



# Investigating English language processing and comprehension difficulties in individuals with neurodevelopmental disorders in Bonny, Rivers State, Nigeria

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**Abstract:** *Using the simple view reading (SVR), this study examined the challenges individuals with down syndrome (DS) and autism spectrum disorder (ASD) in Bonny, Rivers State, Nigeria, have processing and understanding English language. The work investigates how listening and reading comprehension varies among groups, how language processing issues and comprehension are correlated, and how certain educational and environmental factors affect these issues. The work covered the assessment of word reading, reading comprehension, receptive vocabulary and listening comprehension in 10 individuals with DS, 15 with ASD, and 30 normally developing children (TD). In order to get further information, 300 questionnaires were also administered to parents/guardians, teachers and medical experts. The results show notable group disparities with children in the DS and ASD groups performing worse than those in the TD group on all measures. Reading comprehension profiles in DS and ASD was accurately predicted using the SVR model. Consequently, the study recommends instituting/making specialised services accessible, offering professional development to educators, creating support networks for carers, promoting professional inclusion, and encouraging community collaboration. These suggestions are meant to strengthen support networks and raise the quality of English language processing and comprehension in individuals with neurodevelopmental disorders in Bonny, Rivers State, Nigeria.*

**Key Words:** *language processing, comprehension, down syndrome, autism spectrum disorder, poor. Comprehenders.*

## INTRODUCTION

Effective reading comprehension requires both word recognition and listening comprehension, which can be achieved through a basic reading approach. Each contributes independently to reading comprehension, but neither is adequate by itself (Gough & Tunmer, 1986 [1]; Hoover & Gough, 1990 [2]).

This straightforward understanding of reading offers a framework for locating the source of reading comprehension issues, and it has been effectively used in research on reading in populations with both standard and atypical neurodevelopment. (Catts et al., 2006 [3]; Chen & Vellutino, 1997 [4]; Cutting & Scarborough, 2006 [5]; Keenan et al., 2008 [6]; Muter et al., 2004 [7]).



This study examined and contrasted the reading profiles of people with Down syndrome (DS) and autism spectrum disorder (ASD) with those of a sample of normally developing children (TD) in Bonny, Rivers State, Nigeria, using the simple view framework.

## **2. STATEMENT OF THE PROBLEM:**

An increasing amount of research is detailing how people with various neurodevelopmental problems read and pinpointing the source of their difficulty, with an emphasis on those with ASD and DS in particular (Nation et al., 2006 [8]; Ricketts, 2011 [9]; Ricketts et al., 2013 [10]; Roch & Levorato, 2009 [11]; Roch et al., 2021 [12]). There are pertinent theoretical and practical ramifications for this.

Furthermore, since oral language impairments are linked to both ASD and DS, it is anticipated that these kids will have reading difficulties akin to those of children who are labelled as poor comprehenders in the literature: children who have trouble understanding printed texts but end up with better word reading and decoding abilities than expected (Cain et al., 2000 [13]).

Nonetheless, there is variation, perhaps in the reading profiles of children with neurodevelopmental disorders, similar to normally developing groups.

Additionally, no research has been done to date on the comprehension and English language processing issues in people with neurodevelopmental disorders in Bonny, Rivers State, Nigeria.

Thus, in comparison to TD children in Bonny, Rivers State, Nigeria, the current study's goal is to examine/describe the reading profiles of people with DS and ASD and to pinpoint the causes of the individual disparities in reading comprehension across the three groups.

## **3. OBJECTIVES:**

The general aim of this study is to investigate English language processing and comprehension difficulties in individuals with neurodevelopmental disorders in Bonny, Rivers State, Nigeria. However, it is guided by the following specific objectives:

1. To assess English language processing and comprehension difficulties in individuals with DS and ASD in Bonny, Rivers State, Nigeria.
2. To investigate correlations between English language processing difficulties in listening and reading comprehension among individuals with down syndrome (DS) and autism spectrum disorder (ASD) in comparison with typical developing (TD) children in Bonny, Rivers State, Nigeria.
3. To examine educational and environmental factors contributing to English language processing and comprehension difficulties in individuals with DS and ASD in Bonny, Rivers State, Nigeria, considering group differences.
4. To recommend interventions for enhancing language skills in individuals with DS and ASD in Bonny, Rivers State, Nigeria, based on identified factors.

