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DIAGNOSIS AND CORRELATION OF INDIVIDUAL COGNITIVE DEVELOPMENT AS A FACTOR IN EDUCATIONAL EFFECTIVENESS

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Abstract
The article addresses the issue of cognitive development in preschool-aged children as a result of the interplay between various objective and subjective factors. Particular attention is given to the importance of early diagnosis and targeted support of cognitive functions as essential conditions for ensuring educational effectiveness and the successful personal development of the child.

Keywords: Cognitive development, genetic factors, intelligence, symbolic thinking, psychological stimulation, motor and speech development.

Introduction

In contemporary information- and technology-oriented societies, cognitive (intellectual) abilities are of growing importance. The presence and development of such abilities are shaped by a range of factors, including genetic predispositions, maternal health during pregnancy, environmental influences, family composition and socioeconomic status, the impact of preschool and school education, as well as the individual characteristics of both the child and their parents. Within psychological theory, various conceptual approaches have been proposed to explain human cognitive development. For example, Jean Piaget conceptualized a child's intellectual development as a continuous and progressive process [1, p.106], whereas Henri Wallon viewed it as a discontinuous sequence of reorganizations. According to Wallon, development occurs primarily through social interaction, with motor activity, affective responses, and language all playing essential roles [2, p.31]. A comparable perspective was advocated by the renowned psychologist L.S. Vygotsky, who also underscored the crucial role of social interaction in a child's cognitive development.

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The significance of upbringing in the cognitive (intellectual) development of an individual has long been recognized. A widely accepted hypothesis concerning the development of cognitive functions and intelligence suggests the existence of both innate and acquired intelligence. Innate intelligence refers to the inherent potential determined at the moment of conception, serving as the foundation for the formation of intellectual abilities. In turn, acquired intelligence emerges through the interaction of this potential with environmental influences. It is crucial that acquired intelligence not only reveals but also complements and amplifies the innate potential. This interrelation plays a key role in shaping an individual's educational success and professional trajectory.

Intellectual development is influenced by a multitude of factors. Among them, genetic predisposition significantly determines the direction of cognitive growth. However, an individual does not inherit a fixed or "pure" level of intelligence directly proportional to that of their parents.

During the perinatal period, the child remains in a state of close physiological and psychological connection with the mother. Consequently, any disturbances in the mother's physical or mental well-being during this time may exert a significant—and in some cases irreversible—impact on the realization of the child's genetic potential. Maternal illnesses during pregnancy can affect the child's cognitive development. For example, while rubella in a pregnant woman typically presents as a mild illness, if contracted during the first months of fetal development, it can lead to irreversible impairments in vision, hearing, and especially intellectual functioning.

The use of certain pharmaceuticals and psychoactive substances during pregnancy may also negatively affect the child's cognitive abilities. The excessive use of antibiotics in the early stages of pregnancy, tranquilizers such as chlordiazepoxide (commonly known as Elenium), or even aspirin, as well as alcohol consumption and smoking, have all been associated with significant delays in intellectual development.

Environmental factors exert a considerable influence on the development of an individual's cognitive abilities. Nutritional deficiencies or disruptions during infancy—particularly within the first six months of life—can have a pronounced impact on cognitive outcomes. However, if the child subsequently receives appropriate nutrition and is raised in a stable, stimulating environment, they are

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generally able to reach the developmental level of their peers by the age of four or five [3, p.48].

It should be noted that early psychosocial stimulation—beginning in the first months of life—may play a more decisive role in intellectual development than adequate nutrition or physical care alone. For instance, children raised in institutional settings with minimal interpersonal interaction (e.g., one caregiver per ten children) often exhibit marked delays in motor and language development as early as the second year of life. Conversely, children raised in family environments where caregivers actively promote social interaction, provide opportunities to explore novel objects, and encourage the acquisition of new skills, tend to demonstrate significantly higher levels of cognitive functioning.

The development of cognitive functions is also influenced by the number of children in the family. One might assume that a child's intellectual development would benefit from having more siblings; however, research suggests otherwise: the greater the number of children in a family, the lower the average IQ. First-born children consistently demonstrate higher levels of intellectual development than their younger siblings. The highest IQ scores are typically observed among older children in two-child families, while the lowest scores are found among youngest children in families with nine children—with an average difference of up to 10 IQ points. Nonetheless, although larger families may exhibit certain disadvantages in terms of intellectual development, they often possess notable advantages in personality development, including enhanced social competence and moral responsibility. Evidently, such factors contribute to social adaptation, which is no less important than cognitive ability.

