

Empirical Paper

Influence of Child Sex on Cognitive and Social Skills of Children with Autism Spectrum Disorder Within Thematic-Play and Storytelling Interventions in Lagos

Seun Sulaiman Folorunsho^{1,2*}, Opeyemi Shoaga¹, Taiwo Edun¹

Affiliations

¹Department of Educational Foundations and Counselling, Olabisi Onabanjo University, Ago-Iwoye, Ogun State

²Department of Early Childhood Care and Education, Federal College of Education Yola, Nigeria

ORCID Identifiers

Seun Sulaiman Folorunsho
[0000-0002-3552-4926](https://orcid.org/0000-0002-3552-4926)

Opeyemi Shoaga
[0000-0003-4406-3516](https://orcid.org/0000-0003-4406-3516)

Taiwo Edun
[0000-0003-0221-0231](https://orcid.org/0000-0003-0221-0231)

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Abstract

Purpose: This study investigated the influence of child sex on the cognitive and social skills of children with Autism Spectrum Disorder (ASD) within thematic-play and storytelling intervention strategies in Lagos, Nigeria.

Methodology: The study adopted a pre-test-post-test, control group quasi-experimental design derived from a 3×2×3 factorial framework. A total of 30 children aged 5–10 years with mild to moderate ASD were purposively selected from six special schools across three local government areas in the Lagos-East Senatorial District. Participants were assigned to two experimental groups (thematic-play and storytelling) and a control group (conventional teaching). Data were collected using the Childhood Autism Rating Scale (CARS) and the Cognitive and Social Skill Test (COSST). Hypotheses were tested using Quade's Analysis of Covariance (ANCOVA) at a 0.05 level of significance.

Results: Findings revealed that child sex had no significant main effect on cognitive skills acquisition among children with ASD. Similarly, no statistically significant effect was found for social skills, although females recorded marginally higher post-test gains. Overall, both male and female participants responded similarly to the intervention strategies.

Novelty and Contribution: This study contributes to the limited body of empirical research in Nigeria by examining sex as a moderator of ASD intervention outcomes. It provides context-specific evidence that challenges assumptions of gender-based differences in cognitive and social development among children with ASD within structured learning environments.

Practical and Social Implications: The findings suggest that educators and practitioners should prioritise individualised and inclusive instructional strategies rather than gender-based expectations when designing interventions for children with ASD. This has implications for curriculum development, teacher training, and inclusive education policies aimed at improving learning and social outcomes for children on the autism spectrum.

Keywords: Autism Spectrum Disorder, child sex, cognitive skills, social skills, quasi-experimental design

*Corresponding author

E-mail address: folorunshoss@fceyola.edu.ng

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1 Introduction

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition that affects social interaction, communication, and cognitive functioning in varying degrees. In educational contexts, the learning and developmental challenges of children with ASD are often either under-emphasised or neglected, especially in developing nations such as Nigeria. Teachers in special and inclusive schools frequently rely on traditional instructional approaches such as the conventional “talk and chalk” method, with little adaptation to the circumscribed learning needs of children living with ASD. The absence of specialised pedagogical strategies limits the children’s ability to attain cognitive and social milestones (Al Ghazi, 2018). This neglect is largely linked to inadequate knowledge of autism-specific educational interventions and the lack of exposure to innovative methodologies among educators.

Historically, autism was first documented in 1943 by Dr Leo Kanner, who observed a group of children exhibiting distinctive developmental patterns, including difficulties with communication, limited social engagement, and repetitive behaviours. Before now, ASD was viewed more from the angle of mental degradation; however, in recent times, it is no longer classified as a mental disorder but rather a congenital neurodevelopmental condition characterised by deficits in social communication and restrictive, repetitive behavioural patterns (American Psychiatric Association, 2013). Children with autism typically display impairments in executive functioning, speech and language development, working memory, and social-emotional reciprocity (National Autism Centre, 2009). Despite the variations in severity, these characteristics underscore the need for individualised teaching and intervention strategies tailored to each child’s cognitive and social profile.

