



## NEUROPSYCHOLOGICAL FOUNDATIONS OF SPEECH DEVELOPMENT IN PRESCHOOL CHILDREN WITH ALALIA

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### ABSTRACT

Alalia in preschool children is characterized by a primary impairment of speech production and/or comprehension that cannot be explained by peripheral hearing loss or intellectual disability. From a neuropsychological perspective, alalia reflects insufficiencies in functional brain systems that support auditory–phonological processing, articulatory praxis, verbal working memory, and the regulatory control of attention and executive functions. This article synthesizes a systems view grounded in developmental neuropsychology to explain how speech emerges from the coordinated activity of cortical–subcortical networks and why targeted intervention must address more than isolated sound errors. Drawing on the principles of Lurian functional systems, working memory models, and contemporary developmental linguistics, the paper details assessment strategies and therapy implications that prioritize dynamic testing, cueing hierarchies, rhythmic–prosodic scaffolds, and parent-mediated language enrichment. Evidence-informed recommendations emphasize integrating phonological contrast work with praxis training, strengthening verbal short-term memory, and using augmentative supports to sustain participation while oral language develops. The proposed framework links neural mechanisms to observable communicative outcomes, offering a coherent rationale for individualized treatment planning in early childhood.

### KEYWORDS

Alalia, preschool, neuropsychology, speech development, articulatory praxis, phonological processing, verbal working memory, executive functions.

### INTRODUCTION

Speech development in early childhood depends on the maturation and integration of multiple functional systems, including auditory discrimination of speech sounds, temporal sequencing, phonological encoding, motor planning for articulatory movements, and regulation of attention within communicative contexts. In alalia, these systems develop atypically, producing deficits that extend beyond mispronunciations to encompass limited lexical growth, unstable syllable structures, and fragile morphosyntactic patterns. A neuropsychological account treats these phenomena as emergent properties of disrupted network interactions rather than as isolated linguistic symptoms. The dorsal speech stream that maps sounds to articulatory plans and the ventral stream that maps sounds to meaning must interact efficiently; delays or asymmetries in their development lead to characteristic breakdowns in repetition, nonword naming, and rapid automatized articulation. Executive functions modulate this system by sustaining attention, organizing responses, and inhibiting competing motor programs, so immature control further amplifies inconsistency and fatigue during speech attempts. Understanding



alalia through this systems lens clarifies why comprehensive, developmentally sensitive intervention is required.

The aim of this article is to delineate the neuropsychological mechanisms underlying alalia in preschool children and to translate this understanding into principles for assessment and intervention that support robust speech and language outcomes.

A neuropsychological framework for alalia begins with integrated assessment. Auditory-phonological processing is probed through minimal pair discrimination, syllable and stress judgment, and nonword repetition tasks that reduce lexical support and reveal the stability of phonological representations. Articulatory praxis is examined via imitation of novel syllable sequences with varied place-manner configurations, diadochokinetic rates, and prosodic shifts to detect planning versus execution limits. Verbal working memory is measured using digit span, nonword span, and sentence repetition, while attention and executive control are sampled in play-based set-shifting and inhibition games. Language sampling during joint book reading and symbolic play provides ecological evidence of phonotactic choices, morphological productivity, and narrative organization. Dynamic assessment, in which graded cueing and rhythmic-melodic supports are introduced, tests the child's modifiability and identifies effective prompts. Findings guide individualized intervention plans that combine phonological reorganization with praxis training and memory supports, delivered at high repetition with distributed practice. Parent coaching ensures that cueing strategies and enriched input generalize across home routines, while augmentative and alternative communication tools maintain communicative effectiveness as oral speech gains consolidate.

