Open Access
AL-MANAR: Jurnal Komunikasi dan Pendidikan Islam
Vol. 15, No. 1, June 2026
https://journal.staimsyk.ac.id/index.php/almanar/index

The Biological Basis of Language in a Psycholinguistic Perspective and Its Implications for Language Disorders

Fadli Syarief[1], Amrah Kasim[2], Baso Pallawagau[3]
[1] *Sekolah Tinggi Ilmu Tarbiyah Ismail Umar Sanji Makassar, Indonesia*
[2] *Alauddin State Islamic University Makassar, Indonesia*
[3] *Alauddin State Islamic University Makassar, Indonesia*
fadlisyarief702@gmail.com;

ARTICLE INFO
Article history:
Received
May 28, 2026
Revised
June 26, 2026
Accepted
June 30, 2026

Abstract

Language is a complex human capacity that depends on the interaction of neural, sensory, cognitive, motor, and social systems. This article examines the biological basis of language from a psycholinguistic perspective and explains its implications for language disorders, diagnosis, intervention, and Arabic language learning. The study used a qualitative library-research design. Data were drawn from academic books, handbooks, and journal articles on psycholinguistics, neurolinguistics, the neurobiology of language, aphasia, dyslexia, apraxia of speech, dysarthria, stuttering, developmental language disorder, and second-language learning. Sources were identified, selected, classified, and analyzed descriptively and critically through three analytical focuses: the relationship between language, brain, and mind; the biological components supporting language; and the educational and therapeutic implications of language disorders. Source triangulation was applied by comparing foundational theories with recent empirical findings. The review shows that language is not controlled by a single cerebral center but by distributed networks involving frontal, temporal, parietal, and subcortical regions, together with auditory processing, articulatory-motor coordination, working memory, attention, and linguistic experience. Disruption in one or more components may affect comprehension, production, reading, writing, articulation, or communicative fluency. The findings also indicate that similar observable errors may arise from different underlying mechanisms; therefore, diagnosis and intervention should be multidimensional rather than based only on surface performance. In Arabic language learning, difficulties in discriminating unfamiliar phonemes, producing makharij al-huruf, reading unvowelled texts, and applying morphological or syntactic rules may involve phonological representation, working memory, attention, and procedural automatization. The article contributes an integrated biological-psycholinguistic framework that encourages adaptive, gradual, diagnostic, and humane language instruction while supporting collaboration among teachers, clinicians, families, and learners.

Keywords: biological basis of language, psycholinguistics, brain, language disorders, Arabic language learning

Published by STAI Masjid Syuhada Yogyakarta
Website https://journal.staimsyk.ac.id/index.php/almanar/index
ISSN 2615-8879
Copyright
This is an open access article under the CC BY SA license
https://journal.staimsyk.ac.id/index.php/almanar/index
© 2026 by the author(s)

INTRODUCTION

Language is one of the most distinctive and complex abilities that humans have. Through language, humans convey ideas, express emotions, build social relationships, pass on knowledge, and develop culture. In educational life, language is also the main medium for the transmission of knowledge, the formation of intellectual identity, and the development of thinking skills. Therefore, the study of language does not stop at

phonological, morphological, syntactic, semantic, and pragmatic structures, but needs to be extended to the mental and biological processes that enable humans to acquire, understand, produce, and use language.

In a psycholinguistic perspective, language is understood as a mental process that takes place very quickly and complexly. When a person speaks, he builds an idea, chooses words, arranges sentence structures, arranges phonological forms, and then moves the organs of articulation. When a person hears speech, he or she picks up sound signals, distinguishes phonemes, recognizes words, understands structure, interprets meaning, and adjusts responses to context. This process shows that language is not only the result of social habits, but also neurocognitive activities involving the brain, nervous system, memory, attention, auditory organs, and articulation apparatus (Indefrey & Levelt, 2004; Sedivy, 2020; Traxler & Gernsbacher, 2016).

The biological basis of language is increasingly important to study because human language skills are highly dependent on the work of integrated biological systems. The brain functions as a language processing center, the auditory system is the entrance to spoken language, the motor system controls speech production, while memory and attention support the understanding and proper use of language. The neurobiological study of language shows that language cannot be reduced to just the Broca and Wernicke areas, because language works through a broad neural network involving frontal, temporal, parietal, subcortical, and intercortical regions (Friederici, 2017; Hickok & Poeppel, 2007; Hickok & Small, 2016; Price, 2012; Tremblay & Dick, 2016).