Autism is still a relatively misunderstood concept in the Nigerian context. Public awareness remains limited, and systematic data on prevalence are scarce. Many parents and educators often misconstrue ASD as a behavioural disorder rather than a developmental condition. Consequently, the educational needs of autistic children are inadequately addressed in mainstream and special school systems. Social skills development is particularly crucial in the education of children with ASD, as it enables them to navigate interpersonal relationships, regulate emotions, and engage meaningfully with peers (Denham, 2019). Research consistently shows that social competence is an essential determinant of emotional adjustment and general well-being (Fuller & Kaiser, 2019).

Globally, there is growing evidence that sex differences play a significant role in the manifestation, diagnosis, and developmental outcomes of ASD. Several studies indicate that boys are diagnosed with autism more frequently than girls, with some research suggesting a male-to-female ratio of about 4:1 (Sohn, 2019). However, emerging perspectives challenge this traditional view, proposing that diagnostic practices may inadvertently favour the identification of ASD in males. Female children are often able to mask or “camouflage” their symptoms more effectively, leading to underdiagnosis or misdiagnosis (Schuck et al., 2019). This behavioural adaptation, often referred to as the female protective effect (FPE), suggests that females may possess innate compensatory mechanisms that allow them to better manage the social and cognitive deficits associated with ASD (Malone, 2022).

Furthermore, research by Williams et al. (2024) reveals that female children with ASD tend to exhibit higher levels of social competence and communication ability than males on similar levels on the spectrum. These findings indicate that sex-based differences may not only affect prevalence rates but also influence how cognitive and social skills are acquired and expressed. In societies such as Nigeria, where gender roles are strongly embedded, these differences could be further amplified by social expectations. Female children are often socialised to engage more in interpersonal communication and cooperative play, which might support their social adaptability even within the ASD spectrum (Malone, 2022). Conversely, male children may demonstrate more visible behavioural rigidity and reduced social engagement, making their developmental challenges more apparent, thus easier to identify and diagnose.

Although preemptive measures and education of children with autism are far more important than making them face punitive measures (Dickerson & Bond, 2025), understanding the role of child sex in the cognitive and social skill development of children with ASD remains critical for designing responsive educational strategies. It helps educators and therapists tailor interventions that align with each child’s learning style, emotional needs, and social tendencies. Moreover, in Nigeria’s inclusive educational context, identifying how male and female children differ in their acquisition of cognitive and social skills can contribute to more equitable instructional practices. Addressing these differences is essential for optimising developmental outcomes and promoting the educational inclusion of all children living with ASD.

Statement of the Problem

Children living with Autism Spectrum Disorder (ASD) experience diverse developmental challenges that significantly affect their learning and social interactions (Gates et al., 2023). Among the most prominent are deficits in cognitive and social skills. These skills, however, form the foundation for academic achievement and interpersonal competence. These deficiencies often make formal learning environments difficult for autistic children, particularly when conventional instructional methods are employed (Waisman et al., 2022; Napolitano et al., 2022). Many schools in Nigeria still rely heavily on the traditional “talk and chalk” approach, which may not align with the unique learning needs of children on the autism spectrum.

Studies have shown that child sex can influence manifestation and developmental skills in children with autism, such as cognition and social interaction. For instance, male children are diagnosed more frequently and tend to exhibit more overt behavioural symptoms, whereas female children may mask their challenges or present with milder social difficulties (Cruz et al., 2025). Despite these established patterns, there is limited empirical evidence in Nigeria that examines the moderating effect of sex on the cognitive and social skill development of children with ASD. Most available studies focus on general intervention outcomes without disaggregating findings by gender.

This knowledge gap creates a significant limitation in understanding how male and female children with ASD differ in their developmental trajectories. Consequently, educators and therapists lack the evidence needed to design sex-sensitive teaching approaches that could enhance both learning and socialisation outcomes. It is against this backdrop that this study investigates the influence of child sex on cognitive and social skills acquisition among children with autism spectrum disorder in Lagos, with a view to providing data-driven insights for more inclusive educational practices.

Objectives

- i. To determine the main effect of child sex on cognitive skills of children with ASD within thematic-play and storytelling interventions
- ii. To examine the main effect of child sex on social skills of children with ASD within thematic-play and storytelling interventions

Hypotheses

H₀₁: There is no significant main effect of child sex on the cognitive skills of children with ASD across thematic-play and storytelling interventions in Lagos State.

