# English Orthography: A Contributor to Spelling Difficulties of Young Dyslexic Learners in Nigeria

By

**ONWUDINJO, Nneka Anastesia** (Corresponding Author)

Federal College of Education (Technical) Umunze

Onwudinjonneka50@gmail.com

&

**Prof. MADU, Bridget Ngozi**

Chukwuemeka Odumegwu Ojukwu University, Igbariam

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**Abstract**

Dyslexia is a neurobiological disorder that causes reading and spelling challenges in affected individuals. It is incurable but the affected can learn how to read and spell if they undergo special intervention sessions. However, it has been discovered that despite undergoing intervention programmes, many of dyslexic learners of English continue to encounter difficulties with developing these language skills. The aim of this study is to discover if the orthography of English contributes to spelling challenges faced by dyslexics in Nigeria. Data were collected from English essay writing exercises of four dyslexic learners in three privately owned secondary schools in Awka, Anambra State, Nigeria. Thirty-seven words that were wrongly spelt were selected from the learners' essays and qualitatively analysed through the lens of Velluntino et al. (2004) Phonological Coding Deficit theory. Findings revealed that the misspelt words were those that reflected the inconsistency in English spelling patterns. The study concluded that the inconsistency in English orthographic system is a major contributor to the spelling challenges faced by young dyslexic learners in Nigeria.

**Keywords**: English orthography, dyslexia, phonological awareness, phonological coding deficit theory

## 1. Introduction

Dyslexia is one of the factors that are causing learning challenges among young Nigerian learners. This disorder obstructs its victims' ability to develop two crucial language skills, which are reading and spelling. For dyslexic learners to be able to perform any of these linguistic exercises, they would have to go through intensive reading and spelling activities because they cannot learn those skills without assistance (Lama, 2019). However, if their challenges are diagnosed early and they are engaged in intervention programmes, they can devise linguistic strategies, which could help them read and spell all through their lives since dyslexia is incurable.

Fortunately, many Nigerian parents do not hesitate to seek special tutorial classes for their children, especially those that show signs of dyslexia. This means that many dyslexics in the country are already engaged in learning activities that could help them overcome their challenges. Nevertheless, it was observed that some dyslexics continue to encounter challenges despite partaking in these intervention programmes (Macchi, 2022). This could be as a result of several factors, which include genetics. However, one area that has not been given adequate attention is the connection between the orthography of English and the spelling challenges faced by dyslexics. Orthography is the spelling pattern of a language and an individual will find it difficult to communicate effectively and clearly in written language if he or she fails to master the orthographic system of the used language. Considering that Nigeria is a multilingual country that adopted the English language as its lingua franca and the language of education, it will not be farfetched to attribute some of the challenges faced by the dyslexics as partially contributed by the orthographic pattern of the language. According to Nijakowska (2015), English has a complex and opaque writing system, meaning that dyslexics will find it difficult to communicate effectively and clearly with it. But since much attention has not been given to the contribution of the English orthography to the challenges of dyslexic learners, there is scarcity of literature that could help one to drive a conclusion on the case.

The aim of this study, therefore, is to discover how the writing system of English contributes to the spelling challenges faced by young dyslexic learners in Nigeria. The study's objectives are to discover the features of English orthography that pose challenges to Nigerian dyslexic learners and the linguistic strategies used by the affected learners to spell unfamiliar words. Achieving these objectives enabled the study to identify another major cause of the spelling challenges encountered by dyslexic learners.

## 2.1 Dyslexia

Dyslexia is a neurobiological disorder that manifests as a challenge with developing two basic linguistic skills, which are reading and spelling skills. Vizhi and Rathnasabapathy (2023) perceive it as a form of neurobiological disease that affects the victim's ability to learn how to read. This challenge, they reveal, is more pronounced in second and third language learners but Lama (2019) argues that the disability can be found in any affected language learner irrespective of whether they are using their first, second, or third language. Put differently, first language users, who are dyslexic, also encounter reading and spelling challenges in their language.

