку и первичную валидацию Алжирского инструмента оценки вербального поведения при расстройствах аутистического спектра (AVBAT ASD), созданного с учетом культурных особенностей и предназначенного для оценки основных вербальных оперантов – *мандов*, *тактов*, *эхоиков* и *интравербалов* – у детей 3–5 лет, говорящих на алжирском арабском диалекте и имеющих диагноз расстройства аутистического спектра (РАС). Инструмент состоит из 20 пунктов, оцениваемых по 3-балльной шкале, и может применяться менее чем за 30 минут, что делает его особенно удобным для использования в условиях ограниченных ресурсов и времени. В исследовании приняли участие 63 ребенка с диагнозом РАС, из которых 31 прошел повторную оценку через две недели для проверки надежности по методу тест–ретест. Эксплораторный факторный анализ подтвердил двухфакторную

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структуру – «Функциональная коммуникация» и «Эхоик» – объясняющую 84.68% общей дисперсии (КМО = 0.916; χ^2 Бартлетта = 2121.62, $p < .001$). Все пункты показали высокие коммуальности (0.601–0.936) и соответствовали теоретическим доменам. Внутренняя согласованность была высокой (α Кронбаха = .976), все коэффициенты корреляции «пункт–общий балл» были значимыми ($p = .743$ –.941, $p < .001$). Коэффициенты надежности расщепленной половины (Спирмен–Браун и Гуттман = .933) и тест–ретест надежность ($p = .981$, $p < .01$) подтвердили стабильность и согласованность инструмента. Индексы сложности пунктов варьировали от 0.70 до 1.02, охватывая широкий спектр языковых навыков. AVBAT ASD продемонстрировал высокую содержательную валидность, основанную на экспертных и родительских отзывах, и отражал лингвистические и культурные нормы Алжира, что усилило экологическую валидность. Сосредоточиваясь на функциональном использовании языка, а не на его форме, инструмент соответствует бихевиоральной модели Скиннера и совместим с интервенционными подходами, такими как Pivotal Response Treatment. Простота, культурная релевантность и психометрическая надежность делают данный инструмент перспективным средством для клиницистов, педагогов и родителей, занимающихся ранней диагностикой и планированием интервенций для детей с РАС в арабоязычных странах Северной Африки.

Ключевые слова: Расстройства аутистического спектра (РАС), Оценка вербального поведения, Дети говорящие на арабском языке, Культурная адаптация

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MƏDƏNİYYƏTƏ UYGUNLAŞDIRILMIŞ VERBAL DAVRANIŞ QIYMƏTLƏNDİRMƏSİ ƏRƏB DİLLİ AUTİZM SPEKTR POZUNTULU MƏKTƏBƏQƏDƏR UŞAQLAR ÜÇÜN: ƏLCƏZAİRDƏ İLKİN VALİDASIYA

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Abstrakt. Bu tədqiqat Autizm Spektr Pozuntusu (ASP) olan 3-5 yaşlı Əlcəzair ərəb dilli uşaqlarda əsas verbal operantları – *mand*, *takt*, *ekoxik* və *intraverbal* bacarıqları qiymətləndirmək məqsədilə hazırlanmış Əlcəzair Verbal Davranış Qiymətləndirmə Alətinin (AVBAT ASD) inkişafı və ilkin validasiyasını təqdim edir. Alət 3 ballıq şkala üzrə qiymətləndirilən 20 bənddən ibarətdir və 30 dəqiqədən az müddətdə tətbiq edilə bilər ki, bu da onu resursları məhdud və ya vaxt baxımından məhdud şəraitdə istifadəyə xüsusilə uyğun edir. Tədqiqatda ASP diaqnozu qoyulmuş 63 uşaq iştirak etmişdir; onlardan 31 nəfəri test–retest etibarlılığını qiymətləndirmək üçün iki həftə sonra təkrar yoxlamadan keçmişdir. Eksplorativ faktor analizi 84.68% ümumi dispersiyanı izah edən iki faktorlu strukturu – Funksional Kommunikasiya və Ekoxik – dəstəkləmişdir (KMO = 0.916; Bartlett’s $\chi^2 = 2121.62$, $p < .001$). Bütün bəndlər güclü kommunallıq (0.601–0.936) nümayiş etdirmiş və nəzəri sahələrlə uyğun gəlmişdir. Daxili konsistensiya yüksək olmuşdur (Cronbach’s