H₀₂: There is no significant main effect of child sex on the social skills of children with ASD across thematic-play and storytelling interventions in Lagos State.

2 Literature Review

Theoretical Framework

This study is grounded in the Socio-Cultural Theory of Learning propounded by Lev Vygotsky (1978), which emphasises that learning is socially mediated and shaped by cultural contexts. The theory holds that interaction with more knowledgeable peers fosters cognitive and social development. In the context of autism spectrum disorder (ASD), the socio-cultural perspective offers insight into how children acquire social and cognitive competencies through guided participation, communication, and play. Furthermore, the theory provides a lens for understanding how sex-related socialisation patterns may influence the learning processes and outcomes of children with ASD.

To complement this, the study also draws from David Kolb’s Experiential Learning Theory (1984), which posits that meaningful learning occurs through active engagement and reflective experience. The use of thematic play and storytelling methodologies provides children with opportunities to experience, reflect, and internalise learning, thereby enhancing their cognitive and social development.

Conceptual Review

Autism Spectrum Disorder; descriptions and characteristics

Autism spectrum disorder is a congenital neurodevelopmental condition that affects the communication, social, emotional, and behavioural faculties of children, right from the earliest stage. Autism is a pervasive developmental disorder that affects children's social, communicative, and behavioural development. It is characterised by qualitative impairments in social interaction and communication, as well as restricted, repetitive, and stereotyped patterns of behaviour, interests, and activities. In the same vein, autism spectrum disorder is further seen as a lifelong developmental condition, marked by differences and difficulties in social interaction, social communication, and restricted and repetitive behaviour, including differences regarding the perception and management of sensory stimuli (American Psychiatric Association, 2013). These neurodiversity disorders are a group of conditions with their onset in the prenatal period, causing the brain of affected individuals to develop in manners peculiar to them and different from the regular patterns as discovered in typically developing individuals. The disorder manifests early in development, often before the child enters primary classes. It is characterised by developmental deficits that produce impairments of personal, social, academic, or occupational functioning.

Children with ASD and Cognitive Development

Children living with ASD have been noted to have varying deficits or developmental diversities in many facets of their development, including cognitive development. This diversity primarily results from the neurodivergent nature of their brain development. Their brains develop in routes and paths significantly different from the way it does for typically developing children. The extent of the variation in brain development in these children determines their placement on the autism band or spectrum, ranging from minor variation resulting in a mild presentation of the condition to individuals with more pronounced variations in neurodevelopment, resulting in severe deviations (Velikonja et al., 2019).

According to Velikonja et al. (2019), cognitive deficits of children with ASD are very well documented, and researchers have established these as facts. It, however, typically affects the neurocognition and social cognition of such individuals; these aspects of cognition are responsible for executive functioning and basic communal independent functioning, respectively. Understanding the differences between the Chronological age and the mental age of children with ASD is quite important for educators and caregivers working with children with autism. Tailoring educational interventions to accommodate the child's cognitive strengths and challenges enhances the effectiveness of learning experiences (American Psychiatric Association, 2013).

Social Development and ASD

There is uncontroversial evidence that deficit social development traits are one of the hallmarks of autism spectrum disorder. All modern diagnostic and screening tools, as well as relevant professional bodies, acknowledge the universality of deficit in social communication skills as a core criterion for the diagnosis of ASD, meaning every autistic individual exhibits a level of social/communication skills deficit; also, it is often very challenging to remedy the noted deficiency in social communication skills (Williams et al., 2024).

Interestingly, the same social skills remedy has over the years proven to be the most difficult aspect of skill remedy noted in children with ASD. There seems to be a very profound resistance and difficulty encountered by interventionists in social skills development of individuals with ASD, partly because of the wired hard-core deficiencies of these individuals and their natural reluctance to socialise or submit to processes that attempt to remedy the deficiency. Unlike the cognitive and language domains' deficiencies, which are more easily remedied, the social domain deficiency of autistic children tends to persist and indeed is more deeply rooted and perpetuated than imagined; this, to some researchers, is due to the social skills condition of ASD referred to as the social motivation hypothesis of autism (Lei et al., 2019).