## **4. RESEARCH QUESTIONS**

The study is guided by the following research questions:

1. What are the group differences in listening and reading comprehension among individuals with DS, ASD, and TD in Bonny, Rivers State, Nigeria?
2. To what extent does the relationship between listening and reading comprehension differ across the three groups in Bonny, Rivers State, Nigeria?
3. What are the specific educational and environmental factors contributing to language processing and comprehension difficulties in individuals with DS and ASD in Bonny, Rivers State, Nigeria?
4. What interventions, based on identified factors, can enhance language skills among individuals with DS and ASD in Bonny, Rivers State, Nigeria?



## **5. LITERATURE REVIEW:**

The review of literature is segmented into two parts: Down syndrome (DS), and autism spectrum disorder (ASD)

### **Down syndrome (DS)**

With an increasing focus on the need to test the replicability of results to provide converging and accumulating evidence on a topic, we report new data on individuals with Down syndrome and those with autism spectrum disorder and contrast their performance with young readers with no known neurodevelopmental disorder in Bonny, Rivers State, Nigeria. A particular innovation of our approach is the assessment of word reading in isolation. Reading for meaning is the main purpose of reading, and a better understanding of the strategies that support meaning construction is critical for developing appropriate reading instruction and remediation.

According to Næss et al. (2012) [14] an increasing number of people with DS are able to attend formal education fully and develop a variety of reading abilities. Laws et al. (2015) [15] states that it has been confirmed that the simple view paradigm is valid for interpreting the reading results of individuals with DS since both word reading as well as listening comprehension predict reading comprehension. Also, when compared to typically developing readers, individuals with DS frequently have a "poor comprehender" profile, meaning that their word reading is greater than their hearing comprehension, with the former contributing more to their reading comprehension score (Roch & Levorato, 2009 [11]; Roch et al., 2011 [16]; Roch et al., 2012 [17]; Roch et al., 2019 [18]). In addition, in contrast to groups matched for reading comprehension that are usually developing, people with DS have comparatively better word reading abilities; suggesting that language deficiencies play a significant role in their poor reading comprehension (Nash & Heath, 2011 [19]). Based on the works, it is safe to say people with DS have a low comprehension profile.

### **Autism spectrum disorder (ASD)**

According to Nation (1999) [20], there was long held belief that reading proficiency, at least in the area of word recognition, was a strength for people with ASD. For instance, a number of studies show that age-appropriate or advanced sight word reading and non-word decoding abilities are often present in people with ASD. Group means, nonetheless, can conceal heterogeneity, and certain research have shown a high degree of variation in this population (Nation et al., 2006) [8]. In particular, some people with ASD read well but exhibit extremely low comprehension, which is compatible with a hyperlexia reading profile; others struggle to read both words and non-words, and some are unable to decode non-words even though they possess a respectable degree of word reading ability (Roch et al., 2021) [12]. According to other recent studies, reading comprehension in this population is correlated with the severity of ASD symptoms. Oral language skills acted as a mediating factor in the relationship between higher ASD symptomatology and lower reading comprehension (McIntyre et al., 2017 [21]; McIntyre et al., 2017 [22]; Micia et al., 2019 [23]). In a thorough investigation involving 100 participants, the variability of reading characteristics of people with ASD was confirmed (Ricketts et al., 2013) [10]. While word recognition abilities were highly developed for the majority of participants, reading comprehension was a deficit for many, but not all of them. Reading comprehension deficiencies have been observed to be particularly pronounced in groups of individuals with ASD who demonstrate either low or high structural language (Norbury et al., 2011 [24]). As a result, in contrast to those with DS, those with ASD have reading profiles that are more varied and have widely varying accomplishment levels. Nonetheless, individual variances in spoken language proficiency in ASD are mirrored by variations in reading comprehension, which is in line with the findings on DS (Nation et al., 2006 [8]).

In summary, there are a number of similarities between the reading skill profiles of individuals with DS and ASD. Specifically, each have significant strengths in word recognition despite a selective drawback in non-word reading (Byrne et al., 2002 [25]; Cupples & Iacono, 2002 [26]; Roch & Jarrold, 2008 [27]; Mengoni et al., 2014 [28]; Nally et al., 2018 [29]), and their comparative edge in word identification does not ensure that whatever is read is also comprehended by those with DS (Roch & Levorato, 2009 [11]; Nash & Heath, 2011 [19]; Nation & Norbury, 2005 [30]) and ASD (Frith & Snowling, 2005 [31]; Snowling & Frith, 1986 [32]; Jones et al., 2009 [33]; Huemer & Mann, 2010 [34]). The literatures also show that while reading comprehension challenges are present in both DS and ASD groups, the underlying cause of the difficulties may be different. In contrast, people with ASD also exhibit this poor comprehender profile, but a significant portion exhibit a different reading profile. Individuals with DS often demonstrate high word reading skills in relation to hearing comprehension.

