



## Implication of autism spectrum disorders on Yoruba language acquisition of children with intellectual disabilities

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### Abstract

In Africa and Nigeria in particular, the cases of the autism spectrum are on the increase daily, but with little research to look inward on its effect on language acquisition, and Yoruba language acquisition in particular. The study is therefore aimed at investigating the implications of the autism spectrum on the Yoruba language acquisition of children with intellectual disabilities in the southwest states of Nigeria. A descriptive survey design will be applied to the study. The six (6) states of Southwest Nigeria were enumerated. The sample for this study was fifty students with autism and intellectual disabilities randomly selected from public primary schools in the South-West States of Nigeria. A purposive sampling technique was used to sample schools for the study. The following scales were used to collect all necessary data, including the Slosson Intelligence Test (SIT) ( $r=0.75$ ), the Yoruba Word Recognition and Comprehension Inventory (YWRICI) ( $r=0.81$ ), and the Teaching Observation Performance Scale ( $r=0.76$ ). The research questions and hypotheses were formulated and tested at a 0.05 significance level. Data were collected and analysed using Pearson Product-Moment Correlation (PPMC). The study found that there is significant difference in the implications (negative and positive) and learners with intellectual disabilities (Crit-t = 2.32, Cal-t = .921, df = 97,  $P>.05$ ). Furthermore, it was obvious that there is a relative contribution of each of the independent variables on the dependent: Social development ( $\beta = .309$ ,  $P <.05$ ), Emotional development ( $\beta = .442$ ,  $P <.05$ ) and Motor coordination ( $\beta = .274$ ,  $P <.05$ ). It was concluded that children with intellectual disabilities who suffer from autism spectrum disorders have difficulties in acquiring Yoruba language with implications in the social development, emotional development and motor coordination. Hence, among others, it was recommended that competent Yoruba language teachers be employed to serve children with intellectual disability.

**Keywords:** Autism spectrum disorder, Yoruba language, Intellectual disabilities, Social development

### Introduction

Autism Spectrum Disorders (ASD) and intellectual disabilities (ID) are two prevalent neurodevelopmental disorders that often co-occur, presenting significant challenges for affected individuals and their families. ASD is characterised by persistent deficits in social communication and restricted, repetitive patterns of behaviour, interests, or activities (Mughal *et al.*, 2022) [35]. The prevalence of ASD is estimated to be approximately 1% to 2% of the population, with a notable increase in diagnosis rates over recent years (Zeidan *et al.*, 2022) [50]. Intellectual disability, defined by significant limitations in intellectual functioning and adaptive behaviour, affects approximately 1% to 2% of the population (American Psychiatric Association, 2024). The intersection of these two disorders is significant, as studies suggest that between 30% and 70% of individuals with ASD also meet the criteria for ID (Matson & Shoemaker, 2009) [31]. The presence of intellectual disability can influence the diagnostic process for ASD. Research indicates that children with ASD who also have ID are often diagnosed at an earlier age compared to those with higher-functioning autism, who may experience delays in diagnosis of over four years (Fairthorne *et al.*, 2017) [16].

This discrepancy can lead to differences in the availability of early intervention services, which are crucial for improving outcomes for children with ASD and ID (Portillo *et al.*, 2024) [38]. Furthermore, the presence of ID can complicate the diagnostic process for ASD, particularly in

individuals with severe or profound ID, where distinguishing between the two conditions can be challenging (Thurm *et al.*, 2019) [43]. The aetiology of both ASD and ID is complex and multifactorial, involving genetic, environmental, and neurobiological factors. Genetic studies have identified various copy number variations (CNVs) and mutations associated with both disorders, suggesting a shared genetic vulnerability (Wiśniowiecka-Kowalik & Nowakowska, 2019) [47]. For instance, mutations in genes such as CNTNAP2 and NRXN1 have been implicated in ASD and ID, highlighting the genetic overlap between these conditions (Apte & Kumar, 2023) [5]. Additionally, environmental factors, including maternal health and socio-economic status, have been shown to influence the risk of developing ASD (Fairthorne *et al.*, 2017) [16]. Individuals with ASD and ID often face significant barriers in accessing healthcare and support services. Reports indicate that these individuals experience higher rates of comorbid psychiatric disorders, including anxiety and depression, which can further complicate their care (Kessler & Lev-Ran, 2019; Guerrero Fernández de Alba *et al.*, 2020) [18, 25].

