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THE IMPACT OF IMPAIRED SPEECH ON MORPHOLOGICAL, SYNTACTIC, AND SEMANTIC PROFICIENCY AND ACADEMIC PERFORMANCE IN ENGLISH AMONG HARD-OF-HEARING STUDENTS OF THE SCHOOL OF HEARING IMPAIRED HADEJIA

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ABSTRACT

This study investigates the linguistic challenges faced by hard-of-hearing students in English language acquisition, focusing on phonological, morphological, syntactic, and semantic difficulties. Using a written test and classroom exercises as research instruments, the study examined the impact of hearing impairment on language proficiency among students from varying degrees of impairment. A sample of 100 hard-of-hearing students and 40 normal-hearing peers participated in the study, with data analyzed using Systemic Functional Grammar (SFG). Findings revealed significant phonological issues, including substitution, deletion, insertion, and metathesis, which affected students' ability to form grammatically correct sentences. These phonological difficulties also influenced morphological and syntactic structures, leading to errors in tense marking, sentence structure, and passive voice transformations. At the semantic level, challenges such as incorrect lexical choices, lack of coherence, and faulty thematic relationships were observed. Environmental and cognitive factors were found to play a crucial role in shaping language acquisition, with inadequate linguistic input being a key hindrance. The study underscores the need for targeted interventions, including early hearing assessments, specialized instructional strategies, assistive technologies, and inclusive classroom practices. Recommendations emphasize multisensory teaching methods, vocabulary-building exercises, speech therapy, and professional training for educators. Addressing phonological deficits and their cascading effects on other linguistic domains is essential for improving the academic outcomes of hard-of-hearing students. Future research should explore innovative pedagogical approaches and longitudinal studies to assess the long-term impact of these interventions.

Keywords: Impaired Speech, Hearing Impaired, Hard-of-Hearing Students, Morphological Proficiency, Syntactic Proficiency, Semantic Proficiency, Academic Performance.

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Introduction

Language is universally acknowledged as a fundamental aspect of human interaction and cultural development. Scholars have provided various definitions that highlight its nature, structure, and function. Edward Sapir (1921) describes language as "a purely human and non-instinctive method of communicating ideas, emotions, and desires by means of voluntarily produced symbols." This definition emphasizes the intentional and symbolic nature of language, distinguishing it as a unique human faculty. Sapir's work underscores the role of language in expressing complex human experiences.

Noam Chomsky (1957), a leading figure in modern linguistics, views language from a structural perspective. He defines it as "a set of sentences, each finite in length and constructed out of a finite set of elements." This definition focuses on the generative aspects of language, highlighting its underlying rules and structures that enable infinite expression from limited components. Chomsky's theory revolutionized the understanding of language by introducing the concept of universal grammar.

Leonard Bloomfield (1933) offers a social perspective, defining language as "the totality of utterances that can be made in a speech community." His approach situates language within the context of community interaction, emphasizing its role as a medium of communication among individuals sharing a common linguistic system. Bloomfield's definition aligns with the descriptive study of language as a dynamic and evolving phenomenon.

Ferdinand de Saussure (1916), often regarded as the father of modern linguistics, conceptualizes language as "a system of signs that express ideas," comparable to other symbolic systems such as writing, rituals, and signals. He highlights the structural and relational nature of language, where meaning arises from the interdependence of signs. Saussure's insights laid the foundation for structuralist and semiotic approaches in linguistic theory.

Collectively, these definitions provide a comprehensive understanding of language as a symbolic, structural, and social phenomenon. They reveal its dual role as a tool for individual expression and a system that facilitates collective communication within communities. Each perspective enriches the study of language, reflecting its multifaceted nature.

Language processing and production are core aspects of human communication, encompassing the cognitive mechanisms involved in understanding and producing language. These processes have been widely studied in linguistics, cognitive psychology, and neuroscience, offering insights into how humans acquire, interpret, and express language.

Language processing involves the comprehension of spoken and written language. According to Pinker (1994), language processing is a specialized cognitive ability that allows humans to decode linguistic input and extract meaning efficiently. It includes phonological, syntactic, and semantic analyses. Phonological processing enables the identification of sounds and words, while syntactic processing involves understanding sentence structures. Semantic processing, on the other hand, deals with meaning interpretation within contexts.