Consequently, tasks measuring word reading accuracy yield useful data about vocabulary and pronunciation retrieval, while answers to comprehension questions about a piece reveal what has been learned.



## **6. METHODOLOGY:**

Three groups participated: 10 individuals with Down syndrome (mean age = 13 years and 9 months, SD = 7 years 1 month; 20% male and 80% female), 15 individuals with ASD (mean age = 12 years and 8 months, SD = 6 years and 7 months; 53% male and 47% female), and 30 typically developing (TD) children (mean age = 7 years and 6 months, SD = 2 years and 9 months; 43% male and 57% female). The two atypical groups were selected from a larger sample on the basis of excluding any individual whose reading abilities were limited to letter recognition only. All participants had normal or corrected vision. To the best of our knowledge, there were no cases of comorbidity between DS and ASD among our participants. Participants with DS and ASD were recruited from schools after their health status were confirmed by parents/guardian based on their medical history. Participants were recruited with their full consent (or parental/guardian consent where appropriate). Participants with TD were recruited in three different mainstream schools in Bonny, Rivers State, Nigeria.

Also, three hundred (300) questionnaires were distributed to parents/guardians, educators and medical experts in Bonny, Rivers State, Nigeria. The questionnaires were designed to elicit information on the cognitive, behavioural and educational factors contributing to English language processing and comprehension difficulties in individuals with DS and ASD in the area.

## **7. MATERIALS AND PROCEDURE:**

Tailored in line with Roch et al. (2021) [12] study with a few modifications, the participants completed a range of standardised tests and experimental measures of word reading accuracy, reading comprehension, receptive vocabulary, and listening comprehension. The assessments were completed in a single session lasting 45 to 60 min. Tasks were administered to all participants in the same order. Parents/guardians, educators and medical experts completed a questionnaire.

### **Reading Comprehension**

Reading comprehension was measured with the Neale (1997) [35] updated Analysis of Reading Ability. Participants read aloud a sequence of short stories and responded to questions following each one. Answers to certain questions were found in the text, while solutions to others call for the participants to generate an inference. We utilised both age-equivalent ratings and raw scores to ensure uniformity. The raw score for understanding was calculated by adding together all of the questions that were answered correctly. Based on test norms, this raw score may be converted into a reading comprehension age. The NARA-II has a high test-retest reliability ( $> 0.81$ ) and a high internal reliability ( $> 0.82$ ).

### **Word Reading**

The accuracy of single-word, non-word, and word reading in context was evaluated using three tasks. Individuals were given twenty irregular words with one or two syllables each to assess their single word reading proficiency. With a score range of 0 to 20, each accurate solution was worth one point. With 20 non-words that had one or two syllables, single non-word reading was evaluated using the same methodology. Each right response earned one point; the possible scores ranged from 0 to 20. In order to reduce the possibility of lexicalization errors for the non-words, the two tasks were presented independently. The NARA-II was used to measure word reading in context (Neale, 1997) [35]. The amount of words correctly read throughout the passage reading was scored, and based on test norms, this result was converted into reading age accuracy. This test's reliability is 0.89.

### **Oral Comprehension**

Tests for listening comprehension and receptive vocabulary were administered separately. The British Picture Vocabulary Scale (BPVS), developed by Dunn et al. (2009) [36], was used to assess receptive vocabulary knowledge in order to gauge its breadth. Every participant is asked to choose from four images the one that most accurately depicts the meaning of a word that the experimenter says out loud. The raw score is the value of words that are recognised properly minus the number of errors. The test was given and scored in compliance with the manual's instructions; the standard scores had a mean of 100 (SD = 15). The task's split-half reliability in our age group ranges from 0.75 to 0.95.

### **Listening Comprehension**

Utilising Form 2 of the NARA-II, listening comprehension was evaluated. This was applied to passages different from those used to evaluate reading comprehension. After reading the passages aloud, participants were asked questions to determine their level of understanding. We converted raw scores into a listening comprehension age to facilitate



comparisons between groups and among participants, as different participants completed varying numbers of stories and, consequently, varying numbers of questions. The number of questions correctly answered was converted into a listening comprehension age. Both the raw and age-equivalent scores were reported. Across all relevant age groups, the test's parallel form reliability is 0.89.

**Questionnaire**

Out of three hundred (300) questionnaires distributed to parents/guardians, educators and medical experts in Bonny, Rivers State, Nigeria, two hundred and seventy-five (275) were returned filled. The questionnaires were designed to elicit information on the cognitive, behavioural and educational factors contributing to English language processing and comprehension difficulties in individuals with DS and ASD in Bonny, Rivers State, Nigeria.