Jean Piaget identified three major stages of intellectual development in children: the sensorimotor stage (from birth to approximately 2 years), the stage of concrete operations (from about 2 to 11–12 years), and the stage of formal operations (beginning around 12–13 years of age). The preschool period under consideration in this study corresponds to the stage of concrete operations, during which children gradually internalize physical actions, transforming them into mental operations. At this stage, the child engages in activities such as manipulating objects, comparing, evaluating, classifying, and measuring. Research findings indicate that during this period, the child begins to recognize and apply logical categories, albeit unconsciously and only with reference to tangible objects. However, mastery of

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these cognitive structures is a prolonged process. By the age of six, children typically enter the school readiness stage, characterized by increasing independence in their cognitive and behavioral functioning [3, p.69].

Methods

In 2020, Fergana State University and Ural Federal University signed an Agreement on International Cooperation, within the framework of which the Department of Psychology launched a psychological research project aimed at diagnosing the development of neurocognitive functions in preschool-aged children.

Objective

To examine the influence of various factors on the development of core types of neurocognitive functions in preschool children. In accordance with the official Cooperation Agreement between Fergana State University and Preschool Educational Institution No. 34 in the city of Margilan, a longitudinal psychological study has been conducted since January 2020. The specific objectives of the study are as follows:

- To identify the key factors influencing the development of core types of neurocognitive functions in preschool children;
- To determine appropriate psychodiagnostic methods for assessing visual and auditory-verbal memory, attention, visuospatial abilities, sensorimotor coordination, and regulatory (executive) functions.

Research Methods

The study employed a multi-method approach, incorporating both theoretical and empirical techniques:

- Theoretical analysis and synthesis of findings from specialized psychological and pedagogical literature relevant to the development of neurocognitive functions in early childhood;
- Naturalistic psychological observation of preschool-aged children during their regular attendance at kindergarten and participation in educational activities;

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- Implementation of the neuropsychological diagnostic framework developed by the renowned Russian psychologist A.R. Luria, which emphasizes the functional organization of the brain in relation to cognitive processes;
- Utilization of NEPSY, a comprehensive standardized assessment battery developed by American psychologists, designed to evaluate a wide range of neurocognitive functions in children, including attention, memory, language, visuospatial processing, sensorimotor abilities, and executive functions.

Research Results

A total of 44 children aged 5 to 6 years participated in the study: 22 preschoolers residing in rural areas and 22 living in urban environments. Each child was assessed individually. The psychologist administered subtests or experimental tasks in a fixed sequence, following the standardized procedures.

Method 1: Face Memory (Assessment of Visual Memory).

Each photograph was presented to the child for five seconds, during which they were instructed to memorize the image. The first part involved learning and immediate recall of children's faces. The psychologist then presented stimulus material via a computer screen, showing 16 sequences of photographs, each consisting of three images, one of which had been shown previously. (Two sets of 16 sequences were used in total.) During the presentation, the child was asked: "Show me the child you have seen before".

The second part, Delayed Face Memory, was conducted approximately 30 minutes after the first session. Again, 16 sequences of three photographs were presented, with the child required to identify the previously seen face. (Two sets of 16 sequences, totaling 48 photographs, were used).

The results showed that 19 children from rural areas (86.3% of respondents) and 17 children from urban areas (77.3% of respondents) demonstrated a high level of visual perception. Three rural children (13.7%) and five urban children (22.7%) displayed an average ability to recognize human faces. None of the 44 preschool-aged children exhibited signs of impaired mental functioning associated with localized brain damage. For example, a neuropsychological symptom of visual perception disorder would be the inability to distinguish human faces.

Task 2: Dynamic Praxis.This subtest was aimed at assessing the child's ability to acquire a motor program based on visual demonstration, the development of

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mechanisms responsible for the sequential organization of movements, the capacity for automatization of motor skills, as well as the ability to switch from one movement to another and to alternate between different motor programs.

During the second subtest, Dynamic Praxis, the child was shown a sequence of hand movements—Palm–Fist–Edge (PFE)—three times. These movements were first demonstrated with the right hand, then with the left, performed slowly and smoothly. The child was asked to memorize the sequence. The motor pattern was learned through joint execution with the examiner. Following three repetitions and assisted execution, the child was expected to independently and more rapidly reproduce the sequence ten times. If the child was unable to do so, the examiner introduced verbal prompts, repeating the instructions: *"Palm, fist, edge"*.