Furthermore, the social development or domain of a child is described as an avenue and mechanism for relating with others. Unlike in typically developing children who have commensurate social skills identical with their chronological age, children with ASD often have difficulties with their social development. The autistic child often has difficulties in

initiating and responding adequately to joint attention tasks and other forms of verbal and non-verbal social communication, including imitation and other related skills (Chawarska et al., 2016; Muzammal & Jones, 2017).

Empirical Review

Geelhand et al. (2019), in a study conducted recently, opined that there is no significance in the presentation and general perceived symptoms or severity of autistic boys and girls less than five years old. However, they further stated that the case becomes a bit different once the child grows older to around 15 years of age; this means the initial lack of differences in presentation and severity of the condition is erased by the passage of time. Furthermore, some scholars discovered that girls are often later diagnosed with ASD than boys. In the opinion of most scholars of Autism, diagnosis in boys is reached earlier than in girls; however, the placements and the general position of the two sexes on the spectrum are said to be identical. In the investigations of Loomes et al. (2017), the prevalence of male autism diagnosis is at least three times that of the female, and by implication, the condition affects males far more than it affects females.

Wood-Downie et al. (2020) argued that autistic female children attained better scores in social skills when compared to their male counterparts, on identical positions on the autism spectrum. The research was conducted on 101 high-functioning autistic children. Twenty-five of the participants were female children with autism, 25 were typically developing female children, 25 were male children with autism, and 26 were typically developing male children. All of the children were of the same age cohort (10- 16 years). The results from the research indicated that the female autistics outperformed their male counterparts in social skills scores. The findings further discovered that female high-functioning autistics performed similarly to typically developing male children of identical age cohort. Also, the findings of Wood-Downie et al. (2020), however, negate the position of Hull et al. (2019), in their groundbreaking research on "Relationship between non-verbal IQ and sex in autism". According to the findings, male children had much better cognitive performance when compared to their female counterparts, under intervention and real-life situations.

According to McVey et al. (2017), who carried out a play-based intervention on autistic individuals tagged the Peers (play) intervention. The intervention was carried out on 177 adolescents and young adults, some of whom were males and females. The results from the study indicated that the sex of the autistic participants did not have a significant influence on the social skills displayed by the young adults, using the peers play intervention. The children had similar social skills display; despite their sex disparity, sex did not have a significant effect on the social skills display of the said children.

In a study by Selvaraj and Christopher (2020), 101 typically developing and autistic children were examined for social skills possession in some areas. Half of the participating children were males, and half were females. Also, half of the participants were typically developing children while others were autistic. At the end, the research discovered that the social skills of the autistic children were not sex determined. In other words, sex did not influence the social skills of autistic children. According to de la Roche and Kelley (2024), children had skill differentiations owing to sex disparity. This means there was much effect of sex on the social skills of autistic children, exposed to intervention programmes.

3 Methodology

Research Design: This study adopted a pre-test-post-test, control group quasi-experimental design, derived from a larger 3×2×3 factorial study on cognitive and social skill development among children with Autism Spectrum Disorder (ASD). The present paper specifically focuses on the influence of child sex on the acquisition of cognitive and social skills. The design enabled the comparison of male and female participants' performance before and after intervention, while controlling for pre-existing differences. Participants were exposed to one of three treatment conditions: thematic play, storytelling, and conventional teaching, to determine whether sex influenced learning outcomes across the groups.

Population of the Study: The population comprised children under ten years of age with a confirmed diagnosis of Autism Spectrum Disorder (ASD). The population includes those enrolled in special and inclusive schools across Lagos State, South-West Nigeria. Although reliable statistical data on the total number of autistic children in Nigeria

are limited, Lesi et al. (2014) estimated that over 600,000 Nigerian children may be living with ASD, suggesting that several thousand reside within Lagos metropolis.

Sample and Sampling Technique: A total of thirty (30) children diagnosed with mild to moderate autism participated in the study. Participants were selected from three Local Government Areas within the Lagos-East Senatorial District using the convenience sampling technique. Twelve schools were initially screened through the administration of the childhood autism rating scale (CARS) on all available children with autism in the identified schools. Finally, six schools met the inclusion criteria (availability of an adequate number of pupils with mild to moderate ASD and parents' willingness to participate in the study).