Moreover, the healthcare system often lacks adequate resources and training to meet the unique needs of this population, leading to disparities in health outcomes (Hoagland & Kipping, 2024) [21]. Language acquisition plays a crucial role in the cognitive development of individuals with autism spectrum disorders (ASD) and intellectual disabilities. Communicating effectively is

foundational for social interaction, learning, and overall cognitive growth. Research indicates that children with ASD often experience significant challenges in both receptive and expressive language skills, which can hinder their cognitive development and social integration (Schaeffer *et al.*, 2023) <sup>[40]</sup>.

The importance of early language acquisition is underscored by findings that suggest a direct correlation between the age of first words and later cognitive abilities and adaptive skills in children with ASD (Mayo *et al.*, 2012) <sup>[32]</sup>. Early language skills predict better outcomes in various domains, including social functioning and academic achievement (Mayo *et al.*, 2012) <sup>[32]</sup>. Moreover, children with ASD who develop language skills by the age of five tend to exhibit more favourable developmental trajectories compared to those who do not (Riad *et al.*, 2023) <sup>[39]</sup>. This highlights the necessity of timely interventions to enhance language acquisition and foster cognitive development.

Furthermore, the cognitive processes involved in language acquisition are complex and can differ significantly between children with ASD and their typically developing peers. For instance, while children with ASD may utilise similar language-learning mechanisms, they often do so with varying degrees of success (Vogindroukas *et al.*, 2022) <sup>[45]</sup>. This variability can be attributed to differences in cognitive profiles, including challenges in processing social cues and understanding the pragmatic aspects of language (Lai & Lai, 2023) <sup>[27]</sup>. Research has shown that receptive language difficulties are particularly prevalent in children with ASD, often going unnoticed, which can lead to neglect in addressing these critical skills (Marrus & Hall, 2018) <sup>[28]</sup>.

The neural underpinnings of language acquisition in children with ASD also present unique challenges. Studies indicate that abnormalities in the neural architecture associated with language learning may contribute to the language impairments observed in this population (Benítez-Burraco & Murphy, 2016) <sup>[10]</sup>. For example, a failure of left hemisphere specialisation for language processing has been identified as a fundamental issue in children with ASD, potentially delaying their language acquisition and affecting their social communication skills (Benítez-Burraco & Murphy, 2016) <sup>[10]</sup>. This suggests that interventions should focus on language skills and consider the underlying cognitive and neural mechanisms that influence language development.

In addition to the cognitive and neural aspects, the social context in which language is acquired is vital. The interaction between language and social function is particularly pronounced in children with ASD, where social engagement can significantly enhance language learning opportunities (Kuhl *et al.*, 2013) <sup>[26]</sup>. Therefore, fostering environments that promote social interaction and communication can benefit language acquisition and cognitive development.

## Literature review

### Cultural Significance of The Yoruba Language

The significance of mother tongue in the early development of individuals with ASD and intellectual disabilities is multifaceted, involving linguistic, cognitive, and social dimensions. Early language development is critical for all children, but it holds particular importance for those with ASD and intellectual disabilities, where communication challenges are prevalent. Research indicates that using a

mother tongue can facilitate better engagement and comprehension in children with these conditions, enhancing their overall developmental trajectory.

The Yoruba language holds significant cultural importance for individuals with ASD and intellectual disabilities, particularly in the context of communication, identity, and social integration. The cultural relevance of the Yoruba language can be observed through its role in facilitating communication and enhancing the social experiences of individuals with ASD. Research indicates that bilingualism, including exposure to the Yoruba language, can positively influence language development and social engagement in children with ASD. For instance, it emphasises that bilingualism allows children with developmental disabilities to engage more fully with their environments and communities, thus fostering better communication skills and social relationships (Ali, 2023) <sup>[2]</sup>.

