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A Phonological Study of Igbo/English Bilingual Aphasic Patients' Speech

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Abstract
This paper is a phonological study of Igbo-English bilingual aphasics. The objective of this paper is to provide the required information on the two languages in aphasics and determine if any of the languages is more affected by aphasia. The information would be useful for language therapists in their work of rehabilitating bilingual aphasics. This work adopted structuralism theory as its theoretical framework and a descriptive research design. Four Igbo-English bilingual Broca's aphasics, aged 57, 61, 69, and 70 years, selected from the University of Port Harcourt Teaching Hospital formed the respondents for this study. Using word repetition and naming tasks instrument prepared by the researchers and validated by three experts, the utterances of the aphasics were gathered and analyzed qualitatively. The findings of the study revealed that across the aphasics studied, the phonology of the aphasics' L2 (English) is more affected by aphasia than the phonology of the L1 (Igbo). For instance, Igbo data revealed only the errors of substitution processes like consonant weakening, but English data revealed also assimilation and syllabic structure errors. Based on the findings of this paper, it is recommended that there is an urgent need to study aphasia as it affects other areas of language study, as well as study bilingual aphasics who speak English and any other Nigerian language. This would enable language therapists to arrive at baseline information that would help make adequate plans for aphasics' management. Proper management of the disorder would help the patients better their language situation and make them more productive in the society.
Keywords: Aphasia, Bilingualism, Phonology, Language therapists

Introduction
Aphasia is a language impairment that results from brain damage. Language impairment is a disorder that interferes with the use of language skills. It interrupts communication. This interruption can be at the phonological, morphological, lexical, and grammatical levels or related to other language areas like speech production and comprehension. Generally, language problems may be expressive and/or receptive. American Speech-Language-Hearing Association (2021) refers to aphasia as an acquired neurogenic language disorder resulting from an injury to the brain, most typically the left hemisphere. In other words, aphasia is neither a genetic disorder nor a congenital disorder. To this effect, aphasics were competent speakers of their language(s) before the accident but either partially or totally lost the ability to use the language due to damage to some parts of the left hemisphere of the brain. Aphasics exhibit diverse degrees of impairments in the primary areas of communication abilities like speaking, comprehension, writing, and reading, depending on the type of aphasia. In some cases, when the damage to the brain occurs, there is the possibility that only one of these communication abilities might be impaired. However, it is very common for aphasics to be limited to more than one communication area. When the aphasia is very severe, the patient loses both production and comprehension abilities, leading to an aphasic syndrome referred to as global aphasia or non-reversible aphasic syndrome.

Mayo Clinic (1998) states that aphasia typically occurs suddenly after a stroke or a head injury. But it can also come on gradually from a slow-growing brain tumor or a disease that causes progressive, permanent damage (degenerative). The severity of the aphasia depends on several conditions, including the cause and the extent of the brain damage. Aphasia is characterized by language impairment. Naturally, it robs one of the ability to communicate. It can affect your ability and written.

NIDCD (2017) categorized aphasia traditionally into fluent and non-fluent aphasia. John Hopkins Medicine (2021) stated that the types of aphasia are usually diagnosed based on which area of the language-dominant side of the brain is affected and the extent of the damage. For example: People with Broca aphasia have damage to the front portion of the language-dominant side of the brain. Those with Wernicke aphasia have damage to the side portion of the language-dominant part of the brain. While Global aphasia is the result of damage to a large portion of the language-dominant side of the brain.

Impairment or loss of language can affect an individual with one, two, or more languages. When it affects someone with only one language the person is referred to as a monolingual aphasic. When it affects a person that uses two languages, he is referred to as a bilingual aphasic. It can, as well, affect a person that uses more than two languages, in which case the person is referred to as a multilingual aphasic. The ability to use one, two, or more languages is called monolingualism, bilingualism, or multilingualism respectively.

Nordiaquist (2020) defines bilingualism as the ability of an individual or the members of a community to use two languages effectively and asserts that more than half of the world's population is bilingual or multilingual. Bilingualism is a very common phenomenon in the speech repertoire of a normal bilingual individual and it is on the rise in many parts of the world. Many authors like Bamgbose (1982) states that Nigeria has well over 400 indigenous languages and, by its language policy, has English and French as official languages; with three local languages -Hausa, Yoruba, and Igbo - serving as auxiliary official languages. Nigeria is, therefore, identified as one of the bilingual societies in the world where English and other languages are spoken by an individual, with different roles assigned to the languages. Abolaji (2012) notes that as a nation that promotes societal bilingualism, its citizens are expected to be literate in English and/or French, in an indigenous language and one other indigenous language selected from Yoruba, Igbo, and Hausa. An average Nigerian, therefore, possesses the propensity to be bilingual or multilingual.