Five children, aged between 5 and 10 years, were selected from each school, making a total of thirty participants. To ensure balanced group representation, the schools were coded and randomly assigned to treatment and control conditions as follows:

Schools 1 and 2: Experimental Group 1 (Thematic Play)

Schools 3 and 4: Experimental Group 2 (Storytelling)

Schools 5 and 6: Control Group (Conventional Teaching)

The relatively small sample size reflects the nature of the participants (who need individualised instruction) and limited enrolment of children with ASD in formal school settings. It also underscores the willingness of parents to allow their wards to participate in intervention studies.

Instrumentation: Two instruments were employed for data collection: The Childhood Autism Rating Scale (CARS) and the Cognitive and Social Skill Test (COSST).

- i. Childhood Autism Rating Scale (CARS): Developed by Schopler, Reichler, and Renner (1986), this standardised instrument assesses the severity of autism based on 15 behavioural domains. It categorises children as non-autistic, mildly autistic, moderately autistic, or severely autistic. The scale has demonstrated high psychometric reliability (ICC = 0.74) and internal consistency (Cronbach's α = 0.79), and it is widely used in clinical and educational research.
- ii. Cognitive and Social Skill Test (COSST): This self-designed instrument was used for both the pre-test and post-test assessments. It comprises three sections. Section A focused on Demographic information of the child. Section B concerned cognitive skills (25 items covering numeracy and literacy), while Section C contained items on social skills (15 items on cooperation, empathy, and communication behaviours)

The instrument was validated by three experts from Olabisi Onabanjo University, Ago-Iwoye, Ogun State; it yielded a high reliability coefficient of (α = 0.82) after pilot testing.

Treatment Procedure: Before the intervention proper, all participants (through their teachers) completed the pre-test instrument, the cognitive and social skill test (COSST). The core intervention phase lasted six weeks, with participants put in the following partitions:

- Group A (Thematic Play): received instruction through activity-based, theme-oriented play sessions.
- Group B (Storytelling): was taught using narrative-based strategies emphasising language and social interaction.
- Group C (Control): continued with the conventional teaching method used in their schools.

Each group had three contact hours per week, divided into two sessions (1.5 hours each), focusing on numeracy, literacy, and social habit formation. At the end of the six weeks, the post-test was administered to all participants using the same COSST instrument.

Method of Data Analysis: Data were analysed using descriptive and inferential statistics. Descriptive statistics (frequency, percentage, mean, and standard deviation) summarised demographic data and baseline characteristics.

To test the research objectives, i.e. the main effect of child sex on cognitive and social skills acquisition, the Quade Analysis of Covariance (ANCOVA) was employed. This method was selected due to the small sample size ($n=30$) and

the potential non-normality of the data distribution, which violates some assumptions of the parametric ANCOVA. The Quade ANCOVA allowed adjustment for pre-test differences when comparing post-test scores across sex and treatment groups. Statistical significance was tested at a $p < 0.05$ level of significance.

4 Result

Table 1 Descriptive Statistics of Participants' Cognitive Skills by Treatment and Sex

Dependent Variable: Unstandardised Residual

Treatment Group	Sex	N	Mean	Std. Deviation
Thematic-play	Male	8	3.49	7.86
	Female	2	7.63	4.43
Storytelling	Male	8	0.42	8.61
	Female	2	-1.66	8.48
Control	Male	7	-2.3	7.26
	Female	3	-9.05	0.6
Total	Male	23	0.66	7.96
	Female	7	-2.17	8.44

The results in Table 1 reveal that participants exposed to the thematic-play treatment recorded the highest mean cognitive skills score ($M = 3.49$, $SD = 7.86$) among males and ($M = 7.63$, $SD = 4.43$) among females. Participants in the storytelling group had moderate mean scores ($M = 0.42$, $SD = 8.61$ for males; $M = -1.66$, $SD = 8.48$ for females), while those in the control group had the lowest mean cognitive skills scores ($M = -2.30$, $SD = 7.26$ for males; $M = -9.05$, $SD = 0.60$ for females). Overall, male participants showed a slightly higher total mean cognitive skills score ($M = 0.66$, $SD = 7.96$) compared to female participants ($M = -2.17$, $SD = 8.44$).

