Cognitive and speech development in children

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Annotation: This article explores speech development in children with Autism Spectrum Disorder (ASD), focusing on the challenges posed by social, neurological, and sensory factors. It examines how these factors impact language acquisition and proposes a comprehensive framework for understanding and supporting speech development in children with ASD.

Key words: speech, communication, cognition, cognitive development, Autism Spectrum Disorder (ASD), speech delay, social interaction, sensory processing, auditory processing, language acquisition, intervention.

Аннотация:

В данной статье рассматривается развитие речи у детей с расстройствами аутистического спектра (РАС), с акцентом на трудности, обусловленные социальными, неврологическими и сенсорными факторами. Анализируется, как эти факторы влияют на овладение языком, и предлагается комплексная модель для понимания и поддержки речевого развития у детей с РАС.

Russian:

Ключевые слова: речь, коммуникация, когниция, когнитивное развитие, расстройства аутистического спектра (РАС), задержка речи, социальное взаимодействие, сенсорная обработка, слуховая обработка, овладение языком, интервенция.

Annotatsiya:

Ushbu maqola Autizm Spektr Buzilishi (ASB) bo‘lgan bolalarda nutq rivojlanishini o‘rganadi, ijtimoiy, nevrologik va sezgi omillari sababli yuzaga keladigan qiyinchiliklarga e’tibor qaratadi. Bu omillarning til o‘zlashtirishga qanday ta’sir qilishi tahlil qilinadi va ASBga ega bolalarda nutq rivojlanishini tushunish hamda qo‘llab-quvvatlash uchun kompleks yondashuv taklif etiladi.

Kalit so‘zlar: nutq, muloqot, kognitsiya, kognitiv rivojlanish, Autizm Spektr Buzilishi (ASB), nutqning kechikishi, ijtimoiy o‘zaro ta’sir, sezgi signallarini qayta ishlash, eshitish jarayonini qayta ishlash, til o‘zlashtirish, aralashuv (intervensiya).

Speech development is a crucial milestone in early childhood, with the vast majority of children acquiring language skills in a relatively predictable sequence. However, for children with Autism Spectrum Disorder (ASD), the trajectory of speech development often diverges significantly from typical patterns. Autism, a neurodevelopmental condition, is characterized by a range of symptoms including challenges in social communication, restricted or repetitive behaviors, and sensory sensitivities [1]. These symptoms contribute to the complexity of language development in children with ASD, making speech delays or atypical language patterns a defining feature of the condition. Understanding how children with ASD acquire or fail to acquire speech remains a critical area of research, particularly as speech is a fundamental aspect of social interaction and cognitive development [4].

While much attention has been given to the early identification of autism and behavioral interventions, less focus has been placed on the unique pathways of speech development in these children. As the prevalence of autism continues to rise, it is increasingly important to investigate how neurological, sensory, and social factors interact to shape the speech development process in children with ASD [2]. This article aims to explore these factors by synthesizing existing research and proposing a framework that accounts for the multifaceted nature of speech development in children with autism.

Speech development in typical children is governed by a variety of theoretical models, each offering different perspectives on how language is acquired. Children with ASD exhibit significant differences in brain structure and function, which may underlie many of the challenges they face in acquiring language. Neuroimaging studies have identified abnormalities in areas of the brain involved in language processing, such as the left hemisphere's language areas, including Broca's area (responsible for speech production) and Wernicke's area (involved in language comprehension) [2]. These findings suggest that children with ASD may have altered neural connectivity, particularly in regions related to social communication and language processing, which could hinder the development of typical speech skills [5].

Moreover, sensory processing differences are a hallmark of autism. Many children with ASD experience sensory sensitivities, either hypersensitivity or hyposensitivity, to auditory, visual, or tactile stimuli [4]. These sensory differences can disrupt the way children with autism perceive and process speech sounds, leading to difficulties in understanding spoken language or producing clear, intelligible speech. For example, a child who is hypersensitive to sound may become overwhelmed by background noise, making it difficult for them to focus on conversations or follow

verbal instructions. Conversely, a child with hypo-sensitivity to sound may fail to notice important linguistic cues, such as intonation or prosody, which are essential for effective communication [3].

Correlation between speech and cognition is one of the most debated topics. What is the relationship between cognition and speech and language development? Both are interrelated. One cannot function or develop without the other. Children require cognitive skills such as attention to grasp the sounds made by the mother. They need to process and store these in their long- and short-term memory for further use. They need to differentiate between sounds, build vocabulary, and form patterns [6]. This pattern-building skill will help children to learn the grammar of the language. Understanding sentence structure, the pattern of sentences, etc., is also a crucial aspect. In later stages, cognitive skills such as problem-solving, understanding feelings, body language, and decision-making will help them build relationships with peers. It will also help them during play. Reasoning and logic will help kids to understand academic as well as everyday aspects [6].

Cognition is also dependent on language. For instance, if language isn't developing typically but cognition is solid, children cannot express reasoning. The means of expressing cognition is through language. Until the age of 3 years, it is complicated to tell cognition and language apart.

Impact of cognition on speech: What results in the delay of understanding is the delay of cognitive skills, meaning that prepositions, directions, and adjectives do not make sense to children, which in turn leads to a delay in talking. With such problems, academic difficulties occur. Overall development is influenced by cognition. How can we be of assistance to children with related problems? It is often argued that playing and interacting with children can help foster language skills and cognition [4]. Suggested strategies include: Letting your baby explore toys and move; singing and reading; answering "why" questions; talking to them; providing them with choices and helping them make thoughtful decisions.

Theories on speech development often begin with two major paradigms: **nativist and interactionist**. Nativist theories, championed by scholars like Noam Chomsky, suggest that the ability to acquire language is innate [6]. This theory postulates that all humans are born with a universal grammar mechanism, which allows them to absorb language effortlessly in their early years. From this standpoint, children with ASD, despite their other challenges, should have the inherent ability to acquire speech, even if their acquisition process is delayed or disordered.

However, the nativist approach faces challenges when applied to children with autism. A review of literature on language delays in autism reveals that many children with ASD struggle significantly with the foundational processes of language acquisition [4]. For example, children with autism often fail to engage in the mutual eye contact or social reciprocity required to initiate or sustain meaningful conversations, which is a crucial step in the process of language learning. The challenges to communication in ASD suggest that a simple, innate language faculty might not fully explain the complexities of speech development in children with ASD [5].

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