The importance of the biological basis of language is also seen in the case of language disorders. Damage to certain brain regions can lead to aphasia; Phonological processing disorders can have implications for dyslexia; disorders of motor planning can lead to speech apraxia; impaired control of the speech muscles can lead to dysarthria; and disturbances in motor coordination and speech timing can appear in the form of stuttering. Thus, language disorders cannot be understood as linguistic errors alone, but must be analyzed as disorders in the biological, cognitive, motor, and social systems that underpin language (Le & Lui, 2024; Ren et al., 2024).

In the context of language learning, including learning Arabic, understanding the biological basis of language makes an important contribution. Students' difficulties in distinguishing certain Arabic sounds, reading unvowelled Arabic texts, understanding morphological patterns, or applying nahwu rules cannot always be simplified as a result of lack of memorization or low motivation. Some of these difficulties can be related to phonological perception, working memory, attention, symbol processing, and language structure automation. Therefore, language teachers need to have psycholinguistic sensitivity in order to understand students' difficulties in a more scientific and human way.

Based on this description, this article is directed to answer three main questions: first, how language is understood from a psycholinguistic perspective and its relationship to the brain and mind; second, what are the biological bases that support human language skills; and third, how the biological basis of language implications for language disorders, diagnosis, therapy, and language learning. These three focuses are also the main structure of this article's discussion.

METHOD

This article uses a qualitative approach with a literature study type. Literature studies were chosen because the discussion of the biological basis of language requires a conceptual search of the literature on psycholinguistics, neurolinguistics, language neurobiology, language disorders, and language learning. The main data sources for this article are academic books, handbooks, and journal articles that discuss the relationship between language, the brain, the nervous system, cognitive processes, and language disorders.

Data collection is carried out through identification, selection, and review of relevant literature. The literature reviewed includes discussions of general psycholinguistics, neurobiology of language, Broca and Wernicke areas, language neural networks, aphasia,

dyslexia, speech apraxia, dysarthria, stuttering, developmental language disorders, as well as their implications in second language learning and Arabic. Data analysis was carried out in a descriptive-analytical manner by grouping the main ideas into three study focuses according to the problem formulation, namely the psycholinguistic perspective, the biological basis of language, and the implications of language disorders.

The validity of the study is maintained through triangulation of literature sources, namely comparing concepts from psycholinguistic basic books, neurolinguistic studies, and cutting-edge research on language disorders. In this way, the discussion is not only theoretical, but also seeks to connect basic concepts with contemporary findings and practical implications in language education.

RESULT AND DISCUSSION

Language in a psycholinguistic perspective and its relationship to the brain and mind. Psycholinguistics is a field of study that studies the relationship between language and human mental processes. If linguistics describes the structure of language, then psycholinguistics describes how those structures are processed in the mind when humans understand and produce language. Thus, psycholinguistics not only asks about what language is, but also how humans acquire language, store vocabulary, understand speech, structure sentences, read text, write, and use language in the context of communication.

In the psycholinguistic framework, language is a mental activity that transforms experiences into symbols and transforms symbols into meaning. When a person hears speech, he or she not only receives sound waves, but performs phoneme recognition, word segmentation, syntactic processing, meaning access, and pragmatic interpretation. In contrast, when a person speaks, he or she not only makes sounds, but plots the message, selects lexical items, arranges grammatical structures, forms phonological representations, and coordinates articulatory movements. This complexity suggests that language is a process that involves perception, memory, attention, linguistic knowledge, and motor control simultaneously.

One of the important concepts in psycholinguistics is the mental lexicon. Mental lexicons can be understood as a system of storing words in the human mind that contains information about sound forms, meanings, grammatical categories, semantic relationships, and the context in which words are used. When a person speaks or understands speech, he or she must access the mental lexicon quickly. Difficulty accessing words can lead to pauses, mispronunciation, forgetting words, or word selection errors. In certain language disorders, lexical access barriers can become more severe and persistent.