Furthermore, the cultural adaptation of assessment tools into the Yoruba language, as demonstrated, enhances the accessibility and comprehensibility of these tools for Yoruba-speaking populations. This adaptation is crucial for individuals with ASD and intellectual disabilities, as it ensures that they can engage with healthcare and educational assessments in a language they understand, thereby improving their outcomes (Awotidebe *et al.*, 2021) <sup>[7]</sup>. The high reliability and validity of these translated tools suggest that they can effectively measure the experiences and needs of Yoruba-speaking individuals, which is essential for tailoring interventions and support systems to their cultural context (Awotidebe *et al.*, 2021) <sup>[7]</sup>.

The philosophical underpinnings of the Yoruba culture also contribute to understanding disability and identity and discuss how Yoruba beliefs encompass a broader understanding of disability, which includes spiritual and communal dimensions, rather than viewing it solely through a medical lens (Adegbidin, 2021) <sup>[1]</sup>. This perspective can help individuals with ASD and intellectual disabilities feel more accepted within their communities, as it emphasises the importance of social support and cultural identity in their lives.

Moreover, the use of Yoruba in educational settings, such as through the development of multimedia learning systems, can facilitate better learning experiences for children with intellectual disabilities. Creating a Yoruba arithmetic multimedia learning system highlights the importance of culturally relevant educational resources that can engage learners more effectively (Eludiora, 2017) <sup>[15]</sup>. Such initiatives promote using the Yoruba language and enhance cognitive skills in a culturally affirming manner. In addition, the role of parents and caregivers in supporting language development in children with ASD is critical. Studies show that parental linguistic input, particularly in a child's native language, significantly impacts language acquisition and social communication skills (Dale *et al.*, 2015) <sup>[14]</sup>. This is particularly relevant for Yoruba-speaking families, where integrating the Yoruba language into daily interactions can foster a nurturing environment that supports the child's developmental needs.

### Autism Spectrum Disorder And Language Development

Children with ASD often experience atypical language acquisition trajectories, which can manifest as delays in verbal and non-verbal communication skills. One of the earliest indicators of ASD is the absence or delayed onset of

these communication behaviours, which can hinder social interactions and cognitive development (Hodges *et al.*, 2020) [22]. The interplay between auditory processing and language development is critical; for instance, atypical coordination of cortical oscillations in response to speech has been linked to difficulties processing auditory information, which may further exacerbate communication challenges in children with ASD (Jochaut *et al.*, 2015) [23]. The development of lexical and semantic knowledge in children with ASD is another concern.

Studies have shown that children with ASD may exhibit disproportionate impairments in understanding meaning compared to their grasp of linguistic forms, such as syntax and phonology (Wolk *et al.*, 2016) [48]. This suggests that while some children may develop vocabulary, their ability to use language pragmatically and contextually remains compromised. A further aspect of language acquisition is joint attention, in which children simultaneously pay attention to an object or an event. Children with ASD often struggle with joint attention, which can lead to significant deficits in language development (Mody & Belliveau, 2013) [33]. Interventions aimed at improving language skills in children with ASD have gained attention, particularly those that incorporate Augmentative and Alternative Communication (AAC) methods. AAC has been shown to enhance functional communication and support language acquisition in children who are minimally verbal (Adnyani & Munir, 2022) [2]. Additionally, the importance of maintaining language skills over time is emphasized, as children with ASD may experience regression or loss of previously acquired language abilities (Pickles *et al.*, 2022) [37].

Effective interventions must therefore not only focus on initial language acquisition but also on strategies to ensure the retention and application of these skills in various contexts. The neural underpinnings of language development in ASD are complex and involve atypical brain connectivity, particularly in regions associated with language processing (Gao *et al.*, 2019) [17]. Research has indicated that early language delays can be linked to specific neural correlates, such as variations in gray matter in the cerebellum, which may predict later cognitive and behavioral outcomes (D'Mello *et al.*, 2016) [13]. Understanding these neurological aspects is essential for developing targeted interventions that can facilitate better language outcomes for children with ASD.