According to Macchi (2022), dyslexia is a type of disease that affects the brain and consequently prevents the development of reading and spelling skills. He submits that the disorder is sometimes difficult to diagnose because it affects normal intelligent people. The affected

individuals usually struggle to develop those skills but despite their efforts, they are not up to par when compared to their non-dyslexic peers. Wajuihian and Naidoo (2011) explain that even though dyslexia is caused by a minor neurological disorder, its impacts on victims are enormous. This does not only owe to the fact that dyslexics find it difficult to spell and read but also because they face emotional, psychological, social and mental trauma as a result of their inability to complete reading and spelling tasks assigned to them. In addition, many dyslexics are perceived as unintelligent, mentally unstable and academically unfit because of their challenges. These perceptions that people hold about the dyslexics have been identified by Bhawani et al. (2024) as unfounded because, as they argue, dyslexia is not a mental or psychological illness but a difference in the assembling of the affected individuals' brains, which only manifest when they start encountering challenges with developing reading and spelling challenges. In other words, if the dyslexics had no reason to read or spell, their disorder would not be discovered.

Most times, dyslexia goes undiagnosed as a result of several factors, which include the neglect of teachers and non-attendance to formal education, where reading and spelling activities take place. Since the challenges faced by dyslexics can only be identified when they are faced with reading and spelling activities, deficiencies in these language skills have been identified as the symptoms of the disorder (Werth, 2023). Furthermore, if teachers have little or no knowledge of dyslexia, they will be unable to diagnose the disorder in their students. This also means they (the teachers) will fail to aid affected students.

The best way to diagnose dyslexia is by giving literacy tests to learners. Here, they are tested to evaluate their reading and spelling skills, which are the two major symptoms of the disorder (Kuerten et al., 2019; Werth, 2023; Schulte-Korne, 2010). Other methods that may be recommended in some cases are the use of magnetic resonance imaging (MRI) scan and computer tomography (CT) scan, both of which are forms of neuro-imaging techniques (Wajuihian & Naidoo, 2011). Nevertheless, as Schulte-Korne (2010) emphasises, reading and spelling tests are the best ways of diagnosing dyslexia in learners.

This study adopted the conceptualisation of dyslexia by Werth (2023), which perceives it as a reading and spelling difficulty that is caused by the failure of language lateralisation in the brain. He explains that in the brains of the dyslexics, the left hemisphere, which is the part of the human brain that specialises in language processing, does not function as it should because of the neurobiological makeup. By this description, this study identifies dyslexia as a reading and spelling difficulty that is caused by a difference in the neurobiological makeup of the victims' brains.

## 2.2 English Orthography

Orthography refers to the spelling and writing system of a language. According to Miller (2019), it is the relationship between printed texts and the spoken language. Lim et al. (2024) explains that for language users to be able to read and write accurately, they must learn its grapheme (printed letters) and the sound/s represented by each letter, as well as be able to combine these sounds and letters to create words. Llaurado and Dockrell (2020) state that an individual needs to understand the orthographic system of her language to be able to read and spell accurately because learning this writing system can help them to develop their word recognition skills. In other words, learning the orthography of a language is a crucial factor for developing reading and writing skills.

Studies have shown that the orthography of English is inconsistent. Umera-Okeke (2008) for instance, reveals that in English, a sound may be represented by different letters, as seen in the case the sound /f/ being represented by f (e.g. **f**ight), ff (e.g. sti**ff**), ph (e.g. **ph**one) and gh (e.g. cou**gh**). She also observes that a letter can represent different sounds as seen in letter 'a' representing /æ/ (e.g. c**a**t), /ei/ (e.g. m**a**ke), and /eə/ (e.g. p**a**ir) while some are silent in words (e.g. 'h' in **h**our and 't' in cas**t**le). Another inconsistency in English orthography is found in the variation of its tense and plurality markers (Umera-Okeke, 2008; Lim et al., 2024). For instance, while the usual tense marker in English is the addition of the suffix '-ed' or '-d' (e.g. past tense of 'play' = 'played' and 'dive' = 'dived'), some words use irregular past tense markers (e.g. 'go' = 'went' and 'lead' = 'led') or none at all (e.g. 'cost' = 'cost'). Furthermore, the plural markers of English nouns are usually '-s' or '-es'. However, some words have irregular plurality forms (e.g. 'man' = 'men') while others do not show plurality at all (e.g. 'sheep' = 'sheep').

Lim et al. (2024) submit that the inconsistencies in the English orthographic system are mostly noticed while reading than while writing. They explain that this is because while the former involves a visual activity, the latter is achieved through auditory processing. What this means is that some words in English pose challenges to readers because the alphabets that make up the words are different from the sounds they represent. In other words, the affected words may be read wrongly because of the inconsistent nature of the English orthography. However, as Lim et al. explain, in the case of writing, the individual may represent sounds with the conventional letters that represent them in the language.