Working memory also plays a central role in language processing. Working memory helps a person retain information while comprehending long sentences, following instructions, reading academic texts, or composing complex speech. Weakness in verbal working memory can cause a person to lose the flow of sentences, fail to understand the relationships between words, or be unable to grasp the overall meaning. Studies on developmental language disorders show that executive function and working memory have an important relationship with children's language development.

The relationship between language, the brain, and the mind shows that language relies on biological as well as mental work. The brain receives language stimuli through the sensory system, processes them into mental representations, connects them to knowledge and memory, and then regulates verbal or nonverbal responses. Classically, language ability is often associated with the left hemisphere, especially Broca's area and Wernicke's area. Broca's area is largely associated with language production and syntactic processing, while Wernicke's area is associated with language understanding. However, modern studies confirm that language does not work through two single centers, but rather through a vast neural network that is interconnected.

Thus, language can be understood as a bridge between neural activity, mental processes, and social interaction. The human mind uses language to organize experiences, while language needs the mind to form meaning. This process suggests that language is not

just a linguistic object, but a psycho-biological phenomenon that is rooted in the structure of the brain and develops through communication experiences.

The biological basis that underpins human language skills. The biological basis of language refers to the structure and function of the human body that allows language activities to occur. Such structures include the brain, nervous system, auditory organs, articulatory organs, respiratory system, memory, attention, and biological developmental mechanisms. All of these components work in an integrated manner so that humans can understand speech, produce speech, read, write, and use language in social life.

The brain is the main center for language processing. In spoken language, the brain receives auditory input, recognizes sound patterns, connects them to words, and then interprets meaning. In written language, the brain recognizes visual symbols, associates them with sounds and meanings, and then integrates them with sentence structure. In speech production, the brain constructs messages, chooses words, structures syntactics, arranges phonological forms, and controls articulation movements. This process shows that language cannot be separated from the integration between perception, cognition, and motor.

The auditory system is an important part of the biological basis of language because spoken language starts from the ability to pick up and distinguish sounds. Children with hearing loss are at risk of delays in language acquisition if they do not receive the right intervention. Even in individuals with normal hearing, the ability to discriminate sounds still determines the success of recognizing phonemes, distinguishing words, and understanding speech. In learning a second language, including Arabic, the ability to distinguish new sounds is very important because not all sounds of the target language are found in the mother tongue.

The articulation organ is also the biological foundation of language production. Speaking requires coordination between the lungs, larynx, vocal cords, tongue, lips, jaw, palate, oral cavity, and facial muscles. The brain regulates these movements through the motor nervous system so that language sounds can be produced precisely. If there is a disturbance in the planning or execution of speech movements, speech production can be disrupted in the form of speech apraxia or dysarthria. This confirms that the ability to speak does not only depend on knowledge of words and rules, but also on coordinated motor skills.

In addition to the sensory and motor systems, memory and attention are part of the biological-cognitive basis of language. Working memory helps individuals retain sentence elements when listening or reading, while attention helps to select relevant linguistic information and ignore distractions. If working memory or attention is impaired, language comprehension can become slow, inaccurate, or intermittent. Therefore, language processes do not stand alone, but depend on the general cognitive functions that underpin them.

Language development also shows a link between biological readiness and the environment. Humans are born with the biological potential to acquire language, but that potential must be met with linguistic input, social interaction, adult response, and communication experience. Biological readiness without environmental stimulation is not enough to produce optimal language skills. Conversely, a language-rich environment will be more effective if it is supported by adequate biological, sensory, and cognitive conditions. Thus, language acquisition is the result of the interaction between nature and nurture, between biological maturity and social experience (Kuhl, 2010; McMurray, 2023; van Wijngaarden et al., 2024).

The implication of this part is very important: language does not depend on one brain area or one single factor. Language is the work of complex biological networks. Therefore, when a language barrier occurs, the analysis must consider the brain, neural connectivity, auditory system, motor system, memory, attention, social experience, and learning context.