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$\alpha = .976$), bütün bənd–ümumi korrelyasiya göstəriciləri isə əhəmiyyətli olmuşdur ($\rho = .743-.941$, $p < .001$). İkiyarlıq etibarlılıq əmsalları (Spearman–Brown və Guttman = .933) və test–retest etibarlılığı ($\rho = .981$, $p < .01$) alətin sabitliyini və koherentliyini təsdiqləmişdir. Maddə çətinliyi indeksləri 0.70 ilə 1.02 arasında dəyişmiş, dil bacarıqlarının geniş spektrini əhatə etmişdir. AVBAT ASD ekspert və valideyn rəyləri əsasında güclü məzmun etibarlılığı nümayiş etdirmiş, Əlcəzairin dil və mədəniyyət normalarını əks etdirmiş, bununla da ekoloji etibarlılığı artırmışdır. Dilin formasından daha çox onun funksional istifadəsini vurğulamaqla alət Skinnerin davranışçı çərçivəsinə uyğun gəlir və Pivotal Response Treatment kimi müdaxilə modelləri ilə uyğunluq təşkil edir. Sadəliyi, mədəni uyğunluğu və psixometrik gücü sayəsində bu alət ASP olan uşaqların erkən identifikasiyası və müdaxilə planlaşdırılması ilə məşğul olan klinisistlər, müəllimlər və valideynlər üçün perspektivli vasitə hesab olunur.

Açar sözlər: Autizm Spektr Pozuntusu (ASP), Verbal Davranış Qiymətləndirməsi, Ərəb dilli uşaqlar, Mədəni uyğunlaşdırma

1.Introduction

Communication deficits are a core characteristic of Autism Spectrum Disorder (ASD), affecting verbal and social interaction skills from an early age (American Psychiatric Association & American Psychiatric Association, 2013). According to (B.F, 1957), verbal behavior includes functional language units such as mands (requests), tacts (labels), echoics (imitation), and intraverbals (conversational responses). In children with ASD, particularly those aged 3 to 5 years, these verbal operants are often delayed or unevenly developed, limiting their ability to interact, learn, and communicate effectively (Alzrayer, 2024; Kodak & Clements, 2009; Partington & Bailey, 1993). These delays can compromise social interaction, learning, and overall communication competence.

The Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) is widely regarded as a gold-standard tool for assessing these verbal operants(Sundberg, 2014). It has demonstrated strong psychometric properties among Arabic-speaking children with ASD in Jordan, including high reliability and construct validity (Samar & Sabah Hassan, 2022). However, its application in other Arabic-speaking regionsparticularly North Africaremains limited, due in part to linguistic and cultural differences that may affect its relevance and accuracy.

In Algeria, the lack of culturally validated tools for assessing verbal behavior in children with ASD presents a critical gap. Existing instruments, such as the Autism Diagnostic Observation Schedule (Lord et al., 2000)and the Autism Diagnostic Interview-Revised (ADI-R)(Rutter et al., 2016)focus primarily on diagnosis and are not designed to analyze specific verbal operants. Moreover, these tools are rarely adapted to Arabic-speaking contexts, limiting their clinical utility.

To address this gap, the current study developed and preliminarily validated the Algerian Verbal Behavior Assessment Tool for ASD (AVBAT-ASD). This instrument evaluates key verbal operantsechoic, mand, tact, and intraverbal, in children aged 3 to 5 years, and is grounded in Skinner's (1957) theory of verbal behavior.

2.Method

Study Design

This study employed a quantitative, cross-sectional design.