According to Nijakowska (2015), the orthographic system of English is complex and non-transparent because of the unpredictable relationship between its letters and the sounds they represent. Roitsch and Watson (2019) agree with this submission because they state that the relationship between the letters and phonemes of the language are irregular. Ambalegin and Suryani (2018) observe that one of the major areas of inconsistencies in English orthography is the affixation system. For instance, even though both 'auto' and 'potato' end with the same letter 'o' and sound /əʊ/, while the suffix '-s' is attached to 'auto' to pluralise the concept (i.e. 'auto**s**'), '-es' is attached to 'potato' to mark its plurality (i.e. 'potatoes'). These irregularities in English orthography are some of the reasons dyslexic learners find it challenging to spell certain words in the language.

## 2.3 Theoretical Framework

This study adopted the Phonological Coding Deficit theory by Velluntino et al. (2004) as its theoretical framework. This theory is a model of phonological deficit theory of dyslexia, which identifies phonological deficiency as a key factor that prevents dyslexic learners from developing phonological awareness in their language. Lack of phonological awareness has been discovered to impede the dyslexics' ability to represent, store and retrieve speech sounds as well as use them in the orthographic system to build words, phrases, clauses and sentences (Share, 2021; Vellutino et al., 2004). Put differently, the phonological deficit theory, as well as its model, the Phonological Deficit Theory, postulates that dyslexic learners encounter reading and spelling challenges because they have deficiency in phonological awareness.

Velluntino et al. (2004) identified seven means of testing dyslexic learners to discover their levels of phonological awareness skills. The first of these elements is phonological awareness, which should be used to test the individual's ability to identify and process the sounds in words and other

linguistic units, such as phrases, clauses, and sentences. The second component is word identification, which is used to test the individual's ability to identify words in a composition accurately. The third component is letter-sound decoding, which refers to the user's ability to identify and represent sounds with alphabets, especially in cases of spelling unfamiliar words.

Other components of this theory are confrontation naming (ability to identify and name objects during picture reading exercises), rapid naming (speedy and accurate identification of items in series, articulation of words, and retrieval of names from memory), verbal learning (ability to learn and recall words), and verbal memory (ability to recall words, sentences and instructions). However, considering that the scope of this study was delimited to the spelling challenges the English orthography posed to dyslexic learners, it only adopted phonological awareness and letter-sound decoding as the components for analysing collected data.

## 3.0 Methodology

Data were collected from four purposively selected dyslexic students in three privately owned secondary schools located in Awka, Awka South Local Government Area, Anambra State, Nigeria. At the time of data collection, three of the students were 14 years old while the fourth was 15 years old. However, they were all in senior secondary (SS) 1. The criteria used for the selection of these students included exhibition of dyslexic symptoms, engagement in intensive reading and writing coaching, and display of improvement in reading and spelling skills. These criteria were used to enable the study to discover whether the orthography of English contributed to the challenges encountered by the participants. To ensure that the participants met these criteria, their form teachers assisted the researcher in the selection process. They (the teachers) submitted the information and writing materials of the dyslexic students that continued to face dyslexic challenges despite engaging in reading and writing tutorials.

Thirty-seve words were collected from the class English essay writing exercises of the selected participants. The reason for deciding to use the students' essays to evaluate their spelling skills was that it was believed that they composed those essays under relaxed and natural environment, which allowed them to be expressive and uninfluenced by internal and external factors, such as fear of failure, pressure to impress, and the mockery of their peers. Furthermore, the words that were selected were those that were misspelt, as well as those whose meanings could be deciphered from context. Misspelt words, whose meanings were uncertain, were not collected because the researcher did not have any interactive contact with the participants. Furthermore, these selected words were analysed qualitatively through the lens of Phonological Coding Deficit theory by Velluntino et al. (2004). This allowed the story to describe their features extensively.

## 4.1 Data Presentation and Analysis

This section is segmented into two – Test of Phonological Awareness and Test of Letter-Sound Decoding Ability – in order to capture the two tenets of Phonological Coding Deficit theory by Velluntino et al. (2004) that were used to analyse the words.

### 4.1.1 Test of Phonological Awareness

This segment evaluates the dyslexics' ability to identify and process the sounds in words. Here, the analysis is further segmented into sound addition and sound deletion.

#### a. Sound Addition

Some of the words produced by the participants showed that they add sounds to English words while spelling them. Examples of this practice are captured by Table 1.