The instruments to be used were validated by two (2) experts in psychometrics, test construction and development.

**8. RESULTS:**

On the entire group, the data distributions for every measure were examined. The data set obtained pertaining to DS and ASD failed the normality test. However, all TD group data were normally distributed. For every variable, separate-between-subject ANOVAs using raw scores were performed. Significant group differences are shown in Table 1 after significant main effects were investigated using Tukey's HSD post hoc test.

Table 1: Descriptive statistics for both raw and standard scores

	<b>DS(N = 10)</b>	<b>ASD (N = 15)</b>	<b>TD (N = 30)</b>	<b>ANOVA</b>
Single word reading (max = 20)	10.80 (2.20) 9 - 15	8.20 (2.65) 5 - 13	15.10 (3.52) 10 - 20	F(2,54) = 6.90, p < 0.001
Single non-word reading (max = 20)	8.30 (4.42) 2 - 15	6.60 (3.02) 1 - 12	16.23 (2.30) 12 - 20	F(2,54) = 9.63, p < 0.001 DS & ASD < TD
Text reading: Raw scores	20.0 (4.32) 15 - 30	20.27 (11.68) 0 - 35	47.63 (7.19) 37 - 62	F(2,54) = 27.34, p < 0.001 DS & ASD < TD
Text reading: Age equivalent	59.40 (15.47) 40 - 90	72.47 (14.68) 53 - 96	102.0 (5.45) 95 - 118	
Receptive vocabulary: BPVS Raw scores	57.00(21.19) 39 - 86	72.17 (15.72) 50 - 100	109.33 (11.98) 90 - 130	F(2,54) = 37.20, p < 0.001 DS & ASD < TD
BPVS Standard scores (M = 100, DS = 15)	60.70 (20.06) 25 - 86	74.67 (15.32) 51 - 104	127.97 (15.86) 100 - 150	
Listening comprehension: Raw scores	5.40 (3.20) 0 - 10	7.20 (4.31) 0 - 15	20.33 (3.37) 15 - 25	F(2,54) = 13.13, p < 0.001 DS & ASD < TD
Listening comprehension: Age equivalent	41.30 (13.16) 28 - 72	63.07 (25.49) 31 - 108	116.13 (4.85) 108 - 125	
Reading comprehension: Raw scores	4.60 (2.95) 0 - 8	6.00 (4.42) 0 - 16	25.0 (5.04) 17 - 35	F(2,54) = 19.00, p < 0.001 DS & ASD < TD
Reading comprehension: Age equivalent	50.60 (13.37) 30 - 71	58.80 (24.01) 25 - 96	115.53 (15.50) 97 - 148	

To make the data easier to read and interpret, age-equivalent scores are included in Table 1 along with the raw scores. The atypical groups performed poorly compared to the TD children. Albeit such performances, the ASD group displayed much more variability across all parameters compared to the DS group.

The simple view of reading (SVR) in the groups

A relationship between the reading accuracy of words along with non-words and reading comprehension, as well as between oral language skills (receptive vocabulary and listening comprehension) and reading comprehension, was tested with the aim of investigating the predictors of reading comprehension based on the SVR in the three groups.

To begin, we performed four regressions, one for each component, to forecast the TD children reading comprehension. Simply put, reading comprehension was the dependent variable in every regression, and the independent variables were either word reading, non-word reading, listening comprehension, or vocabulary.



Figures 1-4 demonstrate the validity of our technique by showing that all of the regressions within this group explain a significant amount of variance (approximately 73.6%,  $p = 0.01$ ).