Table 1. Matrix of the Biological Basis of Language and Its Function in Language Processes

Biological Components	Functions in Language	Examples of Language Processes	Implications of Being Disturbed
Brain and neural networks	Process language input, connect sounds with meaning, and regulate speech production.	Understand sentences, choose words, compose speech, and read text.	Aphasia, comprehension disorders, production disorders, and language processing inhibitions.
Broca's area and frontal tissue	Supports speech planning, syntactic processing, and language production control.	Structure sentences, arrange grammatical structure, and produce speech.	Speech is not fluent, sentences are short, and it is difficult to build speech structures.
Wernicke's area and temporal network	Supporting language understanding, word recognition, and interpretation of speech meanings.	Interpret words, understand sentences, and maintain coherence of meaning.	Speech can be fluent but meaningless, difficulty understanding speech, and choosing the wrong word.
Auditory system	Receive, distinguish, and pass language sounds to the brain's processing system.	Distinguish phonemes, recognize words, and understand spoken language.	Difficulty in sound perception, delayed language acquisition, and phonological barriers.
Articulation organs and motor system	Produce language sounds through coordination of breathing, phonation, and articulation.	Moving the tongue, lips, jaw, vocal cords, and regulating breathing while speaking.	Apraxia of speech, dysarthria, blurred articulation, and impaired speech fluency.
Working memory	Temporarily withholding language information to understand and structure speech.	Understand instructions, read long sentences, and connect between parts of the text.	Difficulty understanding complex instructions, missing sentence flow, and slow to process text.
Attention	Concentrate focus on relevant linguistic inputs and ignore distractions.	Listen to speech, read, follow conversations, and understand context.	Easily lose meaning, misunderstand speech, and have difficulty following language learning.

The matrix confirms that the biological basis of language does not work separately, but rather is interconnected in a single processing system. The brain, hearing, articulation, working memory, and attention form a chain of processes that allow humans to receive language inputs, process them into meaning, and then reproduce them back in the form of speech or writing. Therefore, disturbances in one biological component can affect different aspects of language, both comprehension, production, reading, and fluency in communication.

Language disorders and their implications for diagnosis, therapy, and language learning. Language disorder is a condition when a person experiences an obstacle in

understanding, producing, reading, writing, or using language according to the context. In biological and psycholinguistic perspectives, language disorders are not only seen as a misuse of language, but as a disorder of the underlying mental and biological processes. These disorders can arise due to brain damage, developmental disorders, hearing impairments, motor weakness, phonological disorders, limited working memory, or other cognitive function impairments.

Aphasia is the most obvious example of language disorder showing the connection between language and the brain. Aphasia generally occurs as a result of damage to the language region in the dominant hemisphere, for example due to stroke, head injury, tumors, or other neurological disorders. Broca's aphasia is usually characterized by speech that is not fluent, short, slow, and grammatically incomplete. Meanwhile, Wernicke's aphasia is characterized by relatively fluent speech but is difficult to understand because it is poor in meaning or incoherent. This difference suggests that language production and comprehension can be disrupted differently even though the two are interrelated.

Dyslexia shows the importance of phonological processing in reading. Individuals with dyslexia may have difficulty recognizing words, associating written symbols with sounds, reading quickly, and understanding text fluently. Dyslexia is not synonymous with low intelligence, as its main difficulties often lie in phonological processing, working memory, attention, and automation of word recognition. Recent studies confirm that dyslexia is a heterogeneous condition that can involve various cognitive and linguistic domains (López-Zamora et al., 2025; Morsanyi et al., 2025).

Apraxia of speech and dysarthria show the involvement of the motor system in language production. Apraxia of speech is related to the disruption of articulatory movement planning; Individuals know what to say, but have difficulty regulating the exact sequence of speech movements. Dysarthria is related to weakness, slowness, or impaired control of the speech muscles due to nervous system disorders. In dysarthria, speech may sound unclear, voice weakened, rhythm disturbed, or breathing is difficult to control. These two disorders suggest that spoken language requires precise motor coordination (Ashraf et al., 2024; Iuzzini-Seigel et al., 2022).

Stuttering is a disorder of speech fluency characterized by the repetition of sounds or syllables, lengthening of sounds, unnatural pauses, or obstacles in starting speech. Contemporary studies show that stuttering cannot be explained simply as nervousness or lack of confidence. Stuttering involves neurodevelopmental factors, the speech motor system, speech time control, emotional experiences, and communication environmental pressures. Therefore, approaches to stuttering need to include neurological, psychological, and social aspects (Chang, 2025; Neef & Chang, 2024).