**Table 1: Sound Addition in the Spelling of Dyslexic Learners**

| s/n | Misspelt Words | Correct Spelling | Remarks |
|---|---|---|---|
| **1.** | Amonge | Among | Addition of /e/ or /ɪ/ at the end |
| **2.** | Sade | Sad | Addition of /e/ or /ɪ/ at the end |
| **3.** | Brothercepa | Brother keeper | Addition of 'keeper' to 'brother' |
| **4.** | Diea | Die | Addition of /æ/ or /ɪ/ at the end |
| **5.** | Sewt | Sweat | Addition of /e/ between /s/ and /w/ |
| **6.** | Allot | A lot | Merging 'a' and 'lot' |
| **7.** | Friskshon | Friction | Addition of /s/ after /ɪ/ |
| **8.** | E**s**specialy | Especially | Addition of /s/ |
| **9.** | Presid**i**ent | President | Addition of /ɪ/ |
| **12.** | Pe**n**rent | Parent | Addition of /n/ |

Table 1 presents instances of sound addition in the spellings of words by the selected dyslexic learners. While entries 1, 2, and 4 show where an extra sound is added at the end of a word, entries 3 and 6 present instances of merging two words to form one. Entries 5 and 7 show instances of the addition of sounds at the middle position of a word. These examples show that the concerned students still struggle with phonological awareness because they could not process the sounds in the affected words. As a result, they could not represent them (the sounds) accurately with letters.

**b. Sound Deletion**

In some cases, the participants delete sounds in words while spelling them. Examples of such instances are captured by Table 2.

**Table 2: Sound Deletion in the Spellings of Dyslexic Learners**

| s/n | Misspelt Words | Correct Spelling | Remarks |
|---|---|---|---|
| **1.** | Sewt | Sweat | Deletion of /e/ after /w/ |
| **2.** | Akrmoney | Acrimony | Deletion of /ɪ/ after /k/ |
| **3.** | Conet | Connect | Deletion of /k/ after /e/ |
| **4.** | Matrial | Material | Deletion of /ɪə/ |

Table 2 shows a few instances of sound deletion in the output of the participants. Though the spellings are generally incorrect, it can be seen that some sounds were not identified or recognised by the participants. These instances also show signs of deficiency in phonological awareness.

### 4.1.2 Test of Letter-Sound Decoding Ability

This segment evaluated the participants' spellings to discover their ability to represent sounds in the English language with correct letters. It is further divided into two subsections – letter-sound representation at different environments and substitution.

**a. Letter-Sound Representation at Different Environments**

This subsection evaluates the participants' ability to represent English sounds at the different parts of words – initial, middle, and terminal. Instances of their challenges with letter-sound representation are presented on Table 3.

**Table 3: Letter-Sound Representation in Different Environments**

| s/n | Misspelt Words | Correct Spelling | Remarks |
|---|---|---|---|
| **1.** | Bod**i** | Body | Final |
| **2.** | Asoc**h**iat | Associate | Middle and final |
| **3.** | Ab**a**ut | About | Middle |
| **4.** | Morn**e** | Mourn | Middle and final |
| **5.** | Man**sh**ion | Mansion | Middle |
| **6.** | Fri**ksh**on | Friction | Middle |
| **7.** | W**e**ist | Waist | Middle |
| **8.** | Pris**e**n | Prison | Middle |
| **9.** | Tr**y**ed | Tried | Middle |
| **10.** | L**a**z**a**r b**ee**m | Laser beam | Middle |
| **11** | T**o**t | Thought | "o" used instead of "ough" |
| **12.** | P**e**nrent | Parent | "e" used instead of "a" |
| **13.** | T**o**t | Taught | "o" used instead of "augh" |
| **14.** | Cach | Catch | Middle |
| **15** | Idintit**i** | Identity | Final |

Table 3 shows that dyslexic learners usually make spelling mistakes because of how they represent sounds at the middle and final positions of words. It is observed here that they do not misrepresent the sounds at words initial positions.

**b. Substitution**

It was discovered that the participants substituted certain words with those that share similar sounds with them. On the same vein, the participants substituted letters in some words by using the conventional letters for representing the identified sounds. Examples of these behaviours are presented on Tables 4 and 5.