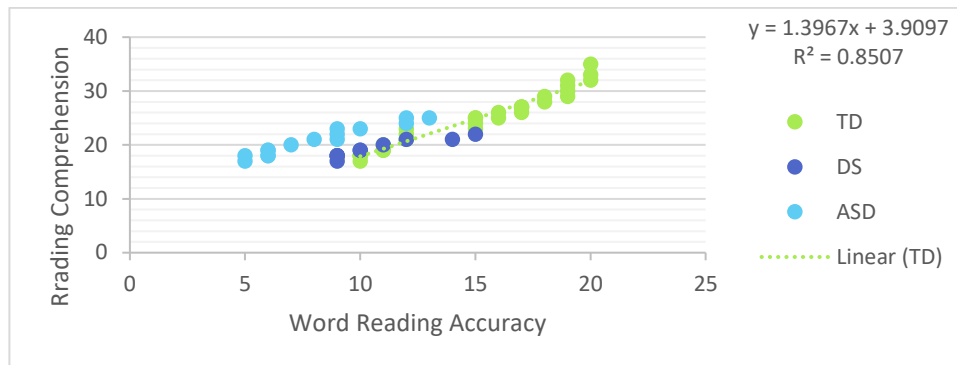


Figure 1: Wording reading accuracy predicting reading comprehension

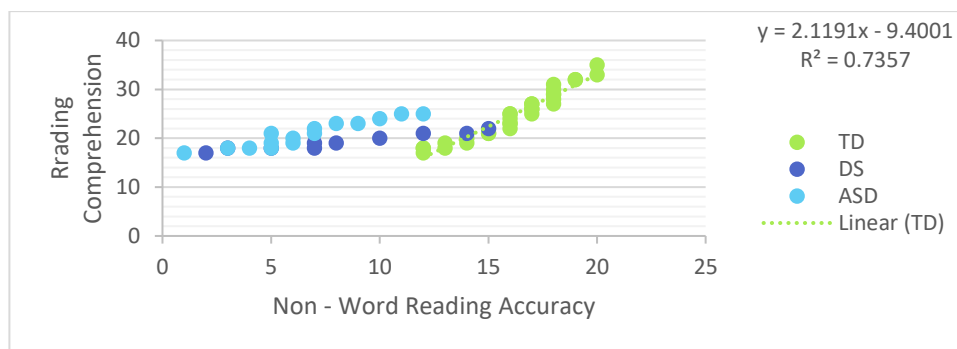


Figure 2: Non-wording reading accuracy predicting reading comprehension

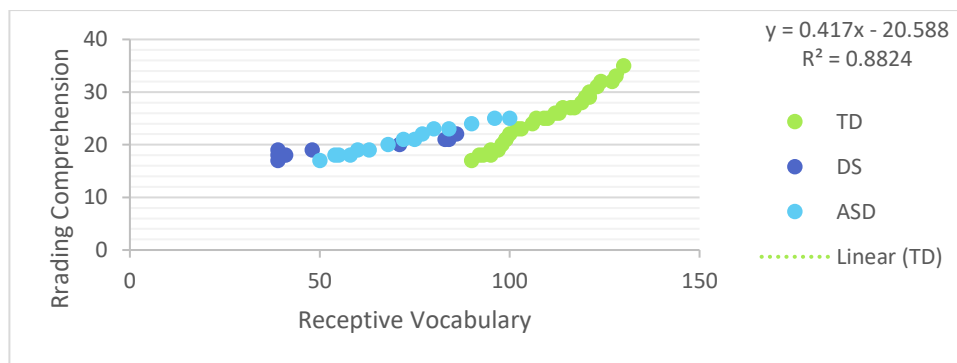


Figure 3: Receptive vocabulary predicting reading comprehension

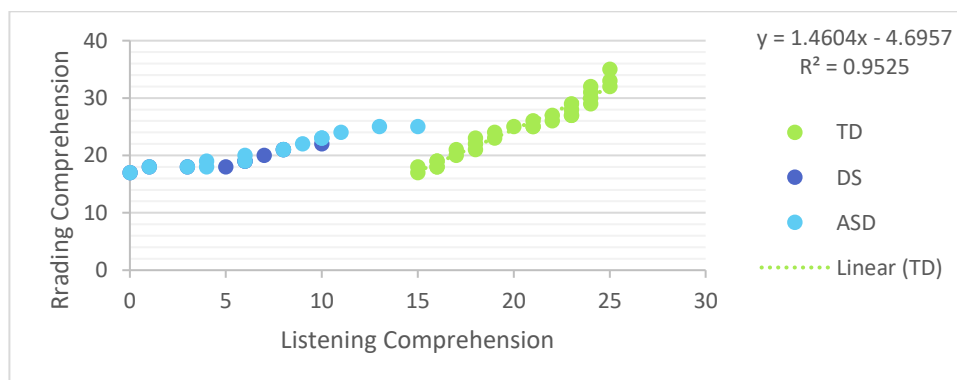


Figure 4: Listening comprehension predicting reading comprehension



Following that, the equation for the relationship between reading comprehension and each predictor in TD children was used to determine expected reading comprehension scores for each individual with DS and ASD, given their score on the predictor variable in question. The standard error in the estimate from the regression of TD children was then used to standardise the "residual" gap between the observed and the expected reading comprehension for each individual with DS and ASD (Jarrold & Brock, 2006) [37]. The standard error in the estimate of the TD regression was used to determine the appropriateness of standardising the performance of the two atypical groups, independent of their sizes and accounting for the level of confidence in the regression.