## Methodology

### Research Design

This study employs a quantitative design utilising a pretest-posttest control group factorial matrix. The design is chosen to assess the impact of autism spectrum disorders (ASD) on Yoruba language acquisition in children with intellectual disabilities. By comparing language skills before and after a targeted intervention, the study aims to determine the effectiveness of the intervention. The study consists of two groups: an experimental group that receives a specific language intervention and a control group that continues their regular educational activities without additional language-focused instruction.

### Participants

The study involves 50 pupils who have been diagnosed with both ASD and intellectual disabilities. Participants were selected using a purposive sampling technique to ensure they met specific inclusion criteria, including a diagnosis of

ASD, a diagnosis of intellectual disabilities, and an age range between 8 and 12 years, with a mean age of 9 years and a standard deviation (SD) of 1.24. Additionally, all participants speak Yoruba as their primary language at home. Exclusion criteria include severe physical disabilities that could interfere with participation in language acquisition activities, or if Yoruba is not the primary language spoken by the child.

### Research Groups

The participants were randomly assigned to two groups: the experimental group and the control group. The experimental group of 25 pupils received a structured intervention to enhance Yoruba language acquisition. This intervention involved storytelling, interactive language games, and structured exercises focused on improving language skills. The control group, which consisted of 25 pupils, did not receive any specific language intervention but continued their regular educational activities. This setup allowed for a comparative analysis of the impact of the intervention on language acquisition.

### Data Collection Methods

Data collection was conducted through a series of assessments. Initially, a pretest was administered to both groups to establish baseline language skills in Yoruba. This pretest involved standardised language assessments that measured Yoruba vocabulary, sentence structure, comprehension, and language usage. Following the pretest, the experimental group participated in an 8-week intervention to target and improve their Yoruba language skills. After the intervention, both groups were subjected to a posttest using the same standardised assessments as the pretest. The pretest and posttest scores were then compared to evaluate the effectiveness of the intervention.

### Data Analysis Techniques

Data analysis involved both descriptive and inferential statistics. Descriptive statistics, including the calculation of means and standard deviations, were used to describe the demographic characteristics of the participants and their pretest and posttest scores. A factorial ANOVA was conducted to analyse the effects of the intervention. This analysis allowed the researchers to examine the interaction effects between the intervention and the participants' language acquisition outcomes. If significant effects were identified, post-hoc tests were performed to pinpoint specific differences between the groups. Cohen's *d* was also calculated to determine the effect size, measuring the magnitude of the intervention's impact on language acquisition.

### Ethical Considerations

These were carefully addressed throughout the study. Informed consent was obtained from the parents or guardians of all participants, ensuring they were fully aware of the study's purpose, procedures, and their right to withdraw at any time. Participant information was confidential, with data anonymised to protect identities. The principle of beneficence guided the study, with the intervention designed to potentially benefit the participants by enhancing their Yoruba language skills while minimising any associated risks.

### Results

The results are presented in tables and references are made to each of the hypotheses.

**Demographic variables**

**Table 1:** distribution of the participants by gender

Gender	Frequency	Percentage
Male	12	24%
Female	38	76%
Total	50	100.0

Table above shows that the male participants were male 12(24%) and their female counterparts were 38(76%). The table above therefore shows that the female are more than the male. The female having the highest frequency of 38 with 76%

**Table 2:** Distribution of the Participants by Level Yoruba Language Mastery

Yoruba Language Mastery	Frequency	Percentage
Below 10%	5	10%
Below 30%	11	22%
Above 50%	23	46%
Above 70%	12	24%
Total	50	100%

Table shows that 5(10%) of the participants were below 10% of Yoruba Language Mastery, 11(22%) were below 30%, 23(46%) were above 50% while 12 (24%) of the

participants were above 70% of Yoruba Language Mastery. By implication, most of the participants fall within the above 50% of Yoruba Language Mastery.