Hypothesis One: There is no significant main effect of sex on the cognitive skills of children with ASD in Lagos State

Table 2 Estimates of Effect of Sex on the Cognitive Skills of Participants

Dependent Variable: Unstandardised Residual

Sex	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	1.657	1.957	-2.471	5.785
Female	-3.113a	2.937	-9.309	3.084

a. Based on modified population marginal mean.

The results in Table 2 indicated that male participants had a mean Cognitive Skills score of 1.657 and a standard error of 1.957, while female participants had a mean score of -3.113 and a standard error of 2.937. To determine if these mean scores are significantly different, an analysis of covariance was conducted. Results are as presented in Table 4.9.

Table 3 Univariate Test of Sex on the Cognitive Skills of Participants.

Dependent Variable: Unstandardised Residual

	Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	100.823	1	100.823	1.826	.194	.097
Error	938.572	17	55.210			

The F test the effect of Sex. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

The results in Table 3 revealed that there was no significant effect of sex ($F(1, 17) = 1.826; p > .05$) on cognitive skills of participants. The null hypothesis, which stated that there is no significant main effect of sex on the cognitive skills of children with ASD in Lagos State, was accepted by this finding. This result implies that participants' cognitive skills will not be significantly different between male and female children with ASD. This result is graphically illustrated in Figure 1.

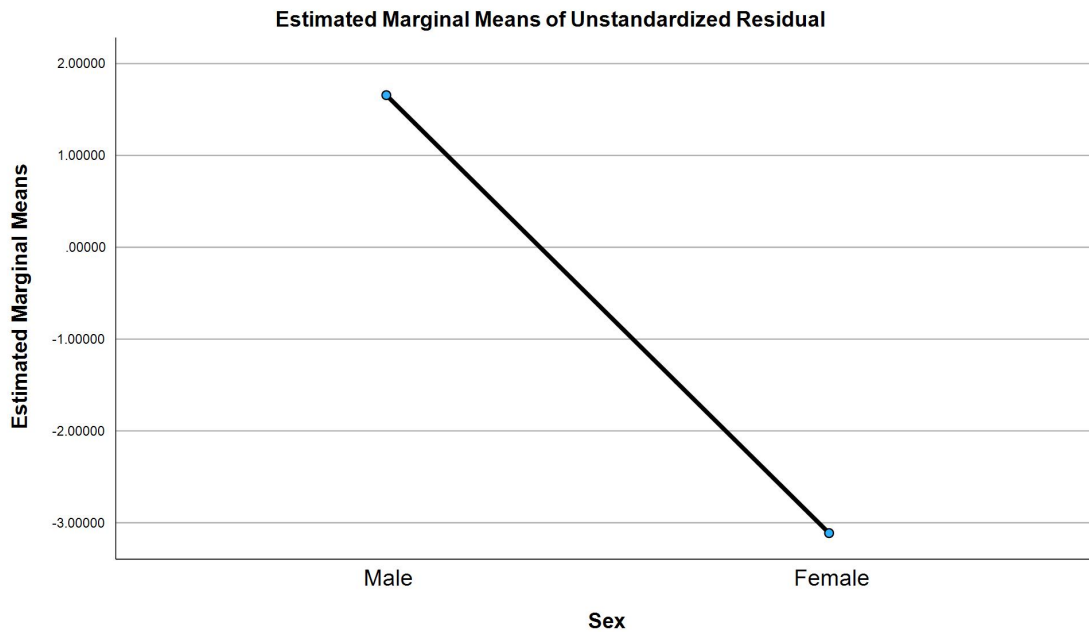


Figure 1 Effects of Sex on Participants' Cognitive Skills.

Figure 1 above showed that female participants had a higher mean score (1.657) on cognitive skills than male participants, who had a mean score of -3.113.