The possibility of meeting and interacting with Nigerians who use two languages and are aphasics is quite high. Unfortunately, even with this possibility in mind, bilingual aphasia has not been fully explored in the Nigerian context. Besides, the few works on bilingual aphasics in Nigerian languages do not provide information with an empirical demonstration on whether the phonology of any of the languages of the bilingual is more affected by the aphasia. Thus, language clinicians are not equipped with adequate information about the phonological features of the language of bilingual aphasics to enhance the rehabilitation process. This has hindered the patients from getting the required professional assistance from the therapists to get over the phonological problems in their language, as the systematic description of the phonology of bilingual aphasics is one of the prerequisites to achieving meaningful language therapy. Based on this, the need to provide information on the phonological problems of aphasics in the Nigerian context arises. The paper identifies the phonological features in the language of

Igbo/English bilingual aphasics whose L1 is Igbo and L2 is English, to determine if any of the languages is more affected by aphasia at the phonological level of language.

Overview of Structuralism

Structuralism is one of the theories of modern linguistics. It is founded by Ferdinand de Saussure. Modern linguistics is descriptive, that is, it analyzes language based on structure or formal characteristics of the language itself. Crystal (1980) notes that structuralism in linguistics refers to any approach to language analysis that pays explicit attention to how linguistic features can be described in terms of structures and systems. The primary fields of interest in structuralism are phonology (the study of sound systems) and morphology (the study of word structure). It is based on the view of Crystal (1980) on the tenets of structuralism that this paper adopts it as its theoretical framework. Structuralism involves gathering a body of utterances and describing all the elements of the utterances at their different linguistic levels. It explains broad subjects by surveying their components and their interaction with each other. Structuralism is, therefore, best suited for this study; as the researchers intend to identify phonological features in the language of Igbo/English bilingual aphasics.

Conceptual Framework

Aphasia

According to Cleveland Clinic (2022), "Aphasia is a brain disorder where a person has trouble speaking or understanding other people speaking. This happens with damage or disruptions in parts of the brain that control spoken language. It often happens with conditions like stroke." For Oweleke (2020), aphasia is a disorder of language use, production, and comprehension caused by brain lesion/damage to the left cerebral hemisphere responsible for language functioning. It is simply the loss of language ability as a result of damage to the brain. National Institute on Deafness and Other Communication Disorders (NIDCD) (2017) defines aphasia as "a disorder that results from damage to portions of the brain that are responsible for language... The disorder impairs the expression and understanding of language as well as reading and writing." This disorder of language abilities can be total or partial depending on the severity of the damage to the brain. Vega (2020) explains aphasia as the inability to understand speech or to produce fluent and coherent speech. It is a language problem acquired after normal language was already established. It is thus described as an acquired language deficit; in contrast with developmental language deficits, which prevent a person from developing normal language abilities in the first place.

Bilingualism

The first records of the word bilingualism come from the 1870s. It is composed of bi-, meaning 'two', lingual, which means 'about languages', and -ism, indicating the practice of something. American Speech-Language-Hearing Association (ASHA) (2004) defines bilingualism as the use of at least two languages by an individual. Bilingualism is typically the regular or habitual use of two languages. In the words of Grosjean (2010:4), bilinguals are "individuals who have various degrees of language abilities in different domains in both languages and dialects..." Bilinguals may or may not be masters of both languages they speak. though in some cases some bilinguals might not be fluent in the second language. According to Boanerges (2018), bilingualism is the existence of two different languages within the speech repertoire of either an individual or a society. This shows that bilingualism exists in two forms- individual and societal. Individual bilingualism exists when an individual has two languages in their repertoire. Bilingualism becomes societal when the two languages involved are assigned two different roles in the society. Nigeria is a typical example of a bilingual society where English

has the role of official language while the ethnic languages have the roles of interaction. Many Nigerians are bilinguals.