**Answering the Research Questions**

**Research Question I:** Do autism spectrum disorders have any implication on the performance of learners with intellectual disabilities in Yoruba language acquisition?

**Table 3**

R	R Square	Adjusted R Square	Std. Error of the Estimate			
.874	.764	.756	3.7198			
ANOVA						
Model	Sum of Square	DF	Mean Square	F	Sig.	Remark
Regression	4290.676	3	1430.225	103.365	.000	Sig.
Residual	1328.324	96	13.837			
Total	5619.000	99				

Table shows the contribution autism spectrum disorder on the performance of learners with intellectual disabilities in Yoruba language acquisition. The result on the table above show a coefficient of multiple correlation (R=.874and a multiple R2 of .764). This means that 74.4% of the variance in accounted for by the predictor variables when taken together. The significance of the composite contribution was tested at P<.05. The table also shows that the analysis of

variance (ANOVA) for the regression yielded a F-ratio of 103.365 (significant at 0.05 level). This implies that the contribution of the independent variables of the dependent variable was significant and that other variables not included in this model may have accounted for the remaining variance.

**RQ II:** Do the implications predict the level at which learners with intellectual disabilities perform?

**Table 4:** T-Test showing relationship between Implications and Learners with Intellectual Disabilities

implication	N	Mean	Std. Deviation	Crit-t	Cal-t	Df	P
Negative	43	88.023	22.1652	2.32	.921	97	.321
Positive	7	13.019	16.1210				

Table above shows that there is significance difference in the implications (negative and positive) and learners with intellectual disabilities (Crit-t = 2.32, Cal-t = .921, df = 97, P>.05).

**Research Question II:** Does autism spectrum disorder have implication on the male learners with intellectual disabilities' performance in Yoruba Language than their female counterparts?

**Table 5**

Model	Unstandardized Coefficient		Standardized Coefficient	T	Sig.
	B	Std. Error			
(Constant)	-4.048	1.149		-3.525	.001
Social	.165	.057	.309	2.897	.005
Emotional	.372	.090	.442	4.333	.000
Coordination	.351	.069	.274	5.079	.000

The result above shows the relative contribution of each of the independent variables on the dependent: Social development ( $\beta = .309, P < .05$ ), Emotional development ( $\beta = .442, P < .05$ ) and Motor coordination ( $\beta = .274, P < .05$ ). Thus, above results show that all the three independent variables were significant.

### Discussion of findings

The results shows that the independent variables significantly contributed to dependent variable was significant, while other variables not included in this model may have accounted for the remaining variance. The heterogeneity of language abilities among individuals with ASD complicates understanding their language development. Research indicates that while some children with ASD may exhibit advanced language skills, others may remain nonverbal or experience significant delays in language acquisition, which can influence cognitive abilities and social communication deficits (Kuhl *et al.*, 2013; Walton & Ingersoll, 2015; Joseph *et al.*, 2019) [24, 26, 46]. Studies show that about 75% of children with ASD have language development problems, which can manifest as delays in speech onset and difficulties in using language functionally (Arutiunian, 2019; Siddieqy *et al.*, 2022; Yoder *et al.*, 2014) [6, 42, 49].

This highlights the importance of individualised approaches in language instruction, as the language profiles of children with ASD can vary widely based on their unique cognitive and communicative strengths and weaknesses (Bradley, 2019; Bal *et al.*, 2016) [18, 12]. The implications of ASD on the language performance of male learners with intellectual disabilities compared to their female counterparts are multifaceted and deeply rooted in the neurodevelopmental characteristics of ASD. Research indicates that ASD is a group of neurodevelopmental disorders characterized by significant impairments in communication and social interaction, which are often more pronounced in males than females. This disparity is particularly evident in language acquisition and usage, where males with ASD frequently exhibit more severe deficits than their female counterparts (Hashim *et al.*, 2023) [20]. Moreover, the social communication deficits inherent in ASD can lead to significant challenges in language performance. Males with ASD are often observed to have more pronounced social anxiety and difficulties in pragmatic language skills, which are essential for effective communication in social contexts (Martin *et al.*, 2017) [29].