Developmental language disorder shows that language barriers can appear from a developmental period without a simple cause such as severe hearing loss or intellectual disability. Children with this disorder may have difficulty understanding instructions, using vocabulary, composing sentences, or following conversations. Recent studies have shown that this disorder is related to differences in neuroanatomy, executive function, verbal working memory, and certain genetic factors (Bishop et al., 2017; Niu et al., 2024; Ullman et al., 2024).

The biological understanding of language disorders has important implications for diagnosis. Diagnosis is not enough by observing that a person is not fluent in speech or slow to read. The examination needs to assess the impaired aspects of language, such as comprehension, production, repetition, naming, articulation, reading, writing, working memory, and social language use. A good diagnosis should be able to distinguish whether the disorder is primarily linguistic, neurological, motor, cognitive, social-pragmatic, or a combination of several factors.

In therapy, biological understanding helps determine the appropriate form of intervention. Individuals with aphasia need language function restoration exercises and communication strategies; children with dyslexia need phonological exercises and explicit reading strategies; individuals with dysarthria need breath control, articulation, resonance,

and prosody exercises; Individuals with stuttering need an approach that pays attention to fluency in speech, emotional experience, and communication pressure. The principle of neuroplasticity is also important because directed, meaningful, and repetitive exercise can help the brain form or strengthen new connections.

In language education, this understanding encourages teachers to look at students' difficulties more objectively. Students who are slow to read, have difficulty understanding instructions, pronounce sounds incorrectly, or have difficulty applying rules cannot always be considered lazy or lack of practice. Some of them may experience obstacles in sound perception, working memory, attention, phonological processing, or articulatory coordination. With psycholinguistic sensitivity, teachers can design more adaptive, gradual, and humane learning (Kormos, 2017).

In learning Arabic, this implication is very real. Sounds such as ha, kha, ain, ghain, sad, dad, tha, zha, and qaf are not always easy to distinguish by Indonesian speakers. Difficulty distinguishing or pronouncing these sounds can occur because students' phonological representations are not yet strong. Therefore, learning Arabic phonology needs to incorporate listening exercises, imitating, distinguishing sounds, and gradually improving articulation. The learning of makharij al-huruf is not sufficiently explained theoretically, but must be trained through auditory and motor practice.

In the aspect of morphology and Arabic syntax, students are often able to memorize rules, but are not yet able to apply them in reading texts. This phenomenon can be explained through the difference between declarative knowledge and procedural skills. Declarative knowledge allows students to know the definition of rules, while procedural skills allow them to use rules quickly and automatically when reading texts. Therefore, Arabic learning needs to move from mere memorization to language processing exercises in a real and repetitive context (Kormos, 2017; Ullman, 2004).

Table 2. Matrix of Language Disorders in Biological and Psycholinguistic Perspectives

Types of Disorders	Biological/Psycholinguistic Basis	Main Symptoms	Implications of Learning/Therapy
Aphasia Broca	Disorders of the left frontal tissue related to speech production and syntactic processing.	Speech is not fluent, sentences are short, grammatical structure is incomplete.	Gradual speech production exercises, sentence structure reinforcement, and functional communication support.
Wernicke's aphasia	Temporal network disorders related to language understanding and speech meaning.	Speech is relatively fluent but the meaning is chaotic, difficult to understand speech.	Speech comprehension exercises, word meaning recognition, and contextual communication strategies.
Dyslexia	Phonological processing barriers, writing symbol recognition, working memory, and reading automation.	Difficulty reading, slow to recognize words, mistakenly connecting sounds and symbols.	Phonological exercises, gradual reading, strengthening of sound-letter relationships, and explicit reading strategies.
Speech Apraxia	Speech motor planning disorders even though the individual knows the words to be spoken.	Articulation errors are inconsistent, it is difficult to regulate the order of speech.	Practice articulatory movement sequences, sound imitation, and gradual speech practice.