This resulted in a z-score for every participant, which showed whether or not their reading comprehension score matched expectations based on how well they performed on the relevant predictor variable. Negative z-scores show that, in relation to their performance on the target predictor, participants' reading comprehension was lower than anticipated.

Diagrammatic representations of these findings are shown in Figures 1-4. Table 2 displays the average z-scores for each predictor.

Table 2: Mean z-scores (standard deviations) for each predictor in the two atypical groups.

Predictors	DS	ASD
Word reading	-2.818 (1.152)	-0.830 (1.586)
Non-word reading	-0.837 (0.643)	-0.199 (1.410)
Receptive vocabulary	-2.473 (0.121)	-4.209 (0.273)
Listening Comprehension	-0.250 (0.895)	-0.279 (0.988)

The z-scores across the domains, with the exception of those derived from listening comprehension and the ASD's non-word reading, exhibited statistically significant deviations from the mean of 0. This variance is distinct from the performance patterns observed in TD children, as outlined in the graphical representations in Figures 1-4.

These findings underscore the widespread challenges faced by both atypical groups across all evaluated domains, owing to the absence of specialized schools in Bonny, Rivers State, Nigeria.

Consequently, individuals within these atypical groups are integrated into mainstream educational settings alongside TD children, where they often lack the tailored support required for optimal academic achievement; thereby contributing to their underperformance. Moreover, a noteworthy correlation emerges between non-word reading, particularly within the ASD domain, and reading comprehension, mirroring a similar association with listening comprehension.

Moreover, the numbers and standard deviation both demonstrate the increased variability among the ASD population, which is especially noticeable in word and non-word reading activities. The predictive validity of the chosen indicators for both the DS and ASD groups is still apparent, despite the noted academic difficulties. This implies that the predictors accurately forecast the academic outcomes within these atypical groups, notwithstanding their subpar performance.

Also, Figures 5-7 show the responses of parents/guardians and educators in simple percentages. Of the 300 questionnaires distributed, 270 were returned filled.

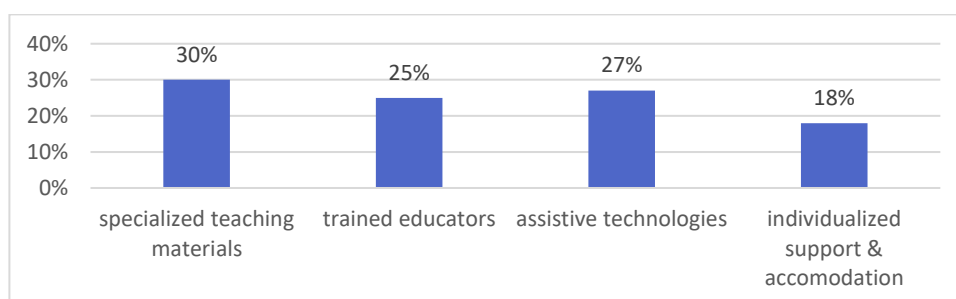


Figure 5: Educators' response to educational resources that are lacking for children with DS and ASD in Bonny, Rivers State, Nigeria

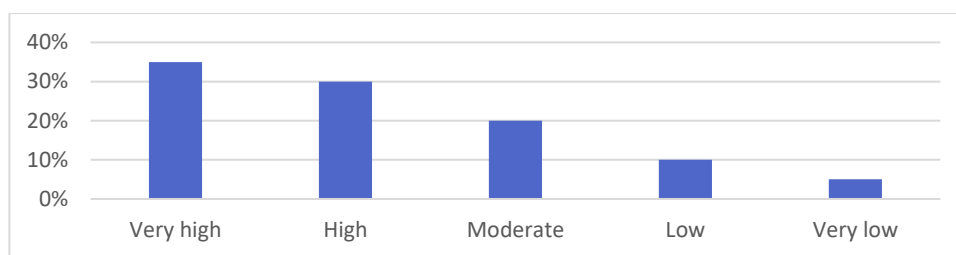


Figure 6: Parents/guardians' response to the influence of cultural attitudes and stigma on English language processing and comprehension difficulties among children with DS and ASD in Bonny, Rivers State, Nigeria

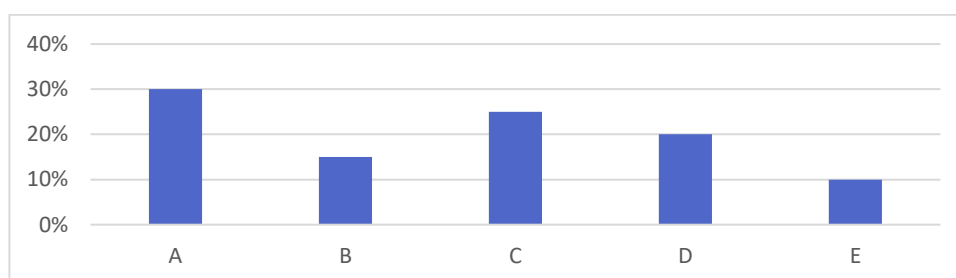


Figure 7: Medical experts' recommendations on ways to improve the support systems for individuals with DS and ASD experiencing language processing and comprehension difficulties