Objective 2

Table 4 Descriptive Statistics of Participants' social skills by Treatment and Sex

Dependent Variable: Unstandardised Residual

Treatment Group	Sex	N	Mean	Std. Deviation
Thematic-play	Male	8	0.56	2.00
	Female	2	1.8	6.44
Storytelling	Male	8	3.17	5.73
	Female	2	-0.01	0.28
Control	Male	7	-3.07	5.30
	Female	3	-3.97	0.78
Total	Male	23	0.36	5.10
	Female	7	-1.19	3.80

The results in Table 4 show that participants exposed to the storytelling treatment recorded the highest mean social skills score among male participants ($M = 3.17$, $SD = 5.73$). Female participants in the thematic-play group also recorded a relatively high mean score ($M = 1.80$, $SD = 6.44$), indicating some improvement in their social interactions. In contrast, participants in the control group obtained the lowest mean social skills scores, with males ($M = -3.07$, $SD = 5.30$) and females ($M = -3.97$, $SD = 0.78$), suggesting that traditional instructional methods were less effective in enhancing social competence among children with ASD. Overall, male participants demonstrated a slightly higher average social skills score ($M = 0.36$, $SD = 5.10$) compared to their female counterparts ($M = -1.19$, $SD = 3.80$), implying that sex differences might have some influence on social skill acquisition in children exposed to the intervention.

Hypothesis Two: There is no significant main effect of sex on the social skills of children with ASD in Lagos State

Table 5 Estimates of Effect of Sex on the Social Skills of Participants

Dependent Variable: Unstandardised Residual

Sex	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	.111	1.047	-2.099	2.321
Female	-1.506a	1.572	-4.823	1.811

a. Based on modified population marginal mean.

The results in Table 5 indicated that male participants had a mean social skills score of .111 and a standard error of 1.047, while female participants had a mean score of -1.506 and a standard error of 1.572. To determine if these mean scores are significantly different, an analysis of covariance was conducted. Results are as presented in Table 6.

Table 6 Univariate Test of Sex on the Social Skills of Participants.

Dependent Variable: Unstandardised Residual

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	11.592	1	11.592	.733	.404	.041
Error	268.905	17	15.818			

The F test the effect of Sex. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

The results in Table 6 revealed that there was no significant effect of sex ($F(1, 17) = .863$; $p > .05$; $\eta^2 = .048$) on the social skills of participants. The null hypothesis, which stated that there is no significant main effect of sex on the social skills of children with ASD in Lagos State, was accepted by this finding. This result implies that participants' social skills will not be significantly different between male and female children with ASD. This result is graphically illustrated in Figure 2.

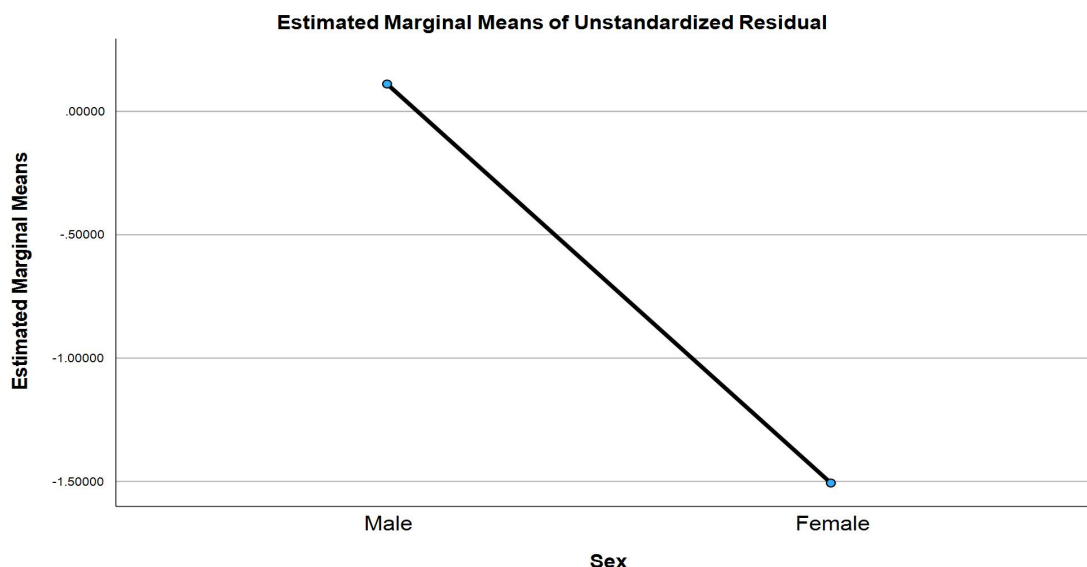


Figure 2 Effects of Sex on Participants' Social Skills.

Figure 2 above shows that male participants had a higher mean score (.111) on social skills than female participants, who had a mean score of -1.506.

