

EARLY DEVELOPMENTAL TRAJECTORIES OF SPEECH AND MOTOR SKILLS IN AUTISM SPECTRUM DISORDER

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Açar sözlər: autizm spektr pozuntusu, erkən inkişaf, nitq bacarığı, kiçik motor bacarığı, böyük motor bacarığı.

Ключевые слова: расстройства аутистического спектра, раннее развитие, речевые навыки, мелкая моторика, крупная моторика

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by deficits that is markedly different in the rate of early development and that manifest in symptoms that vary from individual to individual. ASD causes deficits in various areas of a child's early development—namely, social communication, language skills, motor skills, behavior, and emotional responsiveness. Autism presents with a wide range of characteristics, and each individual's developmental profile is distinct. While one child may primarily exhibit delays in speech development, another might face greater challenges in forming social interactions. This diversity in presentation is the reason autism is referred to as a 'spectrum' disorder, highlighting the broad variability among affected individuals.

This article investigates the developmental trajectories of speech and motor abilities in children diagnosed with Autism Spectrum Disorder (ASD), highlighting the relationship between these skills during early childhood. The co-occurrence of motor and language impairments in children with autism spectrum disorder (1). It has been observed that a substantial 87% of children with autism spectrum disorder (ASD) are vulnerable to developing motor skill impairments (2). Motor impairment was strongly associated with deficits in structural language (1). Impairments in these two areas have a particularly negative impact on the development of social communication skills, resulting in difficulties in social interaction, one of the main characteristics of ASD.

Speech, language, and communication are all connected concepts that play crucial roles in a person's social and cognitive development. Language is a communication tool, speech is how you use it, and communication is the process of conveying information. In other words, a person expresses his thoughts, feelings, and desires through speaking, utilizing linguistic abilities. Speech is one of the fundamental ways by which a social being expresses himself in the community, and it constitutes a base for his ability to communicate, exchange information, and form interpersonal relationships. This process requires an integrated collection of psychological, physiological, and cognitive systems.

Motor skills are a group of functional qualities that enable a person to consciously control their bodily movements. These skills are primarily produced as a result of interactions formed between the muscles and the neurological system, enabling the individual to engage with daily activities. Motor skills are considered to be necessary for children to connect effectively with other people, move autonomously, and develop socially and emotionally. The child can use these skills to manipulate items, be physically active, master daily living tasks (e.g., feeding, dressing), and recognize his or her own body in space. Motor skills are acquired in two primary classifications: Fine motor skills refer to motions requiring collaboration of small muscle groups, especially the hands and fingers. Examples include writing, buttoning, and drawing. Gross motor skills are movements that need the participation of bigger muscle groups in the body. Examples involve walking, sprinting, jumping, climbing stairs, and keeping equilibrium. The development of motor skills, particularly in children with autism spectrum disorders, is correlated with verbal abilities, social interaction, and overall growth.

Progress in motor skills contributes to promoting progress in speech and language development. While these developments are impeded and/or new abilities have not been integrated and remain challenging for the child, the greater potential for explorations provided by new skills, in addition to the related increase in learning opportunities, are restricted. Variation in infant motor and communicative development appears to have cascading effects on development, both on the emergence of behavior in other domains and on the broader learning environment (3).

Both normal development (TD) and autism spectrum disorder (ASD) have been linked to motor skills and social communication abilities. Individuals with higher fine motor abilities create more co-speech gestures, according to the information gathered, and fine motor skills, as well as social communication skills, restricted and stereotypes, and interests, normalize when the ASD diagnosis disappears. Majority hand fine motor capability to imitate were correlated with the formation and the effectiveness of communicative (co-speech) hand gestures (4).

A number of latest meta-analyses have demonstrated a particularly significant correlation between motor and communication abilities for individuals with ASD, as well as a significant correlation between motor and communication skill development in early children with ASD. Atypical co-speech gesture in verbally proficient individuals with ASD is most likely caused by deficits in motor skills and/or motor imitation ability. Individuals with autism who can speak effectively may utilize typical conversational gestures in an unexpected way because their motor skills have limitations or they cannot accurately copy the movements of others (5).

Motor skills impairments may act as a potential risk factor for Autism Spectrum Disorder (ASD) during early development. Motor deficits not only affect the overall developmental process, but may also significantly affect the formation of children's future expressive language skills. Thus, motor coordination and movement problems observed at an early age may be an important indicator for predicting the level of verbal expression in later stages. Motor skill at 6 months predicts Autism Spectrum Disorder (ASD) diagnostic category and expressive language at 24–36 months. Infants at heightened risk for ASD demonstrate poorer motor skills at 6 months than low risk infants at 6 months (6).