**KEYS:**

- A.** Increase accessibility to specialised speech therapy and language intervention programmes
- B.** Implement training workshops for educators and caregivers on effective communication strategies
- C.** Establish support groups or networks for parents and caregivers to share experiences and resources
- D.** Advocate for the inclusion of speech and language professionals within educational institutions and healthcare facilities
- E.** Collaborate with local community organisations to create inclusive environments and opportunities for individuals with DS and ASD

**9. DISCUSSION:**

The major aim of the current work is to investigate English language processing and comprehension difficulties in individuals with neurodevelopmental disorders in Bonny, Rivers State, Nigeria. The group of individuals with DS and ASD were compared to TD children without neurodevelopmental disorders with comparable levels of single word reading accuracy and receptive vocabulary.

While DS and ASD have never been explicitly compared or examined in Bonny, Rivers State, Nigeria, both have a profile that is comparable to that of poor comprehenders as described in the literature. By repeating the pattern of results regarding language comprehension, reading comprehension, and single- and non-word reading in all three groups, our results offer additional support for the validity of the SVR model in both typical and atypical populations.

The SVR's fundamental skills were enough to predict the reading comprehension profiles of people with DS and ASD compared to children with TD who had high reading comprehension. The findings are examined in the context of current pertinent literature arranged in three topical areas.

**Group Comparisons (Reading comprehension, word reading, oral and listening comprehension)**

When compared to TD children, the DS and ASD groups showed poor word reading accuracy. In this regard, TD children performed noticeably better. Similar to word reading, the atypical groups had lower accuracy in non-word reading compared to TD children. This pattern is consistent with earlier researches (Roch & Jarrold, 2008 [27]; Roch &





Jarrold, 2012 [38]; Nation & Norbury, 2005 [30]) that found that people with DS and ASD had poor decoding abilities, which have been linked to defective phonological processing.

For listening and reading comprehension, group comparisons also revealed that the DS and ASD groups demonstrated significantly poorer listening comprehension skills when compared to the TD children. In addition, the two atypical groups demonstrated weak text reading compared to TD children. These results support earlier studies on both English-speaking and Italian-speaking children living with DS, as well as English-speaking children with ASD as portrayed in Roch et al. (2021) [12].

Converging evidence has been found in the current study to suggest that the profile exhibited by individuals with DS and ASD in Bonny, Rivers State, Nigeria, is comparable to that of poor comprehenders.

**SVR in the Three Groups**

The simple view reading (SVR) model was used to analyse the relationship between reading accuracy, oral language skills and reading comprehension across the three groups. In all three groups, reading comprehension was examined as a potential predictor of language comprehension and reading accuracy. The DS group demonstrated the greatest departure from expected performance in word reading accuracy, as predicted by the model, followed by the ASD group; this suggests challenges in this area. When it came to non-word reading accuracy, both the DS and ASD groups deviated poorly from the TD children; however, the ASD group did so less than the DS group. By using the equation for the relationship between each predictor of children with typical development, this work calculated expected reading comprehension for each individual with DS, and ASD. Also, the receptive vocabulary performance of the DS group was significantly different from expected, suggesting difficulties in this domain. The atypical groups performed differently in listening comprehension than the TD group, though the ASD group differed from the DS group marginally.

In general, the SVR model correctly predicted reading comprehension profiles in people with ASD and DS, even though their performance was worse than that of those with TD.

The findings have bearing on research involving people with ASD, as it has been demonstrated that oral language proficiency levels and reading comprehension issues are correlated (Norbury & Nation, 2011) [39].

The novel part of this work is that the two atypical groups were compared in Bonny, Rivers State, Nigeria, for the first time. Additionally, they completed the identical set of activities directly, which revealed significant similarities in their reading profiles.

**Questionnaire**

Questionnaires were distributed to educators, parents/guardians and medical experts to elicit information bothering on specific educational and environmental factors contributing to language processing and comprehension difficulties in individuals with DS and ASD in Bonny, Rivers State, Nigeria.

Table 3 gives a description of the questionnaires distributed and returned.