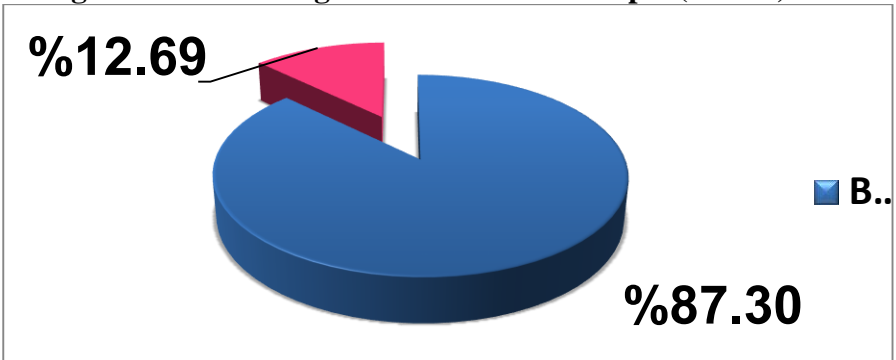
Participants

The study included 63 children between the ages of 3 and 5 years (55 boys and 8 girls), all diagnosed with autism spectrum disorder (ASD). Each child had a confirmed diagnosis based on the Childhood Autism Rating Scale (CARS), supported by thorough medical and developmental histories. To assess the

tool’s stability over time, 31 children from the ASD group took part in a second evaluation two weeks after the initial assessment.

Figure 1

Percentage distribution of gender in the ASD sample (N = 63).



Note. The pie chart illustrates the gender distribution within the sample. Boys made up the majority (87.3%), which aligns with the higher prevalence of ASD diagnoses among males, while girls represented 12.7% of the sample.

Due to the relatively small sample size (N = 63), this study is considered a preliminary validation. Its aim is to provide a solid foundation for future, larger-scale validation research.

Participants were selected through purposive sampling from public and private clinics located in the Algerian cities of Ghardaïa, Ouargla, and Laghouat. Children were eligible to participate if they were native Algerian Arabic speakers, between 3 and 5 years old, had a confirmed ASD diagnosis based on CARS, and did not have any major neurological or sensory impairments.

Measure Development

The tool was designed to be completed collaboratively by parents and clinicians, based on the child’s verbal behaviors observed over the previous 15 days. It includes 20 items divided across four core domains: echoic, mand, tact, and intraverbal. Each item is rated on a simple 3-point scale (1 = no response, 2 = partial response, 3 = full response).

The items were developed based on relevant research and were carefully reviewed by a panel of seven experts, including psychologists and speech therapists. All items reached a strong Content Validity Index (CVI) of 0.80 or higher. Minor wording adjustments were made to improve clarity, and feedback from ten parents helped ensure that the items were both culturally appropriate and meaningful in everyday Algerian contexts.

3.Procedure

Data collection was conducted between October 2022 and June 2025. Informed consent was obtained from the parents of all participants.

The assessment tool was administered by trained specialists in clinical psychology or speech-language pathology. All assessments took place in structured sessions held at public and private clinics in the cities of Ghardaïa, Ouargla, and Laghouat, with the child's primary caregiver present throughout the process.

To check how consistent the tool was over time, 31 children from the ASD group completed the assessment a second time, two weeks after the first session.

4.Data Analysis

Data were analyzed using SPSS version 22 to evaluate the tool's validity and reliability.

Validity was assessed through exploratory factor analysis to establish construct validity, expert review to ensure content validity, and item difficulty analysis to further support construct validity.

Reliability was examined using item-total and domain-total correlations to assess internal consistency, along with Cronbach's alpha, split-half reliability, and test-retest reliability methods.

2. Validity

Construct Validity

Table 1. KMO and Bartlett's Test of Sampling Adequacy

Test	Value
Kaiser-Meyer-Olkin Measure (KMO)	0.916
Bartlett's Test of Sphericity	$\chi^2 = 2121.616$ df = 171p < .001

Table 2. Total Variance Explained by Extracted Factors

Factor	Eigenvalue	% of Variance	Cumulative %	Interpreted Domain
1	14.38	75.68%	75.68%	Functional Communication (Mand, Tact, Intraverbal)
2	1.71	9.01%	84.68%	Echoic

Table 3. Extracted Communalities for Each Item

Range of Communalities	0.601 – 0.936
Extraction Method	Principal Axis Factoring

Table 4.