According to the results, after three assisted repetitions with the examiner, 15 children from rural areas (68.1% of respondents) and 13 urban preschoolers (59%) were able to complete the task independently. At the fourth stage, after performing the movements with verbal instructions (*"Palm, fist, edge"*), 19 urban children (86.3%) and 20 rural children (90.9%) successfully completed the task. However, 2 rural children (9.09%) and 3 urban children (13.6%) demonstrated poor development of voluntary motor control, consistent with kinesthetic apraxia. This was indicated by the so-called *"shovel hand"* symptom, meaning that their movements were poorly differentiated, difficult to control, and accompanied by an inability to accurately reproduce hand postures.

The study also revealed that this developmental period is crucial for the formation of self-awareness. Children begin to distinguish themselves from others and to differentiate objects based on various features, such as shape, color, or size. By the age of four, most children know their name, surname, age, and place of residence, and begin to show a desire for self-expression, observe the actions of others, monitor their own behavior, and persist in completing tasks. At this stage, their level of perceptual abstraction increases: children begin to perform actions that require differentiation of lines, directions, positions, and graphical symbols.

The influence of preschool educational institutions on the development of children's cognitive functions proved to be especially significant. A large portion of a child's early life is spent in kindergartens and schools. It can be assumed that in contemporary preschool and school settings in Uzbekistan, considerable efforts are made to foster the optimal development of each child's abilities. According to

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Godfroid, once an educational system aligns with the child's motivations and rhythms of life, while maintaining harmony with the adult world, children tend to develop more rapidly.

As part of the study, interviews were also conducted with parents. It was found that the parents of children with high levels of intelligence and creative abilities generally exhibited a positive attitude toward life: they enjoy their work, are energetic and dynamic, and prefer to spend their leisure time engaged in cultural or positively creative activities. A key distinguishing trait among these parents was their nonconformism—a tendency toward independence from external opinions, social conventions, or societal prejudices. They display self-confidence and behave freely, without excessive concern for their public image.

The development of both intellectual and creative abilities in children is closely linked to the nature of their relationship with their parents. It is essential that the child experiences warmth and respect from adults. In families where intellectual development is emphasized, stable and emotionally supportive relationships are typically established early in childhood. Parents in such families pay close attention to academic achievement. Children with high verbal abilities often demonstrate strong emotional bonds with their parents, which reinforces dependent behavioral patterns. These parents are actively involved in their children's intellectual development, providing educational toys and books, and engaging in shared physical activities. As a result, such children often excel in mathematics, possess well-developed spatial imagination, and display a high degree of initiative and autonomy.

In contrast, modern families that foster primarily creative development tend to reject authoritarian parenting styles. Instead, children are encouraged to be spontaneous and self-confident, and the family culture places high value on personal responsibility.

In conclusion, it can be stated that the development of cognitive abilities in children is influenced by a range of interrelated factors. A clear understanding of these influences provides opportunities to guide and optimize the intellectual development of the child. Early diagnosis and targeted support for cognitive function are crucial for the effective organization of both preschool and school education, and they significantly contribute to a child's successful educational and professional trajectory.

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References

1. Piaget, J. (2001). *Jean Piaget: Theory, Experiments, Discussions* (Ed. by L.F. Obukhova & G.V. Burlinskaya). Moscow. M.2001.
2. Wallon, H. (2001). *Psychic Development of the Child*. Saint Petersburg: Piter Publishing House. [In Russian].2001.
3. Абдурахманов Р.А Возрастная психология. Специфика и условия развития детей в дошкольном и школьном возрасте. М.: Современный гуманитарный университет, 1999.
4. Luria, A.R. Neuropsychological approach to diagnostics. NEPSY: A comprehensive battery for the assessment of neurocognitive development in children. [Methodology].
5. Mirzajonova, E., & Kiselev, S. (2020, October). Age-related differences in visual object recognition in children. in psychophysiology (vol. 57, pp. s38-s38). 111 river st, hoboken 07030-5774, nj usa: wiley.
6. Мирзажонова, Э. Т. (2023). Перспективы развития инклюзивного образования и услуг для семей с детьми, имеющих особенности в развитии, на базе махалли. академические исследования в современной науке, 2(20), 108-116.