Types of Disorders	Biological/Psycholinguistic Basis	Main Symptoms	Implications of Learning/Therapy
Dysarthria	Impaired speech muscle control due to inhibition of the nervous motor or neuromuscular system.	Articulation is unclear, voice is weak, speech rhythm is disturbed.	Breathing, articulation, resonance, prosody and motor speech control.
Stuttering	Speech fluency disorders involving motor coordination, speech timing, and psychosocial factors.	Repetition of sounds, elongation of sounds, unnatural pauses, obstacles to starting speech.	Fluency therapy, communication stress reduction, and psychosocial support.
Developmental language disorders	Neurocognitive barriers, verbal working memory, executive function, and language developmental factors.	Difficulty understanding instructions, limited vocabulary, difficulty composing sentences and following conversations.	Early intervention, vocabulary and sentence structure exercises, gradual learning, and family and school support.

This matrix shows that language disorders cannot be understood as a uniform type of difficulty. Each disorder has a different biological basis, symptoms, and intervention needs. In the context of language education, including Arabic, this mapping helps teachers distinguish errors that arise due to lack of practice, lack of strong phonological representation, limited working memory, or the presence of neurological and motor barriers. Thus, language learning can be designed to be more diagnostic, adaptive and humane.

Analytical synthesis of the findings. The results of this review support a shift from a strict localization model to a network-process model of language. The classical distinction between Broca's area as the center of production and Wernicke's area as the center of comprehension remains heuristically useful, but it cannot adequately explain the temporal and functional interaction among auditory analysis, lexical retrieval, syntactic computation, semantic integration, and motor planning. This interpretation is consistent with the distributed-network accounts proposed by Hickok and Poeppel (2007), Price (2012), Friederici (2017), and Tremblay and Dick (2016). The dialogue among these studies indicates that language performance emerges from coordinated activity across multiple neural and cognitive subsystems rather than from isolated cerebral modules. This helps explain why damage in a broadly similar anatomical region may produce different language profiles and why comparable surface symptoms may arise from different neural mechanisms. Therefore, the principal analytical finding is not merely that the brain supports language, but that the quality of language performance depends on the efficiency of coordination among neural networks, sensory input, cognitive control, and motor execution.

Table 1 further indicates that the biological components of language form a functional dependency chain rather than a collection of independent capacities. Auditory discrimination supplies structured input, attention selects relevant information, working memory temporarily maintains it, neural networks integrate form and meaning, and the motor system converts linguistic plans into observable speech. This synthesis extends the experience-dependent accounts of Kuhl (2010) and McMurray (2023), which emphasize

that biological readiness is progressively tuned by meaningful linguistic exposure. It also corresponds with Rahayu, Nasokah, and Astina (2026), whose study in AL-MANAR found that Total Physical Response improved language understanding by linking verbal input with concrete bodily action. Although their research concerned English learning and cannot be generalized to every linguistic domain, it reinforces the psycholinguistic proposition that coordinated auditory, visual, and motor activity can strengthen encoding, retention, and retrieval. At the same time, embodied practice should not be treated as a substitute for explicit linguistic instruction: abstract morphology, syntax, and academic reading still require metalinguistic explanation and structured cognitive practice. Thus, the most defensible pedagogical implication is an integration of sensory-motor experience with explicit and progressively automatized language processing.

The findings concerning Arabic phonology are also strengthened by recent studies published in AL-MANAR. Ulhaq, Marlina, and Mustafa (2026) found that mastery of makharij al-huruf and sifat al-huruf through tajwid learning could transfer to more accurate Arabic pronunciation, especially when repeated recitation developed phonological habits and articulatory muscle memory. This result directly supports the present review's argument that pronunciation difficulties should be analyzed as auditory-motor and phonological phenomena, not simply as insufficient effort or memorization. However, their study also reported that transfer was constrained by mother-tongue interference and the lack of systematic integration between tajwid and Arabic-language curricula. This limitation is compatible with Latifah, Utami, and Syafei (2026), who showed that contextual and communicative curriculum design can improve motivation, participation, and Arabic proficiency, while differences in learner ability, limited instructional time, and weak language environments remain significant obstacles. Dialogued with the current review, these findings suggest that adaptive Arabic instruction must connect phonological diagnosis, articulatory practice, communicative use, and curriculum differentiation. The contribution of the present study is to provide a biological-psycholinguistic rationale for that integration: different learners may display the same pronunciation or reading error while requiring different forms, intensities, and sequences of intervention.