Factor Loadings from the Rotated Pattern Matrix

Item Group	Factor	Loading
Item6–item20	1	0.76 – 1.03
Item1 – item5	2	0.673–1.023

Exploratory factor analysis (EFA) was conducted on the verbal behavior tool using Principal Axis Factoring with Oblimin rotation. The Kaiser-Meyer-Olkin (KMO) measure was 0.916, and Bartlett’s Test of Sphericity was significant ($\chi^2 = 2121.616$, $df = 171$, $p < .001$)(Table 1), indicating the data were suitable for factor analysis. Two factors emerged with eigenvalues greater than 1, explaining a cumulative 84.68% of the total variance(Table 2). The pattern matrix revealed that Factor 1 comprised items related to mand, tact, and intraverbal behaviors, and was interpreted as “Functional Communication.” Factor 2 included echoic items exclusively(Table 4). Communalities values ranged from 0.601 to 0.936(Table 3), supporting strong item–factor relationships.

Content Validity

A panel of seven experts, including clinical psychologists and speech-language pathologists, evaluated the scale’s items for relevance, clarity, simplicity, and representativeness. They confirmed the items effectively captured core verbal behavior domains, with minor revisions suggested by three experts to improve clarity and simplicity in four items.

Item Difficulty Analysis

Table 5. Item Difficulty Indices

Item	Mean	Difficulty	Item	Mean	Difficulty
Item 1	2.03	1.02	Item 2	1.86	0.93
Item 3	1.90	0.95	Item 4	1.95	0.98
Item 5	1.95	0.98	Item 6	1.81	0.91
Item 7	1.73	0.87	Item 8	1.51	0.76
Item 9	1.73	0.87	Item 10	1.71	0.86
Item 11	1.67	0.83	Item 12	1.52	0.76
Item 13	1.60	0.80	Item 14	1.67	0.83
Item 15	1.40	0.70	Item 16	1.75	0.88
Item 17	1.46	0.73	Item 18	1.51	0.76
Item 19	1.71	0.86	Item 20	1.49	0.75

(Table 5) showed mean scores ranging from 1.40 to 2.03 and difficulty indices between 0.70 and 1.02, indicating a balanced mix of easier and more challenging items. For example, Item 1 (mean = 2.03) was accessible to most children, while Items 15 and 17 (means = 1.40 and 1.46) captured more advanced verbal skills.

3. Reliability Analysis

Internal Consistency

Item-Total and Domain-Total Correlations

Table 6. Spearman's Correlations Between domains and Total Score

Total	Echoic	Mand	Tact	Intraverbal
	.899**	.865**	.883**	.868**

N = 63; All correlations are Spearman's rho. $p < .001$ (2-tailed).

Table 7. Spearman's Item-Total Correlations.

Item	R	Item	R	Item	R	Item	R
Item 1	.889**	Item 2	.844**	Item 3	.831**	Item 4	.842**
Item 5	.843**	Item 6	.836**	Item 7	.864**	Item 8	.809**
Item 9	.864**	Item 10	.875**	Item 11	.854**	Item 12	.809**
Item 13	.840**	Item 14	.860**	Item 15	.743**	Item 16	.871**
Item 17	.833**	Item 18	.821**	Item 19	.854**	Item 20	.786**

N = 63; All correlations are Spearman's rho. $p < .001$ (2-tailed).

All four domains, echoic, mand, tact, and intraverbal were strongly correlated with the total score ($\rho = .865$ to $.899$, $p < .001$) (Table 6), indicating that each domain meaningfully contributes to the overall construct of verbal behavior. The highest correlation was with the echoic domain ($\rho = .899$), suggesting its strong alignment with total performance.

In (Table 7), Spearman's item-total correlations ranged from .743 to .889, all significant at $p < .001$. This consistent pattern of strong positive associations confirms that each item is a reliable indicator of the total score and supports the internal consistency of the tool.

Cronbach's Alpha

Table 8. Reliability Analysis (Cronbach's Alpha) for the Items of the Scale

Item	Corr. Item-Total	α if Deleted	Item	Corr. Item-Total	α if Deleted
Item 1	0.810	0.983	Item 2	0.799	0.983
Item 3	0.764	0.983	Item 4	0.748	0.983
Item 5	0.749	0.983	Item 6	0.861	0.982
Item 7	0.919	0.982	Item 8	0.841	0.982
Item 9	0.919	0.982	Item 10	0.928	0.982
Item 11	0.922	0.982	Item 12	0.860	0.982

Item 13	0.918	0.982	Item 14	0.924	0.982
Item 15	0.750	0.983	Item 16	0.941	0.981
Item 17	0.862	0.982	Item 18	0.855	0.982
Item 19	0.933	0.981	Item 20	0.816	0.983

According to (Table 8), the overall Cronbach’s Alpha of .976. Corrected item–total correlations ranged from .748 to .941, indicating that all items were strongly related to the total score and contributed meaningfully to the overall construct.