A study of the general population found that poor motor development in newborns and young children is connected with an increased risk of Autism Spectrum Disorder (ASD)

symptoms. That is, children who have deficits in motor skills and coordination problems at a young age are more likely to develop ASD-related behavioral and communication challenges later in life. These findings emphasize the tight relationship between motor development and the development of speech and language skills (7).

Adolescence is a critical time for biological, psychological, and social development, as is well recognized, but it is also a delicate time when people are more vulnerable to substance use, its harmful effects, and addictions that follow. Early substance use raises the chance of addiction if it begins before the age of 18, but it also increases the possibility of subsequent issues (physical, behavioral, social, and health) (8).

Among motor abilities, gross motor skills were more influential in predicting delays in social communication. In contrast, fine motor skills and general motor competence were stronger predictors of the severity of repetitive behaviors and language delays. Overall, both fine and gross motor skills were associated with predicting functional developmental delays (9).

A diagnosis of Autism Spectrum Disorder (ASD) is made when enduring deficits in social communication and interaction coexist with restrictive, repetitive behaviors that significantly impair daily functioning (American Psychiatric Association, 2013) (10). However, symptom expression in ASD is highly heterogeneous. Current models conceptualize the primary social impairment of ASD as a dimensional trait, with no clear demarcation between clinical ASD and milder, subthreshold autistic characteristics (11).

The impact of ASD extends into every domain of daily life. In particular, disruptions to motor development can trigger cascading effects—undermining a child's academic achievement, limiting opportunities for social participation, and impeding effective communication. It has been proposed that age may influence gross motor performance in children with ASD, since motor abnormalities often diminish as maturation progresses (12).

According to research, object control skills (such as ball tossing, catching, and kicking) are strongly linked to social skills in people with autism spectrum disorder (ASD). Individuals with ASD perform much worse on these tasks. People with ASD have lower levels of object control compared to their typically developing peers (13). Children with ASD performed worse on aiming and gripping activities compared to those with intellectual disability (ID), indicating a specific deficit in these skills (14).

Acoustic parameters acquired from free speech and prolonged vowel tasks have a high correlation with expressive vocabulary scores. were indicative with expressive vocabulary exam results. These findings indicate that the coordination of the articulatory, laryngeal, and respiratory systems involved in speech production is related to expressive language skills (15).

Relevance of the article. The relevance of this article results from its investigation of the developmental trajectories of speech and motor skills in children with Autism Spectrum Disorder (ASD). Identifying patterns of delay in both domains allows for more effective early intervention techniques.

Scientific novelty of the article. The article involves how specific motor abilities, both fine and gross, influence the path of speech and language development in children with ASD.

Practical significance and application of the article. Understanding the link between motor skills and language development in children with ASD can lead to more holistic intervention strategies. It can be applied in speech therapy, occupational therapy, and educational settings, where multi-disciplinary approaches can be employed to address both motor and language delays in children with ASD.

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L.S. Müzəffərli

**Autizm spektri pozuntusunda nitq və motor bacarıqlarının erkən inkişaf yolu
Xülasə**

Bu məqalə, Autizm Spektri Pozuntusu olan uşaqlarda nitq və motor bacarıqları arasındakı inkişaf əlaqəsini ətraflı şəkildə araşdırır. O, motor və nitq gerilikləri arasındakı əhəmiyyətli əlaqəni vurğulayır və bir sahədəki geriliklərin digər sahənin inkişafına necə təsir edə biləcəyini göstərir. Araşdırma, erkən uşaqılıq müdaxiləsi proqramlarında həm motor, həm də dil bacarıqlarının həll olunmasının vacibliyini önə çıxarır ki, bu da autizmlə uşaqlara daha geniş yanaşma ilə müalicə təmin edir.

Л.С. Музаффарлы

**Ранние развиточные траектории речи и моторных навыков при аутизме
Резюме**

В этой статье дается тщательное исследование связи между развитием речи и двигательных навыков у детей с расстройством аутистического спектра. В ней подчеркивается значительное совпадение двигательных и речевых нарушений, показывающее, как задержки в одной области могут влиять на прогрессирование другой. Исследование подчеркивает необходимость рассмотрения как двигательных, так и языковых способностей в программах раннего вмешательства в детском возрасте, что обеспечивает более комплексный подход к лечению детей с аутизмом.

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