A cross-disorder comparison in Table 2 yields another important analytical conclusion: observable symptoms are not diagnostically equivalent to their underlying causes. Slow reading may reflect weak phonological decoding, limited working memory, attentional instability, or reduced automaticity; unclear speech may arise from impaired motor planning in apraxia of speech or impaired motor execution in dysarthria; and limited sentence production may reflect lexical, syntactic, executive, or broader developmental constraints. This interpretation is consistent with the multidimensional accounts of developmental language disorder advanced by Bishop et al. (2017), Niu et al. (2024), Ullman et al. (2024), and van Wijngaarden et al. (2024), as well as the evidence of shared and distinct neural abnormalities reported by Ren et al. (2024). Consequently, intervention based only on a visible symptom risks misidentifying the mechanism and selecting an ineffective strategy. The conceptual matrix developed in this article therefore links surface performance to probable biological and psycholinguistic subsystems, appropriate assessment domains, and differentiated educational or therapeutic responses. Nevertheless, because this study is a literature review, the framework remains conceptual and should be tested through classroom observation, clinical assessment, and intervention research involving learners with diverse linguistic and cognitive profiles.

CONCLUSION

This article shows that language from a psycholinguistic perspective is a mental-biological process that connects sounds, words, structures, meanings, contexts, and communicative actions. Language is not only a system of symbols, but complex activities involving perception, memory, attention, mental lexicon, syntactic processing, understanding meaning, and motor control. The relationship between language, the brain,

and the mind confirms that human language skills rely on neural work while also developing through social experience.

The biological basis of language includes the brain, nervous system, auditory system, articulatory organs, respiratory system, working memory, attention, and biological developmental mechanisms. Language does not depend on one particular brain center, but on a vast and interconnected neural network. Biological readiness provides the potential for humans to speak, but this potential requires linguistic input, social interaction, and an adequate communication environment to develop optimally.

Language disorders such as aphasia, dyslexia, speech apraxia, dysarthria, stuttering, and developmental language disorders show that language consists of different subsystems that can be disrupted differently. Understanding the biological basis of language has implications for more precise diagnosis, more appropriate therapies, and more adaptive language learning. In the context of learning Arabic, the psycholinguistic approach helps to explain the difficulties of students in distinguishing sounds, reading texts, understanding morphological patterns, and applying nahwu rules. Therefore, language learning needs to be designed by paying attention to biological, cognitive, psychological, and environmental factors in an integrated manner. Conceptually, the study advances a mechanism-based framework for linking observable language difficulties with probable neural, sensory, cognitive, and motor sources; however, this framework requires empirical validation in classroom and clinical settings.

REFERENCES

Ashraf, A., Naz, S., Iqbal, H., & Mumtaz, N. (2024). Treatment approaches to motor speech disorders: A step towards evidence based practice. Pakistan Journal of Medical Sciences, 40(1), 237–243.

Bishop, D. V. M., Snowling, M. J., Thompson, P. A., Greenhalgh, T., & CATALISE-2 Consortium. (2017). Phase 2 of CATALISE: A multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. Journal of Child Psychology and Psychiatry, 58(10), 1068–1080. https://doi.org/10.1111/jcpp.12721

Chang, S.-E. (2025). Stuttering: Our current knowledge, research priorities, and future directions. Neurobiology of Language. Advance online publication.

Friederici, A. D. (2017). Language in our brain: The origins of a uniquely human capacity. MIT Press.

Haningsih, S., Nudin, B., Harimurti, S. M., & Zainuddin, N. (2026). *Managing Educational Quality in Islamic Senior High Schools : Academic Character Integration through Strategic Education Management*. *5*, 259–273. https://doi.org/10.59373/kharisma.v5i2.138

Hickok, G., & Poeppel, D. (2007). The cortical organization of speech processing. Nature Reviews Neuroscience, 8(5), 393–402. https://doi.org/10.1038/nrn2113

Hickok, G., & Small, S. L. (Eds.). (2016). Neurobiology of language. Academic Press.

Indefrey, P., & Levelt, W. J. M. (2004). The spatial and temporal signatures of word production components. Cognition, 92(1–2), 101–144. https://doi.org/10.1016/j.cognition.2002.06.001

Iuzzini-Seigel, J., Allison, K. M., & Stoeckel, R. (2022). A tool for differential diagnosis of childhood apraxia of speech and dysarthria in children: A tutorial. Language, Speech, and Hearing Services in Schools, 53(4), 926–946.