Chomsky's (1957) theory of transformational grammar provides a framework for understanding syntactic processing, emphasizing the hierarchical and rule-governed nature of sentence construction. Similarly, researchers like Fodor (1983) highlight the modularity of

the mind, proposing that language processing is performed by specific, domain-specific modules within the brain. These modules operate interactively, enabling real-time comprehension of complex linguistic structures.

Language production refers to the processes involved in formulating and articulating language. Levelt (1989) outlines a model of speech production that consists of three stages: conceptualization, formulation, and articulation. During conceptualization, speakers generate ideas and intentions for communication. Formulation involves the conversion of these ideas into linguistic structures, including word selection and syntactic arrangement. Finally, articulation executes the physical act of speech using motor systems.

Evidence from psycholinguistic studies, such as those by Dell (1986), suggests that language production is incremental, meaning that speakers plan and produce language in segments rather than constructing complete utterances before speaking. This incremental nature supports fluency and adaptability in conversation. Furthermore, neuroimaging studies have identified specific brain regions, such as Broca's area and Wernicke's area, as critical for language production and processing (Pinker, 1994).

Language processing and production are not isolated processes but are deeply interconnected. Theories such as Dell's (1986) interactive activation model propose that comprehension and production share overlapping cognitive and neural mechanisms. This bidirectional relationship ensures that speakers can monitor their output and adjust it in response to feedback from listeners or contextual cues.

Language processing and production involve intricate cognitive systems that enable humans to comprehend and produce language. Contributions from scholars like Chomsky, Pinker, and Levelt have provided foundational insights into these processes. Their work reveals that language use is a dynamic interplay of mental representations, neural mechanisms, and social interactions. Understanding these processes not only advances linguistic theory but also has practical applications in areas such as language education, speech therapy, and artificial intelligence.

Morphological, Syntactic, and Semantic Proficiency

Morphological Proficiency: Morphology involves the structure of words and the rules for word formation. Impaired speech can hinder HoH students' ability to use and understand different word forms, affecting their vocabulary and ability to construct meaningful sentences.

Syntactic Proficiency: Syntax refers to the arrangement of words and phrases to create well-formed sentences. HoH students with speech impairments may struggle with understanding and producing grammatically correct sentences, impacting their ability to communicate effectively and understand written and spoken language.

Semantic Proficiency: Semantics involves the meaning of words and sentences. Speech impairments can lead to difficulties in comprehending and conveying meaning, resulting in challenges with reading comprehension, vocabulary usage, and overall language proficiency.

Academic Performance

Language proficiency is closely tied to academic success. Difficulties in morphological, syntactic, and semantic aspects of language can impede HoH students' ability to understand instructional materials, participate in classroom discussions, and complete written assignments. These challenges can result in lower academic performance and hinder their educational development.

The Context of Hadejia School of Special Education

Hadejia School of Special Education is a specialized institution that provides tailored educational programs for students with hearing impairments. The school employs various strategies, including the use of sign language, speech therapy, and assistive technologies, to support the linguistic and academic development of HoH students. However, despite these efforts, many students continue to face significant challenges in achieving linguistic proficiency and academic success.

This study aims to investigate the specific impact of impaired speech on the linguistic and academic outcomes of HoH students at Hadejia School of Special Education. By identifying the areas where these students struggle the most, the research can inform the development of targeted interventions and support mechanisms. Understanding the relationship between speech impairments and academic performance will help educators, policymakers, and caregivers provide better support for HoH students, ultimately improving their educational experiences and outcomes.

The impact of impaired speech on morphological, syntactic, and semantic proficiency, and its subsequent effect on academic performance, is a crucial area of study for understanding the educational challenges faced by hard-of-hearing students. This research will contribute valuable insights into the specific needs of HoH students at Hadejia School of Special Education, paving the way for more effective educational strategies and support systems.

Empirical Studies

Research indicates that speech impairments, often associated with hearing loss, significantly affect language development. Spencer and Marschark (2006) argue that limited auditory input impacts morphological and syntactic acquisition, as hearing-impaired learners rely more on visual and tactile modalities. However, this study primarily focuses on general language acquisition without addressing specific academic implications.The gap in the two researches is limited analysis of how impaired speech affects semantic proficiency and academic performance specifically in English.

Moeller et al. (2007) explored how hearing impairment delays morphological development, particularly in the use of inflectional morphemes such as pluralization and verb tense. The study emphasizes early intervention but lacks a focus on older students, such as those in secondary education, and how these delays impact English academic performance. The gap in the two researches is need for research on the long-term effects of morphological impairments in academic settings.