Table 3: Description questionnaire distribution and return

S/N	RESPONDENTS	QUESTIONNAIRE	
		NUMBER DISTRIBUTED	NUMBER RETURNED
1	Educators	230	219
2	Parents/Guardians	40	32
3	Medical Experts	30	24
TOTAL		300	275

Responses from educators and parents/guardians revealed various challenges faced by individuals with DS and ASD in Bonny, Rivers State, Nigeria.

30% of educators reported a lack of specialised teaching materials for children with DS and ASD in schools within the region. This is in addition to the 27% and 25% whose view supported the lack of assistive technologies, and lack of trained educators respectively. 18% submitted that the problem is adduced to lack of individualised support and



accommodation. These show that schools in Bonny, Rivers State, Nigeria, lack adequate educational resources for children with DS and ASD.

Similarly, parents/guardians highlighted the influence of cultural attitudes and stigma on English language processing and comprehension difficulties among children with DS and ASD in the region. 35% of respondents in this category are of the opinion that the influence of cultural attitudes and stigma on English language processing and comprehension difficulties among children with DS and ASD in the area is very high; 30% feel such an effect is high, while 20%, 10% and 5% are of the view that is moderate, low and very low respectively.

Based on their expertise, medical experts recommended ways to improve the support systems for individuals with DS and ASD experiencing language processing and comprehension difficulties in Bonny, Rivers State, Nigeria. 30% of respondents recommended increase accessibility to specialised speech therapy and language intervention programmes; 25% suggested implementing training workshops for educators and caregivers on effective communication strategies; 20% proposed establishing support groups or networks for parents and caregivers to share experiences and resources; 15% advocated for the inclusion of speech and language professionals within educational institutions and healthcare facilities, while 10% encouraged collaboration with local community organisations to create inclusive environments and opportunities for individuals with DS and ASD in the region.

## **10. RECOMMENDATIONS:**

A comprehensive strategy is needed to address the special difficulties that people with neurodevelopmental disorders, in particular those with Down syndrome (DS) and autism spectrum disorder (ASD), in Bonny, Rivers State, Nigeria, encounter. By employing the simple view reading (SVR) framework to conduct a thorough analysis of reading profiles, and questionnaires specially designed for medical experts, educators as well as parents/guardians of children living with DS and ASD to elicit data, this study has pinpointed particular educational and environmental characteristics that are linked to language processing and comprehension challenges in individuals within the area. The following suggestions are put forth in response to these findings in order to establish/improve support networks and outcomes for local residents with DS and ASD.

First and foremost, it is imperative to make specialised services more accessible to people with DS and ASD. To help more people in need, this entails growing speech therapy and language intervention programmes. In order to provide educators and carers with appropriate communication methods that are specifically adapted to the needs of neurodevelopmental disorders, professional development courses should also be undertaken. The methods and strategies supported by research should be the main focus of these workshops in order to help language development in people with DS and ASD in the community.

To create a forum for learning and mutual support, it is also crucial for parents/guardians and carers to build support networks. These networks can provide insightful information and practical solutions for coping with language processing and comprehension challenges in day-to-day living. Furthermore, it is imperative to champion the integration of speech-language pathologists into healthcare facilities and educational establishments. Working together, educators, medical experts and therapists can improve the support network for people with DS and ASD.

The last step in creating inclusive environments and opportunities for people with neurodevelopmental disorders is to collaborate with local community organisations. This entails taking steps to increase awareness, encourage acceptance, and establish supportive environments that cater to the various needs of people with DS and ASD. By putting these recommendations into practice, stakeholders can work towards enhancing the quality of life and support systems for people with DS and ASD in Bonny, Rivers State, Nigeria.

These initiatives would lead to improved educational results, increased social inclusion and the realisation of the full potential of those suffering from neurodevelopmental disorders in the community.

## **11. CONCLUSION:**

In brief, this research has underscored the challenges related to the processing and understanding of the English language that people with neurodevelopmental disorders, more especially, down syndrome (DS) and autism spectrum disorder (ASD), in Bonny, Rivers State, Nigeria, face. A thorough examination of reading profiles using the simple view



framework has provided important new insights into the particular difficulties these people have learning language and comprehending written materials.

The results of this study show that reading comprehension and word recognition patterns in people with DS and ASD in the region are similar to those of poor comprehenders, as reported in the literature. Both the atypical groups showed poorer levels of word reading accuracy, non-word reading accuracy, listening comprehension, and reading comprehension relative to typically developing children, albeit significant diversity within each group. These findings highlight the critical need for specialised interventions and support networks to address the unique educational and environmental factors causing language processing and comprehension issues in Bonny, Rivers State, Nigeria, individuals with DS and ASD.

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