The “Alpha if Deleted” values ranged narrowly between .981 and .983, suggesting that removing any individual item would not improve reliability. This further confirms the strong internal coherence of the scale.

Split-Half Reliability

Table 9. Split-Half Reliability Statistics

Correlation					
Correlation Between Forms	0.875	Spearman-Brown (Equal Length)	0.933	Guttman Split-Half Coefficient	0.933
Statistic					
Part 1 Alpha	0.967	Part 2 Alpha	0.979	Total	20 items

Table 10. Item-Total Correlations and Cronbach’s Alpha if Item Deleted

Item	Corr. Item-Total	α if Deleted	Item	Corr. Item-Total	α if Deleted
Item 1	0.810	0.983	Item 2	0.799	0.983
Item 3	0.764	0.983	Item 4	0.748	0.983
Item 5	0.749	0.983	Item 6	0.861	0.982
Item 7	0.919	0.982	Item 8	0.841	0.982
Item 9	0.919	0.982	Item 10	0.928	0.982
Item 11	0.922	0.982	Item 12	0.860	0.982
Item 13	0.918	0.982	Item 14	0.924	0.982
Item 15	0.750	0.983	Item 16	0.941	0.981
Item 17	0.862	0.982	Item 18	0.855	0.982
Item 19	0.933	0.981	Item 20	0.816	0.983

Split-half reliability (Table 9) showed strong internal consistency, with both the Spearman–Brown and Guttman coefficients at 0.933. Each half of the scale also had high reliability (Part 1 = 0.967, Part 2 = 0.979).

As shown in (Table 10), item–total correlations ranged from 0.748 to 0.941, and removing any item did not significantly affect the overall reliability (α stayed between 0.981 and 0.983). These results confirm the scale is both consistent and reliable.

Test–Retest Reliability

Table 11. Test–Retest Reliability (Spearman Correlation)

Variables	ρ (Spearman)	Sig. (2-tailed)	N
test – r -test	$\rho = .816$	$p < .01$	31

The correlation between the first and second administrations was $\rho = 0.981$, $p < .01$ (Table 11), based on a sample of 31 participants, these findings provide strong evidence for the tool’s temporal reliability.

Discussion

This study aimed to develop and validate the Algerian Verbal Behavior Assessment Tool for Autism Spectrum Disorder (AVBAT-ASD), a brief, culturally grounded instrument designed to assess key verbal operants, mands, tacts, echoics, and intraverbals, in Algerian children with ASD aged 3 to 5 years. With only 20 items and a completion time of under 30 minutes, the AVBAT-ASD offers a highly practical alternative to longer diagnostic tools, making it especially suitable for use in low-resource environments and with children who may struggle with prolonged testing.

Communication deficits are a core feature of ASD, and impairments in functional language skills such as requesting (mands), labeling (tacts), echoing (echoics), and conversational responding (intraverbals) are among the earliest challenges observed(Battaglia, 2017; B.F, 1957; Kodak & Clements, 2009). Unlike tools that emphasize surface-level vocabulary or imitation, the AVBAT-ASD targets these functional verbal operants, offering a more nuanced picture of a child’s communicative capacity. This approach aligns with Skinner’s (1957) theory of verbal behavior, which emphasizes the function of language rather than its form, making the tool especially relevant for both assessment and intervention planning.

Psychometric analysis supported the tool’s reliability and validity. Exploratory factor analysis revealed a two-factor structure accounting for 84.68% of the total variance: one factor representing functional communication (mand, tact, intraverbal) and a second distinct factor for echoic behavior. The clear separation of echoic from functional items supports developmental models of language acquisition, where vocal imitation serves as a foundational skill for more complex language use(Tager-Flusberg et al., 2005). High factor loadings and item communalities, along with excellent

measures of sampling adequacy ($KMO = 0.916$) and significance (Bartlett’s $\chi^2 = 2121.62$, $p < .001$), provide strong evidence for the tool’s construct validity. Internal consistency was exceptionally high (Cronbach’s $\alpha = .976$), with item–total correlations ranging from .748 to .941. These values indicate that each item contributes meaningfully to its respective domain without redundancy. Split-half reliability was similarly robust (Spearman–Brown and Guttman coefficients = .933), and test–retest stability over two weeks was strong ($\rho = .981$, $p < .01$), confirming the tool’s reliability over time. These metrics are comparable to those of established tools like the VB-MAPP and the PEP-3, reinforcing the AVBAT-ASD’s credibility.