Literature Review

Paplikar, Shailaja, Santosh, Suvarna and Subhash (2018) investigated 38 bilingual and 27 monolingual patients who participated in a longitudinal hospital-based stroke registry and were evaluated at least 3 months after stroke (mean 11.5 months). The work aimed to explore the relationship between bilingualism and the severity of language impairment in stroke aphasia. The hypothesis that enhanced cognitive abilities related to bilingualism explored may have a positive impact on recovery from aphasia. Patient performances on language and other cognitive functions were evaluated with Addenbrooke's Cognitive Examination-Revised (ACE-R) validated for use in aphasia in local languages and varying educational levels. The results of monolinguals and bilinguals were compared after accounting for confounding variables, including age, gender, education, occupation, medical, and stroke characteristics. The findings of the work showed that aphasia severity as measured by the language domain sub-scores (total of language and fluency scores) of ACE-R was significantly higher in monolinguals compared with bilinguals (7.0 vs. 14.4, maximum score 40; $p = 0.008$, effect size $= -0.691$). Bilinguals performed significantly better than their monolingual counterparts in the attention, memory, and visuospatial domains of ACE-R. A univariate general linear model analysis showed that bilingualism was significantly associated with higher language domain scores of ACE-R after adjusting for other confounding variables.

Steele (2021) summarized the findings of a study from Cincinnati, OH, and Birmingham, AL regarding behavioral and neurophysiological changes in persons with chronic aphasia following training and use of a high-tech AAC device with speech output. The research had three goals, namely: (i) to study diminution of overall impairment and accompanying improvements in story retelling following the intervention, (ii) to explore and characterize changes in accompanying brain activation, and (iii) to compare outcomes in a high-technology intervention group vs. usual care group. Twelve persons with aphasia (PWA) from a single left cerebrovascular accident (> 12 months) comprised the participant pool, six randomized to the high-technology group and six to a usual care group. For the former, researchers created two personally relevant stories each using visual scene displays on a DynaVox Vmax™; for the usual-care group, participants received treatment based on Schuell's simulation approach. Intervention occupied 12 clinical hours over four weeks.

Outcome data were gathered from (i) administration of standardized assessments instruments; (ii) taping of stories being retold, for discourse analysis, and (iii) for functional magnetic resonance imaging (fMRI) analysis, data capture from participants in scanners who were shown a noun and asked to produce an associated verb in thought (covert), to produce an associated verb in speech (overt), and to say the name of the noun aloud. Both the high-technology group and usual care group showed improvements following the intervention, but group comparisons showed the high-technology group tended towards greater effect size in standardized assessments and higher activity counts in discourse analysis of their story retelling. In both groups, analysis of fMRI activation patterns revealed a trend towards increased left hemisphere activity lateralization during the language-engaging activities, while cortical areas associated with visual processing appeared to show increased engagement in the high-technology group. The work complements existing research into outcome benefits from AAC intervention in chronic aphasia by characterizing discourse changes and cerebral activation patterns that accompany improvements in standardized assessments.

Manouilidou (2021) presented a report of a 50-year-old man with aphasia whose word retrieval was severely impaired. The study aimed to compare the effect of a combined treatment programme (attention training and language treatment) and a single programme (language treatment) on the naming picture materials. In his study, this case was affected by a hemorrhagic cerebrovascular accident in the territory of the Middle Cerebral Artery branches of the left hemisphere. Two naming treatments, i.e. the single and combined treatments sequentially, were provided for SM; during each of them a 50-item word list was practiced (Lists A and B). 12 treatment sessions were implemented for him during each treatment programme. These two lists along with another list (List C), left for assessment of generalization of treatments to untrained items were probed 6 times during and after each programme. The whole picture set was normalized in another study described in the text.

The findings of the study showed that the patient's naming ability progressed during the treatment programmes. However, this progression was more salient in a combined treatment programme. More specifically, List B had a mean score of 34.25 in a combined treatment programme which was higher than the mean of List A in a single treatment programme (14.5). The slope of List B scores was also higher than that of List A (3.7 vs 1.2). List C showed more generalization of combined treatment to untrained items than single treatment based on its mean scores (27 vs 18.5). The conclusion drawn from the findings was that the observed improvements of naming ability were felt to be the result of combining attention training into the language treatment which led to sustained attention, less distraction, and more concentration.

In another development, Mack (2021) studied a 19-year-old left-handed man who was raised by deaf-mute parents and learned sign language concurrently with normal speech. He sustained a traumatic cerebral contusion. He subsequently had no evidence of apraxic, visual-spatial, or sensorimotor deficits of the left limbs with which he was accustomed to using signs. A global aphasic with a dense right hemiparesis, he initially recovered sign language to a greater degree than spoken language, with a reversal on follow-up observations.