5 Discussion

The first null hypothesis of the study is hereby upheld. This simply implies that there is no significant difference in the cognitive skills of the children with ASD in Lagos, based on their sex. The finding of this research negates the position of Lei et al. (2019), who discovered that male children had far greater cognitive performance when compared to their female counterparts, under intervention and real-life situations.

Also, the research of other studies had varying outcomes, compared to the result of this study. According to the outcome of some other research, female children were found to perform better in cognitive skills when compared to their male counterparts, with identical autistic traits or presentations (Coscini et al., 2020). Conversely, however, Georgantopoulou (2023) found that 73% of girls performed poorer in some selected cognitive tasks when compared to a performance threshold of 53% of their male counterparts, who participated in the same intervention.

The position of some other researchers is that there exists no conclusive research regarding the effects of sexuality on the cognitive performance of children with ASD. In the opinion of such scholars, there is a clear need for further studies to bring out more decisive and definite variation in cognitive performance of autistic children based on sexual presentations (de Giambattista et al., 2021).

The null hypothesis was accepted. Results from this study indicate that there is no significant effect of sex on the social skills of children with ASD in Lagos State. The outcome implies that sex of the participants did not significantly affect their summative performance in social skills after the intervention. The findings of this research negate the findings of de Giambattista et al. (2021), who opined that autistic female children attained better scores in social skills when compared to their male counterparts at identical positions on the autism spectrum. Accordingly, Ayirebi and Thomas (2024) and Head et al. posited that female autistics would display better social coping strategies and also perform better compared to their male counterparts, under similar intervention conditions.

The research of Loomes et al. (2017) was, however, contradictory to the discoveries of this researcher. They asserted that boys had a lesser tendency to perform better in social skills display when compared to girls at identical positions on the ASD spectrum. Similar to this, the findings of Dean et al. (2017) and Tierney et al. (2016) are that girls are more capable of masking the social communication symptoms of ASD and thus often do better than boys in terms of social skills, especially in the realms of remembering and imitation of others.

The findings of this research may however be said to be in line with the findings of Geelhand et al. (2019) who discovered that there is no significant difference in the social presentation and disposition of young autistic female children when compared to those of their male counterparts, although the research further asserts that this equilibrium is displaced by the passage of time, especially once the children reach age 15 years.

6 Conclusion

The findings of this study revealed that there was no significant difference in both cognitive and social skills of children with Autism Spectrum Disorder (ASD) in Lagos State based on sex. This suggests that male and female children with ASD possess similar capacities for learning and social development when exposed to structured play-based interventions such as storytelling and thematic play. Hence, improvement in cognitive and social outcomes appears to depend more on the quality of intervention rather than the sex of the child.

Socially, this indicates that female children living with autism should be accorded equal attention with their male counterparts. The female child with ASD should not, under any condition, be discriminated against or discouraged from learning based on her natural sexual presentation.

These results contradict some earlier studies that reported sex-based disparities in cognitive and social functioning among children with ASD but align with those that found no significant gender effect. The implication is that educators and therapists should emphasise inclusive, experience-based learning approaches that support all children irrespective of sex. Further research is recommended to explore other factors, such as environmental and developmental differences, that may influence learning outcomes among children with ASD.

Study limitations and suggestions for further studies

One of the greatest limitations of this study was the limited number of participants. It might be somewhat difficult to make very strong deductions of generalisation based on findings derived from a study that had only thirty participants. Furthermore, the study was limited to children in the early childhood stage of development and finally, the study only factored high-functioning children with autism, it did not include the low functioning among the children.

In contrast, further studies could have a larger number of participants, in order to make the results of the research more generalised and widely acceptable. Also, low-functioning children with ASD might be considered to measure the effects of the intervention strategies on their cognitive and social skills acquisition.

Recommendation

Going by the findings and conclusions of this study, it is therefore recommended that the government, school administrators and all other stakeholders educators and all other stakeholders should emphasise individualised learning approaches rather than gender-based expectations in designing intervention programmes and curriculum generally for children living with ASD. Also, girls with autism, as much as boys with autism, should be encouraged to prioritise schooling, right from the early childhood stage, without sexual preference and bias, especially against the schooling of the girl child.

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