**Table 4: Lexical Substitution in the Spellings of Dyslexic Learners**

| s/n | Misspelt Words | Correct Spelling | Remarks |
|---|---|---|---|
| **1.** | There | Their | Substituted an adjective with an adverb |
| **2.** | Story building | Storey building | Substituted an adjective with a noun |
| **3.** | Must | Most | Substituted adjective with a verb |

Table 4 shows that dyslexic learners of English can confuse words because of the similarities in pronunciations. Though they did not make mistakes in the spellings, the

**Table 5: Letter Substitution in the Spellings of Dyslexic Learners**

| s/n | Misspelt Words | Correct Spelling | Remarks |
|---|---|---|---|
| **1.** | Akrmoney | Acrimony | 'k' used instead of 'c' |
| **2.** | Beure | Bury | 'e' used instead of 'y' |
| **3.** | Discribe | Describe | 'i' used instead of 'e' |
| **4.** | Toword | Toward | 'o' used instead of 'a' |
| **5.** | Wid | Weed | 'i' used instead of 'ee' |
| **6.** | Manshion | Mansion | 'sh' used instead of 's' |
| **7.** | Idintiti | Identity | 'i' used instead of 'e' |
| **8.** | Patisipete | Participate | "a", "s" and "e" used instead of "ar", "c" and "a", respectively |

Table 5 presents some instances, where the participants misspelt words because they used the wrong letters to represent respective sounds. However, one specific feature of the substitutes is that they are the conventional letters that represent the sounds in the language. But since the English orthography is complete, the sounds are represented with other letters. For instance, entry 6 captures where 's' is the appropriate letter for representing /ʃ/, which is conventionally represented with 'sh'. Hence, the participant used the conventional letters ('sh') to represent the sound in the word, 'mansion'.

## Discussion of Findings

The analysis of data revealed that after going through intensive writing coaching sessions, dyslexic learners show signs of improvements in their spelling abilities. However, the inconsistencies in the orthographic system of the English language proved to be a challenge to them. For instance, Tables 1 and 2 showed that even though the participants still struggle with developing and improving their phonological awareness skills, whereby they added and deleted sounds in words, they showed signs that they could communicate their thoughts in writing. This shows that these participants would have been able to spell words better if the English orthographic system were more consistent, simple and stable.

One of the features of the English orthographic system that affects the development of spelling skills by the dyslexic is that the language is inconsistent with the representation of sounds. Tables 3 and 5 showed where sounds were misrepresented with letters, which led to their misspelling. The errors in this case occurred because the language sometimes represents a particular sound with different letters as observed by Umera-Okeke (2008) and Roitsch and Watson (2019). Table 4 also captured another form of orthographic inconsistency, whereby different words that have the same pronunciation but different spellings were substituted. This behaviour by the participants has shown that such words can be confusing to dyslexic learners.

Another observation that was made by this study is that dyslexic learners strategically adopt letters to represent sounds in unfamiliar words (Table 5). Here, it was discovered that they adopted the letters that were conventionally used to represent sounds when they spell words they were yet to learn. Unfortunately, the spellings of the words captured by Table 5 were incorrect.

## Conclusion

Dyslexia is a neurobiological disorder that manifests as reading and spelling disability. Though this problem is congenital and can never be cured, it can be managed if the victim is diagnosed and the problem detected early. Early detection of this problem is important because the victims can be enrolled into programmes that can help them devise strategies for reading and spelling accurately.

However, this study observed that dyslexics continue to encounter spelling challenges despite partaking in special reading and spelling tutorial classes. It was discovered that a majority of spelling errors in the output of the dyslexics were caused by the inconsistent style of sound-letter representation in English orthography. This indicates that if the language writing system is more consistent, the dyslexics would have had lower level of errors in their spellings. The English orthography is, therefore, a major contributor to the spelling challenges encountered by dyslexics as a result of its inconsistency with sound-letter representation.

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**Appendix**

**List of Misspelt Words**

| S/N | Misspelt Words | S/N | Misspelt Words |
|---|---|---|---|
| 1. | Amonge | 2. | Lazar beem |
| 3. | Sade | 4. | There |
| 5. | Brothercepa | 6 | Story building |
| 7. | Diea | 8 | Must |
| 9. | Sewt | 10 | Beure |
| 11. | Allot | 12 | Discribe |
| 13 | Friskshon | 14 | Toword |
| 15 | Sewt | 16 | Wid |
| 17 | Akrmoney | 18 | Manshion |
| 19 | Conet | 20 | Cach |
| 21 | Bodi | 22 | Matrial |
| 23 | Asochiat | 24 | Esspecialy |
| 25 | Abaut | 26 | Presidient |
| 27 | Morne | 28 | Idintiti |
| 29 | Manshion | 30 | Patisipete |
| 31 | Frikshon | 32 | tot |
| 33 | Weist | 34 | Tot |
| 35 | Prisen | 36 | Penrent |
| 37 | Tried | | |