Similarly, Richter, Wolfgang, Miltner, and Straube (2008) studied the role of the right hemisphere for language processing and successful therapeutic interventions in aphasic patients. They examined the relationship between brain responses and therapy outcomes in chronic aphasia. Using functional magnetic resonance imaging (fMRI), brain activation was measured during word reading (REA) and word-stem completion (COM) in 16 chronic non-fluent aphasic and 8 healthy subjects. At the end of the research, their findings revealed that right hemisphere activation before aphasia therapy strongly predicts therapeutic success, suggesting the brain activation in chronic aphasic indicates the patient’s potential for further language improvement.

Adesina (2012) examined the segmental phonology of ten bilingual Nigerian Wernicke’s aphasics to explain the noticeable patterns of their phonology. He recorded their speech, and subjected it to perceptual analysis using optimality theory to explicate the way constraints were ranked by the subjects. He identified three major forms of deviations at the segmental level: deletion, substitution, and epenthesis; with deletion being the most prominent, followed by substitution.

From the literature reviewed, we see existing gap in research. Although the work of Adesina (2012) sampled bilinguals in Nigeria, none of the Nigerian languages was focused on to

describe its use by the aphasics. Again, none of the reviewed works identified the phonological features of bilingual aphasics to determine if any of the languages is more affected by aphasia. The need to fill the research gap necessitated the present study.

Methodology

This study employs a descriptive research design. It is suitable for this work as it gives the researchers opportunity to describe the phonology of the languages of bilingual aphasics. The geographical area of this study is Nigeria, represented by Rivers State. Rivers State harbours people from different Nigerian regions, particularly the southeastern region, whose L1 is Igbo and L2 English. Therefore, one can easily meet with Igbo/English bilingual aphasics for elicitation of appropriate and suitable data needed for the study. All the respondents reside in Port Harcourt and were selected from the University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt. The study population is four Igbo-English bilingual Broca's aphasics admitted into the hospital, comprising 2 males and 2 females, selected using stratified random sampling technique based on gender. The researchers used people aged 57, 61, 69 and 70 years. None of the patients was more than 72 hours older than the other patients in their hospital admission records, and the severity of their cases were adjudged comparable by their doctors.

In the collection of data, word repetition and naming technique was employed to draw vocabulary using the visual items like pictures, photographs, and real objects around the vicinity and those provided by the researchers to capture all the vocabulary items in the researchers' list. The vocabulary list formed the instrument for data collection. This data gathering instrument, prepared by the researchers, was validated by three experts- a professor knowledgeable in psycholinguistics and two professors in the Department of Early Childhood Education, Nnamdi Azikiwe University, Awka, Nigeria. The aphasics were engaged in the same word-naming and word-repetition task. The words presented cover the different sounds of English and Igbo. Their responses were recorded with a digital recorder to ensure the accuracy of the data collected. The data were phonemically transcribed and presented. Analysis was by descriptive method using structuralism theory as the theoretical framework.

Data Presentation and Analysis

The names of the aphasics studied would not be disclosed in this work for confidentiality. They would be represented with Case 1 to Case 4. Cases 1 and 3 are females aged 57 and 69 respectively, while Case 2, aged 61, and Case 4, aged 70, are males. The data gathered by the researchers reveal some phonological processes used by the aphasics. They are analyzed in the sections below.

Velar Fronting

Velar fronting is when a velar sound is replaced with a consonant produced before the velar region. This could be bilabial, alveolar or palato-alveolar sound. Instances of velar fronting in the data incorporated, as well, vowel doubling and opening of closed syllables. Some examples of velar fronting in the utterances of the aphasics are as follows:

Target Pronunciation	Case 1 Female (57 years)	Case 2 Male (61 years)	Case 3 Female (69 years)	Case 4 Male (70 years)
/dɒg/	doodu	dɒɒdɪ	dɒɒdʊ	dɒɒdɪ
/keɪk/	keeti	keeti	keeti	keeti

The word ‘dog’ /dɒg/ is pronounced as /dɒɒdi/ by Cases 2 and 4; /doodu/ by Case 1 and /dɒɒdʊ/ by Case 3. In all these pronunciations, the voiced velar plosive /g/ is replaced with the voiced alveolar plosive /d/. Also, the voiceless velar plosive /k/ in /keɪk/ ‘Cake’ is replaced with a voiceless alveolar plosive /t/.