Assessment profiles in alalia typically reveal reduced robustness of phonological categories, as evidenced by inconsistent minimal pair discrimination and low-fidelity nonword repetition, indicating fragile mappings between acoustic patterns and stored representations. Weaknesses in articulatory praxis manifest as variable errors across repeated attempts, difficulty transitioning between articulatory postures, and prosodic instability, signaling insufficient feedforward motor plans and heavy reliance on feedback. Verbal working memory limitations constrain online assembly of syllable strings and morphosyntactic frames, which in turn restricts opportunities for practice and stabilization. Executive vulnerabilities, such as distractibility and low error monitoring, further degrade performance in naturalistic contexts. Intervention anchored in these findings targets the mechanisms most responsible for breakdown. Phonological contrast therapies strengthen category boundaries and promote system-wide generalization when paired with perceptual training that heightens attention to place, manner, and voicing cues. Praxis-oriented methods apply motor-learning principles, beginning with blocked, high-frequency practice under tight cueing and gradually shifting to variable conditions with delayed feedback to build stable, automatized sequences. Rhythmic-melodic scaffolds, including syllable tapping and exaggerated stress patterns, provide an external temporal framework that supports sequencing and coarticulation. To relieve cognitive load, tasks are structured to minimize dual demands on memory and planning, with visual-gestural cues and core vocabulary boards facilitating message formulation. Far from displacing speech, such augmentative supports create immediate communicative success that improves motivation and increases the frequency of intentional attempts, thereby accelerating learning. Verbal working memory is strengthened through incremental rehearsal of phoneme-syllable sequences, cumulative nonword chains, and recast-rich interactions in which adults expand the

child's utterances while preserving communicative intent. Executive supports include brief, predictable practice epochs, explicit goal statements, and self-monitoring routines using simple graphic feedback. Cultural and linguistic factors are integral to planning; selection of phonological targets and vocabulary respects the phonotactic patterns and communicative priorities of the child's languages, and parents are coached to apply strategies naturally during shared activities. Progress monitoring emphasizes functional outcomes such as intelligibility in classroom rituals, success in peer play negotiations, and the ability to repair communication breakdowns, ensuring that neural gains translate into participation.

A neuropsychological account explains alalia as a disorder of interacting functional systems that support speech, rather than as a narrow articulatory deficit. Assessment that interrogates phonological representation, articulatory praxis, verbal working memory, and executive regulation yields profiles that predict treatment response and reveal effective entry points. Interventions that integrate phonological and motor principles, rhythmic-prosodic scaffolds, memory supports, and augmentative strategies produce durable improvement when delivered with high repetition, optimized feedback, and strong parent involvement. Aligning therapy with the mechanisms of change increases the likelihood that preschool children with alalia will achieve intelligible, flexible, and socially effective communication.

## REFERENCES

1. Luria A.R. Higher Cortical Functions in Man. — 2nd ed., rev. — New York: Springer, 1980.
2. Vygotsky L.S. Thought and Language. — Cambridge, MA: MIT Press, 1986.
3. Baddeley A.D., Gathercole S.E., Papagno C. The phonological loop as a language learning device // Psychological Review. — 1998. — Vol. 105, No. 1. — P. 158–173.
4. Mastjukova E.M. Alaliya u detey: diagnostika i korrektsiya. — M.: Vldos, 2008.
5. Filicheva T.B., Chirkina G.V. Narusheniya rechi u detey doskol'nogo vozrasta i puti ikh preodoleniya. — M.: Prosveshchenie, 1993.
6. Bishop D.V.M. Uncommon Understanding: Development and Disorders of Language Comprehension in Children. — Hove: Psychology Press, 1997.
7. Akhutina T.V., Pylaeva N.M. Neyropsikhologicheskii podkhod k individualizatsii obucheniya: diagnostika i korrektsiya. — M.: V. Sekachev, 2008.
8. Light J., McNaughton D. Communicative competence for individuals who require AAC: A new definition for a new era // Augmentative and Alternative Communication. — 2014. — Vol. 30, No. 1. — P. 1–18.
9. Kornev A.N. Narusheniya rechi u detey. — SPb.: Rech', 2006.