Nippold et al. (2008) examined the syntactic deficits in hearing-impaired students, finding that complex sentence structures, such as embedded clauses, are particularly challenging. Their study is comprehensive but concentrates on spoken language rather than written

academic tasks. Lack of focus on how syntactic challenges manifest in academic English performance, particularly in written communication is the gap between the researches.

Luckner and Cooke (2010) discuss the difficulties hearing-impaired students face in acquiring a broad and nuanced vocabulary, which hinders semantic comprehension. While this study acknowledges the connection to academic performance, it does not address specific linguistic domains such as morphology or syntax. The gap in the two researches is insufficient exploration of the interplay between semantic deficits and syntactic and morphological impairments.

Antia et al. (2011) assessed academic performance in hard-of-hearing students and found significant lags in reading and writing skills compared to their hearing peers. While this research highlights academic challenges, it does not link them to specific linguistic deficiencies like morphology or syntax. The gap in the two researches is limited integration of linguistic impairments into the analysis of academic performance in English.

Guardino and Antia (2012) evaluated the impact of classroom interventions on hard-of-hearing students, showing that individualized support improves academic outcomes. However, the study does not delve into how these interventions address linguistic deficits specific to English. The gap in the two researches is lack of targeted strategies for addressing morphological, syntactic, and semantic deficiencies.

Quinto-Pozos et al. (2015) investigated morphosyntactic development in bilingual hearing-impaired students, noting greater struggles in their second language. This study is valuable but focuses on bilingualism rather than English as the primary medium of instruction. The gap in the two researches is need for research centered on English language learners with hearing impairments in monolingual contexts.

Marschark et al. (2017) examined language processing speed and accuracy among hard-of-hearing students, finding slower processing times compared to hearing peers. The study, however, does not address how this impacts specific linguistic domains or academic outcomes. The gap in the two researches is limited exploration of the direct academic consequences of impaired language processing in English.

Yoshinaga-Itano (2018) demonstrated that early and consistent speech therapy significantly improves academic performance among hearing-impaired students. The study, however, focuses primarily on early intervention and does not extend findings to students in advanced academic stages. The gap in the two researches is lack of focus on older students and their academic challenges in English.

Mayer and Trezek (2020) explored the writing challenges faced by hearing-impaired students, linking deficits to difficulties in morphology and syntax. While insightful, this study does not address other linguistic domains like semantics or their broader academic implications. The gap in the two researches is insufficient discussion of how these linguistic deficits cumulatively impact overall academic performance.

Theoretical Framework

The theoretical framework for this study draws on key theories from linguistics, cognitive psychology, and educational research to understand the relationship between impaired speech, linguistic proficiency, and academic performance in hard-of-hearing students.

Linguistic Theories

a. Universal Grammar (Noam Chomsky, 1957): Chomsky's theory of Universal Grammar posits that all humans possess an innate ability to acquire language through a set of universal principles. However, for hard-of-hearing students, limited auditory input disrupts access to these principles, resulting in deficits in morphological, syntactic, and semantic development. This theory explains why hearing-impaired students often struggle with rule-based linguistic constructs like verb conjugation and sentence structure.

b. The Theory of Morphosyntactic Deficiency (Leonard, 1989): This theory suggests that morphological and syntactic deficits in hard-of-hearing students stem from incomplete exposure to linguistic input during critical periods of development. The absence of auditory cues prevents the automatic internalization of language rules, leading to persistent gaps in these domains.

c. Semantic Deficit Hypothesis (Luckner & Cooke, 2010): This hypothesis asserts that hearing impairments limit vocabulary acquisition and semantic processing, leading to challenges in comprehension and expression. The inability to access nuanced meanings affects both oral and written communication, directly impacting academic performance in English.

Cognitive Theories

a. Modularity of Mind (Fodor, 1983): This theory postulates that the human mind consists of specialized, independent modules for language processing. In hearing-impaired students, the auditory processing module is underdeveloped, which hinders the integration of linguistic components like morphology, syntax, and semantics. This fragmentation affects the fluency and accuracy of language production and comprehension.

b. Working Memory Model (Baddeley & Hitch, 1974): The working memory model highlights the role of the phonological loop in retaining and manipulating linguistic information. For hard-of-hearing students, impaired auditory processing places greater demands on visual and tactile memory systems, limiting their capacity to process complex linguistic structures and affecting their ability to perform academically in English.