Vowel doubling and opening of closed syllables that manifest in the speech of all the Cases are not to be viewed as peculiar to the aphasics. Although most English monosyllabic words pronounced by the aphasics have their vowels doubled and a vowel added to open closed syllables for ease in pronunciation following the characteristic slow laboured speech of the aphasics, these features could also be found in non-aphasic Igbo-English bilinguals. What is seen in the speech of all the respondents where the vowels /u ɪ ʊ ɪ/ are respectively added at the end of /dɒg/ by Cases 1-4 is not only to obey the Igbo language no coda syllable structure but also its [ATR] vowel harmony. For /keɪk/, the diphthong /eɪ/ is replaced with the double vowel /ee/. The issue of vowel harmony plays out at the vowel /i/ inserted at the end of the syllable to make it an open syllable; as /e/ is phonetically [+ATR] vowel that selects the harmonizing [+ATR] vowel /i/. What could be observed from these cases of vowel doubling and opening of closed syllables is that, as expected, L1 (Igbo) structure took pre-eminence over the structure of L2 (English).

Consonant Weakening

Weakening and strengthening are also known as lenition and fortition respectively in articulatory phonetics. While strengthening is a consonantal change that increases the degree of stricture, weakening reduces the degree of stricture. In explaining weakening and strengthening with reference to Igbo, Eme (2008:38) avers,

> In the Igbo language, the closer together the articulators during the production of a consonant, the stronger the consonant produced. Conversely, the more open the articulators the weaker the consonant. The voiceless sounds are stronger than their voiced variants. For example, voiceless plosives and affricates are stronger than their voiced counterparts.

The Igbo data show that consonants produced with double articulation of equal stricture are reduced to single articulation. This phenomenon in the pronunciation of the aphasics is viewed as consonant weakening. There is no evidence of strengthening in their speech for both Igbo and English data. Instances of weakening in the Igbo data are presented below:

Target Pronunciation	Case 1 Female (57 years)	Case 2 Male (61 years)	Case 3 Female (69 years)	Case 4 Male (70 years)
àkpà 'bag'	àpà	àpà	pà	pà
ọ́kpà 'wall nut'	ọ́pà	ḿpà	ọ́pà	ọ́pà
ḿkpē 'widowhood'	ḿpē	ḿpē	ḿpē	ḿpē
ékpè 'mud fence'	ḿpè	ḿpè	épè	épè
ọ̀kpọ̀ 'intestinal worm'	ọ̀pọ̀	ọ̀pọ̀	ọ̀pọ̀	ọ̀pọ̀
àgbà 'jaw'	àbà	àbà	àbà	àbà
ọ̀gbọ́ 'sponge'	m̀bó	ọ̀bọ́	ọ̀bọ́	m̀bó
úgbō 'farm'	úbō	ḿbō	úbō	úbō
ìgbà 'drum'	-	ìbà	ìbà	ìbà
gbòʧĩ 'prevent'	wòʧĩ	bòʧĩ	bòʧĩ	wòʧĩ

The data reveal that the voiceless labial velar plosive /kp/ and its voiced counterpart /gb/ are weakened to /p/ and /b/ respectively. This runs through the data; with a few changes of the initial sounds by some of the respondents. For instance, 'àkpà, ọ́kpà, ékpè, ọ̀kpọ̀' are pronounced as 'àpà, ọ́pà, épè, ọ̀pọ̀' by the aphasics; though Cases 3 and 4 dropped the initial

vowel of 'àpà' and pronounced it as 'pà' while Case 2 replaced the initial vowel /ʊ/ of ' ókpà' with the syllabic bilabial nasal /m/ to get the pronunciation 'm̀pà'. Likewise, 'àgbà, ògbó, úgbō, ìgbà' are realized as 'àbà, òbó, úbō, ìbà' respectively, except for Cases 1 and 2 who realized 'ògbó' as 'm̀bó'.

Observe that the only verb in the data, the last item (gbòʧí), presents another interesting evidence of weakening of sounds by the aphasics. As with other data items, Cases 2 and 3 weakened /gb/ to /b/, to pronounce 'gbòʧĩ' as 'bòʧĩ'. However, Cases 1 and 4 weakened it further to labial velar approximant /w/ and pronounced 'gbòʧĩ' as 'wòʧĩ'. In all these examples, no tonal changes are observed. Even when the initial tone bearing unit (TBU) is dropped or substituted with another TBU, the remaining syllables or the substituted TBUs retain their tone as in target pronunciation.