Kormos, J. (2017). The second language learning processes of students with specific learning difficulties. Routledge.

Kuhl, P. K. (2010). Brain mechanisms in early language acquisition. Neuron, 67(5), 713–727. https://doi.org/10.1016/j.neuron.2010.08.038

Latifah, V., Utami, N. M., & Syafei, I. (2026). Analysis of Arabic language curriculum component design in improving learning effectiveness: A qualitative study in madrasahs. AL-MANAR: Jurnal Komunikasi dan Pendidikan Islam, 15(1), 403–415. https://doi.org/10.36668/n872ja25

Le, H., & Lui, F. (2024). Aphasia. In StatPearls. StatPearls Publishing.

López-Zamora, M., Sánchez-López, P., & Sánchez-Pérez, N. (2025). Linguistic and cognitive abilities in children with dyslexia. Children, 12(3), 1–17.

McMurray, B. (2023). Understanding language processing in variable populations on their own terms. Language, Cognition and Neuroscience, 39(6), 1–20.

Morsanyi, K., Carroll, J., & Astle, D. E. (2025). Toward an improved understanding of dyslexia. British Journal of Educational Psychology. Advance online publication.

Neef, N. E., & Chang, S.-E. (2024). Knowns and unknowns about the neurobiology of stuttering. PLOS Biology, 22(2), e3002492.

Niu, T., Wang, Y., Zhao, J., & Liu, X. (2024). Executive functions in children with developmental language disorder: A systematic review and meta-analysis. Frontiers in Neuroscience, 18, 1390987.

Price, C. J. (2012). A review and synthesis of the first 20 years of PET and fMRI studies of heard speech, spoken language and reading. NeuroImage, 62(2), 816–847. https://doi.org/10.1016/j.neuroimage.2012.04.062

Rahayu, P., Nasokah, & Astina, C. (2026). The effectiveness of implementing the Total Physical Response method in improving English learning outcomes. AL-MANAR: Jurnal Komunikasi dan Pendidikan Islam, 15(1), 372–379. https://doi.org/10.36668/m2a49e41

Ren, H., Zhang, Y., Li, X., & Wang, Y. (2024). Shared and distinct neural abnormalities in developmental dyslexia and persistent developmental stuttering: A meta-analysis of functional and structural MRI studies. Brain Sciences, 14(11), 1–18.

Sedivy, J. (2020). Language in mind: An introduction to psycholinguistics (2nd ed.). Oxford University Press.

Sibawaihi, Mohd. Arifullah, M. S. H. (2025). *Implementing Multicultural Education in Indonesian State Islamic Universities : Case Studies of UIN Sunan Kalijaga and UIN Sulthan Thaha Saifuddin*. *14*(1), 1–14. https://doi.org/10.14421/jpi.2025.141.1-14

Traxler, M. J., & Gernsbacher, M. A. (Eds.). (2016). Handbook of psycholinguistics (2nd ed.). Academic Press.

Tremblay, P., & Dick, A. S. (2016). Broca and Wernicke are dead, or moving past the classic model of language neurobiology. Brain and Language, 162, 60–71.

Ullman, M. T. (2004). Contributions of memory circuits to language: The declarative/procedural model. Cognition, 92(1–2), 231–270. https://doi.org/10.1016/j.cognition.2003.10.008

Ullman, M. T., Clark, G. M., Pullman, M., & Lovelett, J. T. (2024). The neuroanatomy of developmental language disorder: A systematic review and meta-analysis. Nature Human Behaviour, 8, 1–14.

Ulhaq, U. D., Marlina, L., & Mustafa, I. (2026). The role of tajweed learning in improving the accuracy of Arabic pronunciation of students: A case study at the Baitul Qur'an Cirata Purwakarta Islamic Boarding School. AL-MANAR: Jurnal Komunikasi dan Pendidikan Islam, 15(1), 389–396. https://doi.org/10.36668/d9xxbh43

van Wijngaarden, V., Hilvering, B., van der Knaap, M. S., & van der Aa, N. (2024). Genetic outcomes in children with developmental language disorder: A systematic literature review. Frontiers in Pediatrics, 12, 1315229.