In terms of item difficulty, indices ranged from 0.70 to 1.02, demonstrating that the tool effectively captures a wide range of language abilities, from basic requests to more complex conversational responses. Furthermore, Content validity was established through expert review: all items received a Content Validity Index (CVI) of 0.80 or higher, with only minor refinements made to four items for clarity. This ensures sensitivity across developmental levels and supports the tool’s use in both early identification and individualized intervention planning.

A particularly notable finding was the strong association between echoic performance and overall verbal behavior scores ($\rho = .899$), suggesting that echoic behavior may serve as a gateway to more complex language functions. This aligns with previous research demonstrating that echoic training can facilitate the emergence of other verbal operants, such as intraverbals and tacts, thereby highlighting its foundational role in language development (Petursdottir et al., 2008).

The AVBAT-ASD is not only psychometrically sound but also culturally sensitive. Unlike existing tools that have been adapted from other Arabic dialects, such as Levantine, the AVBAT-ASD incorporates Algerian linguistic and cultural features, enhancing both its ecological validity and usability. This is particularly important in North African contexts, where appropriate assessment resources are scarce and generic translations often fail to capture local nuances (Alasmari et al., 2025; Huda et al., 2024).

Importantly, the tool emphasizes the function of the language rather than its form, aligning with a behavioral framework that prioritizes how language is used over how it sounds or appears. This theoretical orientation makes the AVBAT-ASD especially useful in applied settings, as it aligns closely with intervention strategies like Pivotal Response Treatment (Lei & Ventola, 2017), which aim to increase functional language use through naturalistic, child-centered techniques. By assessing real-world communication units, such as spontaneous requests, labeling, and conversational turn-taking, the tool provides actionable insights for intervention planning.

Another strength of the AVBAT-ASD is its practical applicability across disciplines. Its straightforward format allows for use by speech-language pathologists, behavioral therapists, educators, and even trained caregivers. The inclusion of real-world communicative behaviors, such as spontaneous requesting and conversational turn-taking, makes it highly actionable in naturalistic settings. Research suggests that involving families and educators in assessment and intervention improves outcomes for children with ASD, and the AVBAT-ASD is well-positioned to support such collaborative efforts (Brignell et al., 2018; Cheng et al., 2023).

Nonetheless, the study has limitations. The validation sample was drawn from only three urban regions in Algeria and may not represent the full linguistic or socioeconomic diversity of the country. Furthermore, the absence of normative data restricts its immediate clinical interpretability.

Future research should address these limitations by expanding the sample to include rural and socioeconomically diverse populations across Algeria and other Arabic-speaking regions. Longitudinal studies are also needed to assess the tool's predictive validity, examining how early AVBAT-ASD scores relate to later language, adaptive, or social outcomes. Incorporating input from multiple informants, including caregivers and clinicians, would enhance the tool's holistic utility in real-world settings.

In conclusion

the AVBAT-ASD fills a critical gap in the assessment of verbal behavior among Arabic-speaking children with ASD. It offers a brief, reliable, and culturally responsive alternative to existing tools, aligning closely with both theoretical models and practical needs. By facilitating early identification, personalized intervention planning, and cross-disciplinary collaboration, the AVBAT-ASD holds promise for improving outcomes in a region where resources remain limited and culturally tailored tools are urgently needed.

Ethical Standards and Conflict of Interest

Ethical Statement:

This study, involving Arabic-speaking preschool children diagnosed with Autism Spectrum Disorder (ASD) in Algeria, was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from the legal guardians of all participating children prior to data collection. Throughout all stages of the study, strict adherence was maintained to the principles of confidentiality, respect for privacy, anonymity, and the safeguarding of participants' rights, safety, and well-being.

Conflict of Interest:

The authors declare that there are no conflicts of interest related to the conduct or publication of this study. This statement is included in accordance with academic publishing standards and journal policy.

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