Eme (2008:39) explains that weakening and strengthening is often exploited in the Igbo language for distinction among dialects, such that where one dialect uses a strong consonant, another may use its weak counterpart. However, the instances of weakening in this study are peculiar to the aphasics, as no variety of Igbo would pronounce the words with the weakened consonants, as the pronunciation of the aphasics have them.
In English data for this study, there are also instances of consonant weakening in the utterances of the aphasics. The voiceless bilabial plosive /p/ in the word 'cap' is weakened to the voiced bilabial plosive /b/; the word is thus pronounced as /kaabu/ instead of /kæp/. Also, the word 'soup' /sup/ is pronounced as /suub/ by all the aphasics, thereby weakening /p/ to /b/.

Substitution
The study observes that all the aphasics substitute any sound they find difficult to pronounce with another that is easier to produce. This is a deviation in sound pronunciation as a result of phonological deficit in their speech. One example common to all the aphasics is the substitution of the alveolar approximant /r/ in the English words 'drink' and 'brush' with labial velar approximant /w/. This gives rise to their pronunciation of /brʌʃ/ as /buwɔɔʃɪ/, and /drɪŋk/ as /dʊwɪŋkɪ/. Another instance is the substitution of the post-alveolar fricative /ʃ/ with the post-alveolar affricate /ʧ/; leading to the pronunciation of 'shoe' /ʃu/ and 'ship' /ʃɪp/ as /ʧu/ and /ʧɪp/ respectively.

Consonant Deletion
The aphasics resorted to deletion for ease of pronunciation, especially where there is a consonant cluster. Deletion of one consonant in a CC sequence is common in their speech. Examples of consonant deletion are:

Target pronunciation	Case 1 Female (57 years)	Case 2 Male (61 years)	Case 3 Female (69 years)	Case 4 Male (70 years)
/smɔl/	mɔ	mɔɔlʊ	mɔ	mɔ
/klɒk/	kɒ	kɒ	kɒɒ	kɒk
/desk/	deekɪ	deekɪ	des	des
/mɪlk/	mikɪ	mikɪ	mikɪ	mikɪ
/stɪk/	ti	Tiiki	tik	ti

The consonant clusters in the words 'small, clock, desk, milk, stick' are simplified by the deletion of one of the clustered consonants. Although two or more of the aphasics could have pronounced a word differently, the meeting point for all of them is making the word not to

have consonant cluster. For instance, all of them removed 's' in 'small', 'l' in clock, and either 's' or 'k' in 'desk'.

Discussion

The study has revealed that the Broca's aphasics used in the study demonstrated some form of phonological anomalies in their utterances. They exhibited difficulty in the ability to produce speech. Inasmuch as they found the naming and repetition tasks quite laborious and their utterances in both languages were filled with phonemic distortions, they were able to easily identify the pictures shown to them. That shows that their comprehension and receptive abilities are still intact. Since the problem of the Broca's aphasics is that of articulation that prevents them from effecting the necessary movements with which certain sounds are associated, the patients' utterances are characterized by articulation disorder.

Among the areas of phonological difficulties identified for the aphasics, English has higher deviant use of phonemes than Igbo. For instance, apart from consonant weakening which is prevalent in Igbo data, velar fronting, substitution and consonant deletion commonly affect English. Generally, judging from the performance of the aphasics as presented in the work, the phonology of the L2 of the victims is more susceptible to brain damage as they performed better in the L1 (Igbo) than in the L2 (English). This is to say that bilingual Broca's aphasics do not lose their first and second languages to the same degree after stroke; first language is better preserved than second language.

Summary and Conclusion

This paper, which is a description of the phonological features of the speech of the Igbo/English bilingual aphasics, has established the extent to which the phonology of the languages is affected. The work has thus provided useful information for therapists for use in their work of rehabilitating the bilingual aphasics. This is because identifying Broca's aphasics' areas of difficulty in speech sound production, as done in this study, would be an asset to speech-language therapists. This is because they would be able to concentrate on the difficult sounds in the course of therapy. Doing this would ensure a better and more fluent speech production by aphasics; hence lead to a more productive life for them and reduce the frustration associated with the inability to express themselves that comes with aphasia.

Based on the results of the study, it is obvious that aphasia is a disorder that calls for urgent attention due to its attendant effect on the communication ability of persons suffering from it. To this effect, further studies on aphasia are recommended to fully explore aphasia in other components of language and in other Nigerian languages apart from Igbo. Such studies would make it possible for the caregivers of the aphasics to arrive at baseline information that would help in making adequate plans for their management and rehabilitation. Again, it is necessary to examine why the phonology of a particular language of the bilingual aphasic is more susceptible to aphasia than the other.

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