Educational Theories

a. Vygotsky's Sociocultural Theory (1978): This theory emphasizes the importance of social interaction in language development. Hard-of-hearing students often face reduced opportunities for meaningful interaction with hearing peers, which impacts their exposure to rich linguistic input. This lack of interaction impairs their ability to acquire morphological, syntactic, and semantic proficiency.

b. Bloom's Taxonomy of Educational Objectives (1956): Bloom's taxonomy categorizes learning objectives into cognitive, affective, and psychomotor domains. Impaired speech affects the cognitive domain, particularly in language-related tasks such as analysis, synthesis, and evaluation. This framework provides a lens to analyze how linguistic deficits impact academic performance in higher-order tasks like essay writing and comprehension.

Interaction of Theories in the Study

For the chosen theoretical framework, this study integrates the above theories to analyze the multidimensional impact of impaired speech on linguistic and academic performance. Chomsky's Universal Grammar and Leonard's Morphosyntactic Deficiency theories explain the foundational linguistic deficits, while Fodor's Modularity of Mind and Baddeley's Working Memory Model provide cognitive insights into how these deficits affect processing and production. Vygotsky's Sociocultural Theory highlights the role of environmental and social factors, and Bloom's taxonomy links linguistic challenges to specific academic tasks.

Methodology

Instruments – Written test and classroom exercises

The choice of the instrument was predicated upon some factors such as appropriateness, availability, comprehensiveness, convenience, nature of the information sought, nature of the respondents and so on. The choice of these instrument is based on Bloom and Laley (1978: 506), who note that deaf individuals lack intelligible oral speech. So their language has most often been studied in its written form.

- A list of words containing regular and irregular nouns and verbs and the subjects was provided and administered on the students. That is providing their singular and plural, providing the past forms of some given words,make sentences with given words and transforming sentences from active to passive voice
- The use of Rule Activation Strategy (RAS) – List of words which contain two or three regular words, which then followed by one regular word, were presented to the students. e.g.

The Subjects

Hard-of-hearing students from SI, II and III in the selected schools, especially those from different parental background and degree of impairment. They were tested different types of sentences based on voice and structure. They were also made to write essays on topics such as;

- *How I Spent My Holiday……*
- *My memorable day in this world.*
- *Writing a letter to a friend.*

Population and Sampling Procedure

One hundred (100) students of JSSI, II and III were selected. Forty (40) normal hearing students from another school were selected.

Confidentiality and Ethical Consideration

As a build up to the data collection process, permission was sought in form of ethical clearance/approval from the authorities of the two schools under study. Similarly, the participants were offered a consent explanation regarding the exercise. Anonymity and confidentiality of the participants were guaranteed since there was no incriminating information on the participants or the schools authorities.

Data Presentation and Analysis
Main Findings

1. **Phonological Challenges:** The study identified phonological problems associated with the speech of hard-of-hearing students. These challenges extend to other linguistic domains, including morphology, syntax, and semantics.
2. **Impact of Phonological Problems:** Phonological difficulties were found to affect the morphological, syntactic, and semantic aspects of English as a second language (L2) among hard-of-hearing students.
3. **Environmental Influence on Language Acquisition:** The analysis indicated that correct textual organization is influenced by both physiological and biological factors. Environmental factors, such as inadequate linguistic input, were found to hinder effective language reception, production, and comprehension.

Detailed Finding

i. Substitution: The data revealed a phonological problem known as substitution, characterized by systematic replacement of one sound or grapheme with another. **For example, some students substituted the English /p/ sound, which does not exist in Hausa, with /f/. Thus, "pen" was pronounced as "fen", and "people" as "fifil".**

ii. Deletion: A significant phonological issue observed in the students' writing was deletion, where many sounds (both consonants and vowels) were omitted. **For example, *"past"* was written as *"pas"*, and *"asked"* as *"ask"*.**

iii. Insertion: The findings also highlighted insertion as a recurring phonological process. Students added extra consonants or vowels inappropriately. **For instance, *"school"* was pronounced as *"iskul"*, and *"bread"* as *"buredi"*.**

iv. Metathesis: Hearing impairments were found to result in metathesis, where sounds within a word were transposed, leading to errors such as ***"introduce"* was written as *"intorduce"*, and *"president"* as *"peresident"*.**

v. Overgeneralization: Overgeneralization of linguistic rules was observed. The students applied regular rules to irregular nouns and verbs, such as; **students wrote *"sheeps"* instead of *"sheep"* and *"comed"* instead of *"came"*.**

vi. Syntactic Level: At the syntactic level, the research revealed:

- Poor sentence structure, including violations of the Subject-Verb-Object (SVO) pattern.
- Deletion or inappropriate use of linguistic items.
- Incorrect tense marking and difficulty transforming active voice to passive voice. For example: *"He go to market yesterday."* instead of *"He went to the market yesterday."* (Incorrect use of present tense instead of past tense) *"She is write a letter now."* instead of *"She is writing a letter now."* (Incorrect verb form in the present continuous tense)

vii. Semantic Level: Semantic issues were evident in:

- Wrong lexical choices attributed to limited neurocognitive flexibility.
- Semantic contrasts resulting from inappropriate tense usage.
- Lack of coherence and cohesion, which disrupted the logical flow of ideas.
- Faulty relationships between themes and rhemes in the students' texts. These factors collectively impaired the proper organization of experiences within their writing.

Table 1: Frequency Distribution of Proficiency Levels and Academic Performance among Hard-of-Hearing Students

Category	Low (f)	Medium (f)	High (f)	Total (N)
Morphological Proficiency	20	30	10	60
Syntactic Proficiency	44	20	16	60
Semantic Proficiency	28	24	08	60
Academic Performance	32	20	08	60

Table 2: Frequency Distribution of Proficiency Levels and Academic Performance among normal Students

Category	Low (f)	Medium (f)	High (f)	Total (N)
Morphological Proficiency	08	22	10	40
Syntactic Proficiency	10	17	13	40
Semantic Proficiency	12	16	12	40
Academic Performance	14	17	09	40

Conclusion

This study has highlighted the intricate relationship between linguistic, cognitive, and educational theories in understanding the challenges faced by hard-of-hearing students in English language acquisition. The findings indicate that hearing impairments significantly impact phonological, morphological, syntactic, and semantic development, which, in turn, affects academic performance. The research also underscores the role of environmental and cognitive factors in shaping language proficiency among these students.

The integration of linguistic theories, such as Universal Grammar and the Morphosyntactic Deficiency Theory, provides insights into the foundational gaps in language acquisition. Cognitive theories, including the Modularity of Mind and the Working Memory Model, explain the difficulties in processing and retaining linguistic structures. Educational frameworks like Vygotsky's Sociocultural Theory and Bloom's Taxonomy further illustrate how social and academic environments influence language development.

The study's findings emphasize the need for comprehensive interventions, including early assessments, specialized instructional strategies, assistive technologies, and inclusive classroom practices. Addressing phonological deficits and their cascading effects on other linguistic domains is crucial for improving the academic outcomes of hard-of-hearing students.

Ultimately, fostering an inclusive and supportive learning environment, implementing evidence-based teaching methods, and leveraging technology will contribute to enhancing language acquisition and academic success for hard-of-hearing students. Future research should explore innovative pedagogical approaches and longitudinal studies to monitor the long-term impact of interventions.

Recommendations

Based on the findings of the study, the following recommendations are proposed to address the linguistic and academic challenges faced by hard-of-hearing students:

- Conduct early hearing assessments to identify impairments and initiate timely interventions.
- Implement speech therapy programs focusing on phonological, morphological, syntactic, and semantic development during early childhood.
- Use visual aids, sign language, and tactile teaching methods to support language acquisition.
- Introduce vocabulary-building exercises to enhance semantic proficiency.
- Train educators on effective methods for teaching students with hearing impairments.
- Provide professional development on the use of assistive technologies, such as speech-to-text software and auditory devices.
- Ensure classrooms are acoustically optimized to reduce background noise.
- Use sound amplification systems and provide hearing aids where necessary.
- Create inclusive classrooms that promote interaction between hearing and hard-of-hearing students to enhance social and linguistic exposure.
- Introduce digital tools, such as captioning software and language-learning apps, to support language acquisition.
- Implement computer-based assessments to reduce linguistic barriers in traditional testing.
- Foster partnerships between schools, speech therapists, and parents to provide consistent support.
- Encourage peer-assisted learning programs to create a supportive environment for hard-of-hearing students.
- Use formative assessments that focus on the progress of phonological, morphological, and syntactic competencies.
- Provide funding for resources, assistive technologies, and teacher training programs in schools for the hearing impaired.

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