In contrast, females with ASD may develop compensatory strategies that allow for better social integration and language use, potentially leading to less severe language impairments compared to their male counterparts (Tsikinas & Xinogalos, 2018) [44]. This gender difference in language performance is critical, as it suggests that interventions may need to be tailored differently for male and female learners with ASD to address these disparities effectively. Furthermore, research indicates that the timing of diagnosis and intervention can significantly impact language outcomes. Males with ASD and intellectual disabilities are often diagnosed later than their female peers, which can delay access to necessary support and resources for language development (Fairthorne *et al.*, 2017) [16]. This delay can exacerbate existing language deficits and hinder overall academic performance.

### Conclusion

The intersection of ASD and intellectual disabilities (ID) presents a complex landscape that significantly impacts

individuals and their families. The high prevalence of co-occurrence necessitates a nuanced understanding of both disorders, particularly regarding the diagnostic process and access to early intervention services. Research underscores the importance of timely identification and support, as early language acquisition plays a crucial role in cognitive and social development. Furthermore, the multifactorial nature of both ASD and ID calls for a holistic approach that considers genetic, environmental, and neurobiological factors.

Addressing individuals' unique challenges with both conditions requires well-coordinated efforts from healthcare providers, educators, and policymakers. Enhancing resources and training within the healthcare system is essential to improving outcomes and reducing disparities in access to care. Ultimately, by prioritizing early intervention and tailoring strategies to meet the specific needs of individuals with ASD and ID, we can foster better developmental trajectories. This will improve the overall quality of life for this vulnerable population. Continued research, advocacy, and education are vital in bridging gaps in understanding and support. This ensures that individuals with ASD and ID receive the assistance they need to thrive.

### Recommendations

Based on the findings regarding ASD and Intellectual Disabilities (ID), several key recommendations emerge to enhance understanding, diagnosis, and support for affected individuals. Establishing enhanced early diagnostic practices that recognise the overlapping symptoms of both disorders is critical. Comprehensive guidelines for early screening can facilitate earlier diagnoses and interventions, particularly for children facing dual diagnoses. Training healthcare providers in these practices ensures timely support and care for affected families. Improving access to early intervention services tailored specifically for children with ASD and ID is vital. These services should focus on fostering language acquisition and social skills development, optimising cognitive outcomes.

Exploring funding initiatives to support these services, especially in underserved areas, could significantly impact the availability of necessary resources for families seeking help. An interdisciplinary approach to treatment is also recommended. Promoting collaboration among speech-language pathologists, psychologists, special educators, and occupational therapists can lead to the development of comprehensive treatment plans that meet the multifaceted needs of individuals with both ASD and ID. Regular interdisciplinary meetings would help ensure coordinated intervention strategies and improve treatment effectiveness. The importance of language acquisition highlights the need for targeted research and intervention strategies aimed at improving language skills in children with ASD and ID.

Evidence-based practices that utilize naturalistic interventions to promote communication during everyday interactions can yield positive developmental outcomes. Additionally, supporting healthcare accessibility by advocating for better training for healthcare providers will address the unique needs of individuals with ASD and ID. Developing family support programs that offer resources, training, and counseling can empower families navigating ASD and ID challenges. Providing families with knowledge and skills will enable them to advocate more effectively for their loved ones and access available resources. Longitudinal research on language development and cognitive outcomes in children with ASD and ID is also

recommended to better understand the long-term impacts of early interventions.

Finally, raising community awareness about ASD and ID through educational campaigns that emphasise early detection and intervention is essential. Training educators and caregivers on effective communication strategies will create a more supportive environment for children with these disorders. Additionally, exploring technological innovations, such as apps and online tools for language learning and social skills development, can provide engaging, tailored learning experiences for children with ASD and ID. Implementing these recommendations can significantly enhance affected individuals' lives and foster better outcomes across various domains.

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